A Taxonomic Study of the Thrips (Thysanoptera) of the Maltese Islands

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A Thesis presented to the Institute of Earth Systems, in

fulfilment of the requirements for the Degree of Doctor of Philosophy

at the University of Malta

October 2023

Dedication

I dedicate this work

to my late grandfather Emanuel Caligari (1917- 2003) who sparked my interest in the living world around me,

to my wife Geraldine and my children Nico and Louisa for the patience and support given,

… and to the thrips.

Acknowledgements

First of all, I would like to sincerely thank Professor David Mifsud, my main supervisor for offering guidance and for patiently supporting me throughout the current study. Sincere thanks also go to Professor Adriano Cavalleri, my co-supervisor who helped me out in the identification of specimens and offered guidance in the writing of the identification key.

Grateful thanks go to Dr Arturo Goldarazena Lafuente and Professor Laurence Mound, both of whom helped me out in the identification of a number of specimens. Dr Goldarazena also came over and checked out my reference collection to confirm identity.

Thanks also go to Dr Niki Young, who accompanied me on various field trips to collect material and also offered support during the writing of this work.

Moreover, I wish to thank the following persons: Ruben Azzopardi, Ġużeppi Baldacchino, Ġiljan Borg, Joe Pace and James Lupi Spencer who allowed me to take samples from their private fields.

Thanks also go to Mr Paul Brown from the British Museum of Natural History (BMNH), who kindly lent me specimens of *Chirothrips hamatus* and *Thrips simplex* from the BMNH collection and provided habitus photos of *Tenothrips discolor*, as well as to Dr Edwin Lanfranco and to Mr Stephen Mifsud for their help in identifying some of the plants on which the thrips specimens were collected. Mr Mifsud also helped in the identification of fungal spores found within some specimens.

Finally, sincere thanks go to my family, namely my dear wife Geraldine and my children Nico and Louisa, for the support offered throughout my studies, as well as to my parents, my in-laws and other relatives who allowed me to collect thrips specimens from their private gardens.

Abstract

The thrips (Thysanoptera) of the Maltese Islands have so far been very little studied, with the few existing works focusing on species of agricultural importance. The current study has investigated the biodiversity of thrips species of the Maltese Islands, discriminated between these species by means of a simple illustrated identification key and investigated their feeding habits and geographical distribution. Thrips were collected from 252 indigenous and 146 cultivated plant species and subsequently mounted individually on glass slides to be identified. Literature describing 691 species from the Palaearctic region was consulted to help select which plants to sample for thrips. Online and printed identification keys were used to identify the species. Specimen photos were then sent to world thrips experts to confirm identification. One of these experts, Dr Arturo Goldarazena, inspected the collection of thrips amassed during the current study to help identify species of the genera *Haplothrips*, *Karnyothrips* and *Odontothrips*. In all, 53 species were identified to species level. One species under the genus *Karnyothrips* is a possible new record to science.

Following literature, 48 of the locally recorded species are phytophagous, with six of these being facultative predators, while three species mycophagous and two being obligate predators. Chorological data for the species in the Maltese Islands revealed that 23 species are of cosmopolitan or subcosmopolitan distribution, while 25 species are found across Europe and the Mediterranean region. Nine are alien species, very likely introduced with imported crops and cultivars, since they were not recorded on indigenous plants. These species could affect the local agricultural scenario, even though locally they were found in numbers too small for these thrips to be considered pests.

The current study recommends further investigation of the agricultural impact of thrips species in the Maltese Islands, as well of thrips which may be introduced with locally imported plant material. Further research on the species that could not be identified to species level, as well as on the possible new species of *Karnyothrips* are also recommended.

Contents

Introduction

Introduction

The Order Thysanoptera

Thrips are insects of the order Thysanoptera. This scientific name derives from the two Greek words τηψσανοσ (*thysanos* - fringe) and πτερον (*pteron* - wing), and refers to the unique structure of the wings of these insects, that have a fringe of hair-like cilia on the trailing edge. Thrips are also often referred to as thunderflies, since some species such as *Limothrips cerealium* Haliday, 1836 have been often observed in large numbers during thunderstorms. Most species of thrips are very small, usually no more than a few millimetres long (averaging in size between 1 and 3 mm), and are commonly inconspicuous. Up until the 1930s, only around 2000 thrips species were described worldwide, but since then, some 500 species new to science have been recorded with each decade. The group is currently represented by over 6000 described species (ThripsWiki, 2021).

Thrips are typically found on flowers, leaves or stems, leaf litter and dead wood, depending on their diet. A number of species feed on plant material, usually sucking the sap and leaving a silvery sheen in the area where they were feeding. Other species have predatory habits. Research shows that around 50% of the known species of thrips feed on fungi, while approximately 40% feed on living tissues of dicotyledonous plants or grasses. Most of the other species exploit mosses, ferns, gymnosperms and cycads, or are predatory (Morse & Hoddle, 2006). Predatory species can feed exclusively on smaller arthropods e.g. species of the genus *Franklinothrips* (Mound & Reynaud, 2005), or can be facultative predators, feeding also on pollen e.g. species of the genus *Aeolothrips* (Mound & Kibby, 1998; Trdan et al., 2005). Some species may cause leaf distortion when feeding, causing the leaves to form galls. These thrips species often congregate as colonies, generated by the foundress female (Kirk, 1996) within the gall which would offer protection to the colony. Furthermore, according to Izzo et al. (2002), the Neotropical genus *Aulacothrips*, Hood,1952, includes ectoparasitic species found on ant-protected bugs.

A number of thrips species are regarded as serious agricultural pests since they affect blossoms, fruit and vegetables causing direct damage through feeding on these plant structures, as well as acting as vectors to plant pathogens, especially orthotospoviruses which cause serious plant diseases. These species, which are usually polyphagous and thus can affect a large number of crops and cultivars grown in open fields or in greenhouses, are the ones which have been more studied, owing to their agricultural impact. Modern wide scale worldwide importation of plants was one of the contributing factors leading to some agriculturally important species to spread worldwide (Masumoto, 2010). Nonetheless, the species which are considered serious pests actually make up less than 1% of the described thrips species and in fact, most economic literature deals with just four species (Mound & Teulon, 1995).

Thrips can also contribute positively to the agricultural scenario (Palmer et al.,1989). Whilst some species can act as pollenating agents (Mound & Kibby, 1998), a number of predatory thrips species feed on other arthropod species of agricultural importance, including pest thrips species.

The small size of these insects makes them ubiquitous. Thrips have been recorded to crawl into small spaces, often contaminating packaged goods, including sterile hypodermic needles. They are also known to occur in air-conditioned, sterile labs and, if present in large numbers, can cause smoke detectors to activate fire alarms. When landing on the human body, they can prove to be irritating by probing the skin, apparently in search of moisture (Mound & Kibby, 1998).

Thrips are generally active from spring to autumn, although the females of some species may overwinter on the host-plants. Despite the fact that these insects are weak fliers, aerial dispersal is not dependent on wings. Indeed, non-winged species can disperse more easily than winged ones if they make better use of wind currents. They can get caught up in thermals and wind currents and get carried for long distances. Some wingless species can actually disperse more effectively than other winged ones with cryptic habits (Palmer et al., 1989; Mound & Heming, 1990). Dispersal of these insects can have serious consequences if the species are agricultural pests or potential vectors of virus-induced diseases.

The insect order Thysanoptera, a member of the superorder Paraneoptera, and a sister group to the insect order Hemiptera (bugs) (Buckman et al., 2013), subdivides into two suborders, the Terebrantia, with eight extant families and the Tubulifera with one (Mound & Hastenpflug-Vesmanis, 2021).

Thrips are preyed upon by a number of insects, namely Hemipteran bugs of the genus *Orius* (Anthocoridae) (Loomans et al., 1997; Funderburk, 2001). They can also be infected by a number of parassitoids including nematodes (e.g. Allantonematidae) and wasps (usually belonging to the families Trichogrammatiidae and Eulophidae) (Loomans et al., 1997; 2006)

Thysanopteran insects, have a unique life cycle which is described as paurometabolous. Following the second moult, thrips larvae develop into a propupa before reaching the pupal stage. This stage resembles a larva but would start undergoing the internal physiological changes that usually take place in the pupal stage. Thrips are known to be haplodiploid (Kirk, 1996; Mound & Kibby, 1998) and indeed a number of species e.g. *Heliothrips hemorrhoidalis* (Bouchè) can reproduce parthenogenetically, giving rise to only female colonies (Mound et al., 1976; Kirk, 1996).

Identifying thrips species can be tricky, owing to the fact that these insects are very small and that often, many of the diagnostic morphological characters are very similar to each other. Some diagnostic features include: number of antennal segments, number and length of setae on the body and wings, sculpture on tergites and sternites and number of tarsal segments.

Knowledge gaps concerning the Thrips Fauna of the Maltese Islands

Most insect orders occurring in the Maltese Islands have been extensively studied, but this is not the case with the order Thysanoptera. Despite for the fact that some species of thrips are of agricultural importance, such studies in Malta have been practically neglected mainly due to their small size. Moreover, much work is required to properly mount these insects on microscope slides and some groups are difficult to identify to species level. All these issues resulted in little interest amongst local entomologist these insects. In fact, no local studies specifically focus on this entire group. No surveys have ever been conducted in the Maltese Islands which directly focus on the biodiversity of Thysanoptera. More specifically, no work has ever been carried out to investigate the thrips fauna in the natural habitats of the Maltese Islands, and because the pest thrips were included in generic works which aimed at getting to know the insect pests found in the Maltese Islands, no detailed assessment of the impact of these species was carried out locally. There is therefore a knowledge lacuna concerning the biodiversity of the indigenous as well as the alien introduced species of Thysanoptera of the Maltese Islands. Almost all of the nine species recorded for the Maltese Islands have been recorded in papers that discuss generic pest species for the Maltese Islands.

A knowledge of insect biodiversity is a prerequisite, particularly in view of the fact that the Maltese Islands are becoming rapidly urbanized and natural habitats are becoming scarcer, in order to enable proper conservation programmes, thus avoiding loss of species diversity.

Aims and Research Objectives of the Current Study

The main aim of this work was to provide an overall picture of the thrips diversity occurring in the Maltese Islands. More specifically, it attempted to identify the species that naturally inhabit the Maltese Islands as well as alien species which have been accidentally introduced (with imported agricultural crops and ornamental plants) and established.

The main research objectives for this work are the following:

(i) to conduct different sampling techniques throughout the Maltese Islands during different times of the year for different habitat types and on different plants in order to establish the ecology of the different thrips species found in the Maltese Islands.

(ii) to identify material collected to species level using various keys and descriptions;

(iii) to construct a dichotomous key for the discrimination of all species found in the Maltese Islands. This key was fully illustrated and designed to be user-friendly so it could be used by non-experts;

(iv) to give species diagnosis, with relevant photographs of all species, facilitating recognition of species also to non-experts.

(v) to research the dietary preferences of the recorded species from literature and, particularly for phytophagous species find out if the plant species on which the insects were collected were the same or similar to those from which the same species were collected in other countries.

(vi) to research the geographical distribution of the species recorded and establish the chorotypes for this species. This activity was carried out in order to obtain information concerning the geographical origin of the thrips species found in the Maltese Islands.

Literature Review

Literature Review

Thysanoptera Classification

The insect order Thysanoptera is a member of the superorder Paraneoptera, together with the insect orders Hemiptera, Psocoptera and Phthiraptera (Buckman et al., 2013).

The most recent classification system of thrips is that of Mound and Hastenpflug-Vesmanis (2021) where two orders are included: the Lophineurida, known only from fossils and the Thysanoptera, with eight extant families included there in.

The order Thysanoptera subdivides into two suborders which are distinguished from each other mainly from the shape of the female ovipositor and the venation of the wings. Thrips belonging to the suborder Terebrantia have at least one longitudinal vein in the fore wing. The females of these species have a saw-like ovipositor, which they use to deposit eggs in plant tissues. This family includes most species of thrips and, although there is disagreement concerning the family classification system (Bhatti, 2006; Reynaud, 2010), the website "*ThipsWiki - providing information on the World's thrips*" (ThripsWiki, 2021), which followed the taxonomic system described by Mound and Hastenpflug-Vesmanis (2021), listed eight extant and five extinct families as belonging to this suborder. The extant families of this suborder according to this website include:

Merothripidae (15 described species): These include very small species typically found amongst fungal hyphae in warm countries.

Melanthripidae (67 described species): Large and robust species occurring in temperate countries. Originally placed as a subfamily of Aeolothripidae, the Melanthripidae are now included in a separate family due to the presence of a pair of lobes on the posterior margin of the seventh sternite in adult females, each of these lobes bearing two setae (Mound et al., 2012). Moreover, in contrast to Aeolothripidae, the species are all phytophagous, breeding in flowers.

Aeolothripidae (198 described species): These species are mainly phytophagous and feed on flowers, though some can be facultative predators of other arthropods.

Fauriellidae (five described species): A little studied family with species from southern Europe, South Africa and California.

Stenurothripidae (six described species): Species of this family were formerly placed in the family Adiheterothripidae (Mound et al., 1980). Two of the three genera with living species occur only in western North America, while the third is found from the Mediterranean region to India (Hoddle et al., 2014). Three of the six species are known from the flowers of date palms, *Phoenix dactylifera* (Arecales: Arecaceae).

Heterothripidae (90 described species): Species which originate from the New World. Most of these species live within flowers.

Thripidae (2066 described species): By far the largest family within the suborder Terebrantia. with four subfamilies: Panchaetothripinae (136 described species), Dendrothripinae (93 known species, Sericothripinae (152 described species), and Thripinae (1685 described species). These species occur worldwide and include almost all of the pest species of thrips. Many of these feed and breed on both leaves and in flowers.

Uzelothripidae (one described species): These are also found in warm countries, this species is small and associated with fungal hyphae.

Species which belong to the suborder Tubulifera have hardly any venation in the wings and the females have no or a simple hollow ovipositor. Females of this suborder lay eggs in crevices. There is only one family under the suborder Tubulifera which is:

Phlaeothripidae. This family, with just over 3600 species worldwide, is subdivided into two subfamilies: Idolothripinae (734 described species) and Phlaeothripinae (2,877 described species).

Species from four terebrantian and the only tubuliferan families have been found in the Maltese Islands.

Phylogenetic relationships within the Thysanoptera

Li et al. (2015) who investigated the phylogeny of paraneopteran insects based on molecular loci, concluded that the order Thysanoptera is monophyletic and is the sister group to the Hemiptera.

There is relatively little literature which describes the phylogenetic relationships between the subgroups that belong to the order Thysanoptera. The most recent works are those of Mound and Morris (2007), who described the phylogenetic relationships of the Idolothripinae; Buckman et al. (2013) who studied thysanopteran phylogeny using molecular data; and Zhang et al. (2019), who worked on the phylogeny of the Thripidae using morphological features. According to these authors, both suborders within the order Thysanoptera, the Terebrantia and the Tubulifera, are monophyletic, as are the families Phlaeothripidae, Aeolothripidae, Melanthripidae, and Thripidae (Buckman et al., 2013). The families Merothripidae, Heterothripidae, Stenurothripidae and Melanthripidae are grouped within the same clade, while the family Melanthripidae is described as distinctly different from the Aeolothripidae, under which, this group was previously assigned. Four of the six subfamilies; the Idolothripinae, the Dendrothripinae, the Sericothripinae and the Panchaetothripinae are also monophyletic (Buckman et al., 2013), however the Thripinae (Terebrantia) and Phlaeothripinae (Tubulifera) are paraphyletic.

Zhang et al. (2019) conducted a cladistic analyses of the family Thripidae based on morphological features in order to reconstruct ancestral feeding habits. The authors provided the hypothesis for the evolutionary relationships in the group and their feeding habits history, with leaf-feeding species being recognised as ancestral within this family while flower-feeding as derived. According to this study, the authors also concluded that the family Thripidae is monophyletic, with the three subfamilies, Dendrothripinae, Sericothripinae, and Panchaetothripinae being nested within the Thripinae. The latter subfamily was found to be paraphyletic and consisting of a number of species groups (*Rhamphothrips* genus-group, *Trichromothrips* genus-group, *Thrips* genus-group, *Frankliniella* genus-group, *Chirothrips* genus-group) the relationships of which are poorly resolved due to the high degree of homoplasy.

Three supported ‘lineages’ have been recognized within the subfamily Phlaeothripidae, each of which have a different biology: the leaf- feeding *Liothrips* group, the flower-feeding *Haplothrips* group and the hyphal-feeding *Phlaeothrips* group (Buckman et al., 2013).

Thysanoptera Biology

Ecology and Behaviour

Thrips have evolved a range of different lifestyles. Kirk (1996) argued that primitive thrips probably fed on fungi and leaf litter. According to Mound and Kibby (1998), around 50% of thrips feed on fungal hyphae and are found amongst leaf litter and dead wood. Fungal feeding species belong to the family Phlaeothripidae, with around 600 species which fit under the subfamily Idolothripinae that feed exclusively on fungal spores (Mound & Kibby, 1998). Kirk (1996) described the occurrence of different male morphs within fungus thrips which may have enlarged or slender fore legs designed for defending territories. The author stated that these morphs may be related to advanced social behaviour (Kirk, 1996).

Adults of phytophagous thrips species feed in flowers, sucking contents of cells including pollen grains and of developing fruits (Kirk, 1984) and are found associated with these regions of the host-plants, while others still have adults and larvae which feed only on leaves which may be very young (e.g. *Scirtothrips*) or older and perhaps even senescing leaves. The species that feed on plant material using a “punch-and-suck mechanism” (Lewis, 1973), usually take up the cell sap and leave a silvery sheen in the area where they were feeding. Similar feeding habits are also found in Hemiptera, but unlike these insects, thrips do not penetrate the vascular tissues with their mouthparts and therefore they do not produce honeydew. Some of these leaf-feeding thrips species such as *Limothrips cerealium* are the ones which can cause damage to plants. A number of these species, such as *Thrips tabaci* Lindeman, 1889 can also transmit orthotospoviruses.

Some tropical species of leaf-feeding tubuliferans may distort leaves or induce galls in which they live. According to Kirk (1996), female thrips of gall inducing species feed on very young leaves of the host-plant and this process modifies the growth of the plant producing rosettes, pouches or horn shaped deformities on the leaves. These females can lay hundreds of eggs within the gall and the offspring hatch and can in fact live and breed for one more generation within the same gall. The foundress female (i.e. the female which would have started the gall) and her eggs are generally vulnerable to predatory or parasitic attacks. They may even be attacked by other thrips females in an attempt to take over the gall and deposit their own eggs. Like in the case of male fungus-feeding thrips, females of gall inducing species may have enlarged fore legs in order to defend their gall. In some species, when conspecific females fight over galls the fight is often to the death. Kirk (1996) also claimed that gall inducing species can practice social cooperation. The author described soldier thrips of the species *Oncothrips tepperi* Karny, 1911 and *O. habrus* Mound, 1971. Soldier thrips usually have the task of defending the gall against intruders. They develop from smaller ova than the ovum of the original foundress. These soldiers are flightless females with shorter wings and with larger fore legs. In the more recent work by Kranz et al. (2002), the authors claimed that, apart from gall defence, soldier castes in galls have evolved to minimize risks of dispersal and the costs of latency in reproduction. The authors also argued that temperate conditions could be the reason for the loss of soldier castes in some species, because of the shorter, safer window period between dispersal and gall induction.

Many species of thrips are monophagous, or at the most, oligophagous, but others, particularly the species of agricultural importance, very often have polyphagous tendencies. Moreover, some polyphagous *Aeolothrips* species that live on flowers can also act as facultative predators (Mound et al., 1976; Mound & Kibby, 1998; Trdan et al., 2005; and Alston & Drost, 2008).

According to Lewis (1973), the host-plant is selected by the female during oviposition. Larvae will simply feed on whatever plant they hatch on and are unable to select the host-plant. The author claimed that females locate the host-plant using cues such as colour, shape, size and associated volatiles. The range of differences of these cues varies depending on whether the species are monophagous or polyphagous.

Warm climatic temperatures tend to result in mass flights of thrips, especially those of the genus *Limothrips*, when suitable temperatures are reached (Mound et al., 1976).

Thrips adults and larvae make use of various chemical secretions for communication purposes. Larvae of *Frankliniella occidentalis* (Pergande, 1895), for example, produce alarm pheromones when these are attacked by predators (MacDonald, 2002). These pheromones, produced as a droplet from the tip of the abdomen, cause larvae to move away or drop from the host-plant if detected. They were also found to reduce the rate of oviposition in adult females (MacDonald, 2002).

Predators and Parasites

Loomans et al. (1997) and Funderburk (2001) revealed that bug species of the genera *Orius* (Anthocoridae) as well as parasitic nematodes such as those of the genus *Thripinema* (Allantonematidae) are important natural enemies of flower thrips species such as *Frankliniella occidentalis*. These parasitoids suppress populations and cause local extinctions. Other natural enemies of thrips include wasp egg parasitoids e.g. genus *Megaphragma* (Trichrogrammadtiidae) on species like *Heliothrips hemorrhoidalis* Bouchè, 1833 (Kuslitsky, 2003), and larval parasitoids such as wasps of the genus *Ceranisus* (Eulophidae) affecting species like *Thrips tabaci* and *F. occidentalis* (Loomans et al.,1997; Loomans, 2006), and wasps of the genus *Pedoibius* (Eulophidae) which infect *Gynaikothrips ficorum* (Marchal, 1908) (Kuslitsky, 2003).

Some species of thrips namely *Frankliniella occidentalis*, and *Heliothrips hemorrhoidalis* have developed protective mechanisms against some predators. Lewis (1973), Howard et al. (1983), Tsuch et al. (2001) described how these species produce irritant anal secretions to repel predator attack. These secretions are produced in the anal region of the hindgut and released along the posterior setae.

Thrips Life Cycle

Thrips are haplodiploid, with males being haploid since they develop from unfertilized eggs, while females are diploid, developing from fertilized eggs (Kirk, 1996; Mound & Kibby, 1998). This genetic phenomenon is usually attributed to insects with social hierarchical castes such as Hymenoptera (Kirk, 1996). Indeed, different authors (e.g. Lewis, 1973) described some tubuliferan species to live in colonies, and may have social castes such as those found in Hymenoptera. These have been described in the section "Ecology and Behaviour" earlier in this chapter.

The life cycle of Thysanoptera (see the life cycle of the Western Flower Thrips *Frankliniella occidentalis*, fig. 2.1) is unique amongst insects and described as paurometabolous. In this type of life cycle, the morphological changes occurring in the larvae during the subsequent moults seem to be gradual, unlike the dramatic visible changes that occur between the larvae and pupae and between the pupae and imagines in insects which undergo holometabolous (complete) metamorphosis.

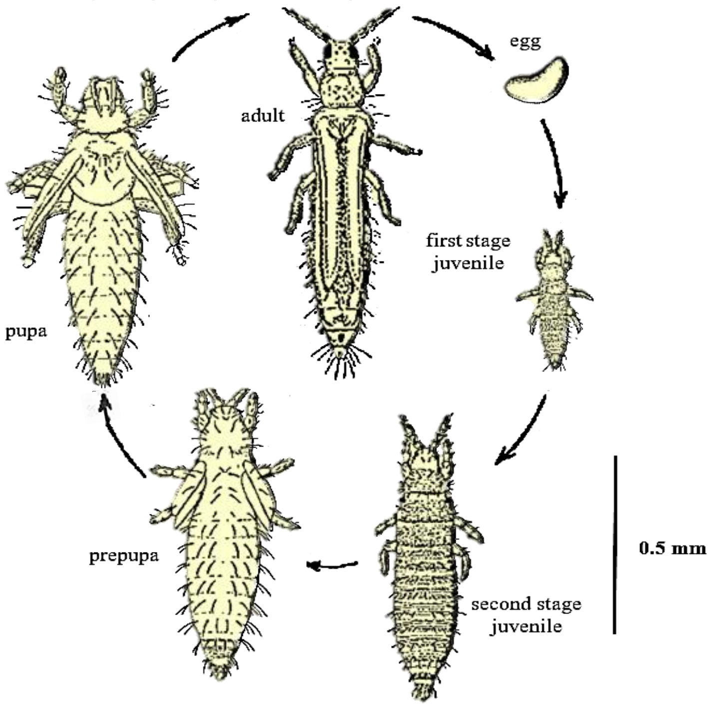

Figure 2.1: The paurometabulous life cycle of the Western Flower Thrips, *Frankliniella occidentalis* (modified from Kirk, 1996; Cloyd, 2009).

In the paurometabulous life cycle, there occurs an intermediate stage between the larva and the pupa known as the prepupa. Despite these gradual external changes, dramatic internal physiological changes take place just like in holometabolous life cycles.

According to Lewis (1973), since most thrips species are winged, mating tends to occur after dispersal. The author also claimed that no chemical identified to mediate mating in Thysanoptera. Opposite sexes locate each other by using cues or short range chemical and visual cues to find a receptive mate. During copulation, a sticky secretion is produced by glands of mating partners to hold male and female while reproducing. In some species, e.g. *Heliothrips hemorrhoidalis*, eggs develop parthenogenetically (Mound et al., 1976; Kirk, 1996). In such species, the majority of the population will consist of females and males tend to be rare. Females lay eggs in plant tissues or on the surface of plants. Eggs deposited in plant tissues are soft-shelled, while those deposited on plants have a rough-textured, hard shell.

Larvae hatch between 2 to 30 days following oviposition (Lewis, 1973; Moritz et al., 2014), depending on the species. The almost transparent larvae may become carnivorous in some species and can feed on other thrips species or other similar sized insects. In order to become an adult, the instar will need to moult two (in the suborder Terebrantia) to three (in the suborder Tubulifera) more times. The first two larval instars are identical to adults except for the size and presence of wings. These instars are rather active and feed continuously. Once they moult into the third instar, they become less active. In a number of species, this instar is enclosed in a cell or cocoon. Larval development may occur quickly or may take several months. Some species overwinter as larvae.

Identifying larvae from adults is important when studying thrips. Mound and Kibby (1998) described thripid larvae to be white or yellow, while phlaeothripid larvae to have spots or bands of bright red or orange internal pigment, with some species even being purple in colour. These authors also state that many phlaeothripid larvae have dark terminal abdominal bases, and brown patches on the body surface around the bases of major setae.

The two instars preceding the adult stage are known as the prepupa and pupa. Wing rudiments will appear during the prepupal stage (instar III in Terebrantia, instar IV in

Tubulifera). Pupation occurs in leaf litter or in the soil. During the pupal stage, thrips cannot feed but can still move slowly. According to Mound et al. (1976), most species are probably univoltine, however the overwintering stage is not always known.

Adults of most predatory thrips species are rather active and capable of flying. In other species, they can only fly very short distances or are completely incapable of doing so. Flight of even the most active species is rather weak, and because of this, thrips can easily get caught in winds and thermals, with the possibility of being carried to great distances and in very large numbers.

Thrips Anatomy

Thrips typical morphology with labelled anatomical features is represented in figure 2.2.

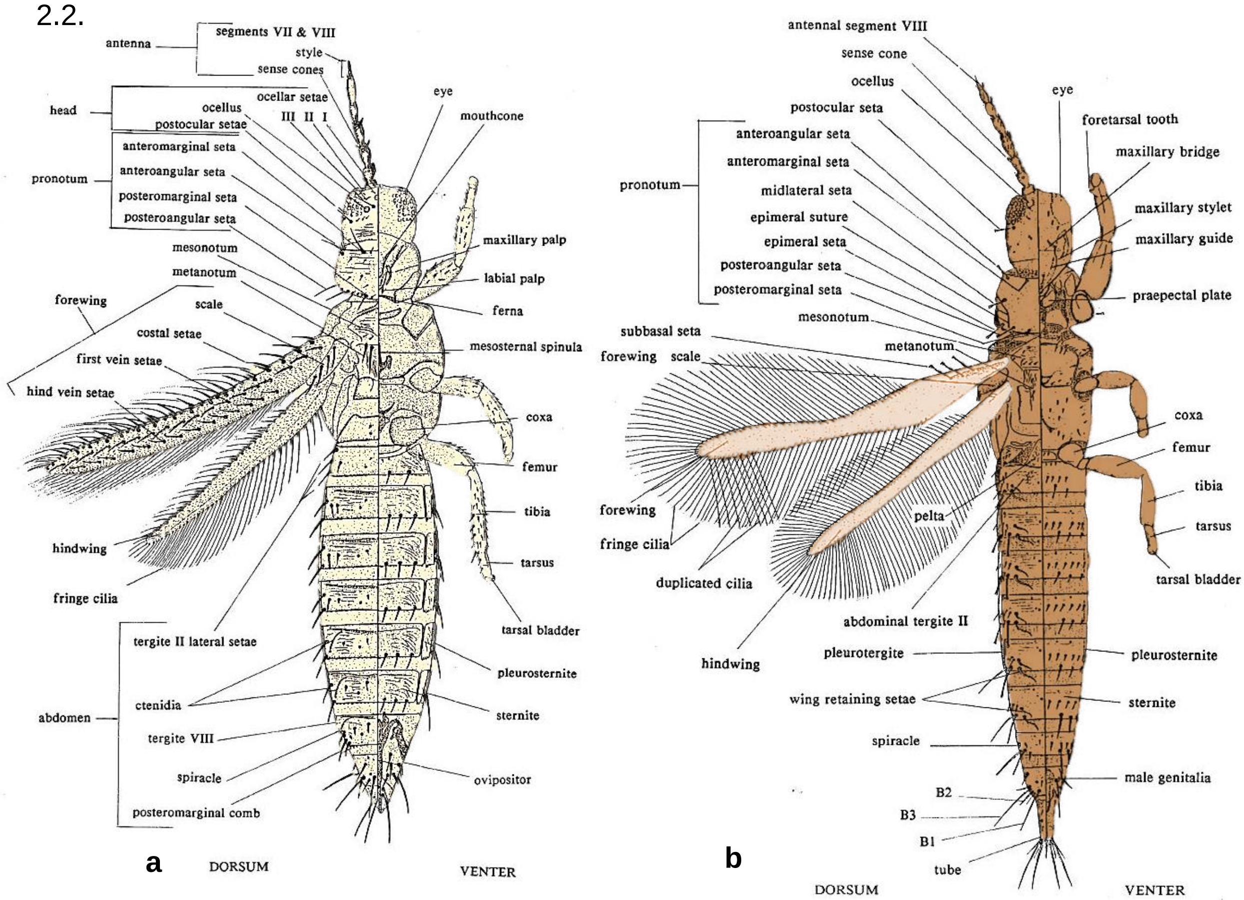

Figure 2.2: General anatomy of a terebrantian (**a**) and a tubuliferan (**b**) (modified from Palmer et al. 1989)

Anatomical features typical of Thysanoptera include: (i) a slender body; (ii) antennae with 6 - 9 joints and 4 - 10 segments; (iii) sensoria on antennal segments III and IV which have distinctive shapes in different groups; (iv) asymmetrical muscular piercing mouthparts which make up of a suctorial, cone shaped rostrum – a structure which consists of a pair of asymmetrical mandibles, one of which is fashioned in the shape of a stylet while the other is greatly reduced or altogether absent; and (v) wings, which, when present, are very narrow and strap-like, fringed in front and with long hairs at the back, and which are held together at the bases by means of a series of hooks. When at rest, wings are folded over the back. Features (iv) and (v) described above are exclusive to Thysanoptera.

Mound et al. (1976) and Mound & Kibby (1998) identified a number of morphological features that can be used for identifying thrips to species levels. These include:

(i) **Surface sculpture.** The texture of the surface of Thysanoptera adults can be diagnostic of some species e.g. with exaggerated reticulation in the Panchaetothripinae (figs. 2.3a-d), finely sculpted as in some *Dendrothrips* (fig. 2.3e), or bearing various numbers of microtrichia as in a number of Terebrantia (fig. 2.3h).

(ii) **Setae.** Adults of Tubulifera, and larvae of Terebrantia, have major setae with apices which are frequently not acute (figs. 2.3f, g).

(iii) **Antennae.** The number of segments (which may vary from 4 - 10 but is usually 7 - 8), the shape of the antennae together with their sensoria (especially those on segments III and IV). Such sensoria are form grooves in Aeolothripidae and Melanthripidae, but protrude in the shape of simple or forked trichomes in the other families (figs. 2.3i, j). Moreover, the degree of fusion of the terminal segments is variable across several genera, e.g. *Dendrothrips* and *Thrips* (figs. 2.3l, m). The occurrence and frequency of sutures may tend to vary within a species e.g. *Anaphothrips obscurus* (Müller, 1776) (fig. 2.3k).

(iv) **Head.** The shape of the head can be diagnostic for some species. Eyes can either be large or else reduced to a few facets. In some species, a number of facets may be pigmented. Moreover, the dorsal ocelli may be absent in some wingless species. The number of setae in this region varies per family. In Thripidae, for example, there occur three pairs of setae associated with the ocelli (fig. 2.3p), with the first pair found anterior to the first ocellus, the second pair near the compound eyes and lateral to the first ocellus and the third pair inside or lateral to ocellar triangle. In Phlaeothripidae on the other hand, there is typically only one pair of major post-ocular setae (fig. 2.3n), with a few species having stout setae or tubercles on the cheeks (fig. 2.3o). The tentorium (internal skeleton) is well developed in Merothripidae and Aeolothripidae. Only one left mandible is developed in adults.

(v) **Maxillary stylets.** The shape of the stylets varies according to the diet of the insect. Maxillary stylets of Terebrantia are typically confined to the mouth cone, while in Phlaeothripidae, these stylets are usually much longer and deeply retracted into the head. They are usually associated with muscle supports or the maxillary guides. In *Haplothrips* species there is a median anterior extension from each guide, known as the maxillary bridge (fig. 2.4a). In Idolothripinae, stylets are exceptionally broad in order to allow ingestion of fungal spores (fig. 2.4e). Mouth cone varies from short and rounded to long and pointed, although shape can be changed according to the pressure exerted by the coverslip. Maxillary palps have 2-3 segments.

(vi) **Prothorax.** In Terebrantia, the prosternum is weakly sclerotized, while the pronotal chaetotaxy (abundance and size of setae on different regions) usually varies between genera (figs. 2.4b-d). In Phlaeothripidae, there usually occur five pairs of major pronotal setae which include the antero-marginals, antero-angulars, mid laterals, epimerals and postero-angulars (fig. 2.4g). Moreover, the prosternum often bears two pairs of median sclerites in some phlaeothripid genera, consisting of the praepectal plates and the probasisterna (fig. 2.4e). The pronotum consists of a transverse sclerite with one to two postero-angular setae.

(vii) **Pterothorax.** The texture of the metanotum and the position of its median setae are diagnostic of some genera and species (figs. 2.4t, u). The Thripidae species which jump actively (fig. 2.4s) have a well-developed metathoracic endoskeletal furca.

(viii) **Wings.** Thysanoptera can either possess large wings with respect to body size (macropterous) or small wing with respect to body size (brachypterous) or wingless (apterous). Each species typically exhibits only two of these three conditions. Wing length amongst members of the same species is largely consistent.

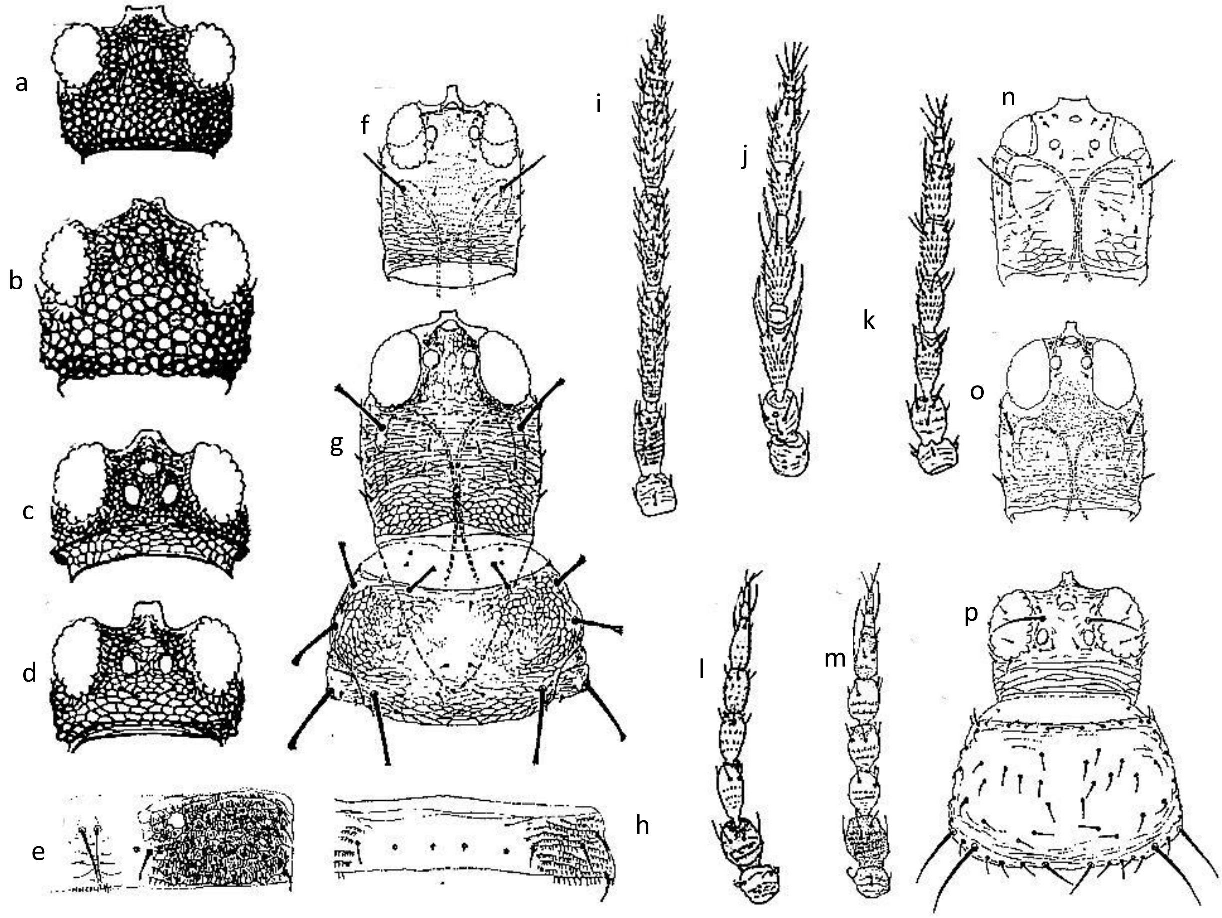

Figure 2.3: Thysanoptera anatomical features (after Mound et al., 1976): heads (**a-d**): (**a**) *Parthenothrips dracenae*; (**b**) *Heliothrips haemorrhoidalis*; (**c**) *Helionothrips errans*; (**d**) *Hercinothrips bicinctus*; (**e**) *Dendrothrips saltator* tergite V; (**f**) *Haplothrips senecionis* head; (**g**) *Hoplandrothrips bidens* ♀ head and pronotum; (**h**) *Drepanothrips reuteri* tergite III; antennae (**i-m**): (**i**) *Aeolothrips tenuicornis*; (**j**) *Anaphothrips orchidaceus*; (**k**) *Anaphothrips obscurus*; (**l**) *Dendrothrips saltator*; (**m**) *Dendrothrips degeeri*; heads showing setae (**n-o**): (**n**) *Abiatothrips schaubergeri;* (**o**) *Phlaeothrips annulipes;* (**p**) *Ceratothrips ericae* head and pronotum.

Colour, chaetotaxy and venation of the fore wings are important diagnostic features of the Terebrantia (figs. 2.4h, i), while fore wings of Phlaeothripidae have no veins, although there usually occur three or four sub-basal setae near the anterior margin. Wings in Phlaeothripidae are sometimes constricted medially, and there occur a variable number of duplicated cilia on the distal posterior margin (fig.2.4j).

(ix) **Legs.** In adults, the tarsi are usually one or two-segmented. Tarsi always bear a well-developed pretarsal apparatus. Larvae possess claws, which become very reduced in adults. The fore tarsus frequently bears a tooth on the inner margin (fig. 2.4g). In some Thripidae, the retractable pretarsal bladder or ariolum bears a terminal tooth (fig. 2.4f). In the Phlaeothripidae the apical margin of the tarsus may be prolonged into a hook, known as the hamus, located ventrally to the pretarsus

(x) **Abdominal tergites.** In the Phlaeothripidae, abdominal tergite I is reduced to a small plate, known as the pelta (fig. 2.4n), while tergites II-VII typically possess two pairs of sigmoid wing retaining setae. The posterior margin of tergite VIII often bears a row of ciliate or dentate microtrichia in Thripidae (fig. 2.4k), however, in many grass-living species, the posterior margin of the tergites and sternites terminates into a flange known as the craspedum (figs. 2.4l). The number of setae near the lateral margins of tergite II is sometimes diagnostic in species of thrips (figs. 2.4o, p), while in the genera *Thrips, Frankliniella* and *Kakothrips,* there is a row of microtrichia laterally, the ctenidia, on the surface of tergites V-VIII (fig. 2.4m)

(xi) **Abdominal sternites.** The marginal setae often arise in front of the margin on the posterior sternites, although in Phlaeothripidae and many Terebrantia, there is also a variable number of accessory setae placed medially on the sternites (fig. 2.4w). In males of Phlaeothripinae species, there frequently occurs a porose glandular area on sternite VIII (fig. 2.4x), while males of *Abiastothrips* and related genera have a reticulate glandular area on sternites V-VII instead.

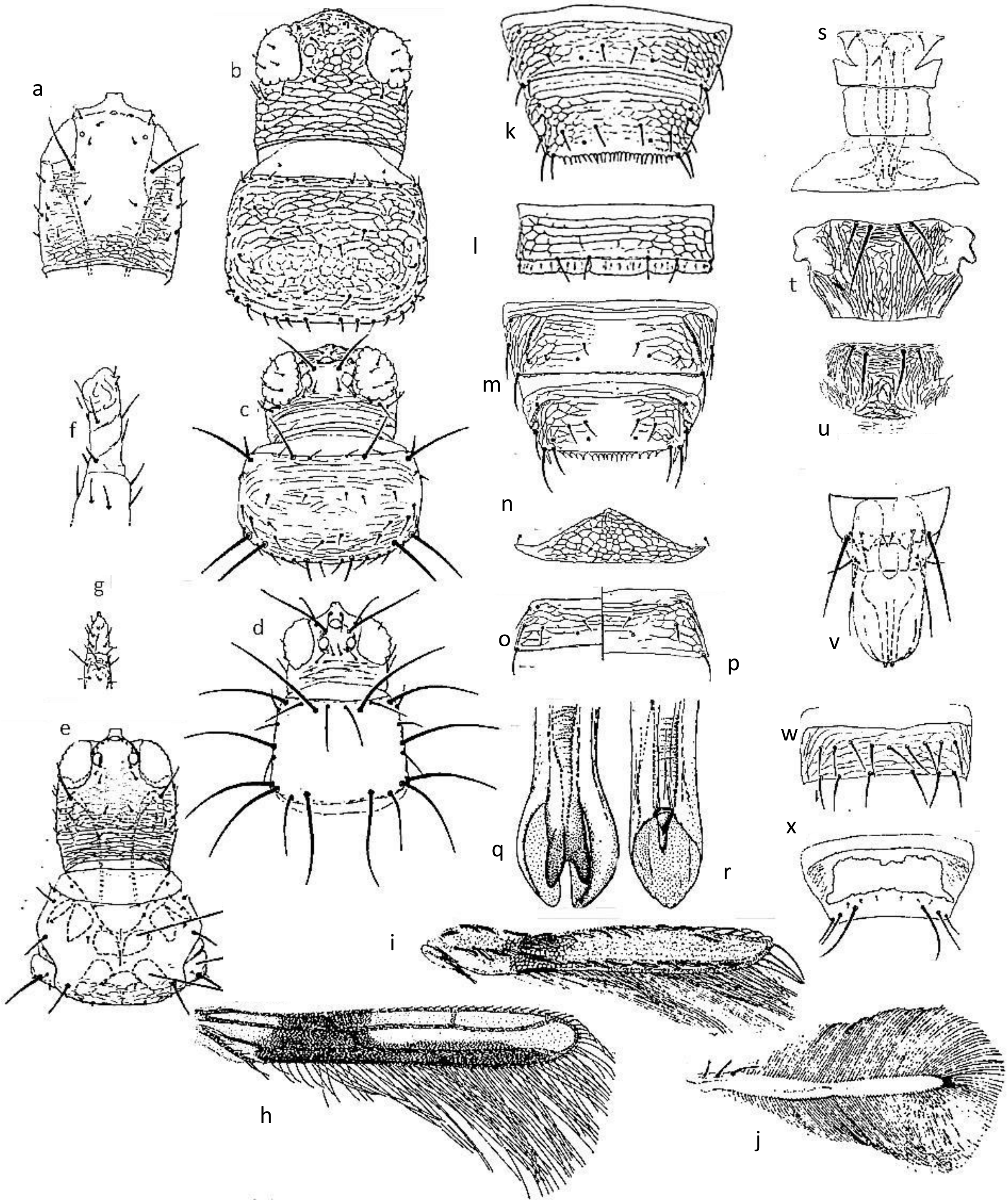

Figure 2.4: Thysanoptera anatomical features (continued) (after Mound et al., 1976): (**a**) *Bolothrips dentipes*; head. head and pronotum (**b-e**): (**b**) *Anaphothrips obscurus*; (**c**) *Frankliniella intonsa;* (**d**) *Scolothrips longicornis*; (**e**) *Haplothrips aculeatus*; head and pronotum showing prosternal sclerites; (**f**) *Kakothrips pisivorus* fore tarsus; (**g**) *Hoplothrips polysticti* ♀ fore tarsus. fore wings (**h-i**): (**h**) *Aeolothrips vittatus*; (**i**) *Parthenothrips dracaenae*. **j,** *Hoplandrothrips bidens*. **k,** *Anaphothrips obscurus* ♀tergites VII-VIII. **l,** *Apterothrips secticornis* ♀ sternite IV; (**m**) *Frankliniella intonsa* ♀ tergites VII-VIII; (**n**) *Cryptothrips nigripes* pelta; ♀ tergite II (**o-p**): (**o**) *Trips major*; (**p**) *Thrips validua*; (**q**) *Haplothrips propinquus* apex ♂ aedeagus; (**r**) *Haplothrips fuliginosus* apex ♂ aedeagus; (**s**) *Dendrothrips eastopi* metathoracic furca; (**t**) *Frankliniella tenuicornis* metanotum; (**u**) *Scirothrips gracilicornis* ♀ metanotum. (**v**) *Odontothrips phaleratus* ♂ genitalia; (**w**) *Thrips minutissimus* ♀ sternite V; (**x**) *Hoplothrips cortices* ♀ sternite IX

The structure of the male genitalia is diagnostic in only two genera: *Haplothrips,* by means of the sclerotised apex of the aedeagus (figs. 2.4q, r) and *Odontothrips,* with the lateral endothecal spines on the inflated intermittent organ (fig. 2.4v). Females have a saw-like ovipositor.

Thrips of Economic Importance

According to Lewis (1997), thrips can become pests because of their predisposition to feed on and cause damage to crops and cultivated plants, their ability to transmit viral diseases to crops, as well as their tendency to spread and colonize new areas quickly but by means of natural methods as well as through exportation of plant material by humans.

Improved modern methods of transporting plants, vegetables and fruits all over the world in a very short time has enabled a number of plant pest species, particularly insects (namely Thysanoptera, Hemiptera and Lepidoptera), nematodes and diseases to spread worldwide (Masumoto, 2010). It has therefore become important to be familiar with these species and their habits in order to better manage pests which affect local agricultural scenarios, and address these problems with practices such as quarantine activities (Masumoto, 2010). Organizations such as the European and Mediterranean Plant Protection Organization (EPPO) alert relevant countries where some potentially harmful pest species (e.g. *Scirtothrips citri* Moulton, 1909, and *Pezothrips kellyanus* (Bagnall, 1916), with the latter species recorded as a citrus pest in Sicily) are and suggest ways how to prevent entry into the country (Vierbergen, 2005).

Thysanoptera are considered pests because when they occur in vast numbers, they are capable of inflicting very serious and extensive damage over the host-plants, thus disfiguring flower heads, spoiling fruit (e.g. by scarring on citrus, and by corky tissue formation on bananas, avocados and table grapes, Mound & Kibby, 1998), and causing the leaf apices of grasses to shrivel, a condition known as “silvertop” (Burton & Burton, 2002). This silvering phenomenon occurs due to air entering cells which have had their internal contents removed (Mound & Kibby, 1998). Silvering can be found on young cereals including rice where it can cause die-back of the plant tip. It can also be found on gladioli, roses and carnations, particularly visible on the red varieties. Large infestations can induce premature flower loss and are suspected to reduce pollen levels (Mound & Kibby, 1998). Large numbers of thrips on some blossoms of fruit trees e.g. pears may also affect fruit development. Lewis (1973) described the damage inflicted by large scale infestations of *Hercinothrips femoralis* Reuter, 1891, in banana tree plantations. The author also mentioned that thrips are responsible for a percentage loss yield in field crops due to direct damage by thrips or through damage from pathogens which are transported by thrips such as orthotospoviruses which seriously affect a number of crop and ornamental plants.

It is widely known amongst scientists but also farmers that some thrips species can act as vectors to orthotospoviruses. Mound (2001) claimed that there exists no relationship between the thrips and orthotospovirus, though the latter are dependent on these insects for transmission to host-plants. The author lists the genera and the species that act as vectors for these viruses. These lists are included in tables 2.1 and 2.2 below.

Table 2.1: The genera of thrips which act as orthotospovirus vectors (after Mound, 2001)

Thripinae genera	Described species	Recorded vectors
Frankliniella	160 species	5 species
Thrips	280 species	3 species
Scirtothrips	90 species	1 species

Table 2.2: The species of thrips which act as orthotospovirus vectors and their world distribution (after Mound, 2001)

Species	World Distribution
Frankliniella intonsa	Europe to Asia
Frankliniella occidentalis	Western USA
Frankliniella fusca	Eastern USA
[*Frankliniella bispinosa*]	S.E. USA
Frankliniella schultzei	S. America
Frankliniella zucchini	S. America
Thrips tabaci	Eastern Mediterranean
Thrips setosus	Japan
Thrips palmi	S.E.Asia
Scirtothrips dorsalis	S.E.Asia

Some alien imported pest thrips species can invade greenhouses. These can not only affect fruit and flowers but also ornamental plants, disfiguring the foliage by means of the excretion of red droplets which eventually turn black (Mound & Kibby, 1998; Burton & Burton, 2002). Examples of such species include *Heliothrips hemorrhoidalis*, *Hercinothriops femoralis* and *Chaetanotrhrips orchidi* (Moulton, 1907). These species can infest greenhouses in countries with colder climates but will also settle in the open in other countries with warmer climates such the Maltese Islands.

Pest thrips species are spreading worldwide, mostly by human intervention. Nickle (2003a), for example, claimed that of the 130 species intercepted in cargo of shipments of plants imported into the Unites States, with 23 species constantly recurring, and 85% of which being *Thrips tabaci* and *Franklinella occidentalis.*

In Europe, there occur 52 alien species belonging to four families, mostly belonging to the families Phlaeothripidae and Thripidae. These species have been introduced over the years from America, tropical and subtropical areas and subsequently Asia (Reynaud et al., 2008).

Table 2.3 summarizes a number of worldwide known pests for Europe, their host-plants, origin and distribution and whether they transmit viral plant diseases.

Table 2.3: Some of the important species of alien Thysanoptera for Europe

Species	Common name	Host-plants	Disease transmitted	Distribution/ time when found
Thrips tabaci Lindeman, 1889	Onion thrips	Yarrow, ragwort, onion and related cops; often infests greenhouses	Iris yellow spot virus – (IYSV) Tomato spotted wilt virus (TSWV) Necrotic spot virus (INSV).	Cosmopolitan but thought to originate from the eastern Mediterranean. Spring (two annual generations).
Limothrips cerealium Haliday, 1836	Grain thrips	Cereals and grasses	None	Originated from western Europe but established worldwide. May-November
Thrips flavus syn. *clavus* Schrank, 1776	Honeysuckle thrips/ European flower thrips	Flowers, blackberry; loganberry apparently highly polyphagous	No, but reports conflicting because of confusion with *T. palmi*	Eurasian origin. Widespread from Britain to China, Japan and Taiwan. Absent from North America.
Franklinella occidentalis Pergande, 1895	Western flower thrips	Highly polyphagous pest, feeding on flowers and leaves, and damaging developing fruits. However, it also feeds on leaf mites of which it can be a useful biocontrol agent.	An important vector of ortho tospoviruses on many crops e.g. TSWV, tomato chlorotic spot virus (TCSV), INSV, groundnut ringspot virus (GRSV).	Originated from western USA. Becoming worldwide.
Heliothrips hemorrhoidalis Bouchè, 1833	Greenhouse thrips	Polyphagous on a variety of ornamental plants. Can sometimes attack oranges.	None	Originated from South America. Found worldwide in the tropics and subtropics.

Thrips can also be useful or beneficial. Palmer et al. (1989) described adult thrips as important aerial plankton, and hence form an important link in specific food webs. Moreover, according to Mound and Kibby (1998) some thrips species act as pollenating agents to some plants, namely the oil palm, while other species, including some with a pest record status can also act as biological control agents.

Trdan et al., (2005) and Alston and Drost (2008) described how different European and North American species of the genus *Aeolothrips* feed on other thrips species which are considered pests, while Borbon, and Agostini (2011), Spézia de Melo et al. (2013), Yaseen Ali (2015) and Collins and Philippou (2015) described the tubuliferan species *Androthrips ramachandrai* Karny, 1926 as a predator to *Gynaikothrips uzeli* Zimmermann, 1900, a gall inducing species found on *Ficus benjamina* (Rosales: Moraceae). Other predatory thrips species attack aphids (Burton & Burton, 2002) and leaf mites (Mound, 2011). Beattie (1985) mentioned *Aleurodothrips fasciapennis* Franklin, 1908 as a predator on citrus red scale in China. Moreover, Lewis (1973) spoke about the leaf-feeding *Liothrips urichi* Karny, 1926 that had been introduced in Fiji to control the perennial invasive weed *Clidemia hirta* (Myrtales; Melastomataceae). Finally, Vasiliu-Oromulu et al., (2009) also described *Frankliniella intonsa* (Trybom, 1895) is an important bio-indicator for air quality, since this species is very resistant to pollutants.

The Maltese Islands

When studying organisms of any particular country it is important to review literature that gives information on the physical characteristics of that country to try to determine what potential the different habitats may have in terms of the biodiversity of that particular group of organisms under study.

Geography

The Maltese Archipelago is situated in the centre of the Mediterranean Sea, 93 km South of Sicily 352 km North of Tripoli, and 288 km East of Tunis. To the Northwest lie the

Eolian Islands, part of the Italian Territory. The archipelago covers an area of 316 km^2 and is 45 km in length (Pedley et al., 2002).

The southernmost island of Malta, the largest in the archipelago, is 28.3 km long and 14.5 km wide, with an area of 196.8 km^2 and highest point being at Ta' Dmejrek at 253 m above sea level, situated in the vicinity of the village of Dingli. The island of Gozo is the smaller of the inhabited islands found to the northwest of Malta. This island, is 14.5 km long and 7.2 km wide, has an area of 67.07 km^2, with the highest point being at Ta' Dbiegi at 191 m above sea level. Gozo is greener and relatively less developed, with larger stretches of countryside that are comparatively left undisturbed by humans.

A third, smaller island, that of Comino, located in the strait between Malta and Gozo is 2.6 km long and 2.25 km wide. It has an area of 2.78 km^2, with highest point being 75 m above sea level. This island is the least developed - being almost uninhabited and consisting largely of bare land with very little available fresh water (Azzopardi, 2002).

Selmunett (off the coast of Comino) and Filfla (to the South of Malta off the coast of Wied iż-Żurrieq) are two very small uninhabited islands also belonging to the Maltese archipelago. The latter island has progressively become smaller in recent years, mainly because of constant erosion, but also partly because it was formerly used for military target practice from the 1940s to the 1970s. It is nowadays declared a natural sanctuary and access is restricted to only those wanting to research the fauna and flora inhabiting the islet.

Climate

The climate of the archipelago alternates between dry hot seasons from early June to the end of September and mild rainy cold seasons from October till May (Chetcuti et al., 1992). Temperatures during the hot season average about 30°C although occasionally they peak at 40°C.

Water availability on the islands is rather scarce, with typical average rainfall for the period 1900 - 2000 being of 550 mm for the period (FAO, 2006). Moreover, there is a high demand for water resources. Indeed, abstraction of groundwater necessary to sustain the relatively limited perennial surface water ecosystems exceeds aquifer recharge rate (FAO, 2006). The local agricultural scenario also depends exclusively on the rainwater collected during the relatively short rainy season, since this is the only natural water source available to the islands. Agricultural water demand, used to irrigate 29% of the total utilized agricultural area (NSO, 2010) is significantly higher during the summer months and is projected to increase (FAO, 2006). This limits the availability of freshwater habitats and hence the biodiversity of such ecosystems in the Maltese Islands. The freshwater fauna and flora has nonetheless adapted to manage the active part of their life cycle during the wet season.

Habitat types

The Maltese Islands represent a small archipelago with limited surface area and with limited natural habitats. No mountains, rivers, large forests and alpine environments are present. Moreover, the population density is one of the largest worldwide at 1649 per km^2 (NSO, 2021). as well as the large amount of tourists visiting the islands (c. 1.5 million per annum) are leaving a considerable negative impact on the natural environment, with natural habitats becoming scarcer as the land is used for agricultural purposes or being built over. Nonetheless a range of natural habitats are found.

The predominant habitat is karstland, which forms when groundwater containing dissolved carbon dioxide percolates through the rocks, and gradually dissolves the calcium carbonate, leaving insoluble residues of iron oxides in cavities. This process leads to the formation of soil patches, which are subsequently colonized by vegetation.

The variety of habitats within the islands is rather limited due to the size and origin of the Maltese Islands. With no mountainous ranges, large forests, and rivers or lakes, the species diversity of many insect groups is limited, as compared to the number of species found on both the European as well as the African continent. The fact that the islands are relatively isolated also contributes to the limited species diversity.

The natural landscape of the Maltese Islands can be categorized into four types of terrestrial habitats which can be placed in order of ecological succession. All four of these habitats can potentially host thrips species. Many locations show gaps of transition between one habitat and the other with some locations showing areas with most of the different habitat types within a few metres of each other. These habitats are described by the Malta Environment and Planning Authority (MEPA) website (2015) and include:

(i) the steppe, which is considered the first stage of the process of ecological succession. This habitat is considered a degraded habitat that was once maquis, garigue, or even abandoned agricultural land which has been exposed to processes such as fire or overgrazing. It is usually devoid of trees and typical vegetation in this habitat includes umbellifers (e.g. *Foeniculum vulgare*), legumes (e.g. *Vicia sativa*), bulbous species (e.g. *Ornithogalum narbonense*) and, especially when in a degraded state, grasses (e.g. *Stipa capensis*), thistles (e.g. *Galactites tomentosa*) and geophytes (e.g. *Asphodelus ramosus*). Most plants in this habitat will dry up during the dry season. Examples of locations with steppe habitats from where material for this study was collected include: Ta' Sabbara Woodland and Wied Anġlu (figs. 2.5 a and b).

(ii) The garigue (or garrigue). Considered the second stage of ecological succession, this habitat is the most common vegetation type on the Maltese Islands, characterised by low lying, often aromatic shrubs that are adapted to resist drought and strong winds (e.g. *Thymbra capitata,* Lamiaceae). This habitat is typically found in areas of karstic rocky regions on outcrops of coralline limestone amongst which lie patches of soil where vegetation grows. The garigue also often forms from the degradation of forest and maquis. Plants which are common in the garigue include *Erica multiflora* (Ericaceae), *Drimia* (=*Urginea) maritima* (Asparagaceae) and the endemic *Euphorbia melitensis* (Euphorbiaceae), *Limbarda crithmoides* (Asteraceae) and *Crithmum maritimum* (Apiaceae) are two of the plant species that are usually found in locations where garigue slopes face the coast (maritime garigue). Some locations with this type of habitat where data was collected in the current study include Lapsi, Pembroke (figs. 2.5 c and d), Triq is-Santi, l/o Rabat, and Ta' Ċenċ in Gozo amongst others (see table 3.2 in the Materials and Methods chapter). The first two habitats also include vegetation typical of maritime garigue.

(iii) The maquis. A habitat which consists largely of an evergreen shrub community consisting of small trees of species such as *Ceratonia siliqua* (Fabaceae) and *Olea europaea* (Oleaceae) as well as large shrubs such as *Pistacea lentiscus* (Anacardiaceae), *Myrtus communis* (Myrtaceae), and *Laurus nobilis* (Lauraceae). This community grows over areas with larger coverage of soil than the previously described habitats. Climbers such as *Hedera helix* (Araliaceae) as well as *Smilax aspera* (Smilacaceae) and *Asparagus aphyllus* (Asparagaceae) and herbaceous shade loving species such as *Acanthus mollis* (Acanthaceae) and *Arum italicum* (Araceae) are often commonly found in this habitat. The maquis habitat may occur at the, often inaccessible, sides of steep valleys. In some areas this habitat would form the peak of ecological succession. Typical locations with this kind of habitat where thrips data was collected in this work include il-Maqluba in Malta and Mġarr ix-Xini in Gozo (figs. 2.5 e and f).

(iv) Woodland. Considered as the climax of the successional ecological sequence, this type of habitat mostly consists of Mediterranean sclerophyll forest with species such as *Quercus ilex* (Fagaceae) and *Pinus halepensis* (Pinaceae) with an undergrowth of smaller shrubs. *Tamarix* spp. (Tamaricaceae) and *Vitex agnus-castus* (Lamiaceae) prevail on coastal wood remnants, while *Populus alba* (Salicaceae) and *Ulmus* spp. (Ulmaceae) occur in riparian woodland remnants. Thought to have covered large areas of the islands before these were colonized by humans, the native forest on the Maltese Islands is currently extinct due to cutting down of trees for wood and to clear land for domestic and agricultural purposes, as well as the introduction of grazing animals that prevented regeneration of such forests. Remnants of such forests however still persist in four localities on the island of Malta. Typical woodland habitats visited for specimen collection purposes in this work include include il-Buskett, l/o Dingli, and Ta' Sabbara Woodland, l/o Żabbar (figs. 2.5 g and h).

Apart from these main terrestrial habitats, there occur a number of specialized habitats found in specific sites on the archipelago including valleys, often with water courses (e.g. Wied Speranza and Wied Babu, figs. 2.6 a and b), saltmarshes (e.g. Il-Ballut, l/o M'Xlokk, fig. 2.6 c)

Steppe: (**a**) Sabbara Woodland, l/o Żabbar; (**b**) Wied Anġlu, l/o Naxxar

Garigue: (**c**) Lapsi, l/o Siġġiewi; (**d**) Pembroke

Maquis: (**e**) Maqluba, l/o Qrendi; (**f**) Mgarr ix-Xini, Gozo

Woodland: (**g**) Buskett, l/o Rabat; (**h**) Sabbara Woodland, l/o Żabbar

Figure 2.5: Photographs of locations representing the four main habitats in the Maltese Islands where data samples were collected.

Valleys: (**a**) Wied Speranza, Mosta; (**b**) Wied Babu, l/o Zurrieq

Saltmarsh: (**c**) Il-Ballut, l/o M'Xlokk. **Sand Dune**: (**d**) Ramla, Gozo

Figure 2.6: Photographs of locations with special habitats in the Maltese Islands where data was collected.

and sand dunes (e.g. Ramla Bay, Gozo, fig. 2.6d). These form from successive build-up of sand resulting from wave action.

The vegetation found in this habitat needs to be suited to the harsh conditions of this environment namely high temperatures, dryness, occasional inundation by seawater and accumulation of sand. Different plant species are found depending on the distance of the sand dune location from the beach with species like *Cakile maritima* (Brassicaceae) and *Sporobolus pungens* (Poaceae) found in the seaward zones (embryo dune), then species such as *Elytrigia juncea* (Poaceae) and *Eryngium maritimum* (Apiaceae) occupying the mobile dune region further away from the sea, followed by plants like *Euphorbia terracina* (Euphorbiaceae) and *Pancratium maritimum* (Amaryllidaceae) which occupy the semi consolidated dune and lastly in the fixed dune which is the furthest away from sea water, one finds plants such as *Lotus cystisoides* (Fabaceae) and *Sixalix atropurpurea* ssp. *maritima* (Caprifoliaceae). These plants may be worth investigating since they could host some thrips species which may have never been studied previously. Plants associated with these specialized habitats have also been investigated for the possible presence of thrips. According to the Coordination of Information on the Environment (CORINE) land map for 2006 (MEPA, 2007) seen in figure 2.7, the above-mentioned habitats occupy around 19% of the land area of the archipelago, with most of these habitats found close to coastal locations. 51% of the land on the other hand is taken over by land which is used for agricultural purposes.

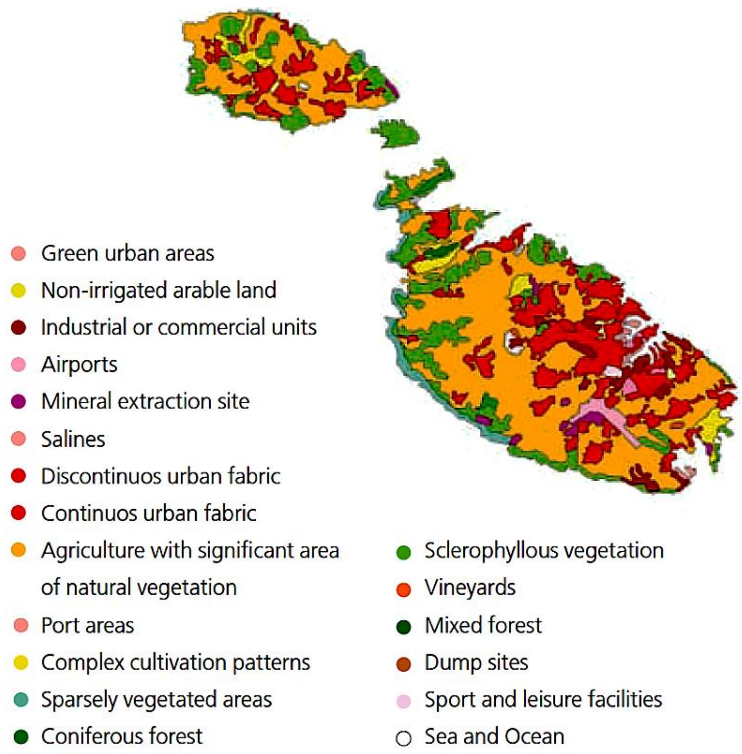

Figure 2.7: CORINE land map of the Maltese Islands for 2006 (MEPA, 2007) showing cover classes.

This type of habitat may well be the breeding grounds for species which may have been imported with agricultural material and settled in favourable conditions increasing their numbers to cause vast infestations. Moreover, greenhouses and plant nurseries, also found within these areas, may host species of thrips that require the temperature and humidity levels provided by these facilities and not found elsewhere on the islands. It is therefore important for this work that observations and samples were taken from such habitats to investigate the species which occur as well as their impact. Since the Maltese Islands are surrounded by the sea, they may be exposed to stronger wind currents which may bring with it a number of species from southern Europe or northern Africa. In fact, with this geographical orientation, the flora and fauna one would expect to find in the Maltese Islands are those of Mediterranean origin and distribution, together with some North African species. Previous local studies on insects with the approximate size and mobility of thrips (e.g. Carapezza & Mifsud, 2015) indicate that most of the local fauna is of European origin whereas African representation is very limited.

Current state of the Maltese Islands

The Maltese Islands are becoming urbanized at a rapid rate due to the high population density, scoring at 1649 per km^2 (NSO, 2021). This problem is compounded by the fact that the economy of the Maltese Islands heavily depends on tourism, with c. 1.5 million tourists visiting the islands every year. These factors leave a considerable negative impact on the Maltese natural environment. Extensive use of plant protection products is also causing the decline of a number of indigenous insect species, many of which serve as ecosystem providers.

Literature on the Thysanoptera of the Maltese Islands and the western Palaearctic Region

Since the current work involves researching the thrips of the Maltese Islands, studying the existing literature about such insects was essential, as was also the reviewing of literature on Thysanoptera recorded in neighbouring countries with possibly similar climate and habitats. Although literature on the thrips of Europe and the Palaearctic does exist, no work that discusses these insects exhaustively is available. In view of this, it was decided to compile such a list of species for this particular work. A demanding exercise therefore commenced. Data was collected from available papers and other material, printed or on-line, that included checklists of species of thrips from individual countries as well as new records (Appendix I). Details of what information was collected is found in the Materials and Methods chapter.

In all, information about 691 species from seven families was collected. Table 2.4 shows the number of species described per family and subfamily.

Table 2.4: Table showing the number of thrips species recorded in the Palaearctic for each Family and Subfamily

Suborder	Family	Subfamily	No. of species
Terebrantia	Aeolothripidae	-	49
	Melanthripidae	-	32
	Fauriellidae	-	02
	Merothripidae	-	01
	Stenurothripidae	-	02
	Thripidae	Dendrothripinae	11
		Panchaetothripinae	18
		Sericothripinae	13
		Thripinae	341
Tubulifera	Phlaeothripidae	Idolothripinae	24
		Phlaeothripinae	197
Total			**691**

The tables with lists of thrips species per country included in this chapter (tables 2.5 - 2.9) were constructed using the compiled data from this list. During the period of study, the list kept being updated as more literature became available.

All extant Thysanoptera families were represented in the Palaearctic with the exception of Heterothripidae and Uzelothripidae, which include mostly tropical species. The subfamily with the largest number of species in the Palaearctic is the family Thripinae with 270 species, followed by the subfamily Phlaeothripinae with 170 species (ThripsWiki, 2021). Therefore since these two subfamilies are the most highly represented in the Palaearctic Region, it is extremely likely that a great number of new records to the Maltese Islands would belong to these two subfamilies. The species discovered in the Maltese Islands during the current study and their taxonomy is discussed in the results chapter of this work.

Studies on the Thysanoptera of the Maltese Islands

Literature on the Thysanoptera of the Maltese Islands records nine species belonging to three families from the Maltese Islands. The first record was by Saliba (1963), who mentioned the Onion Thrips, *Thrips tabaci*, referring to it as "*nemusa tal-basal*" (Maltese vernacular name) as this species is an agricultural pest found commonly on onions (*Allium cepa*: Amaryllidaceae) and garlic (*A. sativum*: Amaryllidaceae). This species was recorded again by Farrugia (1997) as a pest on cauliflowers (*Brassica oleracea* var. *botrytis*: Brassicaceae). The author argued that the species is only abundant in warm weather, and that males are wingless and very rare. Farrugia (1997) also pointed out that this thrips species causes more damage on the lower surface of large leaves since these offer more shelter to the insects. He also claimed that *T. tabaci* causes more damage to cabbage cultivars, causing a rough, bronzed oedema on the leaves inside the head during feeding.

Mound and Palmer (1974), in their paper on thrips from Israel, refer to specimens of *Tenothrips discolor* (Karnyi, 1907) found in the collections of the British Museum of Natural History and collected from Malta.

Mifsud (1997) also reported the presence of *Thrips tabaci* as fairly common and also records the introduced presence of the Western Flower Thrips, *Frankliniella occidentalis*. This author also reported the introduction of several glasshouse thrips predators to control thrips pests, namely the hemipteran bugs *Orius laevigatus* ssp. *laevigatus*, and *O. insidiosus* (both in Anthocariidae). According to Mifsud (1997), the first species was found to be an active predator on thrips, while *O. insidiosus* being a less effective one.

In another work, Mifsud and Watson (1999) mentioned the presence of *Franklinella occidentalis* as an alien pest species, originating from North America, which has spread pandemically. The authors describe the species as a pest causing serious damage to seed crops, nursery stock, peaches, plums, nectarines, strawberries, sweet peppers, grapes, cotton, and many other crops. Mifsud and Watson (1999) also highlighted that this species causes discoloration on "*open blooms especially carnations*…" (p.30), *Dahlia* and *Gerbera* in greenhouses. They also described the species as a vector of Tomato Spotted Wilt Virus

(TSWV) which can result in the destruction of up to 100% of the tomato crop. Mifsud and Watson (2000) described the presence of another introduced alien species of tropical American origin, the Greenhouse Thrips, *Heliothrips haemorrhoidalis* describing it as a pest which has also spread pandemically and which is highly polyphagous on plants with a relatively low nitrogen content. The impact of this species was under study at the time of publication of the work, but was found to affect plants such as cultivated *Viburnum* sp.

Haber and Mifsud (2007) recorded the Olive Thrips, *Liothrips oleae* (Costa, 1857), a species of Mediterranean and eastern African distribution, which produces leaf galls on olive trees. The authors argue that, despite the species being common in the islands, and despite the deformities it causes on leaves, "… *it does not cause damage of economic significance.*" (p.146).

Mifsud et al. (2012), reported the presence of the alien species *Gynaikothrips ficorum* or Cuban Laurel Thrips, a gall inducing, oligophagous species originating from Southeast Asia. *Gynaikothrips ficorum* is a tubuliferan belonging to the family Phlaeothripidae and subfamily Phlaeothripinae. This species was recorded on *Ficus* with preference for *F. microcarpa* (Moraceae) from different localities in Malta and Gozo. a heteropteran bug, *Montandoniola moraguesi* (Anthocoridae) was also collected with the samples of *Gynaikothrips ficorum* (Mifsud et al., 2012). The heteropteran bug is a natural predator of the thrips. According to the authors, it is not known whether its introduction was accidental with the importation of *Ficus* plants or deliberate as a pest control measure. *M. moraguesi* was first recorded locally by Péricart (1972). This could imply that it is likely that *Gynaikothrips ficorum* could have occurred since then, though this bug is also recorded to feed on other species of thrips and other smaller insects.

The online database "*Fauna Europaea*" (Vierbergen, 2013) mentioned five species of thrips as occurring in the Maltese Islands, these being: *Aeolothrips tenuicornis,* Bagnall, 1926, *Melanthrips fuscus* (Sulzer, 1776), *Tenothrips discolor*, *Thrips tabaci* and *Gynaikothrips ficorum*, which was already mentioned by Mifsud et al. (2012). The first three species are typically found on flowers, where they either feed on pollen or, particularly in the first species mentioned, can even act as facultative predators on smaller species of insects including juvenile and adult stages of smaller species of Thysanoptera.

Vierbergen (2013) listed *Tenothrips discolor* from the Maltese Islands based on the record by Mound and Palmer (1974) who, in their paper on thrips of Israel, describe a specimen found in the BMNH and collected in the Maltese Islands in 1956.

Lastly, zur Strassen, (2003) and zur Strassen and Kuslitzky (2012) included the Maltese Islands as part of the geographical distribution range for *Melanthrips libycus* (Priesner, 1936), together with Southern Spain, Southern Italy, Libya, and Egypt.

Table 2.5 shows a list of the works that report thrips from the Maltese Islands, while table 2.6 shows the recorded Mediterranean distribution of the nine locally recorded species. Most of the works mentioned in table 2.5 happen to have collected data and thrips material as part of a research which either focused on pest identification and management, or as part of a general exercise in attempting to discovering the biodiversity of the Maltese Islands. No specific work on the Thysanoptera of the Maltese Islands has in fact ever been carried out. This information is what the current study set out to provide.

Table 2.5: Table of list of works which mentioned different species of thrips in the Maltese Islands.

Author	Date	Species
Saliba	1963	*Thrips tabaci*
Mound & Palmer	1974	*Tenothrips discolor*
Farrugia	1997	*Frankliniella occidentalis* *Heliothrips hemorrhoidailis*
Mifsud & Watson	1999	As above
Haber & Mifsud	2007	*Liothrips oleae*
zur Strassen	2003	*Melanthrips libycus*
Mifsud et al.	2012	*Gynaikothrips ficorum*
Vierbergen	2013	*Aeolothrips tenuicornis* *Melanthrips fuscus* *Tenothrips discolor* *Gynaikothrips ficorum*

Table 2.6: Recorded distribution of species found in the Maltese Islands, and their distribution range from neighbouring Mediterranean countries (Bl: Balearic Is.; Co: Corsica; Cr: Crete; Cp: Cyprus; Fr: French mainland; Gr: Greek Mainland; It: Italian Mainland; Sa: Sardinia; Sic: Sicily; Sp: Spanish mainland; Li: Libya; Tn: Tunisia; Al: Algeria; Isr: Israel; Eg: Egypt)

Family	Species	Country																
		Bl	Co	Cr	Cl	Cp	Fr	Gr	It	Sa	Sic	Sp	Li	Tn	Al	Isr	Tky	Eg
Aeolothripidae	*Aeolothrips tenuicornis*						✓		✓		✓	✓				✓	✓	✓
Melanthripidae	*Melanthrips fuscus*			✓		✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
	Melanthrips libycus										✓	✓	✓			✓		✓
Thripidae	*Heliothrips hemorrhoidalis*		✓				✓	✓	✓	✓	✓	✓	✓			✓		✓
	Franklinella occidentalis			✓		✓	✓		✓		✓	✓		✓	✓	✓		
	Tenothrips discolor		✓	✓		✓	✓	✓	✓		✓	✓		✓		✓	✓	✓
	Thrips tabaci	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓		✓	✓	✓
Phlaeothripidae	*Gynaicothrips ficorum*		✓	✓				✓	✓	✓	✓	✓				✓		✓
	Liothrips oleae		✓				✓		✓			✓				✓		

Studies on Thysanoptera of the Mediterranean Region

The Thysanoptera of Mediterranean countries, particularly European ones, are rather adequately covered by literature even though for certain territories and for the Tubulifera, no recent updates are available. Books on the subject include books by Dr. Hermann Priesner namely “*Die Thysanopteren Europas*” (1928), “*A Monograph of the Thysanoptera of Egyptian Deserts*” (1960) and “*Ordnung Thysanoptera (Fransenflüger: Thripse)”* (1964), and others such as “*Conoscere i Tisanotteri*” by Marullo (2003), “*Die Terebrantien Thysanopteren Europas*” by zur Strassen (2003), and “*Thripse*”, by Moritz (2006). The biodiversity of the Thysanoptera of Mediterranean countries has been discussed in greater detail in a number of papers and websites, as briefly outlined hereunder.

The Thysanoptera of Spain were described by the website “*Fauna Iberica*” (Goldarazena, 2001, in Angeles-Ramos, 2014), which mentioned 286 species from five families occurring in the Spanish mainland and the Balearic Islands; and the website “*Fauna Europaea*” (Vierbergen, 2013), which updated the species list to 297 species from six families. It has to be pointed out however that the list provided by this website may have errors so the species list may not always be accurate. Regarding the thrips of agricultural importance for this country, Navarro Campos (2013) studied the agricultural impact of the pest species

Pezothrips kellyanus which affects citrus orchards in Spain and is also found in other Mediterranean countries. Navarro Campos (2013) claimed that this pest has quickly spread over vast areas in Spain where citrus trees are grown and has replaced other pest species such as *Thrips tabaci* and *Frankliniella occidentalis*. A more recent work by Goldarazena (2016) had recorded the presence of *Thrips hawaiiensis* (Morgan, 1913), a potential polyphagous pest originating from Asia which is found on a number of cultivated flowers.

The website "*Fauna Europaea*" (Vierbergen, 2013), listed 257 species from six families as occurring in the French Mainland and Corsica. Reynaud et al. (2008) recorded the presence of *Thrips hawaiiensis* in the south of France. The authors also correctly predicted that this species will colonize other European countries. The more recent work by Pizzol et al. (2012) recorded the presence of *Microcephalothrips abdominalis* (Crawford, 1910), a species of neotropical origin in and around greenhouses in the south of France. Pizzol et al. (2014) also mentioned 53 of the species listed for this country as occurring inside and around greenhouses in the south of France.

The Thysanoptera fauna of Italy and the surrounding Islands has been extensively documented, with works including those by Ravazzi (2001), who recorded eight new species of thrips; Conti et al. (2001), who investigated the agricultural impact of *Pezothrips kellyanus* in Sicily; the website "*Fauna Italica*" (Stoch, 2003) which listed 214 species from five families; the website, "*Fauna Europaea*" (Vierbergen, 2013) updated the list to 221 species belonging to three families from mainland Italy, 40 species from Sardinia and 81 from Sicily; Rapisarda and Tropea Garzia (2004), who also spoke about the impact of the pest species, namely *Thrips tabaci*, *Frankliniella occidentalis* and *Pezothrips kellyanus* in Sicily, and De Marzo and Ravazzi (2005), who added yet five more new species records. The most recent list of thrips from Italy was found in the work by Marullo and De Grazia (2013). These authors updated the list of species to 255 species from six families with *"…more than 170 species* [that] *live in Central and Northern Europe, more than 60 are Mediterranean or North African, and 12 are introduced from more distant countries"* (p.127). More recently, Marullo and De Grazia (2017) recorded the presence of *Thrips hawaiiensis* on various flowers, vegetables and fruit trees. It seems that, due to environmental changes which can be either related to climate change, or to mass importation of plants from tropical countries, tropical species such as the afore-mentioned *Thrips hawaiiensis* are being introduced into different countries with the possibility of devastating consequences to the agriculture.

The thrips fauna of the former Yugoslavian countries have been relatively little studied. Trdan, (2001) and Trdan et al. (2003) recorded 107 species from Slovenia, and 114 from former Yugoslavia; while Trdan et al. (2005) reported six species of *Aeolothrips* in Serbia, Montenegro and Slovenia and investigates the prey relationships of *A. intermedius* Bagnall, 1934 in Slovenia; finally, Trdan et al. (2012) reported first records of *A. gloriosus* Bagnall (1914) in Slovenia. Andjus et al. (2001) recorded 19 species of thrips from coloured water traps in winter wheat field crops in Serbia; and Andjus et al. (2008) discussed specimens of *Sericothrips* (two species) and *Neohydatothrips* (two species) from the Natural History Museum in Belgrade and which were collected from Serbia. Finally, according to Raspudic et al. (2009) 47 species of Thysanoptera belonging to four families were recorded in Croatia.

There occurs no formal checklist to the Thysanoptera of Greece (Baderitakis et al., 2015), however a number of works gave an approximate number of species occurring in the country. Jenser and Tsanakakis (1985) recorded 22 species of thrips from 29 host-plants in Northern Greece, while zur Strassen (1986) who conducted studies on the Thysanoptera in Greek Islands, records 79 species, with a total of 108 species from Greece, of which eight are locally recorded species (see table 2.1). The author also mentioned the record of 77 species from Albania. The website "*Fauna Europaea*" (Vierbergen, 2013) also quoted the same number of species belonging to four families to occur in the Greek Mainland, one species from the Cycladic islands and 25 species from Crete. More recently Baderitakis et al. (2015) studied the thrips found on alfalfa and cultivated and wild *Medicago*. The authors discussed the idea of a "host-plant" as one where all the stages of the life cycle of the thrips are found. They report around eight species of thrips on the plants under study and report only alfalfa as being the host-plant for *Thrips tabaci* and *Frankliniella occidentalis*.

Tunc et al. (2012) claimed that most work on the Thysanoptera of Turkey focuses on "*single agroecosystems and areas*" (p. 592). In the study by the authors on thrips from the Aegean region in spring between 1993 and 1995 revealed 82 species belonging to five families with 28 species being new records. Atakan et al. (2015) recorded *Thrips hawaiiensis* from Turkey. Tunc and Hastenpflug-Vesmanis (2016) updated the list of species from all the regions in Turkey to 193 belonging to five families.

The most complete checklist for the Thysanoptera fauna of Cyprus was that in the website "*Enalia Physis*" (Srour, 2015) Cyprus. This website listed 70 species from four families. The more recent work by Collins and Philippou (2016) recorded *Gynaikothrips uzeli*, a gall inducing thrips of southeast Asian origin which mostly attacks *Ficus benjamina* (Moraceae)*.* The authors also described the presence of the predatory tubuliferan *Androthtrips ramachandrai*, which inhabits the galls of *G. uzeli* and preys on it in Cyprus.

When it comes to literature on the thrips of the Mediterranean Asia minor countries, Jenser (2009) mentioned 15 species from Syria and points out 14 of them as new records. In his work, the author also made a vague reference to a checklist of Syria without quoting the author or other publishing details. It was not possible to obtain this checklist in the current study. Yaseen Ali (2014) reported the presence of the gall inducing *Gynaikothrips uzeli*, and the tubuliferan *Androthrips ramachandrai* (Yaseen Ali, 2015).

zur Strassen and Kuslitzky (2012) compiled an annotated checklist of Thysanoptera for Israel. This checklist included 157 species from three families. The authors classified the species in the list as native species of Mediterranean origin and introduced species which are mostly agricultural pests. A similar scenario was expected to be found regarding the thrips fauna of the Maltese Islands.

Other relevant work on the thrips of the Mediterranean include: Minaei and Mound (2015), who spoke about the disjunct zoogeographical distribution between America and Mediterranean of a number of unrelated thrips species; and Nickle (2003a; 2003b; 2008; 2009), who listed a number of thrips species imported with plant material from the Mediterranean and North Africa, and intercepted in the US.

Work on the biodiversity of thrips of northern Africa is also scarce, though a small number of papers do exist.

When the author Richard zur Strassen passed away, his unpublished records, which included a number of species from various countries, amongst which Egypt, were compiled by the team of the website "*ThripsWiki*" (2021). In all, the author described 133 species from four families from Egypt, although the website claims that these records need confirmation since these lists were considered as drafts. Abd el Wahab (2015) recorded the presence of the Marigold thrips, *Neohydayothrips samayunkur* Kudô, 1996, on *Tagetes* spp. in the region of Giza, Egypt.

Very few species are described from Libya. This is due to the lack of work concerning Thysanoptera which was conducted in this country. Priesner (1960;1964) include Libya in the geographical distribution of *Franklinothrips megalops* Trybom (1912). Moritz et al. (2014) added *Limothrips cerealium* and *Gynaikothrips ficorum* to the list of species from this country. The latter species is also mentioned by the website "*Fauna Europaea*" (Vierbergen, 2013) while zur Strassen and Kuslitzky (2012) describe *Melathrips libycus* to this list. Finally, Fathy Mohammed and Shaurub (2010), provided a checklist of insects from Misurata, Libya and recorded two species of Thysanoptera; The thripid *Heliothrips haemorrhoidalis* and the phlaeothripid *Haplothrips cottei* Uzel, 1895.

Jenser (1982), recorded 12 species of Thysanoptera captured from expeditions in Tunisia. Some of the named species, namely *Aptinothrips rufus* Haliday, 1836 and *Chirothrips manicatus* Haliday, 1836 are species which are quoted by various authors (e.g. Stoch, 2003; Vierbergen, 2013; Marullo & De Grazia, 2013) as being widespread across the Mediterranean and are therefore likely species to be found locally. Elimem et al. (2011) who investigated *Frankliniella occidentalis* in pepper crop greenhouses in the region of Mokhine in Tunisia found out that thrips populations can increase with conditions such as increase in ambient temperature, relative humidity and longer days (such as those in April and May). Elimem et al. (2013) record the presence of *Bregmatothrips dimorphus* (Priesner, 1919) in Tunisia.

More recent work describing the Thysanoptera fauna of Tunisia include that by Elimem and Chermiti (2014), who describe the occurrence of *Thrips australis* (Bagnall, 1915), as well as the study by Belaam Kort et al. (2020), who recorded 21 species of thrips belonging to three families in a study of the Thysanoptera fauna occurring in citrus orchards.

Works investigating the thrips of Algeria include that by Razi et al. (2013) who studied the thrips pest species that occur in the bean plant *Vicia faba* in the Biskra region in Algeria, found six species of thrips the majority of which are harmful to the plant with *Frankliniella occidentalis* being also a vector for orthotospoviruses. A number of the mentioned species in this work, namely *Aeolothrips intermedius*, *Rhipidothrips gratiosus* Uzel, 1895, *Thrips angusticeps* Uzel, 1895 and *Odontothrips loti* (Haliday, 1852) are also recorded from different countries in the Mediterranean (e.g. Vierbergen, 2013; Stoch, 2003; Marullo & De Grazia, 2013) and thus are also likely candidates to be found in the Maltese Islands. The more recent work by Halimi et al. (2022) which studied species of thrips frequenting olive orchards in Algeria added six more species to the list from this country.

Table 2.7 summarises the number of families and species of Thysanoptera recorded in Mediterranean countries as reported from the above-mentioned literature.

Studies on Thysanoptera of other European countries

The records of countries in Europe and the rest of the Palaearctic Region are also of interest to the current study since according to literature, the geographical distribution range of a number of species found in the Mediterranean countries also extends to these mentioned regions. This can possibly happen due to the fact that these small insects can be carried for very long distances by wind currents which these insects exploit in order to facilitate dispersal.

The thrips fauna of the UK has been rather extensively studied by Mound et al. (1979) and Kirk (1996). Collins (2010) who described 176 species with 19 non-native species found to be established in glasshouses and a further 52 intercepted at quarantine inspections of imported plant material. The most recently updated checklist of the thrips of the UK by Mound, Collins & Hastings (2018) have revised and updated the work carried out in 1979 and made the material online in the website "*Thrips Britannica et Hiberica*". This website listed 177 species.

Table 2.7: Table of list of works which mentioned different species of thrips in Mediterranean countries.

Authors	Date	Country/ region	Families	Species
Vierbergen Goldarazena, 2001, in Angeles-Ramos Navarro Campos Goldarazena	2013 1997- 2013 2014 2016	Spanish mainland and Balearic Islands	6	297
Vierbergen Reynaud et al. Pizzol et al. Pizzol et al.	2013 2008 2012 2014	French mainland and Corsica	6	257
Ravazzi Conti et al. Stoch Vierbergen Rapisarda & Tropea Garzia De Marzo & Ravazzi Marullo & De Grazia Marullo & De Grazia	2001 2001 2003 2013 2004 2005 2013 2017	Italy mainland and Islands	6	255
Trdan et al. Trdan et al. Trdan, Vidrih & Vierbergen.	2003 2005 2012	Slovenia	4*	109
Raspudic et al.	2009	Croatia	4*	47
Andjus et al. Trdan Andjus et al.	2001 2005 2008	Other former Yugoslavian countries	4*	114
zur Strassen	1986	Albania	4*	77
Jenser & Tzanakakis zur Strassen Vierbergen Baderitakis et al.	1985 1986 2013 2015	Greek mainland, Cycladic Islands and Crete	4	112
Tunc et al. Atakan et al. Tunc & Hastenpflug Vesmanis	2012 2015 2016	Turkey	5	193
Srour Collins & Philippou	2015 2016	Cyprus	4	71
Jenser Yaseen Ali	2009 2014	Syria	2	16**
zur Strassen & Kuslitzky	2012	Israel	3	157
Abd El Wahab. Thripswiki Contributors	2015 2019	Egypt	4	134
Priesner Fathy Mohamed & Shaurub zur Strassen & Kuslitzky Vierbergen	1960;1964 2010 2012 2013	Libya	4	6**
Jenser Elimem et al. Elimem et al. Elimem & Chermiti Belaam et al.	1982 2011 2013 2014 2020	Tunisia	3	14** 21
Razi et al. Halimi et al.	2013 2022	Algeria	3	13**

* These works focused their studies in specific regions within the country so the lists may not be complete for that specific country.

** These works either focused on a generic coverage of fauna (e.g. Fathy Mohammed & Shaurub, 2010) or else focused on the Thysanoptera found on specific plants or plant groups, so these lists are not exhaustive for the country under study.

In the Netherlands, Vierbergen (2001) reported a survey conducted every year since 1995 to the publishing date by the Dutch Plant Protection Service on the occurrence of glasshouse Thysanoptera, in the open in the Aalsmeer area. The work recorded 41 thrips species.

zur Strassen (1994) reported the presence of the rare mycophagous species *Haplothrips carpathicus* Pelikan, 1961 and *H. feldsi*, Crawford (1939) in Germany and Sweden, as well as *Cephalothrips coxalis* Bagnall, 1926 in Sicily. The author claimed that these new records raise the list of species from Germany to 224.

Gertsson (2015) provided a complete checklist of Thysanoptera from Nordic countries, namely Sweden, Norway, Denmark, and Iceland. The list provided descriptions for 60 of the 143 species of thrips found in all the regions in Sweden, but also described an additional 53 species from other Nordic countries. The total number of species described in this work is 196 belonging to five families.

Kucharzyk and Zawirsika (2001) reviewed the knowledge of the biodiversity of thrips fauna in Poland. The current list of species at the time of publication was 216 belonging to five families. Amongst these listed species, 34 of these records dated from around World War II and were only one-time records while 25 new records being identified between 1991 and 2001. The authors also argued that the best studied habitats in the country are the xerothermic ones. The more recent work by Kucharzyk and Salapa (2011) recorded the presence of *Hoplandrothrips famelicus,* (Priesner, 1926) in Poland on the apical shoots of *Phragmites australis* (Poales: Poaceae)*,* particularly in the galls of the dipteran *Lipara* sp. (Diptera: Chloropidae) in habitats where water was abundant. Sierka et al. (2008) described the presence of 105 species from Carpathian mountain region in Poland.

Fedor et al. (2004) and Sierka (2006) claimed that up to 151 species have been recorded in Slovakia. The author, who for almost 40 years of research in the Šúr Nature Reserve, identified 98 species, also reported the presence of *Chirothrips ambulans* Bagnall, 1932 *"… with saline vegetation, various shrubs, grasses and sedges within Pannonian Wood*." (p. 641) in the country.

Karadjova and Krumov (2015) provided a checklist for the Thysanoptera fauna of Bulgaria, with details of geographical distribution and feeding preferences of thrips species.

Their findings showed the presence of 155 species in six families. The authors also listed 14 pest species are listed for Bulgaria, of which *Frankliniella occidentalis*, *Thrips tabaci* and *Haplothrips tritici* (Kurdjumov, 1912) are of economic importance. The paper also evaluated "… *the biodiversity of Thysanoptera and the extent to which each region of the country has been studied*" (p.93).

Literature on the Thysanoptera of Belgium includes the work by Lock (2006) who claimed that according to the specimens found in the Belgian Royal collection, together with literature on species for this country, the Thysanoptera fauna consists of at least 64 species belonging to four families. However, this author argues that this number probably accounts for less than half the number of species that actually occurs in Belgium. The website *"Fauna Europaea*" (Vierbergen, 2013) also mentions *Haplothrips tritici* from Belgium, thus bringing the total number of species for this country to 65.

Literature on the Thysanoptera of Romania focuses on specific regions rather than the whole country. Sierka et al. (2008) listed 158 species belonging to four families from the Carpathian region, while Vassiliou-Oromolu et al. (2009) found 21 thrips species belonging to four families in a southern Romanian vineyard. These works together listed 169 species belonging to four families, but it is possible that more species exist in regions which were not covered by these studies.

For Slovakia, Sierka et al. (2008) 136 species were recorded from the Carpathian region, while the more recent work by Zvarikova et al. (2020) gave a more complete picture of the thrips species of this country by listing a total of 189 species belonging to four families.

The Thysanoptera fauna of Hungary has been described by Jenser (2011), who listed 219 species belonging to four families.

Table 2.8 summarises the number of families and species of Thysanoptera recorded in European countries in the Palaearctic Region as reported from the above-mentioned literature.

Table 2.8: Table of list of works on Thysanoptera from different European Countries

Authors	Date	Country	Families	Species
Mound et al. Kirk Collins Mound et al.	1979 1996 2010 2018	UK	6	176
Vierbergen	2001	Netherlands	4*	41
zur Strassen	1994	Germany	3*	224
Gertsson	2015	Nordic countries	5	196
Kucharzyk & Zawirsika Sierka et al. Kucharzyk & Salapa	2001 2008 2010	Poland	5	217
Fedor et al. Sierka Sierka et al. Zvarikova et al.	2004 2006 2008 2020	Slovakia	4	189
Karadjova & Krumov	2015	Bulgaria	6	155
Lock	2006	Belgium	4	65**
Sierka et al.	2008	Romania (Carpathian region)	4	158
Jenser	2011	Hungary	4	219

* The number of species quoted in these countries may represent a small portion of the total fauna because the research only focused on species in or around greenhouses.

** according to the author, this list is not complete.

Studies on Thrips of countries in the Eastern Palaearctic Region outside Europe, as well as India

Literature regarding thrips found in some countries from the eastern Palaearctic and India were researched since a number of species recorded in the Mediterranean also extend their geographical distribution to these areas. This is likely due to the fact that some plant species where these thrips occur have a wide geographical distribution extending from the Mediterranean basin to the Asiatic territory of the Palaearctic Region.

Moreover, since the species descriptions given in the literature regarding the thrips of these countries were often more detailed than other literature describing the same species from the Mediterranean basin, descriptions of thrips in the Palaearctic Region outside Europe as well as India were used in the identification of specimens collected in the Maltese Islands.

Most of the work outside Europe but still in the Palaearctic Region comes from Iran and Iraq. It is probable that little or no studies were carried out in a number of other neighbouring countries since no relevant literature was found. Abdul-fatah Hamoodi and Abdul-Rassoul (2004) provided a key for 22 species belonging to the family Thripidae, collected from 1999 -

2001 from the centre of Iraq, of which four species being new to science and another 14 being new records to Iraq. 12 of these species are also found in the Mediterranean region.

Bhatti et al. (2009) provided a detailed checklist of the 177 species from six families found in Iran, and also compile quotes literature and studies on Iranian species. Fallahzedah et al. (2011) conducted surveys in the Fars province in Iran, revealing 20 species of thrips. Mirab-balou (2013) and Mirab-balou et al. (2013) investigated the species of the Family Thripidae from the Hamedan province in Iran, listing 84 species and updating the total species list of Iran to 206. The work of Mirab-balou et al. (2013) provided a complete checklist of the species of the country, listing and describing 217 species from six families. 151 of these species have a geographical distribution which includes the Mediterranean region.

Even though India is a country that is geographically situated in the Oriental region, it had been included in this work since a number of species present in Europe have geographical distribution ranges that extend to this country. Kumar et al. (2008) provided a checklist of 86 species belonging to three families of the thrips of Delhi. More recently, Rachana and Varathajaran (2017) claimed that literature listed 333 species of Indian thrips belonging to six families. The authors also provided a checklist of Indian terebrantian thrips. 54 species from this list are also found in the Mediterranean region.

Table 2.9 summarises the number of families and species of Thysanoptera recorded in Palaearctic Region outside Europe and India as reported from the above-mentioned literature.

Table 2.9: Table of list of works on Thysanoptera from different Countries in the Palaearctic Region outside Europe.

Authors	Date	Country	Families	Species	Species also occurring in Europe and the Mediterranean
Abdul-fatah Hamoodi & Abdul-Rassoul	2004	Iraq	3*	22	12
Bhatti et al. Fallahzedah, et al Mirab-balou Mirab-balou et al.	2009 2011 2013 2013	Iran	6	217	151
Kumar et al. Rachana & Varathajaran	2008 2017	India	6	333	54**

* The number of species quoted for Iraq may represent a small portion of the total fauna because the research only focused on the central region of the country.

** includes only Terebrantia.

This table also includes the number of species recorded from these countries which have also been recorded in Europe and the Mediterranean.

What is still not known regarding Thysanoptera of the Maltese Islands

Despite the fact that only nine thrips have been recorded from literature, a much larger number of others are likely candidates to be also found, both in natural habitats as well as in cultivated crop fields and greenhouses. Indeed, given the range of habitats and variety of flora in the Maltese islands, which amounts to about 1,100 species (Mifsud, 2013) including several endemic species, it is likely that one can be able to find between 40 to 50 indigenous species, perhaps even more. It is more difficult to predict what the number of alien imported species will be since this would depend on the type of plants imported, as well as the countries from where these plants are imported from.

This work therefore attempted to obtain such knowledge. It has also provided information concerning the geographical distribution of the species recorded in this study.

Materials and Methods

Materials and Methods

Schedule of Work

The study was subdivided into phases as illustrated in table 3.1.

Table 3.1: Summary table showing the schedule of work carried out in the current study.

Phase	Activity	2015-16	2016-17	2017-18	2018-19	2019-20	2020-22
I	Collection of data from literature						
II	Collection of thrips specimens from the field						
III	Mounting of specimens on microscope slides						
IV	Identification work						
V	Writing of thesis and constructing keys for identification of Maltese thrips						

Materials and Methods used

Preliminary research from Literature

In order to become familiar with the ecology and with the different feeding modes of the different thrips species, literature was consulted so as to decide in which habitats to conduct fieldwork in and what collection techniques to use.

A list of thrips species occurring in the Palaearctic Region, was compiled from existing recent works (Appendix I). This list contained: the author/s describing the species; plants on which the species was recorded including relevant literature source; notes on behaviour (if any) and geographical distribution. From this information, the likelihood of such species being locally found was assessed based on the presence of its host-plant and close geographical distribution. Geographical distribution of the locally recorded species was used to assign the species chorotypes.

For easy reference, the species were also colour-coded depending on what plant groups the species were found on and whether they are phytophagous, predatory or mycophagous.

Habitats chosen for collecting thrips

Thrips specimens were collected from 75 different locations in Malta and Gozo between Spring 2015 and Spring 2022. These specimens were gathered from plants found in a selection of the four main habitat types found in the Maltese Islands, the steppe, the garigue, the maquis and the woodland, as well as from some rare specialized habitats such as sand dunes and salt marshes. Specimens were also obtained from public and private gardens (e.g. The public garden in St. Thomas Bay, M'Scala, and the author's private garden), as well as from roadside roundabouts, cultivated fields and greenhouses. These sites yielded plants which are cultivated, non-indigenous species (e.g. *Salvia coccinea*: Lamiaceae, and *Yucca gloriosa*: Asparagaceae) and could have hosted thrips which may not have otherwise been found elsewhere. Plant species were identified using fieldwork guides such as Haslam et al. (1977), Weber (2004), Bonnett and Attard (2005), Weber and Kendizor (2006) and Lanfranco and Bonnett (2015). Photographs of some plants which were sampled and not identified in the field were sent to local plant specialists, namely Dr. Edwin Lanfranco and Mr. Stephen Mifsud for determination.

Some locations, e.g. Wied Ħesri, Maqluba l/o Qrendi, Dingli Cliffs, Buskett, Wied Għollieqa, Wied Qirda in Malta and Ramla Bay in Gozo were visited more than once at different times of the year in order to be able to follow the life-cycle of some species, as well as to collect different species which may occur on plants, particularly annuals, which may not be present all year round.

Figure 3.1 shows the locations of the sites where specimens were collected between 2015 and 2021. The sites have been colour-coded according to the date of collection. Table 3.2 lists the sites that appear in figure 3.1. These have been sorted by habitat type. Listed sites in table 3.2 are mapped on figure 3.1.

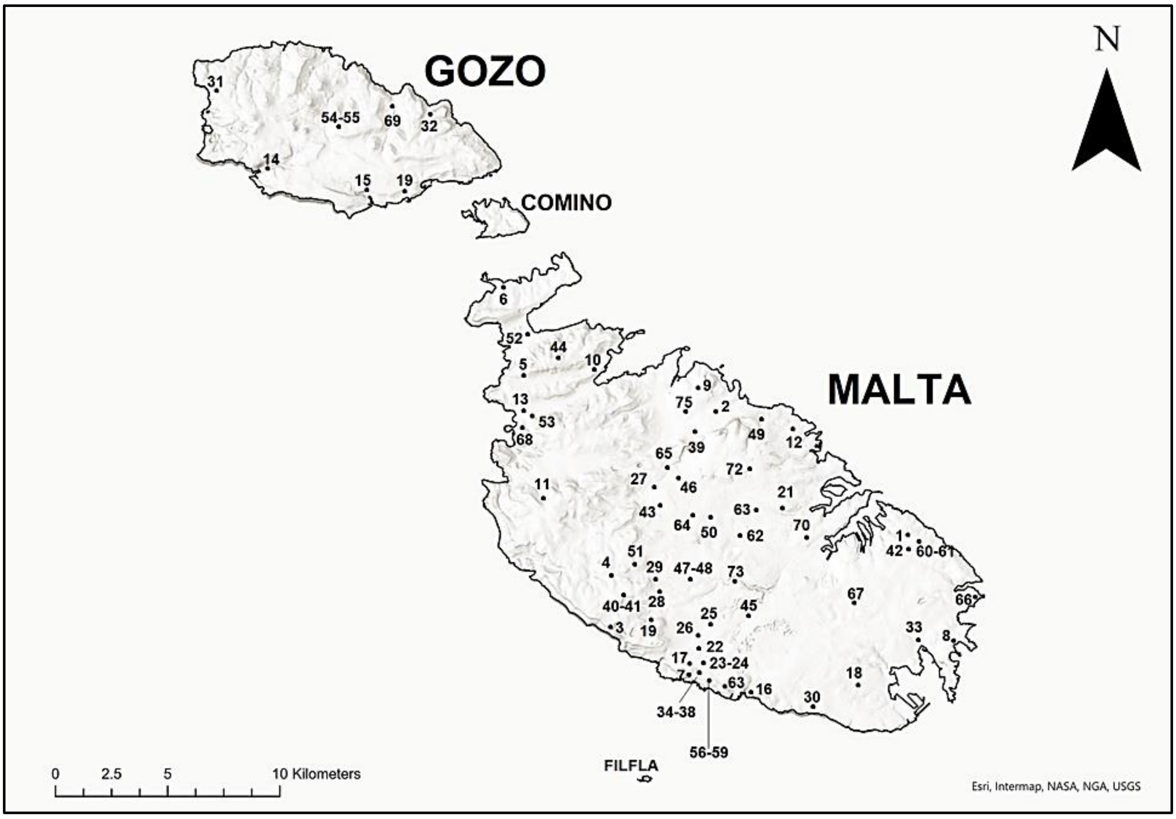

Figure 3.1: Map of the Maltese Islands showing the locations where data was collected from 2015-2022.

Table 3.2: Table showing a list of the sites visited to collect data, grouped per habitat type.

Predominant Habitat type	Site No	Site	Year of visit
Steppe	1	Ta' Sabbara, l/o Żabbar	2017
	2	Wied Anġlu, l/o Birguma	2018
Garigue	3	Dingli Cliffs, Dingli	2016
	4	Triq is-Santi, l/o Rabat	2016-17
	5	Behind Manikata Church, Manikata	2017
	6	Paradise Bay Hotel grounds, Ċirkewwa	2017
	7	Lapsi, Siġġiewi	2017
	8	Xrobb l-Għaġin, Delimara	2017-18
	9	Għaxqet l-Għajn, l/o Għargħur	2017-18
	10	Mġiebaħ, Xemxija	2018
	11	Lippija Tower, l/o Mġarr	2018
	12	l/o Science Centre, Pembroke,	2017
	13	l/o Majjistral Park, Għajn Tuffieħa	2018
	14	Xlendi Tower, Xlendi, Gozo	2018
	15	Ta Ċenċ, Gozo	2018
Maquis	16	Il-Maqluba, Qrendi	2016-17
	17	Fawwara, l/o Siġġiewi	2018
	18	Has-Saptan, l/o Gudja	2018

Woodland	19	Buskett, Dingli	2016
	1	Ta' Sabbara, l/o Żabbar	2016-17
	20	Mgarr ix-Xini, Gozo	2017
Valleys	21	Wied Għollieqa, San Ġwann	2016-18
	22	Wied Ħesri, Siġġiewi	2016-18
	23	Wied Musa, Siġġiewi	2016-17
	24	Wied Xkora, Siġġiewi	2016
	25	Wied Qirda, Żebbuġ	2016
	26	Wied il-Baqqiegħa, Żebbuġ	2017
	27	Wied Speranza, Mosta	2017
	28	Wied Qlejgħa, l/o Rabat	2017
	29	Wied tal-Fiddien, l/o Rabat	2017
	30	Wied Babu, Żurrieq	2017
	31	Il-Qattara, Dwejra, Gozo	2017
Sand dunes	32	Ramla l-Ħamra, Gozo	2017-18
Saltmarsh	33	Il-Ballut, Marsaxlokk	2017
Town and Country Roadsides	34	Triq it-Tank, Siġġiewi	2016-17
	35	Triq Dun Manwel Zammit, Siġġiewi	2017
	36	Triq Mons. M. Azzopardi, Siġġiewi	2017
	37	Triq Blat il-Qamar, Siġġiewi	2017
	38	Triq l-Imdina, Siġġiewi	2017
	39	Triq S.Pawl, Naxxar	2017
	40	Triq it-Tiġrija, Rabat	2017
	41	Triq ir-Rebħa, Rabat	2017
	42	Triq il-Labour, Żabbar	2017
	43	Road, l/o Ta' Qali	2017
	44	Road, l/o Popeye Village	2018
	45	Triq S. Tumas, Luqa	2018
	46	Triq il-Buqana, l/o Mosta	2018
	47	Mdina road, L/O St Dorothy School, Żebbuġ	2018
	48	Mdina Road, Żebbuġ	2018
	49	Road, Ġebel San Pietru, l/o Madliena	2018
	50	Triq tat-Torba, Attard	2018
	51	Road, Il-Kunċizzjoni l/o Rabat	2018
	52	By-pass to Għadira Bay	2018
	53	Road, /o Għajn Tuffieħa	2018
	54	Triq l-Universitas, Victoria, Gozo	2018
	55	Triq Mro. Dirjanu Lanzon, Victoria Gozo	2019
Private and Public Gardens	56	Private garden 1, Siġġiewi	2015-22
	57	Private garden 2, Siġġiewi	2016
	58	Plant nursery, Siggiewi	2016
	59	Private garden 3, Siġġiewi	2016
	60	Private garden 1, Żabbar	2016-17
	61	Private garden 2, Żabbar	2016-17
	62	Junior College Grounds Ringroad, Msida	2016-18
	63	University Grounds, Msida	2017
	64	Private garden, Attard	2017
	65	Private garden, Mosta	2017
	66	Public garden, Bajja ta' San Tumas, Marsaskala	2017
	67	Public garden, Sta. Lucia	2017
	68	Public garden, Grounds, l/o Golden Bay	2017
	69	Public garden, Triq Santa Marija, Qbajjar Gozo	2018
Roundabouts	70	Floriana Car Park Roundabout, Floriana	2016
	71	Roundabaout, Triq il-Mitħna, Qormi	2016
Open Fields	72	Farm l/o San Ġwann	2018
	73	Farm l/o Qormi	2018
	74	Farm, l/o Siġġiewi	2017
	75	Field, l/o Għargħur	2018

Collecting and temporarily storing thrips material

Fieldwork visits lasted approximately two and a half hours, during which time, thrips were collected from a number of encountered plant species found in the site under study. Predatory and phytophagous thrips specimens were collected from 398 different plant species, 252 of which being indigenous and 146 being alien cultivated species. The choice of plants on which collection took place was influenced by the plants mentioned in the literature (Appendix I), however, other plant species encountered during fieldwork sessions especially endemics were also examined for thrips specimens. The full list of plant species from which thrips were collected is included in Appendix II.

Plants under investigation were beaten using a plastic rod onto a white plastic tray, as recommended by Mound et al. (1976), Palmer et al. (1989) and Mound and Kibby (1998). The beating process, particularly if carried out in full sunlight, stunned the thrips making them easier to collect.

Specimens presumed to be mycophagous (feeding on fungal spores or other tissues) were collected from sites containing leaf litter and dead wood. Leaf debris was placed on a 1mm mesh and beaten so that only small particles fall in the collecting tray. Samples from locally grown as well as imported crops were also checked for Thysanoptera and specimens obtained by beating, or by hand picking using a fine brush as described earlier in this section.

Thrips material was also obtained from Malaise traps (fig. 3.2), used for small flying insects such as Diptera and Hymenoptera, set up by Professor David Mifsud at Fawwara l/o Siġġiewi and at Buskett. Material was collected in ethanol.

Figure 3.2: Malaise trap https://www.nhbs.com/malaise-trap-3

Collected specimens were transferred into collecting Eppendorf tubes by means of the fine brush (e.g. size 00) dipped in AGA fluid mixture. This mixture, also placed in the Eppendorf tubes, consisted of 60% alcohol, glycerine and acetic acid at a ratio of 10:1:1. AGA enables specimens to distend the body and keeps limbs supple, so it was ideal to use for temporarily preserving specimens before these were mounted onto microscope slides for later identification work. Each Eppendorf tube was labelled and the location, date, time and host-plant where the specimens were collected from were recorded in pencil, since any form of ink may dissolve when in contact with AGA. The tubes were subsequently sorted alphabetically per host-plant and per year of collection and placed in hermetically sealed jars until specimens could be individually mounted onto microscope slides. This prevented evaporation of the AGA solution. Squares of 1 x 1 cm plastic garden mesh were used in order to stack the Eppendorf tubes inside the hermetically sealed jars.

Slide mounting procedure of thrips

Preparation of thrips specimens for viewing under higher magnifications using compound microscopy followed the method suggested by Mound et al. (1976), Palmer et al. (1989), Kirk (1996), Mound and Kibby (1998) and Masumoto (2010) with a number of modifications.

Prior to mounting specimens on slides, these needed to be treated using a two-phase procedure involving maceration and dehydration. Maceration was carried out as follows:

(i) the contents of the Eppendorf tube were poured into a glass watch glass under the stereo microscope (Phillip Harris A75989). The specimens selected for mounting were removed from the AGA mixture using micropins, placed into fresh 60% alcohol for about 30 minutes, and subsequently removed and placed in water for about two hours,

(ii) specimens were then removed from the water and placed in a 5% sodium hydroxide. Larger and/or darker specimens were left in the sodium hydroxide for a period between four to twelve hours, while smaller and/or paler specimens and larvae were left for a time between half an hour to three hours. During this time, specimens were periodically inspected using a stereomicroscope in order to see if the maceration process was complete. Once the process was finished, internal structures would be easily seen through the exoskeleton,

(iii) After immersing in the sodium hydroxide solution, specimens were placed in distilled water for around two hours and finally stored in a solution of 60% alcohol for at least 24 hours,

(iv) While being stored in the 60% alcohol solution, specimens were punctured between the hind coxae with a fine needle and massaged by means of fine micropins in order to expel most of the body contents and speed up entry of alcohols, and legs and antennae are spread.

Once the maceration process was complete, specimens were dehydrated. This step was necessary since specimens were mounted using Canada Balsam, a mountant which is ideal for preserving specimens over a long period of time. This mountant however tends to become cloudy on exposure to water, thus reducing the visibility of the specimen.

Dehydration was carried out as follows:

(i) specimens were removed from the 60% alcohol and placed for one hour in fresh 75% alcohol.

(ii) specimens were afterwards placed in 80% alcohol for 20 minutes,

(iii) and subsequently in 95% alcohol for ten minutes,

(iv) then in absolute alcohol for five minutes, and finally the absolute alcohol was replaced with fresh absolute alcohol and specimens left in this mixture for another five minutes,

(v) After this treatment, specimens were immersed into clove oil for a period of about two to three hours. Clove oil served as a good clearing agent and also rendered the specimens more flexible, thus reducing the possibility of legs and antennae breaking off during the mounting process and also enabling final positioning of wings legs and antennae during mounting.

Following dehydration, specimens were ready for mounting. The mounting procedure that was carried out involved the following steps:

(i) a drop of mountant was placed on a 13 mm coverslip, and the specimen was placing ventral side up on the cover slip,

(ii) final spreading adjustments of the legs, wings and antennae were carried out using micropins,

(iii) a drop of Canada balsam was placed on the centre of a glass slide and this was quickly lowered onto the cover slip. The quantity of mountant used was enough to support the cover slip. This was tricky to establish at first but eventually was established by practice,

(iv) the glass slide was re-inverted as soon as the mountant on the cover slip touched the mountant on the glass slide. This technique was used in order to avoid or reduce the formation of air bubbles.

(v) Specimens were allowed to dry in trays which stored the slides horizontally for a number of weeks.

(vi) Full collection data was preserved with the specimens. Labelling was done according to suggestions by Palmer et al. (1989), with head of specimen facing downwards on the slide. The left label contained the species, gender, morph and possible comments on anatomical features e.g. whether macropterous or micropterous, while the right-hand label contained plant on which the specimen was recorded on, location, date collector's name. Labels were also attached on top of sections of thick cards attached at the extremities of the glass slides which enabled stacking of the glass slides without the weight of the glass slides squashing the mounted specimen. An illustration of a mounted and labelled specimen is found in figure 3.3.

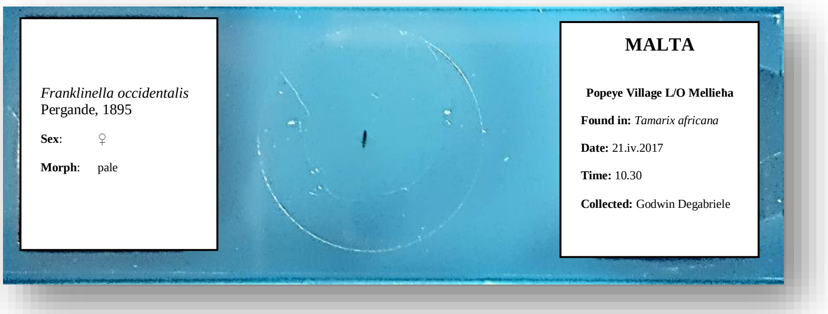

Figure 3.3: A microscope slide showing a mounted *Frankliniella occidentalis* specimen with labels.

Customization of methods described in literature for the current study

Whilst conducting the tasks of collecting and mounting specimens according to recommendations from literature, it was found that the following changes produced better insect yields and mounting results: The customisations included:

- Literature recommended the use of coloured water traps (e.g. Andjus et al., 2001) and sticky traps (e.g. Silva et al., 2020) as means to capture Thysanoptera. These types of traps were avoided the current study however, since specimens may be difficult to remove from these traps or are likely to become damaged, making them unsuitable for identification (Goldarazena pers. comm., 16.06.2022).
- Palmer et al. (1989) and Mound & Kibby (1998) suggested that prepared slides should be allowed to dry in an oven at 30 - 45ºC for six hours, and subsequently for three weeks to dry the mountant. Due to the hot and dry climate of the Maltese Islands this procedure was not necessary and mounted slides were simply stored horizontally in trays until the xylene solvent present in the Canada balsam mixture would evaporate.
- Palmer et al. (1989) suggested that specimens be left in clove oil for at least 30 minutes before mounting. During the current study however, it was found that leaving the specimens for a period of about two to three hours improved the clearing qualities of the clove oil and also rendered the specimens more flexible, thus reducing the possibility of legs and antennae breaking off during the mounting process and also enabling final positioning of wings legs and antennae during mounting.

  The material collected in the current study is housed in the private collection of the author. Representative samples of the different species have been donated to Dr. Goldarazena and It is planned that another sample collection will be donated to the Institute of Earth Systems at the University of Malta.

Thrips material in private and public collections

Professor David Mifsud had amassed a small collection of thrips specimens collected in the 1990s, which he made available. In all, this collection included 25 mounted specimens belonging to nine different species. Two of the species in this collection were unpublished. All of these species were subsequently recorded in the current study. This material from this collection was included with the material examined in the current study.

Curators of Natural History Museums in different countries in Europe were contacted to check if they had any material of Maltese thrips housed in their collections. In fact, at the British Museum of Natural History in London (BMNH),13 specimens belonging to six different species were found. Two of these species were previously unpublished and were also included with the material examined in the current study.

Processing of data

Species Identification

Six hundred of the collected specimens were mounted on microscope slides for examination under compound microscopy. Each mounted specimen was examined using the following microscopes: a Zeiss Axioscop 2 Plus microscope with DIC illumination fitted with a Canon `Powershot 20 camera; a Leica DM3000 microscope with DIC/ Phase contrast microscope illumination and fitted with a Leica ICC50 camera; and a Leica DVM6. Contrast and brightness of the photographs were adjusted using Gimp.

In order to identify the collected specimens to species level, literature was consulted (e.g. Lewis, 1973; 1997; Palmer et al., 1989; Mound & Kibby, 1998) to find out which anatomical characters are generally used for this purpose. For the current study it was decided to use the following anatomical features:

- shape of the head (fig. 3.4b);
- number and length of pairs of setae on the head;
- shape of the tentorium (fig. 3.4b);
- number and shape of antennal segments (fig. 3.4a);
- shape and number of sense cones on antennal segments III and IV (fig. 3.4a);
- colour of different antennal segments (fig. 3.4a);

- number and length of pairs of setae on pronotal margins (fig. 3.4b);
- distance between the pronotal setae on the anterior and posterior margins (fig. 3.4b);
- sculpture on the meso- and metathorax (fig. 3.7b);
- presence of medial setae on the meso- and metathotrax (fig. 3.7b);
- presence of metathoracic campaniform sensilla (fig. 3.7b);
- presence or absence of the spinula on the meso- and methathoracic endofurca (fig. 3.5b);
- number of setae on the anterior margin of the clavus (in Terebrantia) or the basal fore wing setae (in Tubulifera);
- fore wing shape (fig. 3.6);
- number of setae on the fore wing, namely on the veins and edges (in Terebrantia), or the duplicate setae on the trailing edge of the fore wing and texture of the cilia on the fore wing tip (in Tubulifera);
- presence of teeth on tarsi (fig. 3.5a);
- shape of abdominal segment I or the pelta (in Tubulifera);
- number and length of the discal and marginal setae on different abdominal segments; the presence of campaniform sensilla on abdominal tergites;
- presence or absence of craspeda and microthrichial combs comb on posterior margin of abdominal tergites (fig. 3.5b);
- texture of pleurotergites (in species of the genus *Thrips*);
- presence, absence and position of ctenidia or alternative structures (e.g. region of microthrichia) on abdominal segments (fig. 3.8a):
- presence or absence and size of trichobothria (in the genera Aeolothripidae and Melanthripidae) (fig. 3.8b);
- and chaetotaxy of segments IX and X (figs. 3.8a - b).

A glossary of the above mentioned terms has been compiled with minor modifications following Moritz et al.(2014b) (pp. 301-306).

Figure 3.4: (**a**) antenna; (**b**) head and pronotum

Figure 3.5: (**a**) fore leg; (**b**) pterothorax

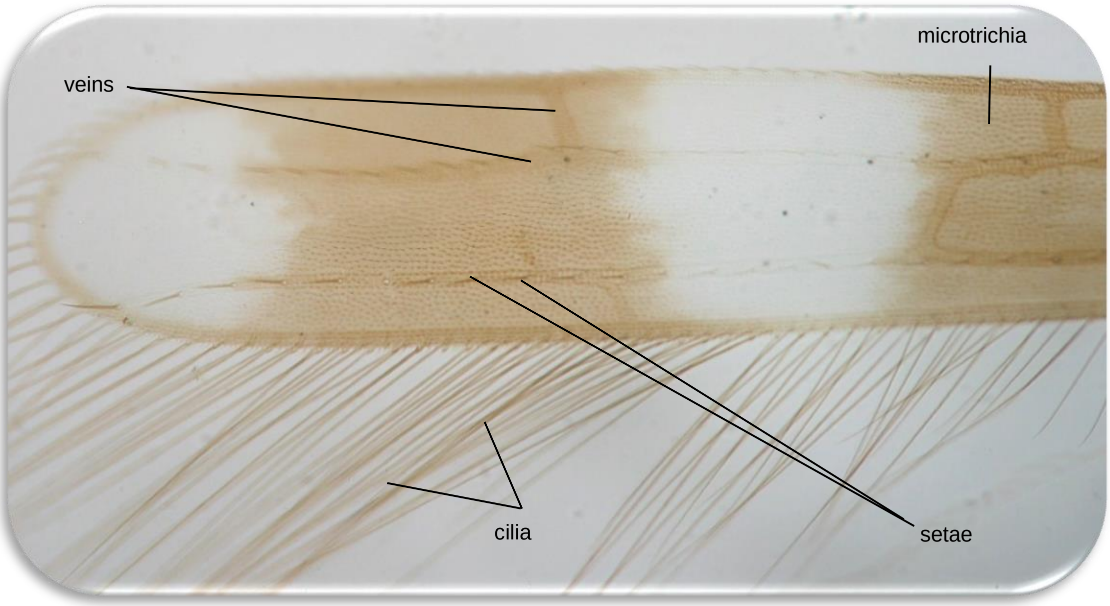

Figure 3.6: fore wing

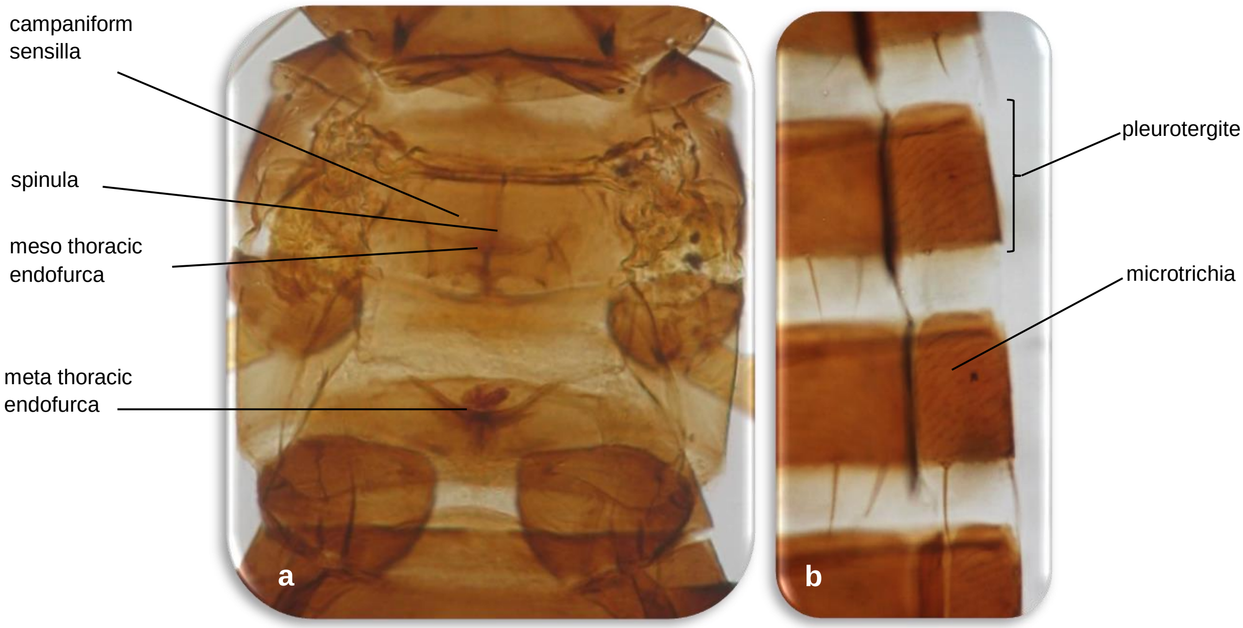

Figure 3.7: (**a**) pterothrorax; (**b**) abdominal pleurotergites

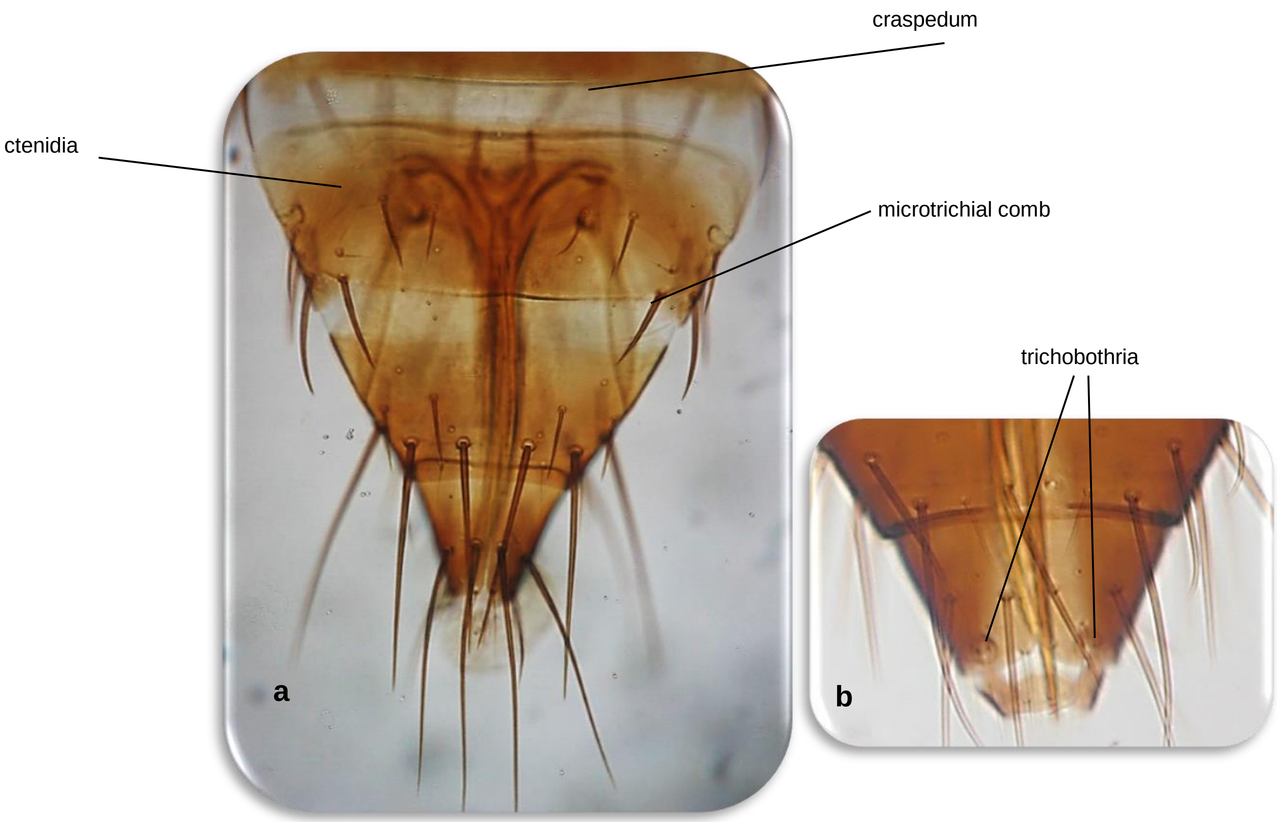

Figure 3.8: (**a**) abdominal segments VII – X; (**b**) segments VIII-X.

Most of the above morphological characters were used to observe specimens collected during this study.

A number of specimens ranging from 1 to 25 were examined per species. For each specimen, the above-mentioned characters were described. Appendix IVa includes the template for the description of specimens. Following this exercise, descriptions of the characters for each species were subsequently compiled, indicating any variations which occurred within each species. Appendix IVb is template for the description of the locally occurring species. These species descriptions were then compared to existing literature to confirm identity as well as to check for any discrepancies between descriptions in this literature and the those of the current study.

Guides such as Mound and Kibby (1998) and Zhang et al. (2018) were used first, since these provided distinct descriptions and keys that distinguished between different genera. Once most species were identified to genus level, the other guides and descriptions listed in table 3.3 that distinguish amongst different species were consulted.

Table 3.3: Table with list of works and guides used in the process of identification of thrips material for the current work.

Author	Date	Title	Melanthripidae	Aeolothripidae	Stenurothripidae	Thripidae				Phlaeothripidae		Other families/ notes
						Dendrothripinae	Panchaetothripinae	Sericothripinae	Thripinae	Idolothripinae (=Megathripinae)	Phlaeothripinae	
Stannard	1957	The Phylogeny and Classification of the North American Genera of the Suborder Tubulifera (Thysanoptera)	-	-	-	-	-	-	-	✓	✓	-
Priesner	1960	A Monograph of the Thysanoptera of the Egyptian Deserts	✓	✓	-	✓	✓	✓	✓	✓	✓	Heterothripidae Merothripidae
Priesner	1964	Ordnung Thysanoptera (Fransenfluger Thripse)	✓	✓	-	✓	✓	✓	✓	✓	✓	Heterothripidae Merothripidae
Stannard	1968	Thrips of Illinois	-	✓	-	✓	✓	✓	✓	✓	✓	Heterothripidae Merothripidae
Wilson	1975	A Monograph of the Panchaetothripinae	-	-	-	-	✓	-	-	-	-	-
Mound et al.	1976	Thysanoptera ("*Handbooks for the identification of British Insects*" series)	✓	✓	-	✓	✓	✓	✓	✓	✓	-
Mound & Palmer	1983	The generic and tribal classification of spore-feeding thrips	-	-	-	-	-	-	-	✓	-	-
Palmer et al.	1989	Thysanoptera ("*Guides to insects of Importance to Man*" series)	-	✓	-	✓	✓	✓	✓	✓	✓	Largely up to GENUS level Adults + Larval stages Merothripidae Heterothripidae
Palmer	1990	Identification of common North African thrips	-	✓		✓	✓	✓	✓	✓	✓	Fauriellidae Merothripidae
Palmer	1992	Genus *Thrips* from Pakistan to the Pacific	-	-	-	-	-	-	Genus *Thrips*	-	-	-
Moritz	1994	Pictorial key to the economically important species of Thysanoptera in Central Europe	✓	✓		✓	✓	✓	✓	✓	✓	Adults + Larval stages
Marullo	1993	Le specie italiane del genero *Aeolothrips* Haliday	-	✓	-	-	-	-	-	-	-	Genus Aeolothrips only
Kirk	1996	Thrips ("*Naturalists' Handbook*" series)	✓	✓	-	✓	✓	✓	✓	✓	✓	Adults + Larval stages

Table 3.3: Table with list of works and guides used in the process of identification of thrips material for the current work (continued).

Marullo & Mound	1996	Thrips of Central and South America	-	✓		-	✓	-	✓	✓	✓	Uzelothripidae Merothripidae Heterothripidae
Marullo	1996	La Collezione del Museo Civico di Storia Naturale "G.Doria" di Genova. Thysanoptera of South Italy.	✓	✓	-	-	-	-	✓	-	✓	Only a few species per family
Mound & Kibby	1998	Thysanoptera - an identification Guide	✓	✓	✓	✓	✓	✓	✓	✓	✓	Largely up to GENUS level Merothripidae Heterothripidae
zur Strassen	2003	Der terebrantien thysanopteren Europas	✓	✓	✓	✓	✓	✓	✓	-	-	Heterothripidae Fauriellidae Merothripidae
Marullo	2004	Morphological remarks and some biological notes on some southern Mediterranean species	✓	-	-	-	-	-	✓	-	✓	Only a few species per family
Moritz	2006	Thripse	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Moritz et al.	2014	Pest thrips of east Africa	✓	✓	-	✓	✓	✓	✓	✓	✓	-
Minaei & Mound	2008	The Thysanoptera Haplothripini (Insecta: Phlaeothripidae) of Iran.	-	-	-	-	-	-	-	-	Genus Haplothrips	-
Mound et al.	2017	Thysanoptera Aaotearoa – Thrips of New Zealand.	✓	✓	-	✓	✓	✓	✓	✓	✓	On-line Lucid Key
Mound et al.	2018	Thysanoptera Britanica et Hiberica	✓	✓	-	✓	✓	✓	✓	✓	✓	On-line Lucid Key
Zhang et al.	2018	Thysanoptera Chinensis	✓	✓	-	✓	✓	✓	✓	✓	✓	On-line Lucid Key
Mound et al,	2019	Oz thrips	✓	✓	-	✓	✓	✓	✓	✓	✓	On-line Lucid Key
Mound et al.	2019	Thysanoptera Californica	✓	✓	-	✓	✓	✓	✓	✓	✓	On-line Lucid Key
Mound & Tree	2020	Thysanoptera Australiensis	✓	✓	-	✓	✓	✓	✓	✓	✓	On-line Lucid Key
Thripswiki contributors	2020	ThripsWiki	✓	✓	-	✓	✓	✓	✓	✓	✓	Uzelothripidae Merothripidae Faurielidae Heterothripidae

The literature chosen to identify the collected specimens included papers such as Marullo (1993; 1996; and 2004), books and other publications such as Priesner (1960: 1964) and zur Strassen (2003) as well as on-line services such as Moritz et al. (2014), Mound et al. (2018) and Mound et al. (2019) that featured detailed species descriptions and keys of species.

Apart from the above-mentioned literature, other papers, which focused only on descriptions of single, or only a few species or genera were also used, such as Marullo and Vono (2017), who provided a species description for *Liothrips oleae* (Costa, 1857).

Literature material did not always describe the Mediterranean species exhaustively, particularly the Tubulifera. Works that provided identification about thrips species worldwide (e.g. Minaei & Mound, 2008) were also therefore consulted in the hope of increasing the chances of identifying the material collected.

To further confirm identification of the species, photographs of the diagnostic features of the species found were sent to three leading world Thysanoptera experts, namely the co-supervisor for the current study, Professor Adriano Cavalleri, from the University of Sao Paolo, Brazil, Professor Laurence Mound, from the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia and Dr. Arturo Goldarazena, from the Museo Nacional de Ciencias Naturales, Madrid, Spain. Dr. Goldarazena also went over all the specimens in the collection to collection to confirm the identity of the species identified in this study.

Mounted specimens of the terebrantian genera *Odontothrips* and *Tenothrips* as well as the tubuliferan *Haplothrips* and *Karnyothrips,* which proved to be were particularly difficult to identify, were sent to Dr. Goldarazena, who could compare the material collected in the current study with specimens.

The specimens (belonging to six species) that could not be identified were the ones which were collected in small quantities and/or ended up being mounted poorly. These were described in the sections “Non-Identified Terebrantia” and “Non- Identified Tubulifera” in the Results chapter.

Dichotomous Key

Once the process of species was complete, the diagnostic features for each species were used to construct a dichotomous key, found in the Results chapter. The key, written in the style of in Mound et al. (1976), also included relevant illustrations of morphological features necessary in the form of labelled photographs for easy identification. The key was devised in a way that it required minimal experience to operate effectively, apart from some basic familiarity with the anatomical insect features. In order to facilitate identification, the couplet steps were kept as short as possible, using no more than three features per couplet.

This key was also verified by Dr. Goldarazena and subsequently tested by a number of undergraduate B.Sc. student volunteers, who were given 20 unlabelled Thysanoptera specimens and were asked to identify them using the constructed key. Verbal feedback from these students was used to make the language in the key more user friendly and clear.

Species catalogue

The data obtained from examining material and comparing it to literature was also used to develop diagnoses for each species, found in the Results chapter as well. These diagnoses included detailed information on the thrips species recorded in the current study. In all, a total of 61 species diagnoses were written, for 55 species which were identified to species level and six that were identified to genus or subfamily level.

The style of writing of such diagnoses followed that used in guidebooks for other insects e.g. Haahtela et al. (2011) and Sterry et al. (2016) who produced guidebooks for British and European Lepidoptera; Dijkstra and Lewington (2006), and Smallshire and Swash (2020) who produced guidebooks on European Odonata.

Information found in the species diagnoses included:

- Latin name,
- Common name/s when available,
- Material examined, with included both slide mounted specimens and others left in AGA mixture,
- Body length,
- Wing type,
- Further notes on species. This section listed the authors who wrote descriptions of the species apart from the original diagnostic description of the species author

and compared discrepancies where features observed in the current study did not match those in the literature,

- Diagnostic features. The species templates compiled earlier, together with descriptions of the same species from literature were reviewed and the features which were unique and which could help to distinguish the species from other recorded species belonging to the same genus as well as other species that are likely to be recorded in the Maltese Islands in future were listed in this section,
- Similar species. A brief account pointing out differences from other species belonging to different genera but were observed to be similar looking,
- Biology. Brief notes obtained from literature concerning the duration of the life cycle, the dietary preferences of the species, the plant species where the thrips were recorded, both in literature as well as in the current study, records concerning parasites and predators for the species, as well as information concerning the agricultural importance of each species,
- Geographical distribution. A list of countries where the concerned species was recorded according to literature,
- Records from the Maltese Islands. This section indicated whether the species described was a new record to the Maltese Islands or whether it had already been recorded, listing the authors who first described the species.

This catalogue section also included a brief account of the diagnostic features of relevant suborders, families, subfamilies as well as genera to which the recorded species belonged to. The order in which the different suborders, families, genera and species appeared in the species diagnosis section followed the classification system according to Mound (2021) and ThripsWiki (2021).

The species authors and the taxonomic rankings (e.g. order and family) for the predators and parasites were omitted from the main text in species diagnoses section (in the Results chapter), unless deemed relevant to what is being described in the text. Family names for plant species on which thrips species were recorded were only included if the plant species was found to be, or was suspected to be a host plant. It was also decided that, in order to make the text easier to read, whenever scientific names of species were mentioned throughout the current work, the authority and date of original description of the species were only included the first time that species were mentioned.

Following the completion of the study, a number of specimens were chosen to be donated to the British Museum of Natural History, as well as to Dr. Goldarazena who will deposit these specimens in the collection of the Museo Nacional de Ciencias Naturales, Madrid, Spain. These specimens are listed in the material examined within the species diagnoses section (in the Results chapter).

Abbreviations used in the "Material collected" section

The material described in this chapter was collected by:

- Godwin Degabriele (GD)
- Charles Farrugia (CF)
- Sylvan Farrugia (SF)
- David Mifsud (DM)
- E.R. Speyer (ERS)
- I.A. Speyer (IAS)
- Gillian Watson (GW)
- J.W. Ismay (JWI)
- Niki Young (NY)

Other abbreviations

- Slide mounted specimens (sm)
- Specimens examined in AGA mixture (aga)
- Specimens housed in the BMNH (BMNH)

The habitus for each species was provided in Appendix V.

Summary of the thrips species of the Maltese Islands

A summary table (Table 4.4) featuring the fully identified species and whether these species were new records was also included for easy reference to the species. For the species which were already recorded prior to the current study, the literature which mentioned the species was also included.

Dietary Preferences

In order to answer the research question concerning feeding habits for the species of the Maltese Islands, the species identified from the Maltese Islands were grouped according to mode of feeding, whether predatory, phytophagous or mycophagous. The grouping exercise was based on descriptions of the species habits obtained from literature e.g. Priesner (1960); zur Strassen (2003); and Mound et al. (2018). The information obtained is represented in table 4.5 in the Results chapter.

The phytophagous species were further sub-divided into three groups depending on the plants that they use as host-plants. Burkhardt et al. (2014) defined the term “host-plant” for hemipteran psyllids (Psylloidea) as that were complete development (from larval stages to adult) of the insect takes place, therefore, plants that are considered as host plants should only include those where different stages of the life cycle of the insect are found. According to these authors, other plants where the same insects would occur should be termed “shelter plants” if the psyllids overwinter and may casually feed on these, “food plants” if the plants are used as a food source but not a site for larval development or “casual plants” if the insects happen to be found on these plants by chance. Thrips show similar behaviour in relation to plants to psyllids, so the terminology described by these authors could also apply for thrips.

It was decided that for the present study, locally recorded thrips species were considered to be monophagous if the larvae were only found on one plant species, oligophagous if the larvae were recorded on more than one closely related species and polyphagous if the larvae were recorded on a number of completely unrelated plants. Where possible, larvae of the Thripidae were identified using the work by Vierbergen et al. (2010).

In other cases where plants yielded only one thrips species and adults were found alongside larval specimens, it was assumed that the larvae belonged to the same species. Table 4.6 of the Results chapter summarizes the findings of this exercise.

Another exercise which was carried out with the phytophagous species involved grouping the species depending on which part of the plant they were collected from, whether the flowers or the stems or both. The exercise was again carried out using the recorded of the collected thrips material in the current study and by descriptions from Priesner (1960); zur Strassen (2003); Mound et al. (2018) and Mound et al. (2019). In this case, results matched almost completely.

Pie charts showing percentage breakdown of the different categories of dietary preferences for in the Maltese islands in the current study was also constructed (see figs. 5.1-5.4 in the Discussion chapter). Finally, the data obtained from locally collected specimens was also compared to similar data obtained from Italy (Marullo, 2002; 2004; Marullo & Meduri, 2006; Marullo & De Grazia, 2013) in order to find out whether locally occurring species occur on the same or similar plant species.

Species Chorotypes and maps

The current study also aimed at finding out the geographical distribution of the species of Thysanoptera recorded in the Maltese Islands. The distribution of each species was investigated from literature and the countries where each species was recorded were mapped out on a copyright free downloadable world map (see Appendix III). Geographical distributions were then examined and categorized according to chorotypes proposed by Vigna Taglianti et al. (1999). This data was included in the Results chapter (Table 4.8), together with the proportion of chorotypes for the species in the Maltese Islands (Table 4.9). Trends for these results were reviewed in the Discussion chapter. A pie chart showing percentage breakdown of the different chorotypes for the species found in the Maltese islands in the current study was also constructed (fig. 5.5 in the Discussion chapter).

Results

Results

Fifty-three species of Thysanoptera, consisting of 40 terebrantian species belonging to four families and 22 genera, and 13 tubuliferan species belonging to one family and eight genera were identified, with 45 of these being new records to the Maltese Islands. An illustrated dichotomous key is here under presented to discriminate between these identified thrips.

Illustrated Key to the Thrips Species of the Maltese Islands

1 Abdominal segment X conical in females (fig. 4.1a) and rounded posteriorly in males; fore wings with one or two longitudinal veins (fig. 4.1c); females with external ovipositor (figs. 4.2e - f) .... **Terebrantia** .. 2

Abdominal segment X tubular in both sexes (fig. 4.1b); fore wings with no veins (fig. 4.1d); females lacking external ovipositor (fig. 4.1b) .... **Tubulifera** .. 41

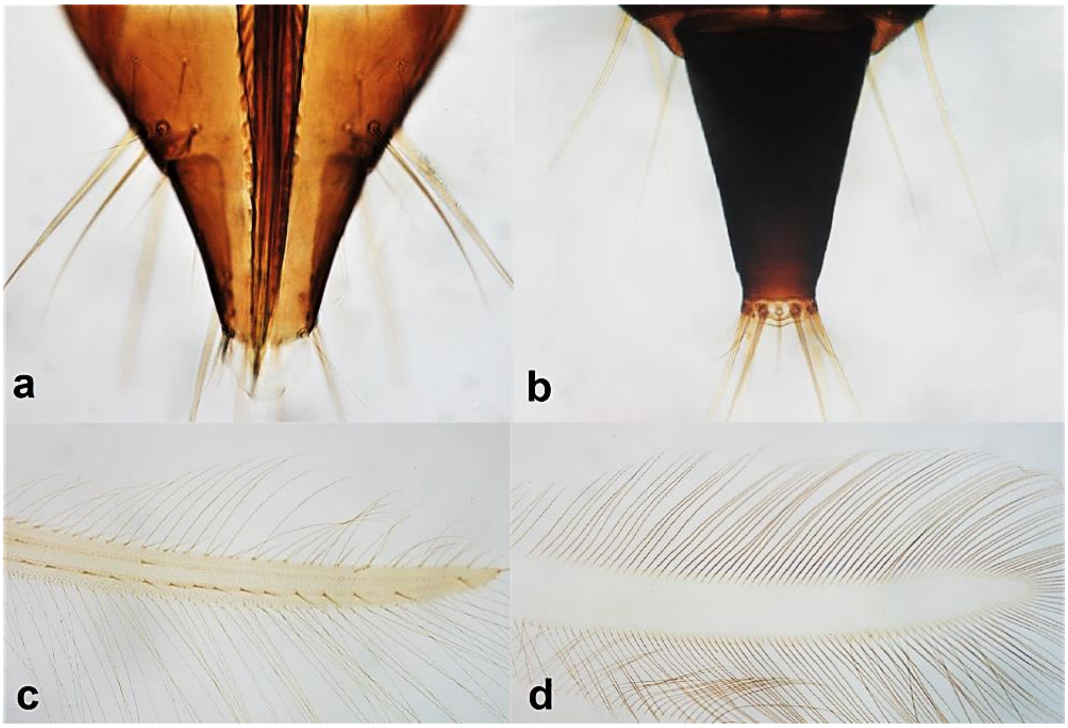

Figure 4.1: Abdominal segment X (**a - b**): (**a**) conical; (**b**) tubular; **fore wing** (**c - d**): (**c**) with longitudinal veins; (**d**) with no veins.

2 Antennal segments III and IV with sensoria consisting of a ridge-like structure set in parallel (fig. 4.2a) or perpendicular (or oblique) to each segment (fig. 4.2b), never produced as trichomes; fore wing broad, being five to ten times as long as broad (fig. 4.2c); females with ovipositor curving upwards towards abdominal segments (fig. 4.2e) ………………………………………………………………………………………………… 3

Antennal segments III and IV with emergent sensoria, consisting of an acorn-shaped structure (fig. 4.2g), or a simple (fig. 4.3h) or forked trichome (fig. 4.2i); fore wing narrow, being 11 – 18 times as long as broad and often tapering apically (fig. 4.2d); females with ovipositor curving downwards (fig. 4.2f) ………………………………………………… 15

3 Antennal segments III and IV with sensoria set in parallel to length of segment (fig. 4.2a); antennal segments VI-IX broadly joined basally (fig. 4.3a) ………… **Aeolothripidae** .. 4

Antennal segments III and IV with sensoria set perpendicular or oblique to length of segment (fig. 4.2b); antennal segments VI-IX constricted basally and clearly distinct from each other (fig. 4.3b) ………………………………………………… **Melanthripidae** .. 12

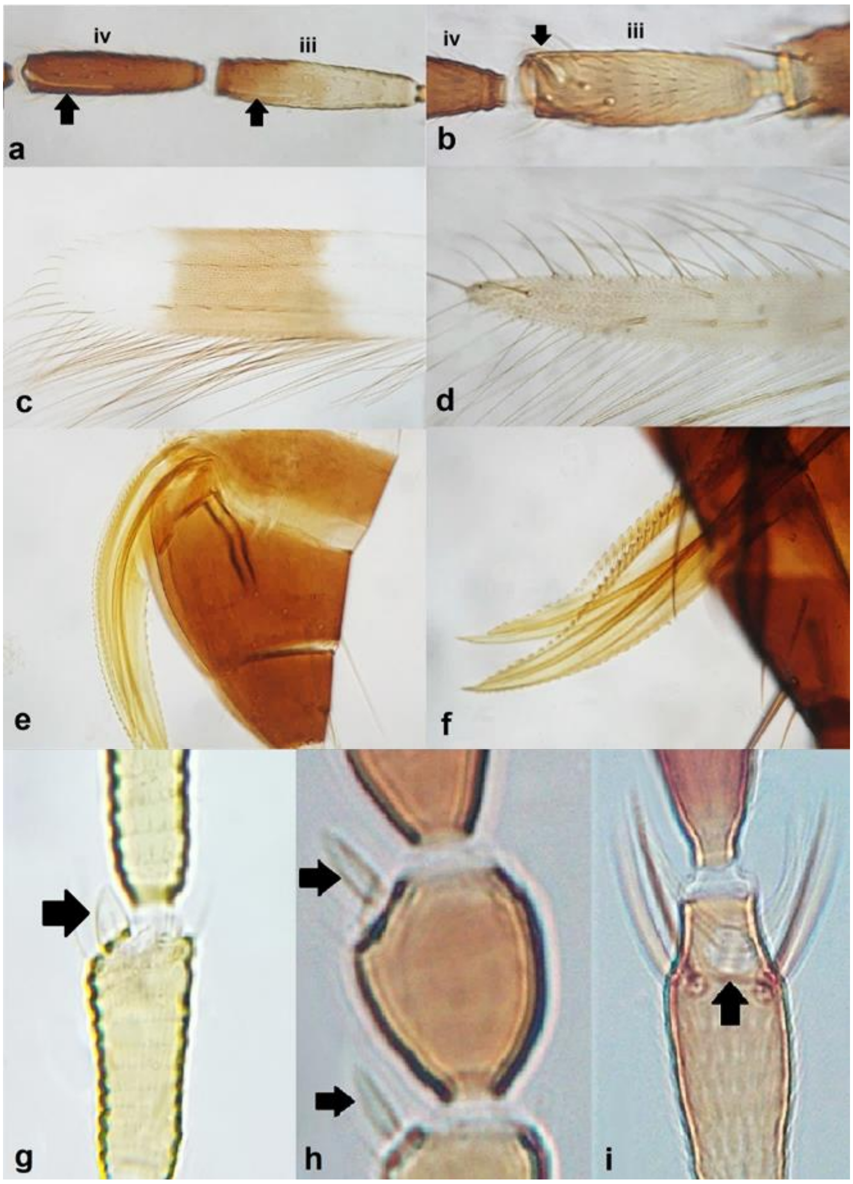

Figure 4.2: Sensoria on antennal segments III and IV (**a,b**): (**a**) parallel to length of segment; (**b**) perpendicular to length of segment; **fore wing tip** (**c,d**): (**c**) broad; (**d**) narrows apically; **ovipositor** (**e,f**): (**e**) curving upwards towards body: (**f**) curving downwards; **antennal sensoria on segments III and IV** (**g,i**): (**g**) cone-shaped; (**h**) simple or hair-like; (**i**) forked.

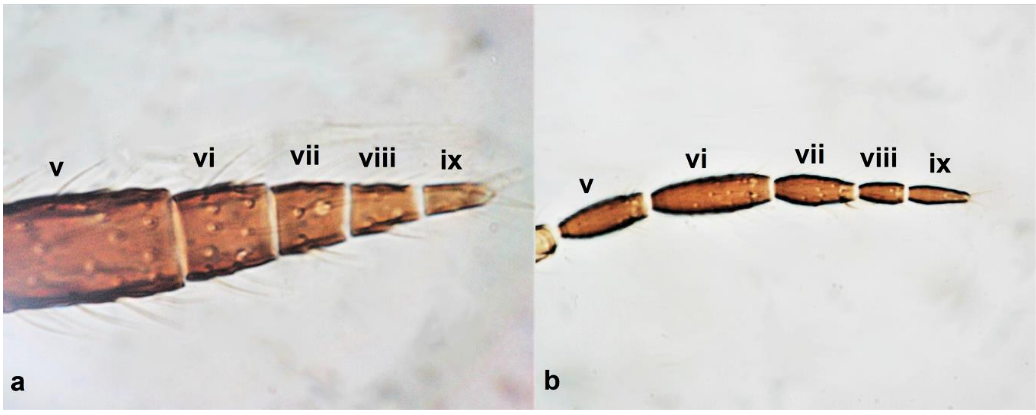

Figure 4.3: Antennal segments VI–IX: (**a**) broadly joined basally; (**b**) distinct from each other**.**

4 Antennal segment III about 15 times as long as wide (fig. 4.4a); antennal segments III and IV with sensoria consisting of a multitude of dot-like structures lined up parallel to length of segment (fig. 4.4b); fore wings with dark band sub-apically (fig. 4.4c); abdominal segments I-III significantly narrower than other segments, giving the appearance of a wasp-like waist (fig. 4.4e) ……………………… ***Franklinothrips megalops*** Trybom, 1912

Antennal segments III 3.3 - 5 times as long as wide; antennal segments III and IV with sensoria consisting of one or a small number of continuous ridge shapes lined up parallel to length of segment (fig. 4.4b); fore wings with light coloured sub-apical region (fig. 4.4d); abdominal segments I-III only slightly narrower than other segments (fig. 4.4f) ………………………………………………………………………………………… 5

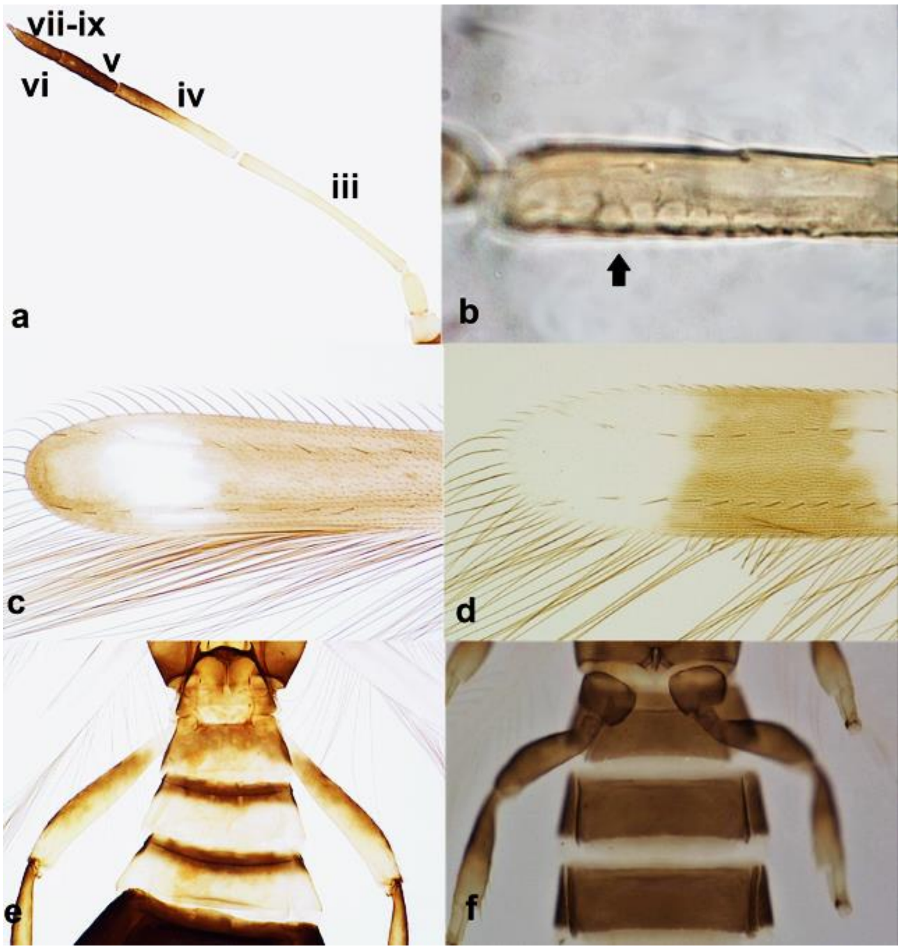

Figure 4.4: (**a**) antennal segments III–IX; (**b**) sensorium on antennal segment III; **fore wing tip** (**c,d**): (**c**) with dark band sub-apically; (**d**) with light-coloured sub-apical region; **upper abdominal segments** (**e,f**): (**e**) being considerably narrower than other segments; (**f**) only slightly narrower than other segments.

5 Antennal segments III and IV with sensoria consisting of one continuous ridge-like structure lined up parallel to length of segment (fig. 4.5a); fore wings broad, being less than six times as long as broad and with two dark bands (fig. 4.5c); pronotum postero-marginal setae as long as discal setae .... ***Aeolothrips*** Haliday, 1836 .. 6

Antennal segments III and IV with sensoria consisting of lens-shaped structures lined up parallel to length of segment (fig. 4.5b); fore wings narrow, being more than six times as long as broad and of a uniformly pale brown hue (fig. 4.5d); pronotum bearing a pair of postero-marginal setae that are longer than discal setae ……………………………………………… ***Rhipidothrips***, 1895 .. 9

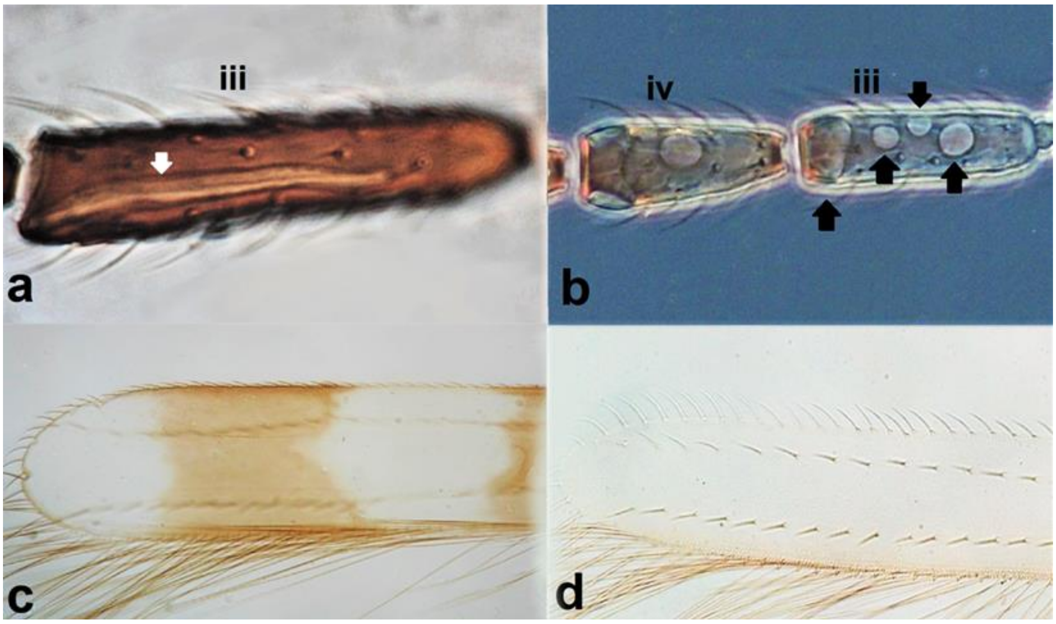

Figure 4.5: Antennal sensoria on segment III (**a,b**): (**a**) continuous and ridge-shaped; (**b**) lens-shaped; **fore wing** (**c,d**): (**c**) broad and banded; (**d**) narrow and monochrome.

6 Fore wing margin at tip as light as wing membrane (fig. 4.6a) …………………………… 7

Fore wing margin at tip darker than wing membrane (fig. 4.6b) ………………………….. 8

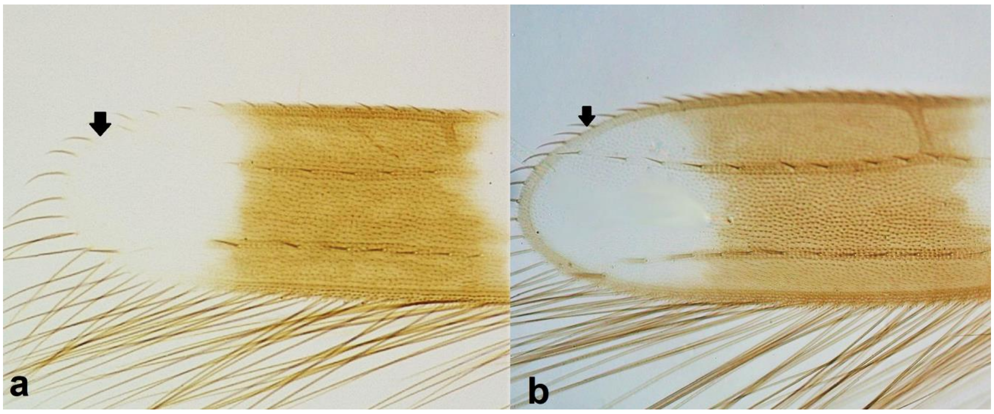

Figure 4.6: Fore wing: (**a**) pale coloured margin at tip; (**b**) dark coloured margin at tip.

7 Body bicoloured, with head and thorax yellow with brown areas medially (fig. 4.7a); antennal segment III bicoloured, with the basal half of segment pale yellow, while the apical half dark brown (fig. 4.7c) …………………… ***Aeolothrips gloriosus*** Bagnall, 1914

Body uniformly dark brown, though upper abdominal segments can sometimes be lighter coloured (fig. 4.7b); antennal segment III yellow or yellowish brown with the distal fifth brown, paler than segment II (fig. 4.7d) ……… ***Aeolothrips intermedius***, Bagnall, 1934

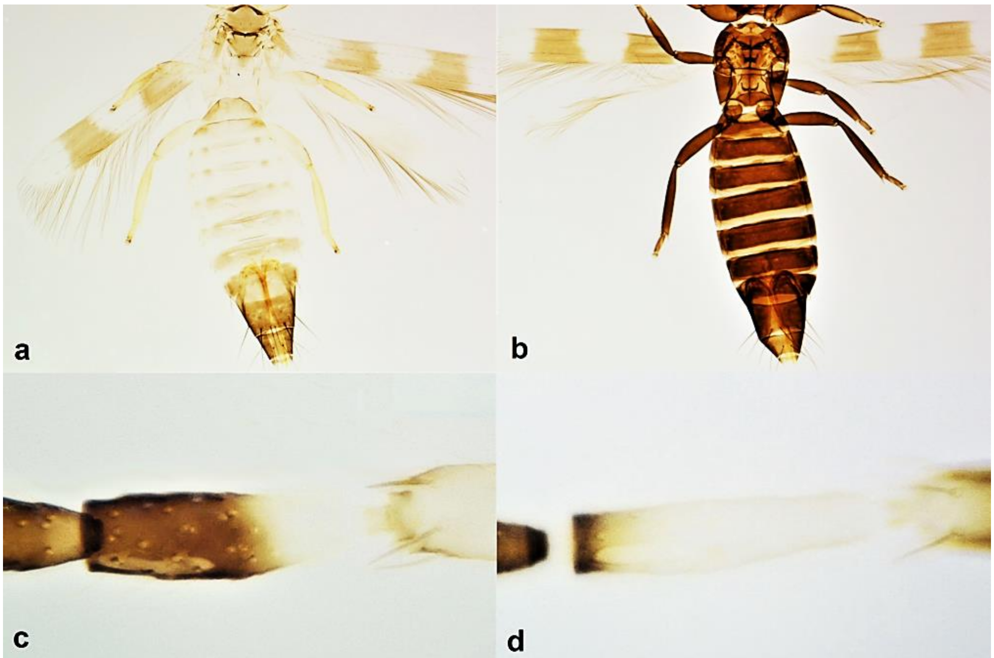

Figure 4.7: Body (**a,b**): (**a**) bicoloured; (**b**) uniformly brown; **antennal segment III** (**c,d**): (**c**) distal half brown; (**d**) only distal fifth brown.

8 Antennal segment III with sensorium being one third the length of the segment (fig. 4.8a); antennal segment IV with sensorium two thirds the length of the segment (fig. 4.8a); prothorax pale, often yellow (fig. 4.8c) …………………………………………………… ***Aeolothrips melisi*** Priesner, 1936

Antennal segment III and IV with sensoria about half the length of the segment (fig. 4.8b); prothorax dark, usually brown (fig. 4.8d) ……..………………………… ***Aeolothrips tenuicornis*** Bagnall, 1926

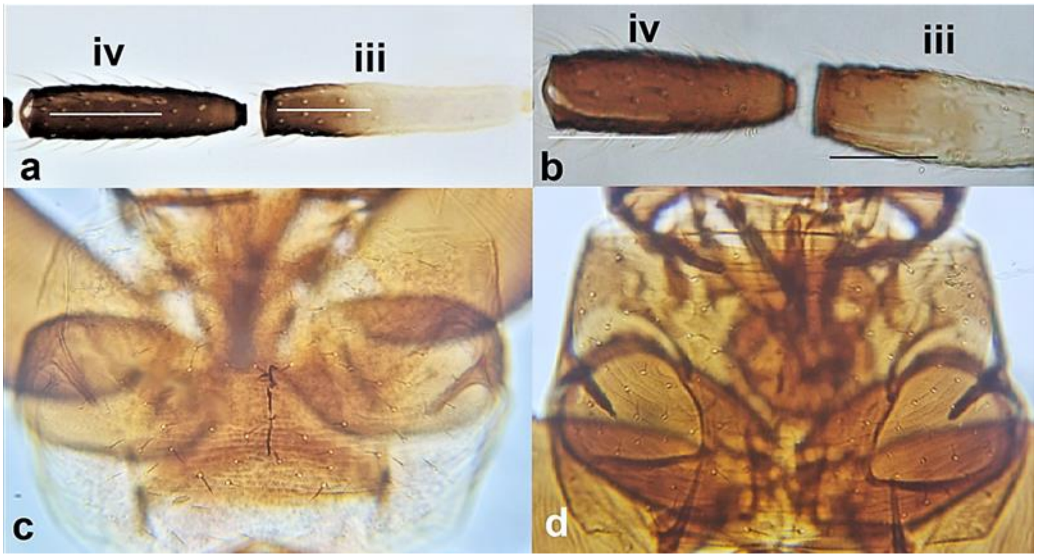

Figure 4.8: Antennal segments III and IV (**a,b**): (**a**) sensoria about one third the length of segment in III, two thirds the length of segment in IV; (**b**) sensoria about half the length of segment in both III and IV; **pronotum** (**c,d**): (**c**) pale; (**d**) dark.

9 Antennal segment II yellow (fig. 4.9c); pronotum yellow to light brown and with three to four long pairs of postero-marginal setae (fig. 4.9a); females always macropterous (fig. 4.9f); abdominal tergites with little or no sculpture or microtrichia (fig. 4.9g) ………………...…….………………………………… ***Rhipidothrips gratiosus*** Uzel, 1895

Antennal segment II brown (fig. 4.9d); pronotum brown and with two to three long pairs of postero-marginal setae (fig. 4.9b); females usually micropterous (fig. 4.9e); abdominal tergites sculptured, sometimes lined with microtrichia (fig. 4.9h) …………………………………...…. 10

10 Internal body colour orange brown (fig. 4.10a); females macropterous. On *Stipa capensis* ………………………….……………….………….…... ***Rhipidothrips unicolor*** zur Strassen, 1965

Internal body colour often carmine red (fig. 4.10b); females can be macropterous or micropterous (fig. 4.9g). On different species of Poaceae ………………………..…...…. 11

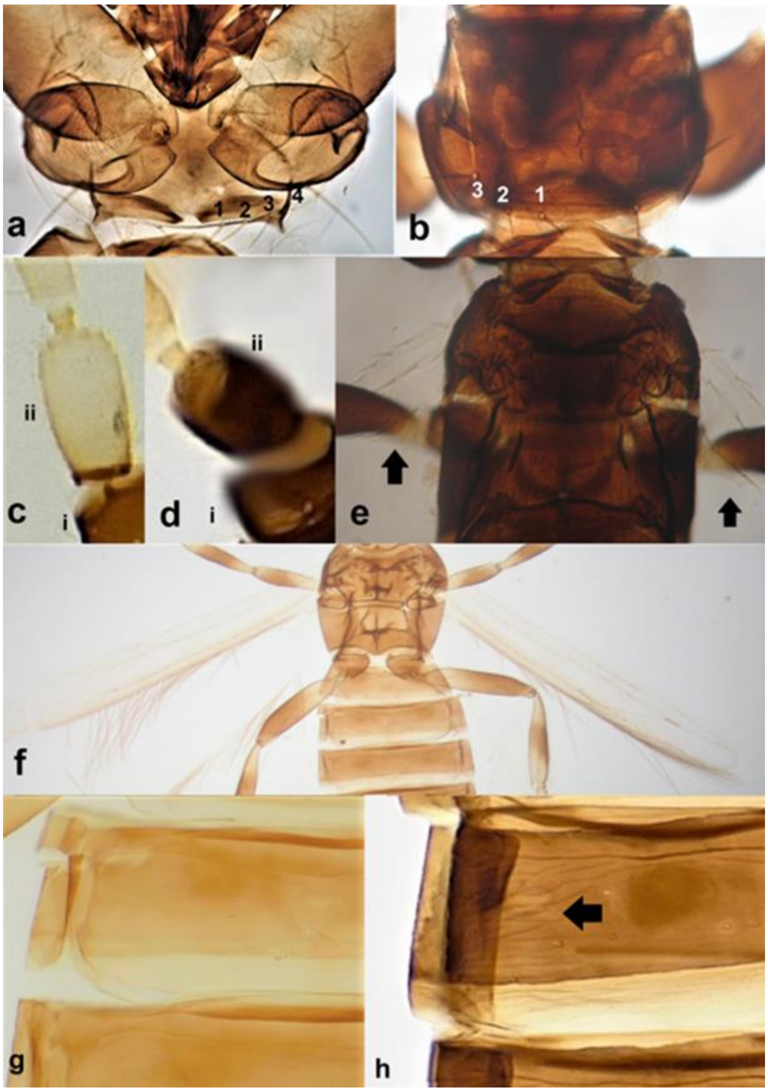

Figure 4.9: Antennal segment II (**a,b**): (**a**) yellow; (**b**) brown; **pronotum** (**c,d**): (**c**) with four pairs of long postero-marginal setae; (**d**) with three pairs of postero-marginal setae; **fore wings** (**e,f**): (**e**) micropterous; (**f**) macropterous; **abdominal tergites** (**g,h**): (**g**) with no sculpture; (**h**) with sculpture**.**

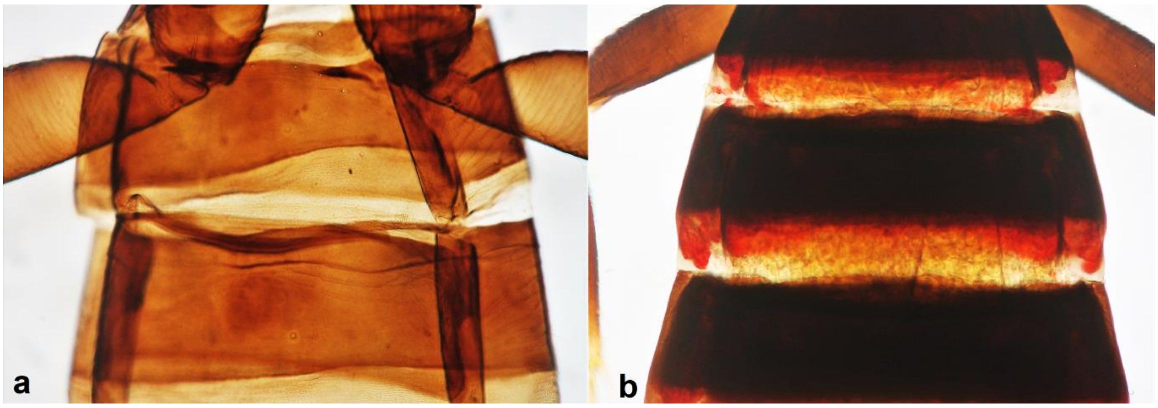

Figure 4.10: Abdominal segments II and III showing internal body color: (**a**) brown; (**b**) red.

11 Abdominal tergites with microtrichia on sculpture lines (fig. 4.11a); females usually macropterous ……………………………... ***Rhipidothrips niveipennis*** O.M. Reuter, 1899

Abdominal tergites with no microtrichia on sculpture (fig. 4.11b); females usually micropterous ……………………...…………. ***Rhipidothrips brunneus*** Williams, 1913

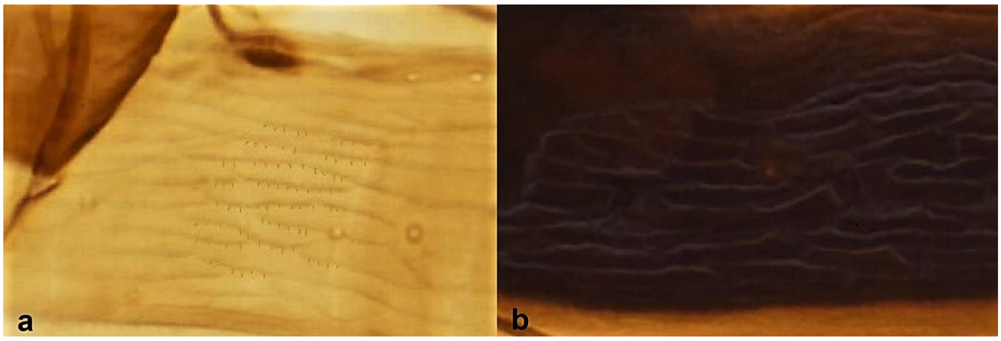

Figure 4.11: Section of abdominal tergites: (**a**) with microtrichia on sculpture; (**b**) with no microtrichia on sculpture.

12 Fore wing banded (fig. 4.12a) …………………………… ***Melanthrips ficalbii*** Buffa, 1907

Fore wing evenly brown, not banded (fig. 4.12b) and with a small pale sub-basal area .. ……………………………………………………………………………………………….. 13

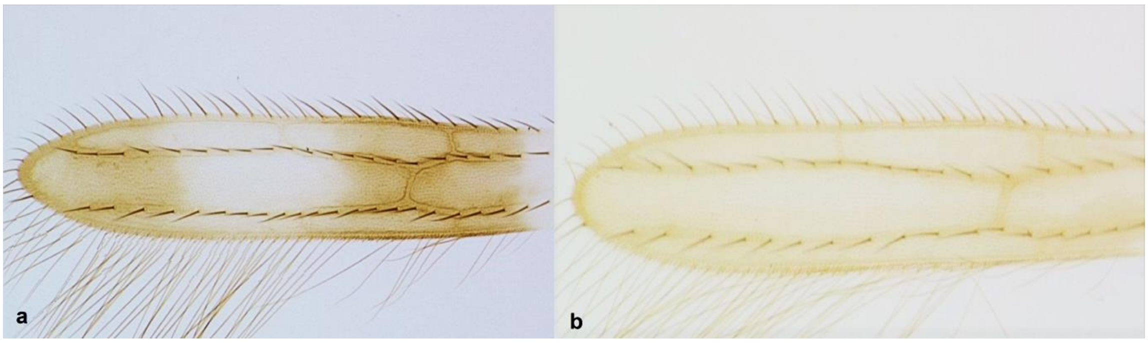

Figure 4.12: Fore wing: (**a**) banded; (**b**) not banded.

13 Anterior margin of fore wing between transverse veins with one row of setae (fig. 4.13a) …………………………………………………........... ***Melanthrips knechteli*** Priesner, 1936

Anterior margin of fore wing between transverse veins with two rows of setae (fig. 4.13b) ………………………………………………………………………...……………..… 14

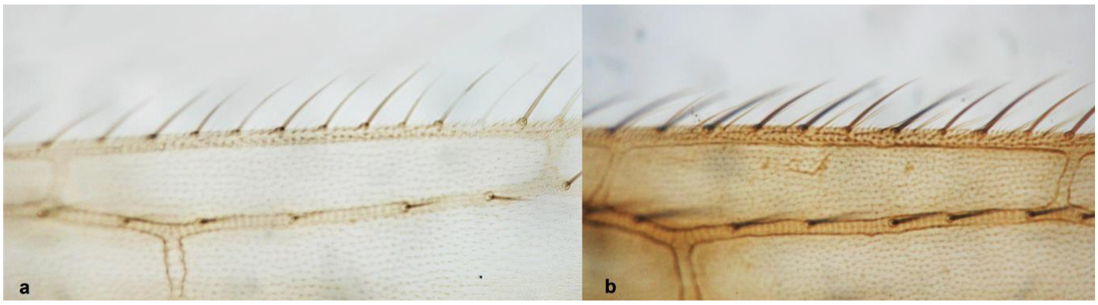

Figure 4.13: Fore wing: (**a**) with anterior margin between transverse veins with one row of setae; (**b**) with anterior margin between transverse veins with two rows of setae.

14 Hind tibia with one long seta (fig. 4.14a) ……………. ***Melanthrips fuscus*** (Sulzer, 1776)

Hind tibia with two long setae (fig. 4.14b) …………. ***Melanthrips lybicus*** Priesner, 1936

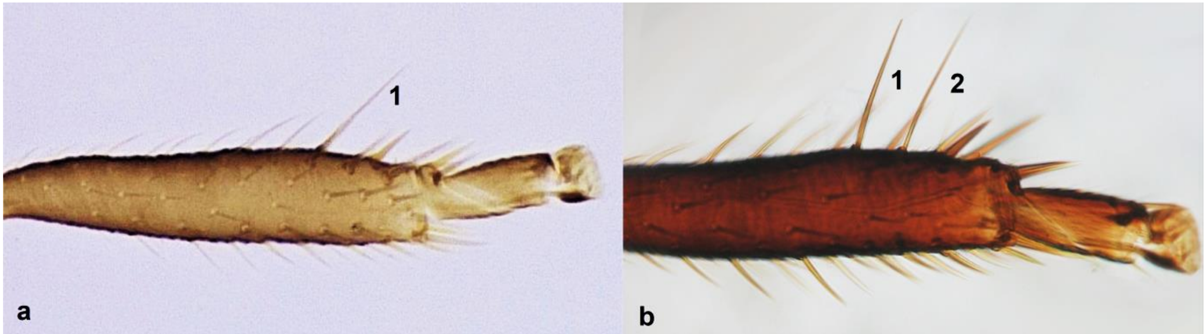

Figure 4.14: Hind tibia: (**a**) with one long seta; (**b**) with two long setae.

15 Antennae nine-segmented (fig. 4.15a); antennal segments III and IV with cone-shaped sensoria (fig. 4.2g) ... **Stenurothripidae** .. ***Holarthrothrips tenuicornis*** Priesner, 1919

Antennae six-, seven-, or eight-segmented (figs. 4.15b-d); antennal segments III and IV with sensoria consisting of a single (simple or hair-like) (fig. 4.2h) or forked filamentous structure (fig. 4.2i) ……….……………………………………...………………. **Thripidae** .. 16

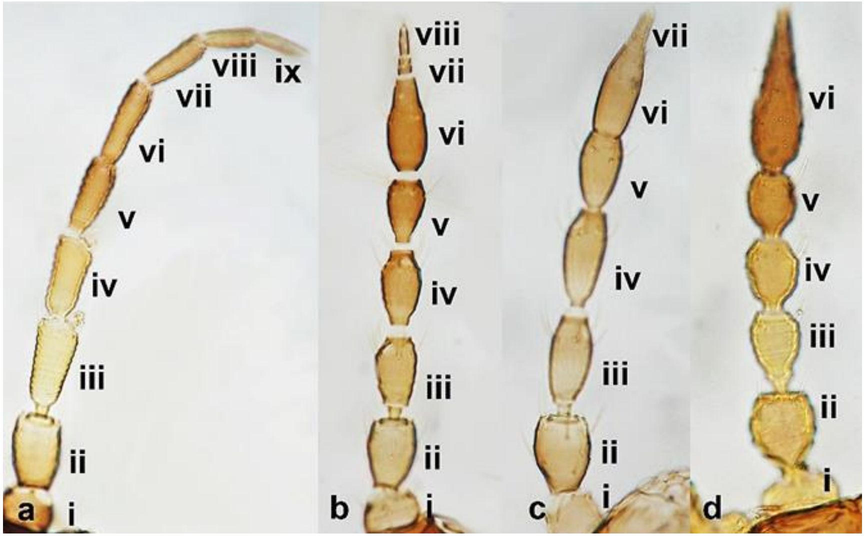

Figure 4.15: Antenna (**a - d**): (**a**) nine-segmented; (**b**) eight-segmented; (**c**) seven-segmented; (**d**) six-segmented.

16 Metathoracic endofurca lyre-shaped, with arms extending well beyond length of segment (fig. 4.16a); median tergal setae on abdomen arising close to each other (fig. 4.16c) ………………………… **Dendrothripinae** .. ***Dendrothrips saltator*** Uzel, 1895

Metathoracic endofurca not lyre-shaped (fig. 4.16b), and usually not extending beyond length of segment; median tergal setae set far apart (fig. 4.16d) ……………………… 17

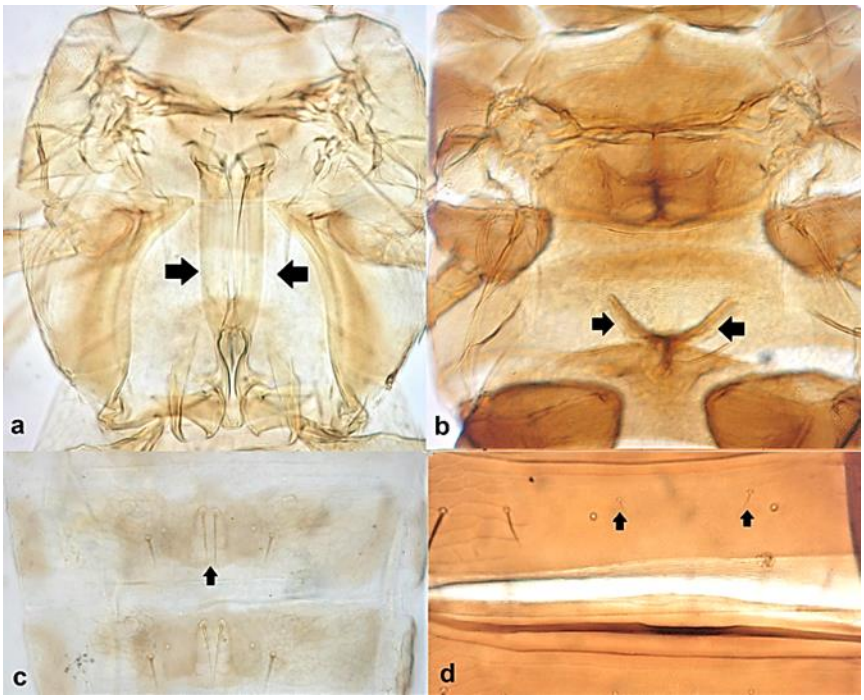

Figure 4.16: Pterothorax (**a,b**): (**a**) with lyre-shaped metathoracic endofurca; (**b**) with metathoracic endofurca not lyre-shaped; **tergites** (**c,d**): (**c**) median setae close to each other; (**d**) median setae far away from each other.

17 Fore wing with one row of postero-marginal cilia (fig. 4.17a); antennal segments VI-VIII long and slender when compared with basal segments (fig. 4.17c) ………………………………………………………………… **Panchaetothripinae** .. 18

Fore wing with two rows of postero-marginal cilia (fig. 4.17b); antennal segments VI-VIII not sharply elongated (fig. 4.17d) ……………………………………………… **Thripinae** .. 19

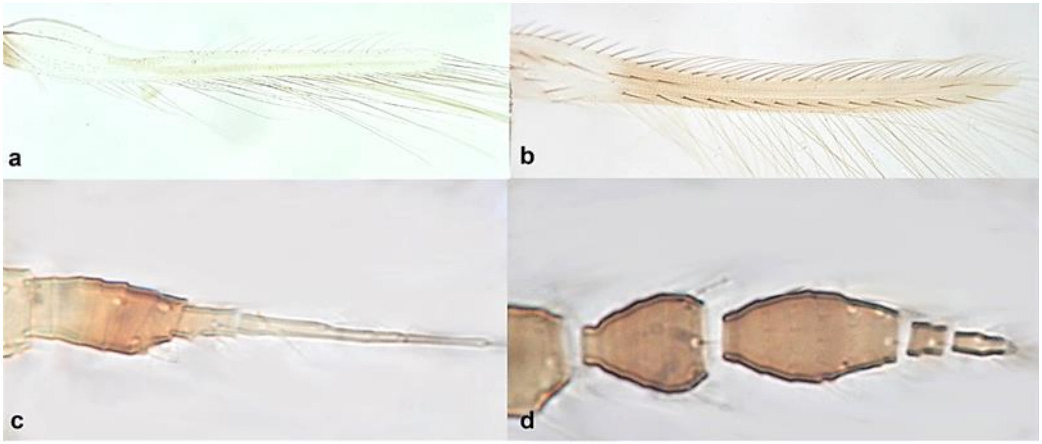

Figure 4.17: Fore wing (**a,b**): (**a**) one row of postero-marginal cilia; (**b**) two rows of postero-marginal cilia; terminal antennal segments (**c,d**): (**c**) ending in a sharp point; (**d**) not ending in a sharp point.

18 Fore tarsi one-segmented (fig. 4.18a); fore wings uniformly light brown; postero-marginal cilia straight (fig. 4.18c); fore wing apex rounded (fig. 4.18c) ……………………………………………….. ***Heliothrips haemorrhoidalis*** (Bouchè, 1883)

Fore tarsi two-segmented (fig. 4.18b); fore wings brown with white stripes; postero-marginal cilia wavy (fig. 4.18d); fore wing apex pointed (fig. 4.18d) ………………………. ……………………………………………………….. ***Hercinothrips femoralis*** Reuter, 1881

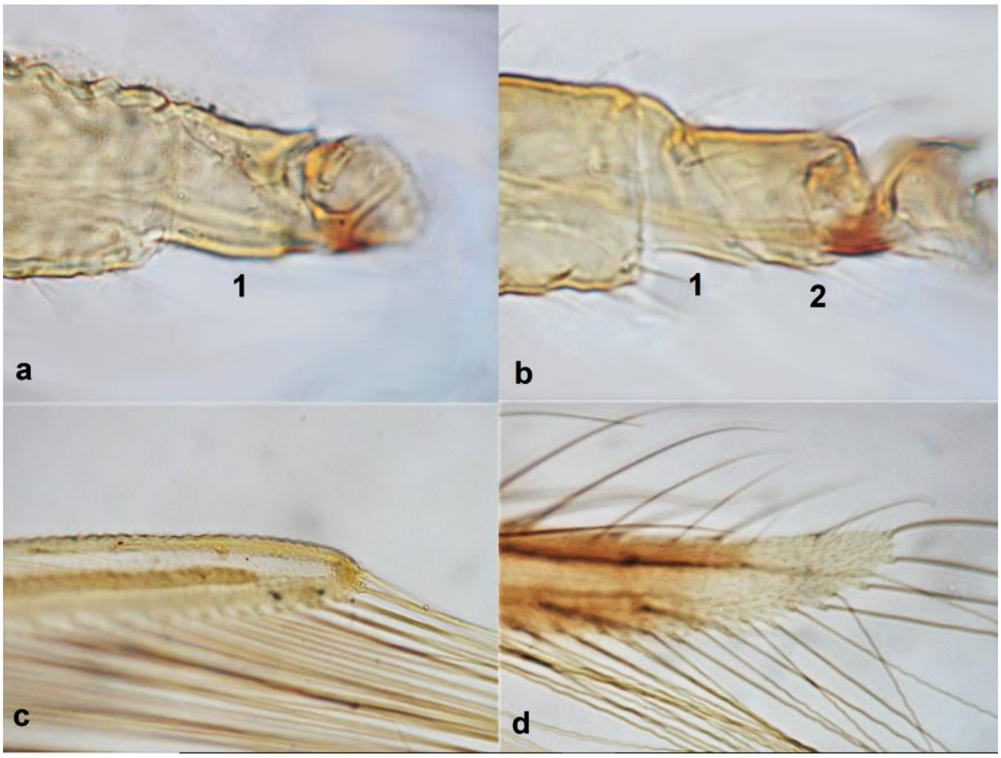

Figure 4.18: **Fore tarsus** (**a,b**): (**a**) one-segmented; (**b**) two-segmented; fore wing (**c,d**): (**c**) postero-marginal cilia straight and apex rounded; (**d**) postero-marginal cilia wavy and apex pointed.

19 Pronotum considerably narrower at anterior margin than at posterior margin (fig. 4.19a).

……………………………………………………………………... ***Chirothrips*** Haliday, 1836 .. 20

Pronotum having the same width at the anterior and posterior margin (fig. 4.19b).

………………………………………………………………………………………….……. 21

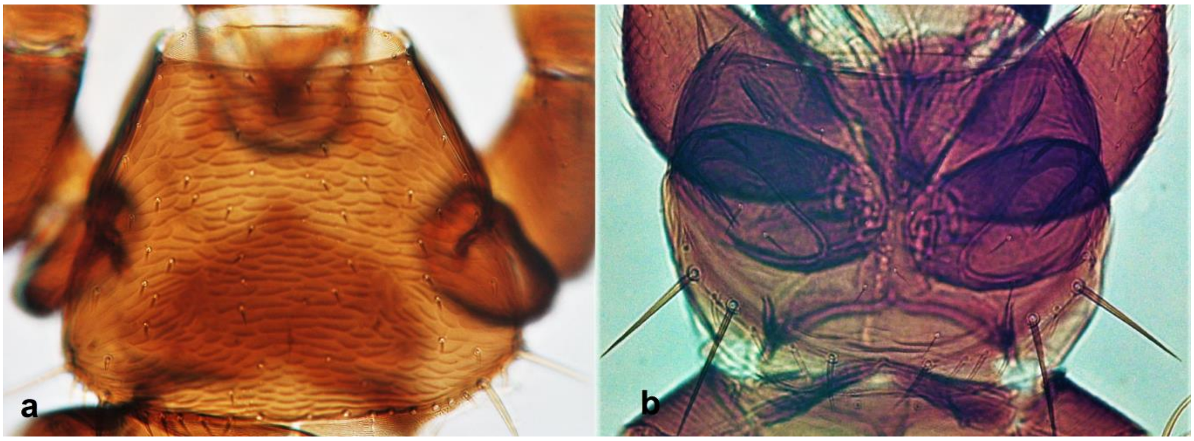

Figure 4.19: Pronotum: (**a**) considerably narrower at anterior margin than at posterior margin; (**b**) being almost the same width at both margins.

20 Antennal segment II symmetrical …………………… ***Chirothrips hamatus*** Trybom, 1895

Antennal segment II asymmetrical (fig. 4.20a - b) ……………………………………….. 21

21 Antennal segment II with the outer edge nearly straight (fig. 4.20a); antennal segment IV with forked sense cone (fig. 4.20c); antennal segment VII longer than VIII; males usually macropterous (fig. 4.20e) ……………………… ***Chirothrips meridionalis*** Bagnall, 1927

Antennal segment II with the outer edge at an obtuse angle from the base of the segment, creating a tip with bulge (fig. 4.20b); antennal segment IV with simple sense cone (fig. 4.20d); antennal segment VII shorter than VIII; males micropterous (fig. 4.20f) ………....
……………………………………………………….. ***Chirothrips manicatus*** Haliday, 1836

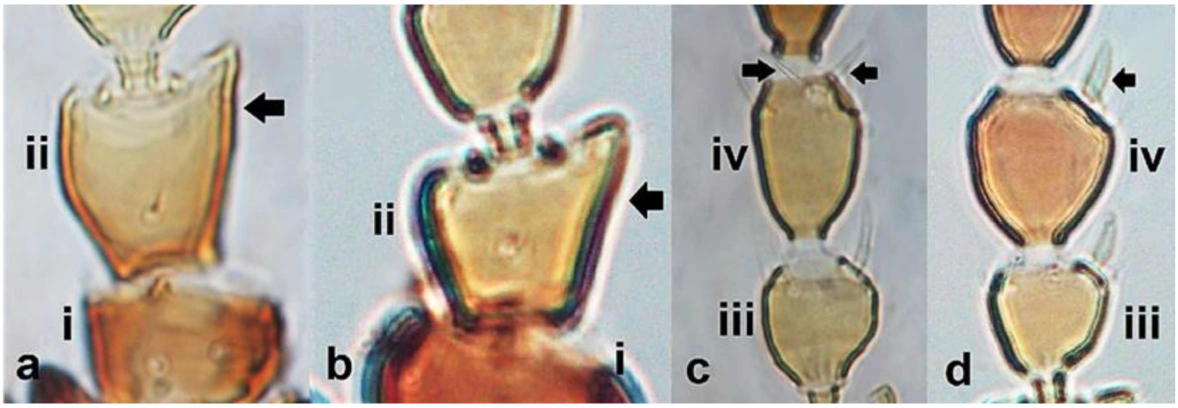

Figure 4.20: Antennal segment II showing outer edge (**a,b**): (**a**) nearly straight; (**b**) at an obtuse angle from the base of the segment; **antennal segment IV** (**c,d**): (**c**) with a forked sense cone; (**d**) with a simple sense cone.

22 Abdominal segment X bearing a pair of thorn-shaped setae (fig. 4.21a) ………………………………………………………………. ***Limothrips*** Haliday, 1836 .. 23

Abdominal segment X without thorn-shaped setae (fig. 4.21b) ………………………….. 24

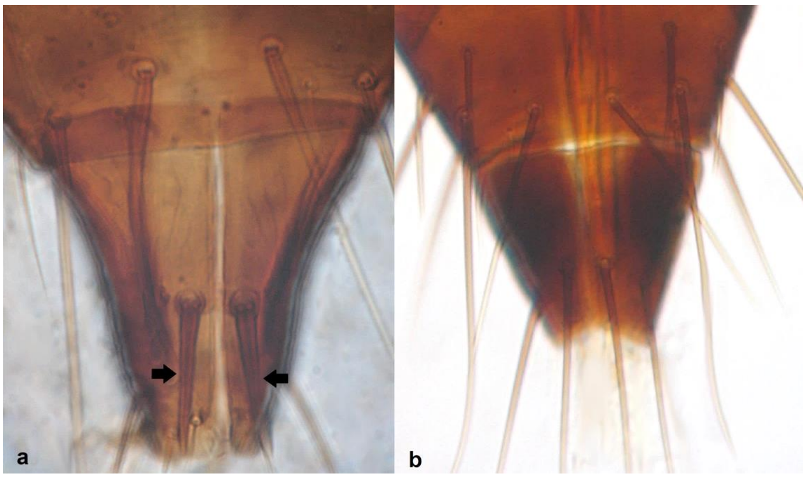

Figure 4.21: **Abdominal segment X**: (**a**) with thorn-shaped setae; (**b**) lacking thorn-shaped setae.

23 Antennal segment II asymmetrical, with elongated extremity at outer side of segment (fig. 4.22a); antennal segments III and IV with forked sense cones (fig. 4.22c) ……………………………………………… ***Limothrips angulicornis*** Jablonowski, 1894

Antennal segment II rounded and symmetrical (fig. 4.22b); segments III and IV with simple sense cones (fig. 4.22d) ……………………………… ***Limothrips cerealium*** Haliday, 1836

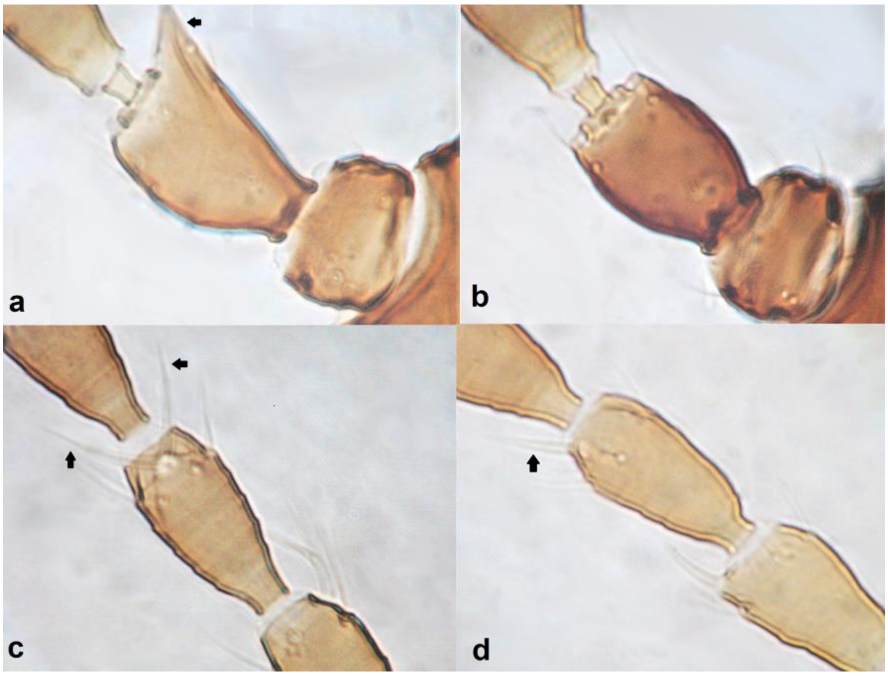

Figure 4.22: **Antennal segment II (a - b):** a. asymmetrical (*Limothrips angulicornis*); b. symmetrical (*Limothrips cerealium*); **Antennal segments III and IV (c - d):** c. with forked sense cones (*L. angulicornis*); d. with simple sense cones (*L. cerealium*).

24 Antennal segments III and IV with simple sense cones (fig. 4.2h) ……………………… 25

Antennal segments III and IV with forked sense cones (fig. 4.2i) ……………………… 28

25 Antennae six-segmented (fig. 4.15d); head and body having a distinct bright yellow colour (fig. 4.24a) ………………………………………………… ***Aptinothrips rufus*** Haliday, 1836

Antennae eight-segmented (fig. 4.15b); head and body pale yellow, brown, or bicoloured pale yellow and brown (fig. 4.24b) ………………………………………………………… 26

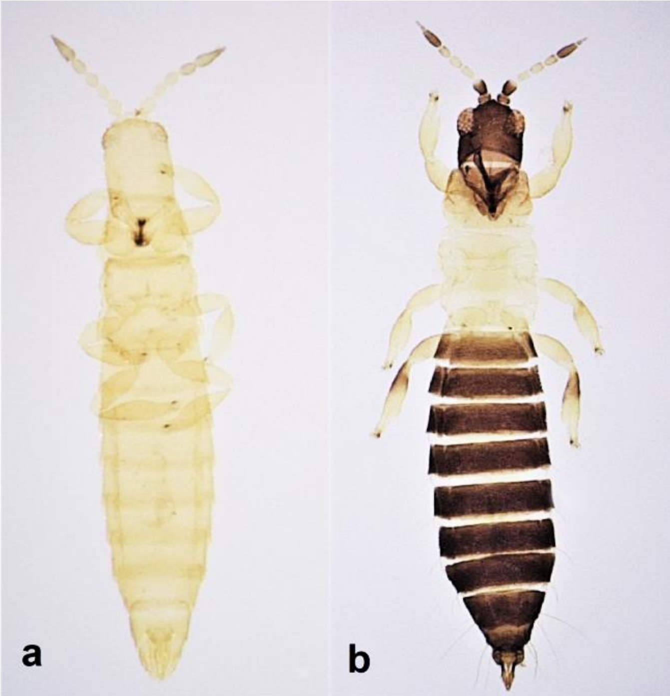

Figure 4.23. Male habitus: (**a**) yellow body colour; (**b**) body bicoloured.

26 Fore wing with setae on vein always long, dark and capitate (blunt tipped) (fig. 25b); second vein with no setae (fig. 25a); antennal segment VIII ending in a sharp point (fig. 18c); males macropterous………………………. ***Echinothrips americanus*** Morgan, 1913

Fore wing setae on vein not always long and dark and tapering to a point; second vein with setae (fig. 4.24c); antennal segment VIII rounded at tip (fig. 4.17d); males micropterous …..…………………………………………………………………………..... 27

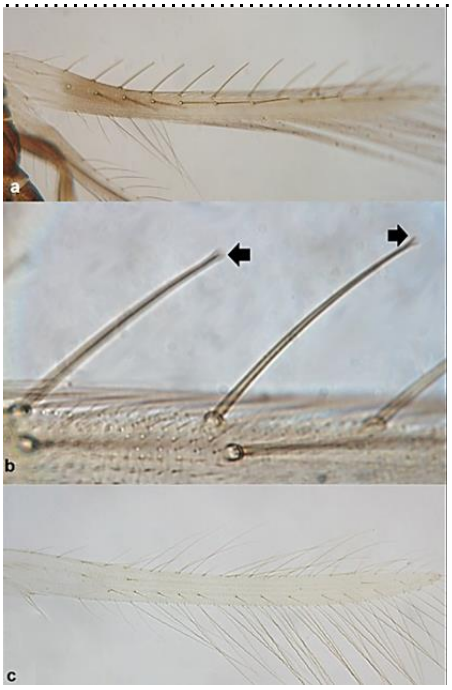

Figure 4.24: (**a**) Fore wing with second vein with no setae; (**b**) setae on vein of fore wing with capitate tips; (**c**) fore wing with second vein with setae.

27 Females micropterous; head with reticulate (network-like) sculpture; ridge present between antennal sockets (fig. 4.25a) ………… ***Prosopothrips nigriceps*** Bagnall, 1927

Females macropterous; head with no distinct sculpture; ridge lacking between antennal sockets (fig. 4.25b) ……………………… ***Bregmatothrips dimorphus*** (Priesner, 1919)

Figure 4.25: Head: (**a**) with reticulate sculpture and with a ridge between antennal sockets; (**b**) with no distinct sculpture and with no ridge between antennal sockets.

28 Pronotum with no long postero-angular setae (fig. 4.26a); fore wing with dark band at proximal region (fig.4.26c) …………………… ***Anaphothrips sudanensis*** Trybom, 1911

Pronotum with one to two pairs of long postero-angular setae (fig. 4.26b); fore wing with no dark band at proximal region (fig. 4.26d) ………………………………………………… 29

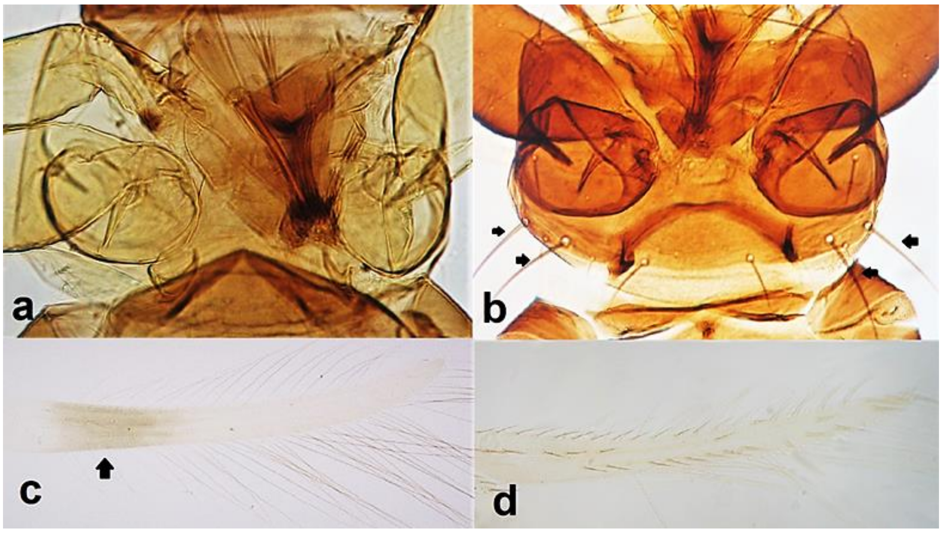

Figure 4.26: Pronotum (**a,b**): (**a**) with no long postero-angular setae; (**b**) with long postero-angular setae present; **fore wing** (**c,d**): (**c**) with a dark band at proximal region; (**d**) with no dark band at proximal region.

29 Both sexes micropterous; antennal segment V yellow with very little brown on distal margin (fig. 4.27a) ………………………… ***Asphodelothrips croceicollis*** (Karnyi, 1914)

Both sexes macropterous; antennal segment V either evenly brown (fig. 4.27b) or distinctly bicoloured (fig. 4.27c) …..……………………………………………………… 30

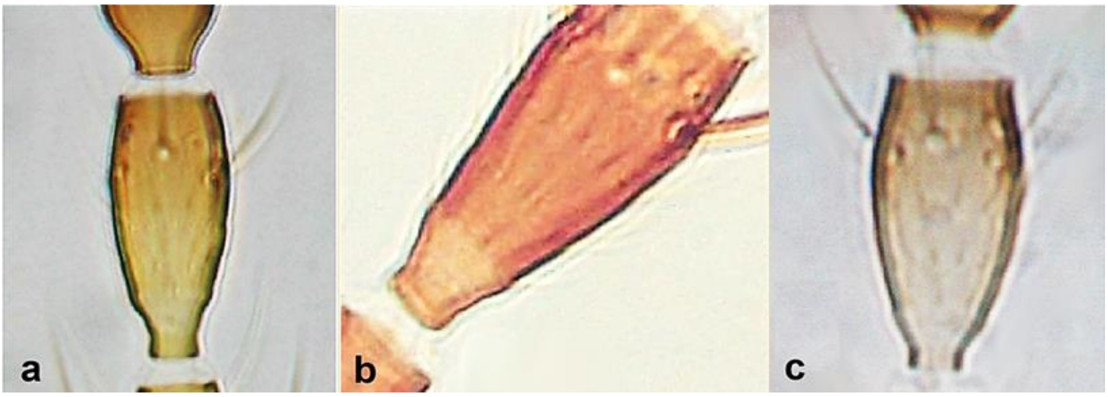

Figure 4.27: Antennal segment V: (**a**) pale yellow; (**b**) evenly brown; (**c**) bicoloured.

30 Pronotum with five (rarely 4) pairs of prominent postero-marginal setae, with submedian pair more than twice as long as the discal setae (fig. 4.28a); male antennal segment VI as long as segments IV and V together (fig. 4.28c); male with a row of around 12 pore plates on each of abdominal sternites II-VII (fig. 4.28e) ……………………………………………………… ***Pezothrips kellyanus*** (Bagnall, 1916)

Pronotum with variable number of prominent postero-marginal setae, usually fewer than five and submedian pair never twice as long as discal setae (fig. 4.28b); male antennal segment VI shorter than segments IV and V together (fig. 4.28d); male with only one or no pore plate on each of abdominal sternites II-VII (fig. 4.28f) …………………………… 31

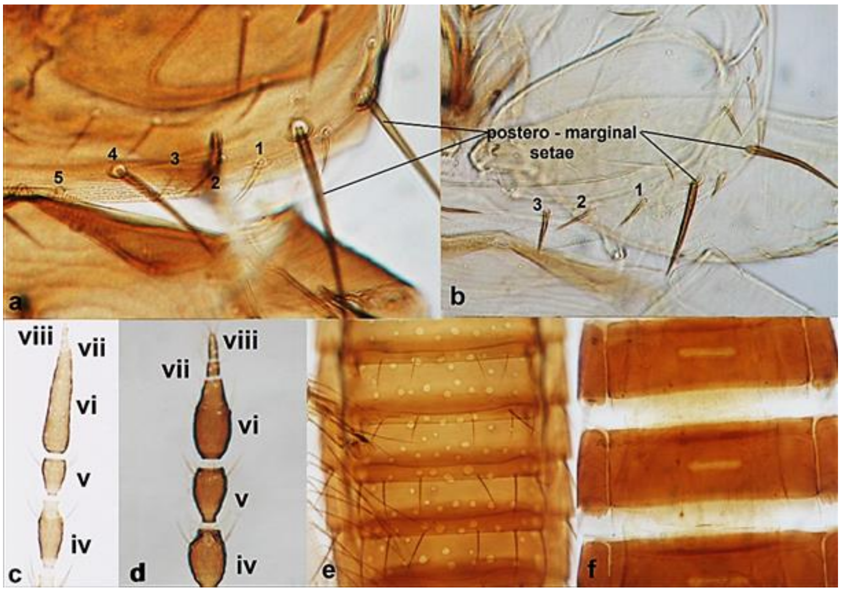

Figure 4.28: **Pronotum** (**a,b**): (**a**) with five pairs of prominent postero-marginal setae; (**b**) with four pairs of prominent postero-marginal setae; **antennal segments V–VIII** (**c,d**): (**c**) antennal segment VI as long as IV + V; (**d**) antennal segment VI shorter than IV + V; **male abdominal sternite** (**e,f**): (**e**) with around 12 small pore plates per sternite; (**f**) with one large pore plate per sternite.

31 Antennal segment VI with a sensorium of which the length of the base (insertion) of the sense cone is longer than the width of segment VII (fig. 4.29a) ………………………………………………………... ***Odontothrips meliloti*** Priesner, 1951

Antennal segment VI with sensorium of which base is shorter than the width of segment VII (fig. 30b) ……………………………………………………………………………… 32

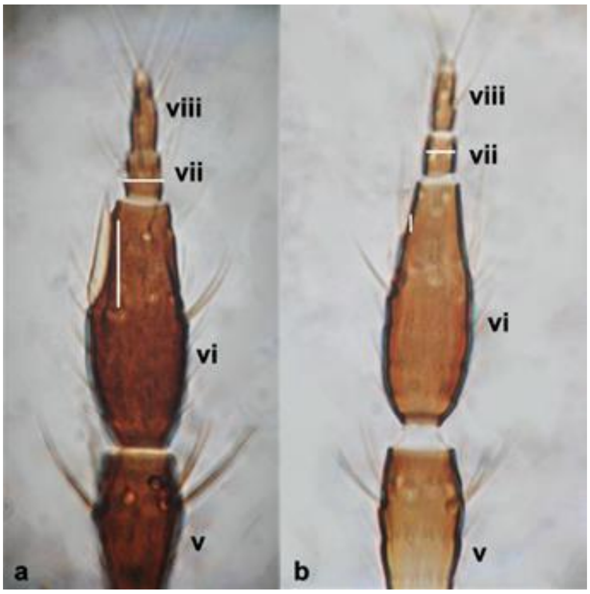

Figure 4.29: Sensorium on antennal segment VI: (**a**) with base of sensorium longer than width of segment VII; (**b**) with base of sensorium shorter than width of segment VII.

32 Abdominal tergite VIII without paired lateral ctenidia (fig. 4.30a), often replaced by rows of microthrichia …………………………………………………………………….………….. 33

Abdominal tergite VIII with paired lateral ctenidia (fig. 4.30b) (not arranged in a row) ... 35

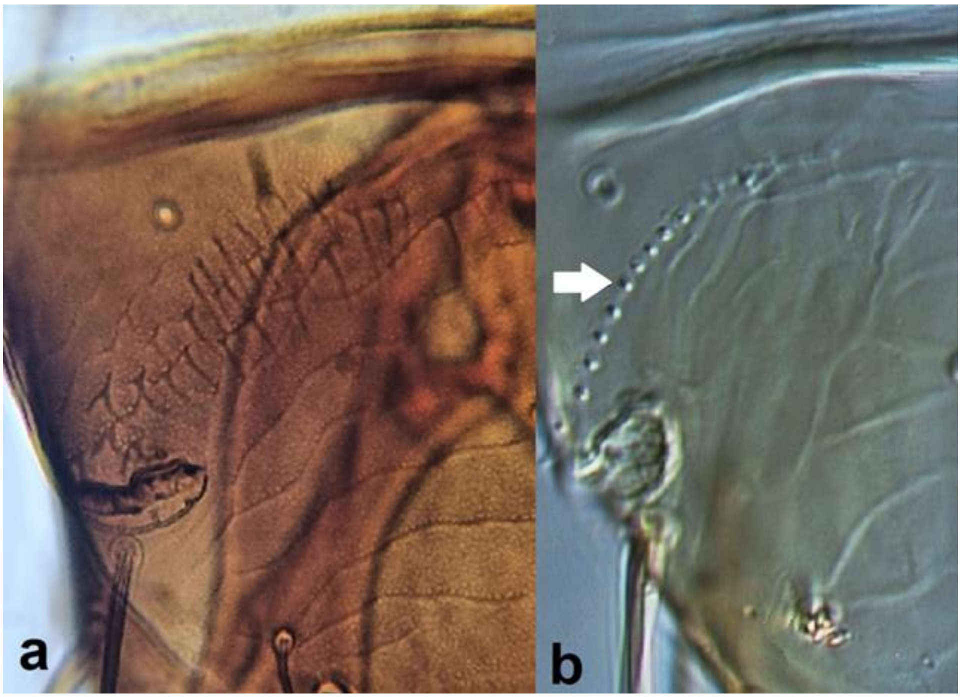

Figure 4.30: Left side of abdominal segment VII: (**a**) lacking ctenidia; (**b**) with ctenidia.

33 Fore wing clavus with five marginal setae (fig. 4.31a); second vein of fore wing with 8 - 10 setae ………………………………………………… ***Tenothrips discolor*** (Karny, 1907)

Fore wing clavus with six marginal setae (fig. 4.31b); second vein of fore wing with 11 or more setae ……………………………………………………...……………………… 34

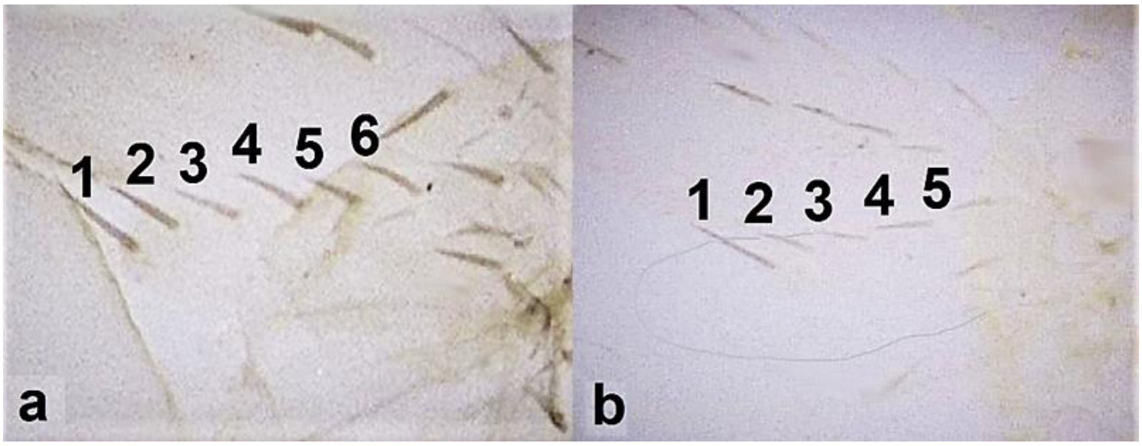

Figure 4.31. Clavus (**a,b**): (**a**) with six marginal setae; (**d**) with five marginal setae.

34 Abdominal sternites bearing discal setae; ocellar setae iii found just antero-lateral to ocellar triangle (fig. 32a); pronotum with one pair of postero-angular setae longer than discal setae (fig. 4.32c) ……………………………………… ***Oxythrips ajugae*** Uzel, 1895

Abdominal sternites with no discal setae; ocellar setae iii either arising outside ocellar triangle (fig. 4.32a) or between hind ocelli; pronotum with two pairs of postero-angular setae longer than discal setae (fig. 4.32b) ………… ***Ceratothrips ericae*** (Haliday, 1836)

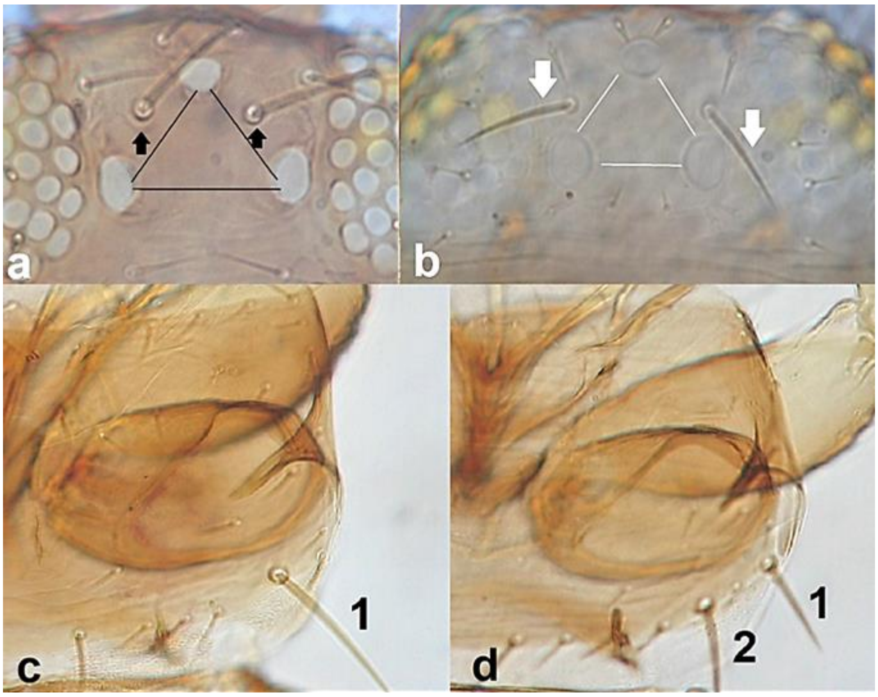

Figure 4.32: **Head** (**a,b**): (**a**) showing ocellar setae iii just anterolateral to ocellar triangle; (**b**) showing ocellar setae iii arising outside ocellar triangle; **pronotum** (**c,d**): (**c**) with one pair of postero-angular setae longer than discal setae; (**d**) with two pairs of postero-angular setae longer than discal setae.

35 Ctenidia on abdominal segment VIII situated antero-laterally to spiracle (fig. 4.33a); anterior margin of pronotum bearing at least one pair of long setae ……………………………………………………………… ***Frankliniella*** Karny, 1910 .. 36

Ctenidia on abdominal segment VIII situated postero-mesad to the spiracle (fig. 4.33b). anterior margin of pronotum with no long setae …………… ***Thrips*** Linnaeus, 1758 .. 37

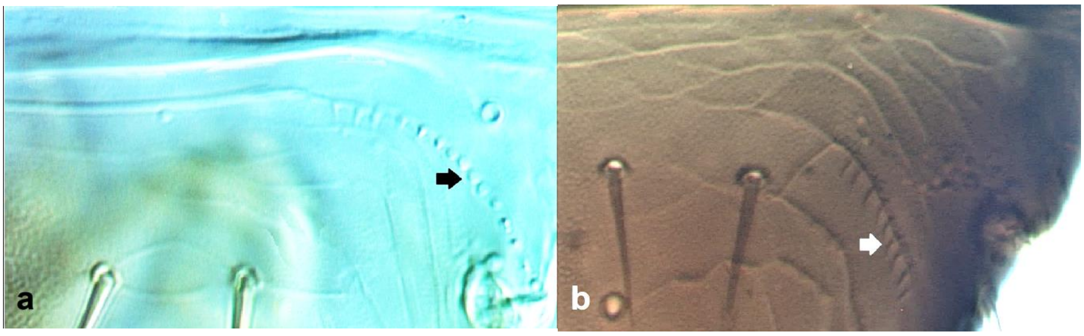

Figure 4.33: Position of ctenidia on abdominal segment VIII: (**a**) antero-laterally to spiracle; (**b**) postero-mesad to spiracles.

36 Ocellar setae iii arising on anterior margins of ocellar triangle (fig. 4.34a); meta-thoracic campaniform sensilla present (fig. 4.34c); microtrichial comb at the posterior margin of tergite VIII fully developed (fig. 4.34e) ……. ***Frankliniella occidentalis*** Pergande, 1895

Ocellar setae iii arising close together between hind ocelli (fig. 4.34b); meta-thoracic campaniform sensilla absent (fig. 4.34d); microtrichial comb at the posterior margin of tergite VIII not developed (fig. 4.34f) ……………… ***Frankliniella schultzei*** Trybom, 1910

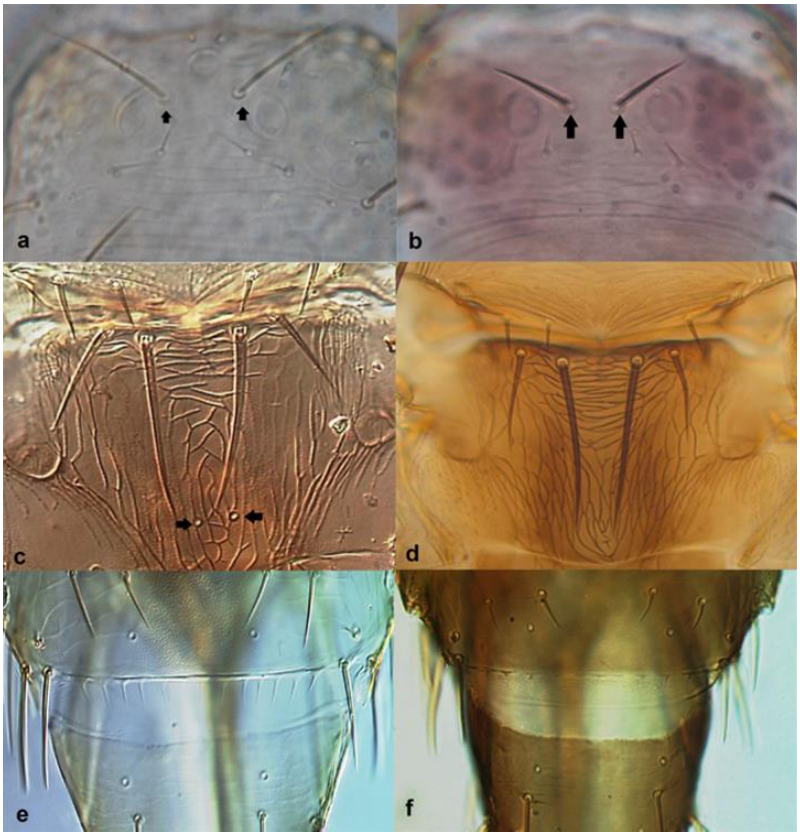

Figure 4.34: Head (**a,b**): (**a**) with ocellar setae iii arising on anterior margins of ocellar triangle; (**b**) with ocellar setae iii arising close together between hind ocelli; **metanotum** (**c,d**): (**c**) with campaniform sensilla present; (**d**) with no campaniform sensilla; **abdominal tergite VIII** (**e,f**): (**e**) with complete microtrichial comb; (**f**) with no microtrichial comb.

37 Antennae eight-segmented (fig. 4.15b) …………………… ***Thrips simplex*** Morison, 1930

Antennae seven-segmented (fig. 4.15c) ………………………………………………… 38

38 Abdominal tergite II with four lateral setae (fig. 4.35a); clavus with six marginal setae (fig. 4.35b) ……………………………………...…………… ***Thrips australis*** (Bagnall, 1915)

Abdominal tergite II with three lateral setae (fig. 4.35c); clavus with five marginal setae (fig. 4.35d). ……………………………………..……………………………………… 39

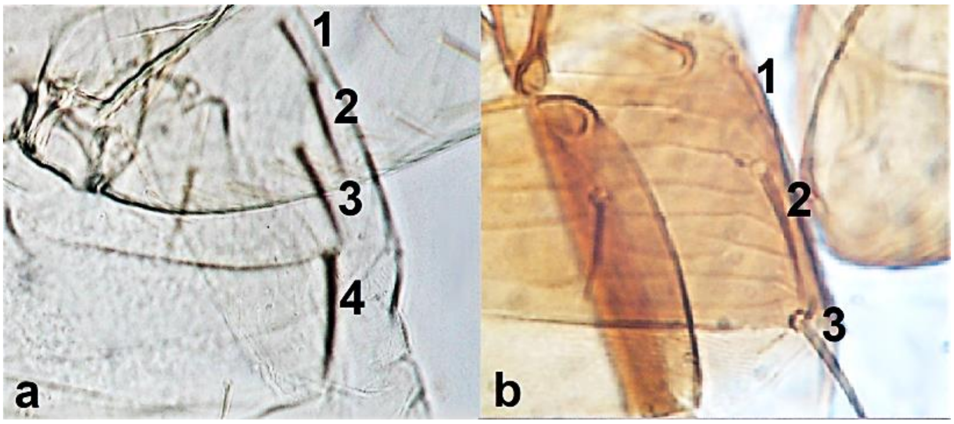

Figure 4.35: Abdominal tergite II (**a,b**): (**a**) with four lateral setae; (**b**) with three lateral setae.

39 Abdominal tergite VIII with microtrichial comb medially incomplete (fig. 4.36a). ……………………………………………………………………….. ***Thrips major*** Uzel, 1895

b. Abdominal tergite VIII with microtrichial comb complete (fig. 4.36b). …..……………... 40

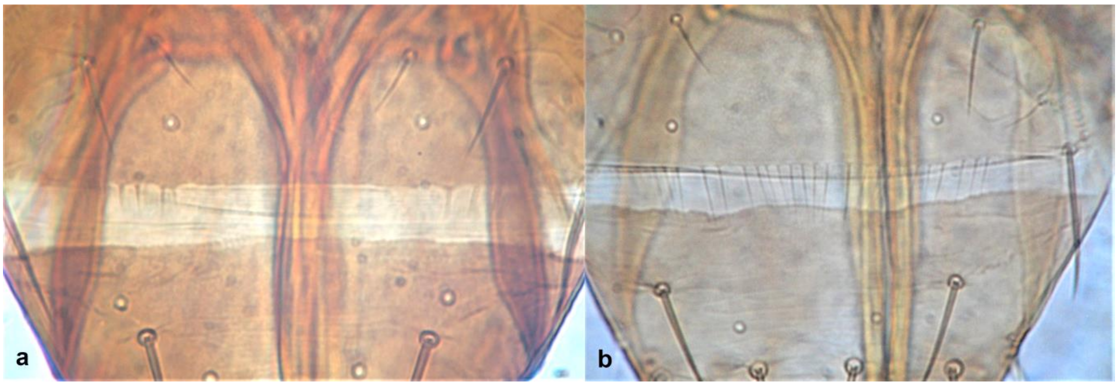

Figure 4.36: Abdominal tergite VIII: (**a**) medially incomplete; (**b**) complete.

40 Fore wing first vein with two to six (usually four) setae on distal half and second vein with about 15 setae (fig. 4.37a); pleurotergites with closely spaced rows of distinct fine ciliate microtrichia (fig. 4.37c) ……………………………………… ***Thrips tabaci*** Lindeman, 1889

Fore wing first vein with three setae on distal half and second vein with a row of about 12 setae (fig. 4.37b); pleurotergites without distinct ciliate microtrichia (fig. 4.37d). …………………………………………………... ***Thrips* cf. *tarfayensis*** (zur Strassen, 1968)

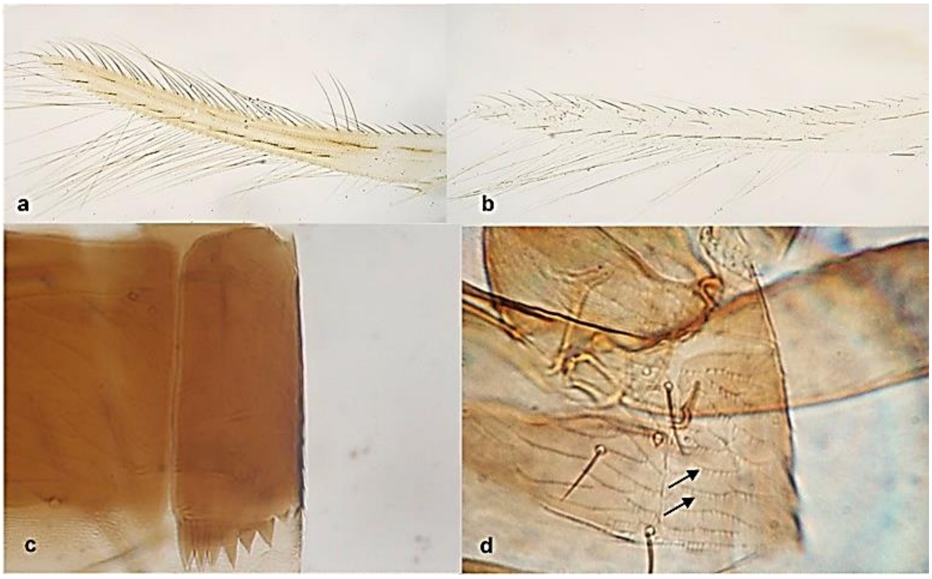

Figure 4.37: **Fore wing** (**a,b**): (**a**) with three setae on distal half of first vein and 12 setae on second vein; (**b**) with four setae on distal half of first vein and 15 setae on second vein; **Pleurotergite** (**c,d**): (**c**) with no microtrichia; (**d**) with microtrichia.

41 Maxillary stylets broad usually more than 5 µm in width throughout their length (fig. 4.38a); usually with fungal spores visible in the digestive tube (fig. 4.38c) ……. ……………………………………………………………………………… **Idolothripinae** .. 42

Maxillary stylets 2 - 3 µm in width (fig. 4.38b); never with fungal spores visible in the digestive tube (fig. 4.38d) …………………………………………… **Phlaeothripinae** .. 44

Figure 4.38: Head (**a,b**): (**a**) with maxillary stylets broader than 5 µm throughout their length; (**b**) with maxillary stylets around 2 - 3 µm throughout their length; **habitus** (**c,d**): (**c**) with fungal spores present in digestive tube; (**d**) with no fungal spores in digestive tube.

42 Antennae seven-segmented with segments VI and VII broadly joined (fig. 4.39a); abdominal segment X yellow (fig. 4.39c) .... …………………...................................... ***Priesneriella mavromoustakisi*** (Crawford, 1948)

Antennae eight-segmented with all segments distinct from each other (fig. 4.39b); abdominal segment X brown (fig. 4.39d) ………………………………….……...………. 43

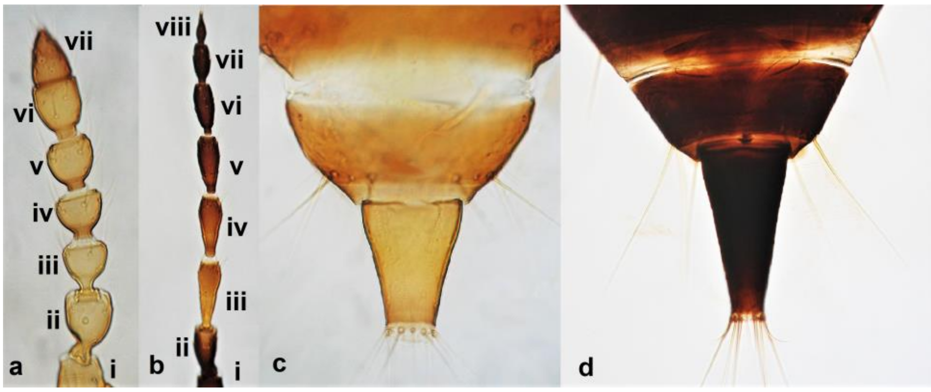

Figure 4.39: **Antennae** (**a,b**): (**a**) 7-segmented; (**b**) 8-segmented; **abdominal segment X** (**c,d**): (**c**) pale coloured; (**d**) dark coloured.

43 Ventral length of compound eyes about 1.3 times (sometimes less) the dorsal length (fig. 4.40a); abdominal segment X more than two times as long as base (fig. 4.40c); setae S_1 on abdominal segment IX shorter than segment X; body colour dark brown (fig. 4.40c) ………………………………………………………… ***Bolothrips dentipes*** (Reuter, 1880)

Ventral length of compound eyes at least 1.6 times the dorsal length (fig. 4.39b); abdominal segment X not longer than two times the length of base (fig. 4.39d); setae S_1 on abdominal segment IX longer than segment X; body colour light brown (Figure 5d) ………………………………………………………….. ***Bolothrips insularis*** (Bagnall, 1914)

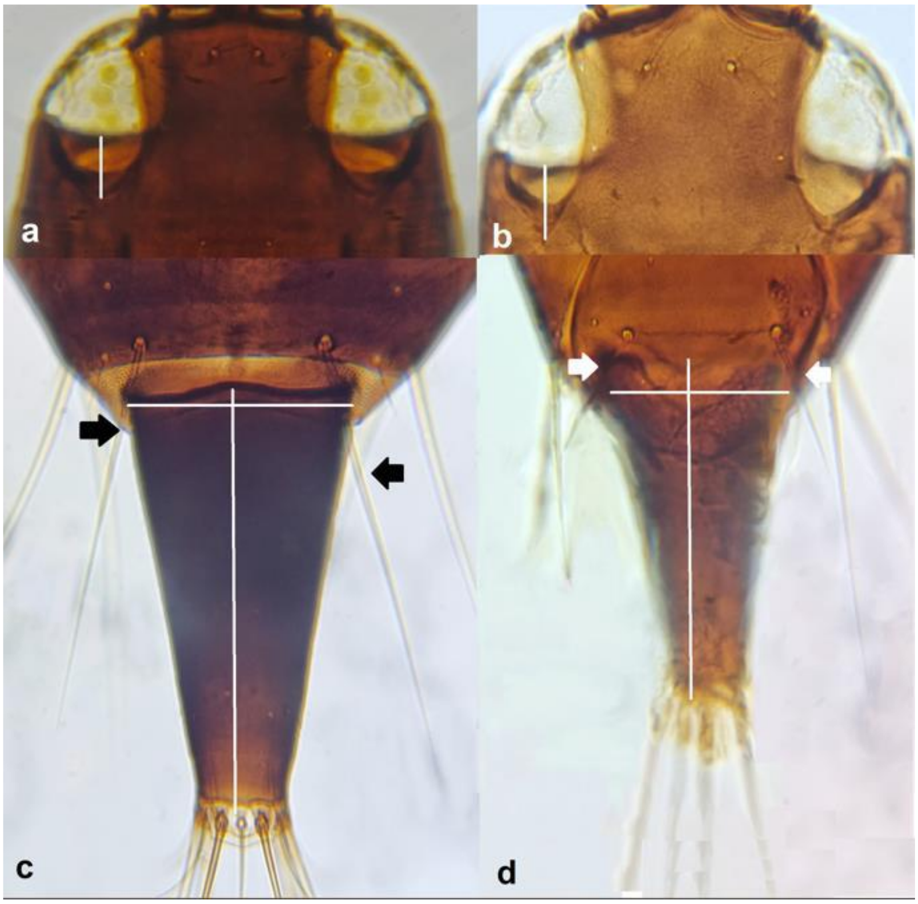

Figure 4.40: Upper section of head showing compound eyes (**a,b**): (**a**) with ventral length of compound eyes about 1.3 times the dorsal length; (**b**) with ventral length of compound eyes at least 1.6 times the dorsal length; **abdominal segments** (**c,d**): (**c**) dark brown, abdominal segment X more than two times as long as base and with setae S_1 on abdominal segment IX shorter than segment X; (**d**) light brown, abdominal segment X not longer than two times the length of base and with setae S_1 on abdominal segment IX longer than segment X.

44 Fore wings constricted medially (fig. 4.41a); maxillary bridge present (fig. 4.41c); prosternum with basantra (fig. 4.41e); antennal segment III with two sense cones; segment IV with four sense cones ………………………………………………………… 45

Fore wings not constricted medially (fig. 4.41b); maxillary bridge absent (fig. 4.41d); prosternum with no basantra (fig. 4.41f); antennal segment III with three sense cones; segment IV with two sense cones ………………………………………………………… 50

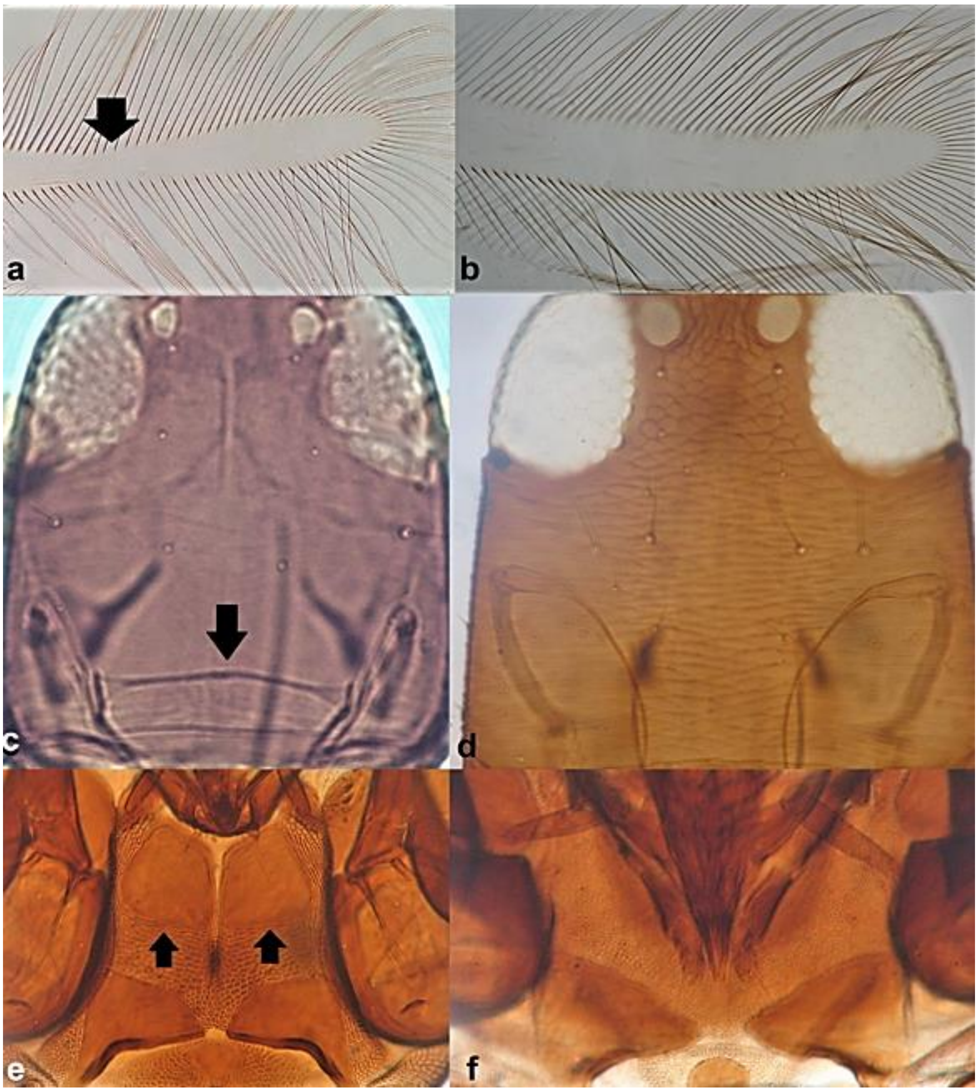

Figure 4.41: **Fore wing** (**a,b**): (**a**) showing medial constriction; (**b**) with no medial; **head** (**c,d**): (**c**) with maxillary bridge; (**d**) with no maxillary bridge; **pronotum** (**e,f**): (**e**) with basantra; (**f**) with no basantra.

45 Antennal segment IV with three sense cones (fig. 4.42a); basantra as long as broad (fig. 4.42c) …………………………………………. ***Karnyothrips flavipes*** Jones (1912)

Antennal segment IV with four sense cones (fig. 4.42b); basantra broader than long (fig. 4.42d) ……………………………………………………………………..……. 46

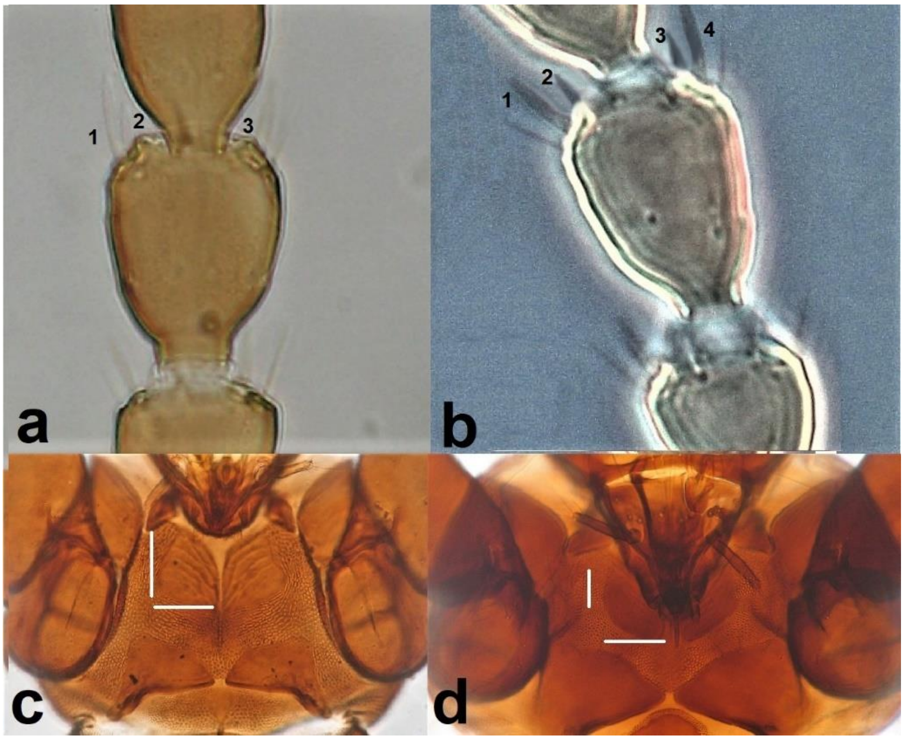

Figure 4.42: Antennal segment IV (**a,b**): (**a**) with three sense cones; (**b**) with four sense cones; **pronotum** (**c,d**): (**c**) with basantra as long as broad; (**d**) with basantra broader than long.

46 Antennal segment III with three sense cones (fig. 4.44a); fore wing with 12 - 18 duplicate cilia (fig. 4.43c) ……………………. ***Neoheegeria dalmatica*** Schmutz, 1909

Antennal segment III with one to two sense cones (fig. 4.44b); fore wing with not more than nine duplicate cilia (fig. 4.43d) ……… ***Haplothrips*** Amyot & Serville, 1843 .. 47

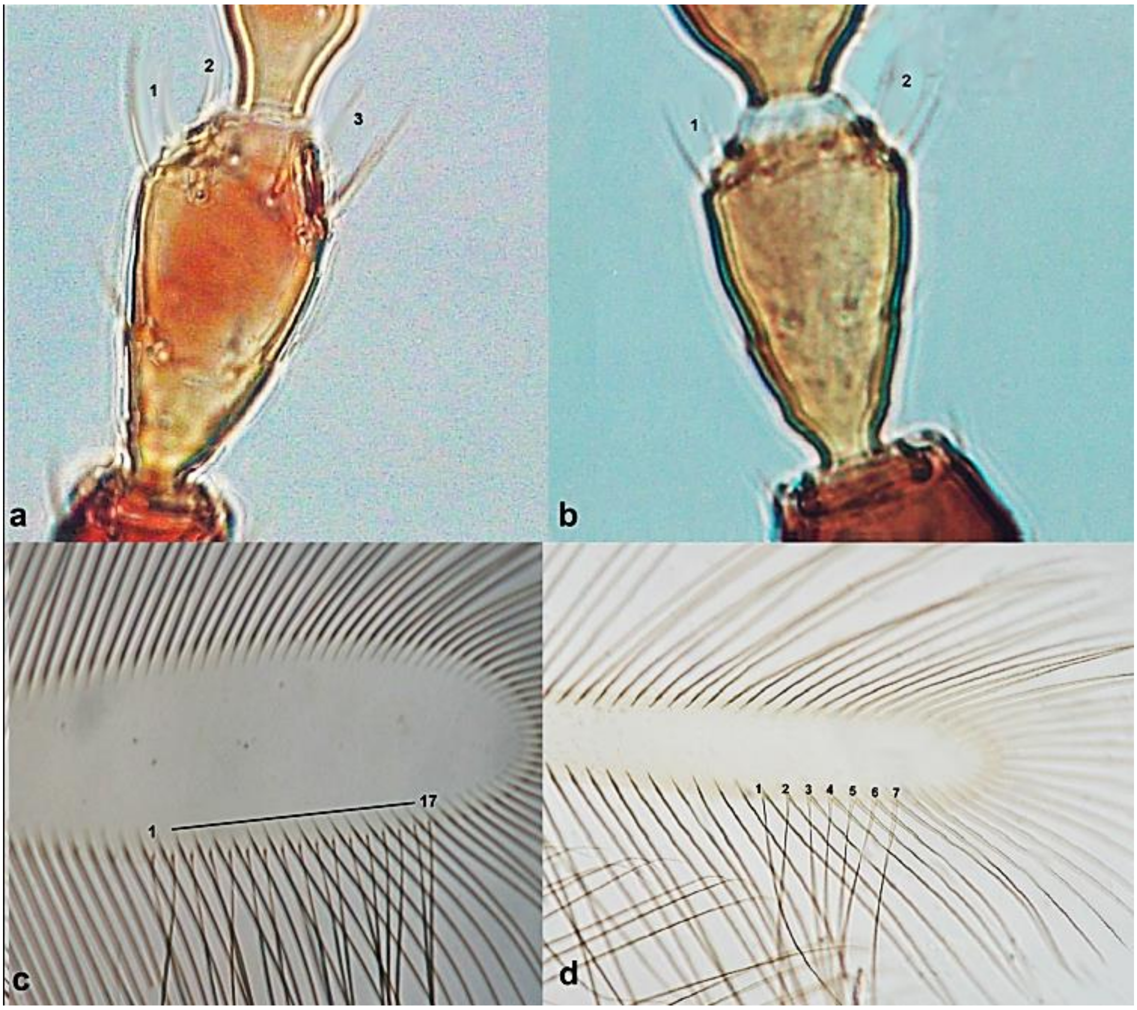

Figure 4.43: Antennal segment III (**a,b**): (**a**) with three sense cones; (**b**) with two sense cones; **fore wing** (**c,d**): (**c**) with 17 duplicate cilia; (**d**) with seven duplicate cilia.

47 Antennal segment III prominently asymmetrical with one sense cone (fig. 4.44a); pronotum with prominent postero angular and epimeral setae, other setae being as long as discal setae (fig. 4.44c); ommatidia occasionally with internal red pigment (fig. 4.44e) …………………………………………………. ***Haplothrips aculeatus*** (Fabricius, 1803)

Antennal segment III, symmetrical and with two sense cones (fig. 4.44b); pronotum with all five pairs of setae well developed (fig. 4.44d); compound eyes never with red pigment (fig. 4.44f) ………………………………………………………………………………..…. 48

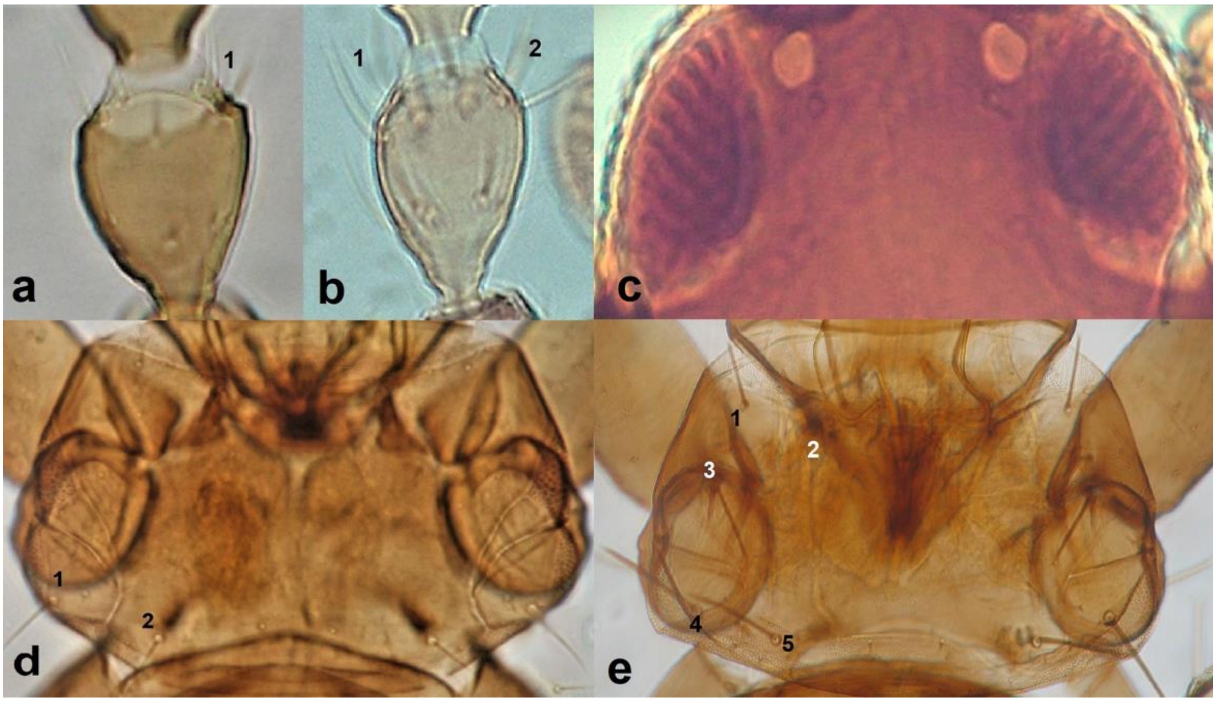

Figure 4.44: Antennal segment III (**a,b**): (**a**) one sense cone; (**b**) two sense cones; (**c**) compound eyes showing red internal pigment; **pronotum** (**d,e**): (**d**) with two pairs of prominent setae; (**e**) with five pairs of prominent setae.

48 Head with post-ocular and pronotal setae having a capitate tip (fig. 4.45a) ……………………….………………………….. ***Haplothrips acanthoscelis*** (Karny, 1910)

Head with post-ocular and pronotal setae having a pointed or blunt tip (fig. 4.45b) …. 49

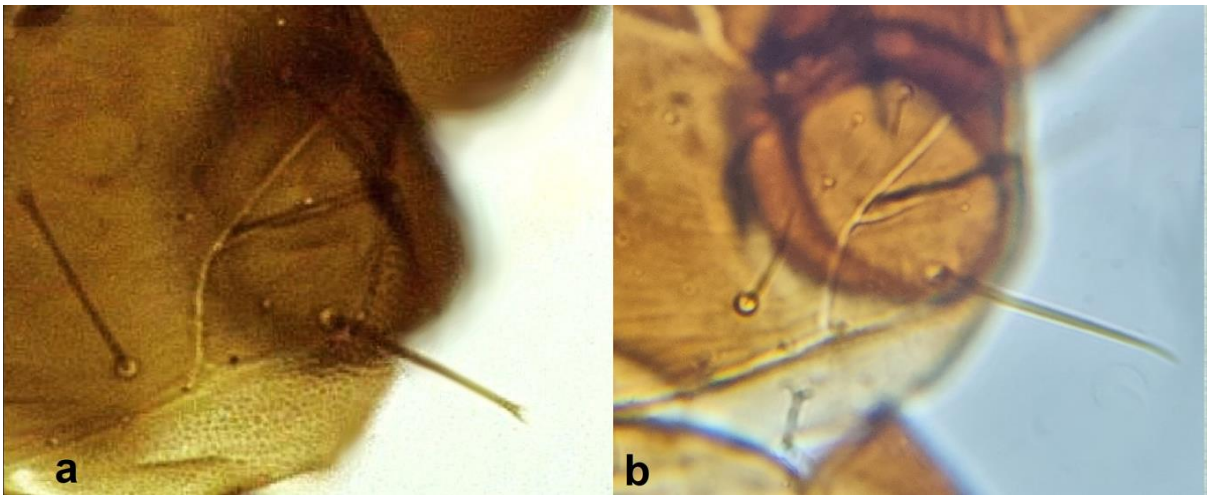

Figure 4.45: Pronotal and coxal setae: (**a**) capitate; (**b**) pointed.

49 Wing tip cilia barbed (fig. 4.46a); post-ocular setae with pointed tips. ……………… ………………………………………………………. ***Haplothrips setiger*** Priesner, 1921

b. Wing tip cilia smooth (fig. 4.46b); post-ocular setae with blunt tips. ……………… ……………………………………………………..… ***Haplothrips tritici*** (Kurdjimov, 1912)

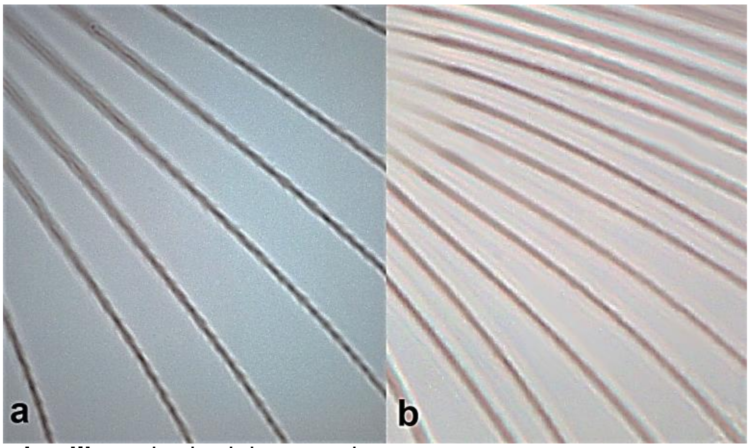

Figure 4.46: Wing tip cilia: a. barbed; b. smooth.

50 Mouth cone rounded at tip (fig. 4.47a); pronotal sculpture reticulate (fig. 4.47c); both sexes with a small fore tarsal tooth present in both sexes (fig. 4.47e). Develop on *Ficus* …………………………………………………… ***Gynaikothrips*** Zimmermann, 1900 .. 51

Mouth cone long and pointed (fig. 4.47b); pronotal sculpture striate and not always distinct (fig. 4.47d); fore tarsal tooth absent in both sexes (fig. 4.47f). Develop on different plants other than *Ficus* ………………………………………………… ***Liothrips*** Uzel, 1895 .. 52

51 Head with with post ocellar setae i being 05 – 1 times as long as post ocellar setae ii and post ocellar setae II not overlapping posterior margin of compound eye (fig. 4.48a); pronotum with tips of postero-angular setae scarcely developed, much shorter than epimeral setae (fig. 4.48c) ……………………… ***Gynaikothrips ficorum*** (Marchal, 1908)

Head with post ocellar setae i being 03 – 0.5 times as long as post ocellar setae ii and post ocellar setae ii considerably overlapping posterior margin of compound eye (fig. 4.49b); pronotum with postero-angulars and epimerals almost equal in length (fig. 4.49b) ………………..…………………………….…… ***Gynaikothrips uzeli*** (Zimmermann, 1900)

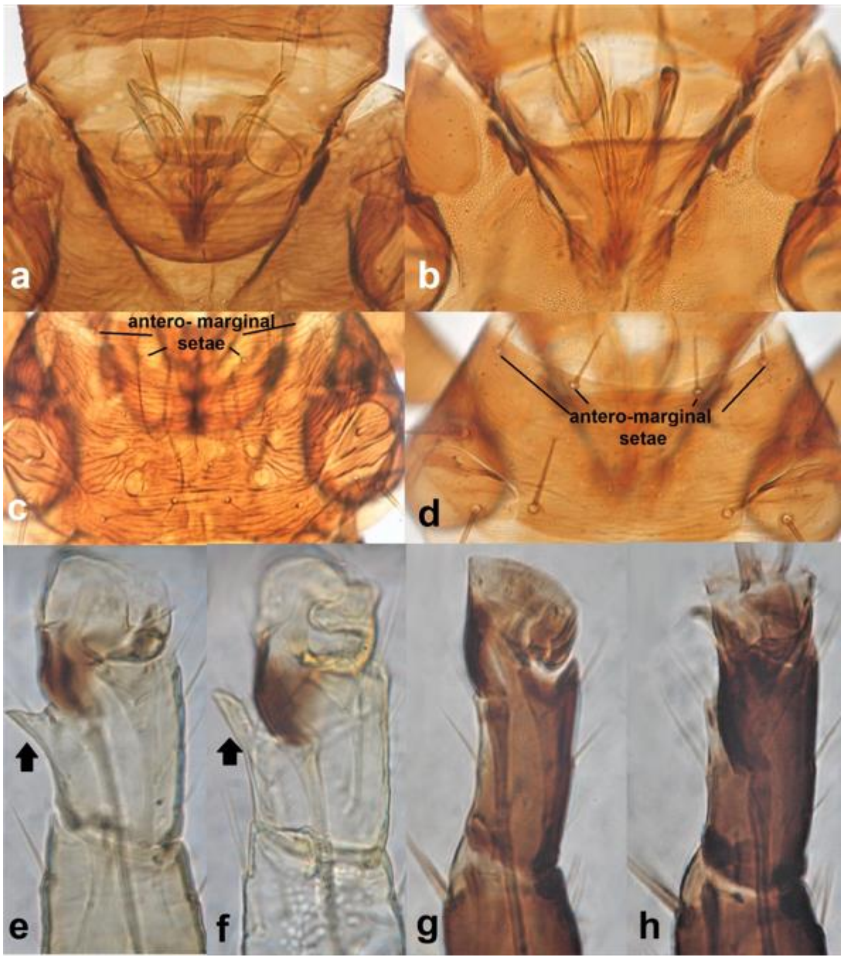

Figure 4.47: **Mouth cone** (**a,b**): (**a**) rounded; (**b**) pointed; **pronotum** (**c,d**): (**c**) with sculpture; d. without a distinct sculpture; **fore tarsus** (**e-h**): (**e,f**) toothed; (**g,h**) with no tooth.

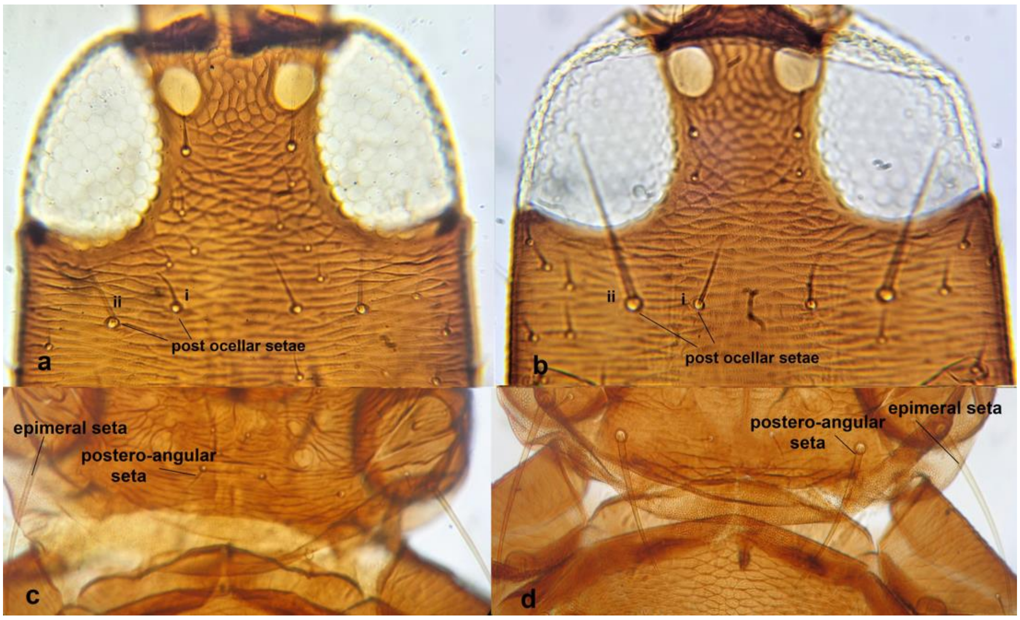

Figure 4.48: **Head** (**a,b**): (**a**) with post ocellar setae i 05 – 1 times as long as post ocellar setae ii and post ocellar setae II not overlapping posterior margin of compound eye; (**b**) with post ocellar setae i 03 – 0.5 times as long as post ocellar setae ii and post ocellar setae II considerably overlapping posterior margin of compound eye; **Pronotum** (**c,d**): (**c**) with postero-angular setae much shorter than epimeral setae; (**b**) with postero-angular and epimeral setae almost equal in length.

52 Fore wing with around 17 duplicate setae (fig. 4.49a); post-ocular setae longer than discal setae in the head (fig. 4.49c); fore tibiae and tarsi yellow (fig. 4.49e). On *Olea europaea* ……………………………….................. ***Liothrips oleae*** (Costa, 1857)

Fore wing with less than seven duplicate setae (fig. 4.49b); post-ocular setae not longer than discal setae (fig. 4.49d); fore tibiae and tarsi brown (fig. 4.49f). On *Tamarix*. ……………………………………………………….… ***Liothrips reuteri*** (Bagnall, 1913)

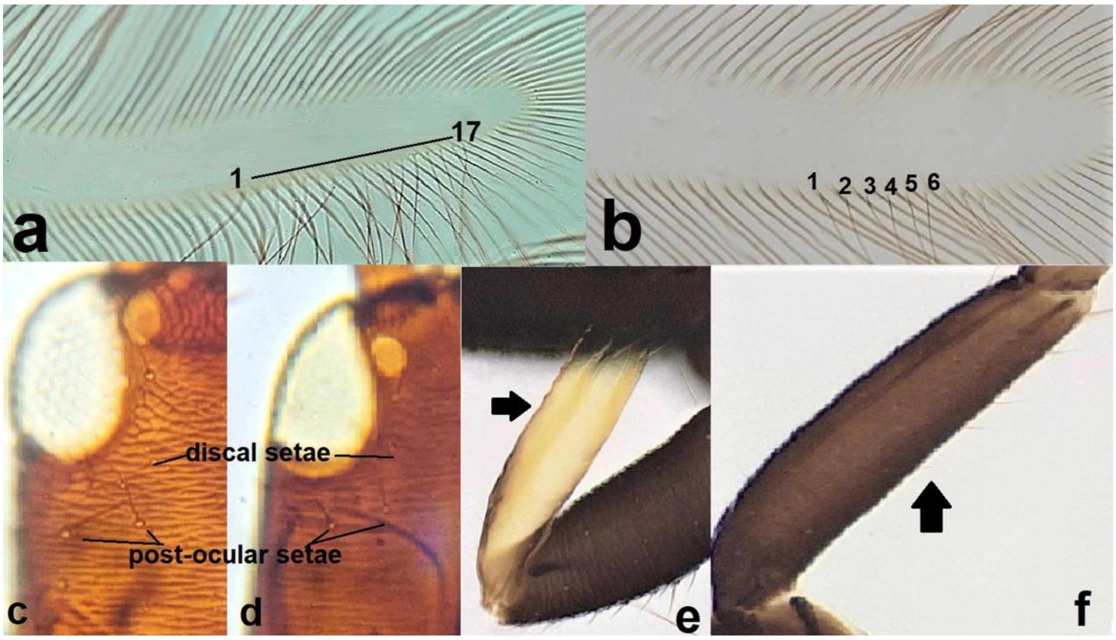

Figure 4.49: Fore wing (a - b): a. with 17 duplicate setae; b. with six duplicate setae; **Head (c - d):** with post-ocular setae longer than discal setae; d. with post ocular setae not longer than discal setae; **Fore tibia (e - f):** e. yellow; f. brown.

Species Catalogue for the Thysanoptera of the Maltese Islands

Suborder Terebrantia

A suborder which includes species that deposit eggs within plant structures via a prominent serrated ovipositor. Many species are found in flowers or other plant structures and some are indeed pest species causing damage on crops, and cultivated plants. Eight families are recognised worldwide, of which, species from four families have been recorded from the Maltese Islands in the present work.

Family Aeolothripidae

The family Aeolothripidae includes a number of phytophagous species occuring mainly on flowers. Some species act as facultative predators and a few are obligate predators of small arthropods, namely small insects including other thrips species, as well as mites. Species in this family occur worldwide, and although the majority of the species are Holarctic, most genera are found in the warmer parts of the world. They are typically medium-sized to largish species, with local species having a body length ranging between 1240 μm (in small males) and 2550 μm (in large females). Members of this family pupate underground and spin a cocoon as a means of protective covering against ant attack (Mound & Reynaud, 2005). Antennae are nine-segmented (as in Melanthripidae and Stenurothripidae), with antennal segments VI - IX fused to form a single unit. Maxillary palps are three-segmented in most genera. Head and pronotum typically bear no long setae. Females have an ovipositor which curves upwards towards the abdominal segments (fig. 4.2e, as in Melanthripidae). The wings are broader than those of other families and with a number of cross veins. Currently, this family includes 24 genera and 218 described extant species (ThripsWiki, 2021). In the Maltese Islands, nine species accommodated in three genera have been recorded in this work.

Genus *Aeolothrips* Haliday, 1836

Common name: Banded Thrips

This genus currently accommodates 113 described species from the Holarctic and 70 described species from the Palaearctic (ThripsWiki, 2021). Four species are recorded in the Maltese Islandsin the current study. Body length of species in this genus ranges from 1200 to 2550 μm, with females being larger than males. Both sexes are macropterous. Features of the species recorded from the Maltese Islands include: head being longer than broad; antennal segment V being longer than VI - IX together; sensoria on segments III and IV consisting of one ridge of variable length per segment, per species, which is aligned parallel to the length of segment (fig. 4.2a); setae on anterior and posterior margin generally as long as discal setae (fig. 4.50a); campaniform sensilla present on both meso- and metathorax; spinula present on both meso- and metathoracic endofurcae; Legs with hardly any sculpture or, at the most, weak transverse sculpture lines in most species; tarsi two-segmented; fore tarsus with stout apical recurved ventral hamus; wings longer than head and thorax together; fore wings with three pale bands alternating with two brown bands and with a pale region on the wing tip; fore wing broad being less than six times as long as broad, wide-tipped and with two longitudinal, four cross-veins and a ring or wing-tip vein (fig. 4.50c), the latter being variable in colour in different species; veins on fore wing with two complete rows of setae on longitudinal veins; tergites with a horizontal row of two to three pairs of short setae in the centre of each tergite and with no campaniform sensilla, craspedum or microtrichial comb; tricobothria on tergite X as large as or slightly larger than setal bases on same segment (fig. 4.50b); sternite VII with three pairs of long postero-marginal setae and two pairs of short setae S_1 and S_2 set away from the margin; distance between S_1 - S_1 and between S_1 - S_2 varies and is diagnostic of different species (fig. 4.50d); tergite IX in males with lateral setae, with short seta at the base of the clasper not reaching apex of segment, with bifurcate claspers and in some species, with paired sickle-shaped setae; the distance between median setae of tergite IX in males varies per species (fig. 4.50e); sternites in males with no pore plates.

Aeolothrips gloriosus **Bagnall, 1914**

Common name: -

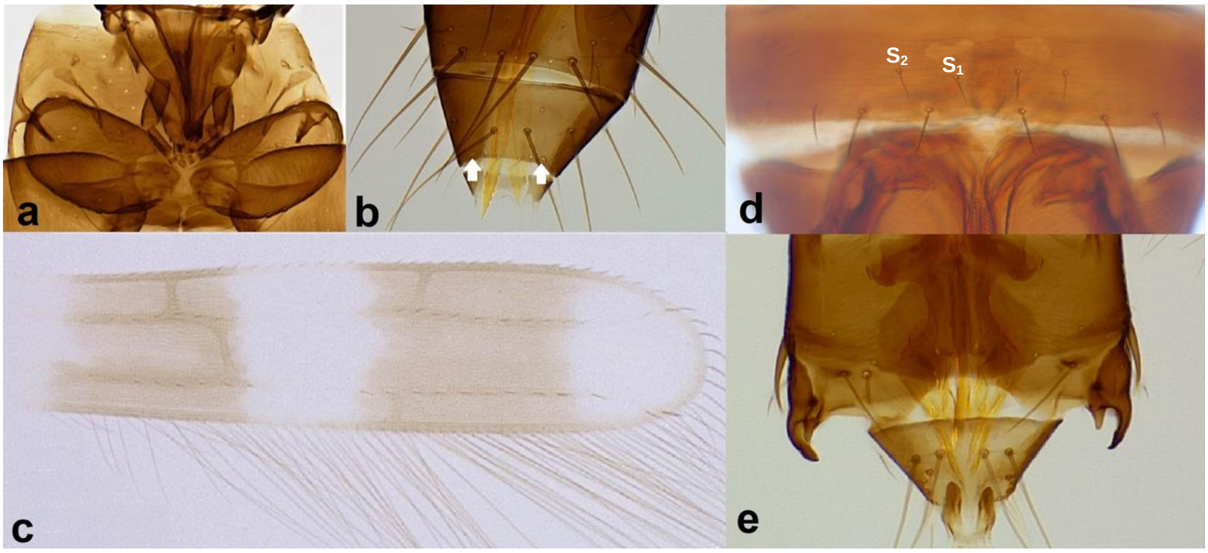

Figure 4.50: ***Aeolothrips* features:** (**a**) pronotum with all marginal setae as long as discal setae; (**b**) trichobothria on tergite IX; (**c**) banded fore wing; (**d**) sternite VIII with three pairs of postero-marginal setae and with two pairs of short setae set away from the margin; (**e**) male tergite IX with lateral setae, bifurcate claspers and sickle shaped setae.

Material examined: MALTA: Buskett, 19.iv.2016, 2 ♀♀ (sm) on *Laurus nobilis*, GD; Buskett, 21.ii.2018, 1 ♀ (sm) on *Rhamnus alaternus*, GD; Xemxija, 3.iii.2018, 2 ♀♀ (sm) on *Pistacea lentiscus*, GD.

Body length: ♀: 1760 - 1940 μm; ♂: no records

Wing type: ♀: macropterous; ♂: no records

Further notes on species by: Priesner (1964), Mound et al. (1976); zur Strassen (1986; 2003); Tunc (1991); Marullo (1993); Mound et al. (2018); Mirab-balou et al. (2013) and Trdan et al. (2012).

According to zur Strassen (2003) and Mound et al. (2018), the mid- and hind tibiae are sometimes brown in specimens from Britain and the European continent. All specimens recorded from the Maltese Islands had legs which were entirely yellow. Tunc (1991) and Mound et al. (2018) described male specimens to have similar body coloration as in females and with tergite IX lacking paired claspers. Male body length according to zur Strassen (2003) is 1170 - 1300 μm.

Diagnosis: This species can be distinguished from other local congeners by the following features: the body regions which are yellow with a medial brown area; the dark brown body setae; the lack of sculpture on dorsal region of pronotum; the yellow antennal segments

I - II and base of III; The yellow leg coloration; the number of pairs of setae on dorsal side of head (12 - 15); the lack of sculpture on legs; and the clavus with nine marginal setae.

Aeolothrips tenuicornis and *A. melisi* differ from *A. gloriosus* by having a darker body colour, darker antennal segments I - II, and a dark wing-tip vein on the forewing. *A. intermedius* also has a pale fore wing ring vein, but in *A. intermedius*, antennal segments I, II IV are dark (segments I and II are entirely pale and IV is pale in the proximal half in *A. gloriosus*).

Franklinothrips megalops and *Melanthrips ficalbii* also have banded fore wings like in all *Aeolothrips* species, however the tips of the fore wings in both these species are dark, while those of all *Aeolothrips* species are pale. Moreover, the shape and size of the antennal sensoria in both these species are different in shape from those described in the *Aeolothrips* species, with *M. fuscus* having transverse sensorial grooves, while *F. megalops* having a complex chain of round sensoria lined up in parallel with length of segment. Antennal segments III and IV in *F. megalops* are considerably longer than those of *Aeolothrips*. Antennal segments of *M. ficalbii* are constricted at the base, unlike those found in the genus *Aeolothrips*.

Biology: According to Trdan et al. (2012), the biology of this species is not widely known. During the current study, no literature could be traced which yielded information about the duration of the life cycle of this species.

According to Priesner (1964) and to Marullo (1993), *A. gloriosus* is found on the flowers of *Anthyllis*, *Calicotome, Citrus*, *Prunus*, and *Ulex* spp., as well as *Pistacea lentiscus.* zur Strassen (1986; 2003) described the species as leaf-dwelling on woody deciduous plants, often found on flowering branches of *Fraxinus ornus*, *Olea europaea*, *Phillyrea* sp. and *Sambucus nigra*. Mound et al. (1976) also recorded the species from *Tilia* sp., Mirab-balou et al. (2013) on *Euphorbia* sp., while Tunc et al. (2012) recorded the species from *Pergamum harmala*. Marullo and De Grazia (2013) described *A. gloriosus* as a facultative predator. In the Maltese Islands, this species was the only *Aeolothrips* species to be found exclusively on trees and shrubs (*Pistacea lentiscus* and *Rhamnus alaternus*) in woodland and maquis habitats.

A. gloriosus has not been recorded as an agricultural pest.

Distribution data: zur Strassen (2003), claimed that this species can be found in the Aegean region, but spans from Anatolia to Morocco and the Azores. Vierbergen (2013) also recorded *Aeolothrips gloriosus* from the Near East and North Africa, without specifying the countries where this species was collected from. It has been recorded from the UK (Mound et al., 1976; Mound et al., 2018), Sweden (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Croatia, Spain, (Trdan et al., 2005), Slovenia, (Trdan et al., 2012), Portugal, Ukraine (Vierbergen, 2013), France including Corsica (Pizzol et al., 2014), Italy including Sardinia (Stoch, 2004; Trdan et al., 2005; Marullo & De Grazia, 2013), Greece (Jenser & Tsanakakis, 1985; zur Strassen, 1986), Turkey (Priesner, 1964; Tunc et al., 2012) and Cyprus, (Priesner, 1964; Srour, 2015). It has also been recorded in Palestine (Priesner, 1964) and Iran (Bhatti et al., 2009).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

***Aeolothrips intermedius* Bagnall, 1934**

Common name: Banded Thrips

Material examined: MALTA: 03.iv.1959, 1 ♀ and instar larva (sm) on *Gladiolus* sp., ERS (BMNH); Wied Qirda, 06.iv.2016, 1 ♂ (sm) on *Glebionis coronaria*, GD; Wied Ħesri, 22.iv.2016, 2 ♀♀ (sm) on *Avena* sp., GD (BMNH); Wied Qirda, 17.iii.2017, 1 ♀ (sm) on *Asphodelus ramosus*, GD; Manikata, 29.iv.2017, 1 ♀ (sm) on *Pallenis spinosa*, GD; Fawwara, 22.v.2017, 1 ♀ (sm) from Malaise trap, DM; Lapsi, 09.x.2018, 1 ♀ (sm) on *Hyparrhenia hirta*, GD.

Body length: ♀: 1700 - 1840 μm; ♂: 1300 μm**.**

Wing type: Both sexes are macropterous.

Further notes on species by: Priesner (1964), Marullo (1993), Moritz (1994; 2006), Kirk (1996), zur Strassen (2003) and Mound et al. (2018).

The male specimen recorded from the Maltese Islands is slightly smaller than the specimens described by zur Strassen (2003).

Diagnosis: This species can be distinguished from other local species of the same genus by the following features: the colour of antennal segments I-III, with segment I being dark brown, segment II bicoloured with a brown basal area and a yellow apex and segment III yellowish brown with a brown distal quarter; the clavus with six to eight marginal setae; the marginal setae on sternites that arise at, or close to the posterior margin; the inner posterior margin of mid coxae which has a ventral series of ridges; the prominent tubercles on tergites in males; tergite IX in males which has bifurcate claspers, with slender, straight lateral setae, and with short seta at the base of the clasper not reaching apex of segment but lacks the paired sickle-shaped setae; and the distance between median setae of tergite IX of males which is smaller than the length of setae.

According to Moritz (2006) and Mound et al.(2018), this species is very hard to distinguish from *Aeolothrips fasciatus* and *A. ericae*, both of which belong to the same Eurasian species-complex as *A. intermedius* and neither of which have been recorded locally but both of which being likely to occur in the Maltese Islands due to their geographical distribution which extends to regions which are geographically near the Islands and because they have been recorded on plants that can be found in the Islands. *A. ericae* has in fact been recorded on *Bituminaria bituminosa, Hypericum perforatum*, *Medicago marina* and *Spartium juncaeum* (zur Strassen, 1986), while *A fasciatus* on *Ficus carica* and *Olea europaea* (Tunc et al., 2012).

Franklinothrips megalops and *Melanthrips ficalbii* also have banded fore wings, however they differ in a number of characters as previously described in the “Diagnosis” section under the description of *Aeolothrips gloriosus*.

Biology: No literature occurs that describes the duration of the life cycle of this species.

A. intermedius has been recorded from a wide variety of unrelated plant species (Priesner, 1964; Marullo, 1993; 1996; zur Strassen, 2003; Conti et al., 2003), often on yellow flowered plants such as those of Asteraceae, Cruciferae, Leguminosae, and also Poaceae (Priesner, 1964; Mound et al., 1976; Moritz, 2006). This species has been recorded on

Brassica napus (Kirk, 1996), *Malva silvestris*, *Pistacea terebinthus Spartium juncaeum*, (Jenser & Tsanakakis, 1985), *Beta vulgaris* var. *saccharifera*, *Carthamu*s sp., *Cirsium arvensis*, *Capsicum annuum*, *Centaurea cristata, Convolvulus* sp., *Daucus carota*, *Gladiolus gandavensis*, *Glycine max*, *Helianthus annuus*, *Nicotiana tabacum Rorippa austriaca*, *Raphanus sativus*, *Sinapis arvensis*, *Sambucus nigra*, *Papaver rhoeas*, *P. somniferum*, *Phaseolus vulgare*, *Punica granatum*, *Rumex obtusifolius*, *Rosa canina*, *Trifolium campestre*, *T. pratense, T. repens*, *Typha* sp., *Zea mays*, (Raspudić et al., 2009), *Raphanus* sp., *Vicia faba* (Fallahzadeh et al., 2011), *Althaea* sp., Asteraceae, *Avena sativa*, *Amygdalus communis*, *Bromus* sp., cereals, *Crataegus* sp., *Dianthus* sp., *Eucalyptus* sp., *Euphorbia* sp., Fabaceae, *Hordeum vulgare*, *H. sativum*, *Lamium* sp., *Ligustrum* sp., *Medicago sativa*, *Phragmites* sp., *Pinus* sp., *Prunus avium*, *Quercus* sp., *Raphanus* sp., *Rumex* sp., *Salvia* sp., *Sinapis* sp., *Triticum aestivum*, *Trifolium* sp., *Tripleurospermum* sp., *Triticum* sp., *Vicia sativa* and *Vitis vinifera* (Tunc et al., 2012). Larvae are mainly predatory (Tunc, 1991; Conti et al., 2003; Marullo, 2004) while adults also feed on pollen (Marullo, 2004). In the Maltese Islands, this species was also found on a number of mostly annual, herbaceous plants such as *Asphodelus ramosus, Glebionis coronaria* and *Pallenis spinosa*, as well as on grasses such as *Avena* sp. and *Hyparrhenia hirta*.

This species is also a facultative predator (Moritz, 2006). The work by Trdan et al., (2005) investigated the species of thrips which *Aeolothrips intermedius* feeds on. According to these authors, *A. intermedius* preys on a number of thrips species which have been recorded in the current study, namely *Chirothrips manicatus, Haplothrips aculeatus, Haplothrips tritici Limothrips cerealium, Thrips simplex* and *Thrips tabaci*. *A. intermedius* has also been recorded to feed on other genera such as *Frankliniella*, species of which also occur in the Maltese Islands. Moritz (2006) also mentioned *Anaphothrips sudanensis* as potential prey for this species.

A. intermedius has not been described as an agricultural pest, however it was listed, by Moritz (1994) in his work on European thrips of economic importance. The author does not explain the choice of species deemed “of economic importance”, that are included in his work.

Distribution data: zurStrassen (2003) described this species to be widespread in Europe and Palaearctic Asia. Vierbergen (2013) also described this species from the East Palaearctic, North Africa and the Oriental regions. *Aeolothrips intermedius* is common and widespread in many European countries, being recorded in the UK (Mound et al., 1976; Mound et al., 2018; Kirk, 1996), Scandinavia and Denmark (Gertsson, 2015), Hungary, (Andjus et al., 2001; Jenser, 2011), the Netherlands as a glass house species but also in open spaces (Vierbergen, 2001, Trdan et al., 2005), Austria, Germany, Serbia & Montenegro (Trdan et al., 2005), Croatia (Trdan et al., 2005; Raspudić et al., 2009), Poland, Romania (Trdan et al., 2005; Sierka et al., 2008), Bulgaria (Karadjova & Krumov, 2015), Slovenia, (Trdan et al., 2005; Trdan, Vidrih & Vierbergen, 2012), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Belgium (Lock, 2006), Albania, Central, Northwest and South European Russia, Czech Republic, Estonia, Latvia, Lithuania, Luxembourg, former Yugoslav republic of Macedonia, Portugal, Switzerland, Ukraine (Vierbergen, 2013), Spain, (Trdan et al., 2005), France including Corsica (Pizzol et al., 2014), Italy including Sardinia (Stoch, 2004; Trdan et al., 2005; Marullo & De Grazia, 2013), Greece (Jenser & Tsanakakis, 1985; zur Strassen, 1986) and Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016). This species has also been recorded in Tunisia (Belaam-Kort et al., 2020), Israel (zur Strassen & Kuslitzky, 2012), Algeria (Razi et al., 2013) and Iran (Fallahzadeh et al., 2011). *A. intermedius* has also been intercepted in US from plant material imported from Europe (Nickle, 2003a).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

***Aeolothrips melisi* Priesner, 1936**

Common name: -

Material examined: MALTA: Wied Ħesri, 22.iv.2016, 1 ♀ (sm) on *Capparis orientalis*, GD; Mellieha road l/o Popeye Village, 29.iv.2017, 1 ♀ (sm) on *Tamarix africana*, GD. **GOZO**: Ramla Bay 18.iv.2017, 2 ♀♀ and 1 ♂ (sm) on *Cakile maritima* and 2 ♀♀ (sm) on *Medicago marina*, 18.iv.2017, GD.

Body length: ♀: 1960 - 2550 μm; ♂: 1780 μm

Wing type: Both sexes are macropterous.

Further notes on species by: Priesner (1964), Marullo (1993) and zur Strassen (2003). The latter author described the pronotum as having a distinct marginal cross lined sculpture dorsally. This feature was not so distinct in locally recorded specimens. The size range for local female specimens is wider than the size range described by zur Strassen (2003).

Diagnosis: Priesner (1964) described this species as one which is large in size. In fact, *Aeolothrips melisi* is the largest local species of this genus. This species can be distinguished from other local *Aeolothrips* by the following features: the colour of the antennal segments with segment I being dark brown while segment II pale in colour and III mostly pale with a dark distal tip. All other segments being dark brown; the narrow sensoria on antennal segment III and IV which are longer than those of other *Aeolothrips* species; the yellow colour of the pronotum; the clavus with 9 - 11 marginal setae; the absence of tubercles on tergites in males; the distance between medial setae on tergite IX in males; and the male tergite IX with two side marginal setae; a pair of bifurcate claspers; and two lateral short curved setae.

Aeolothrips gloriosus and *A. intermedius*, have the ring or wing-tip vein on the fore wing which is the same colour of the wing membrane in the light bands of the wing and on the wing tip. In *A. melisi* and *A. tenuicornis*, the wing-tip vein is darker than the wing membrane. *A. tenuicornis* is different from *A. melisi* in having a brown rather than yellow pronotum. Moreover, the sensorial grooves on antennal segments III and IV in *A. melisi* tends to be longer and narrower than those of the other *Aeolothrips* species.

Franklinothrips megalops and *Melanthrips ficalbii* also have banded fore wings, however they differ in a number of characters as previously described in the “Diagnosis” section under the description of *Aeolothrips gloriosus*.

Biology: During the current study, no literature occurs describing the duration of the life cycle of this species could be traced.

This species has been described as a facultative predator (Marullo & De Grazia, 2013). Moreover, zur Strassen (2003) claimed that this species can be found on flowers of unrelated plants. It has in fact been recorded on Brassicaceae such as *Alyssium maritimum* (Priesner, 1964; Marullo, 1993) and Fabaceae such as *Cystisus* sp. (Marullo & De Grazia, 2013). In the Maltese Islands, this species was found in a number of different habitats on a number of unrelated plants such as *Cakile maritima Capparis orientalis*, *Medicago marina* and *Tamarix africana*.

This species has not been recorded as being an agricultural pest.

Distribution data: *Aeolothrips melisi* has been recorded in Italy including Islands (Priesner, 1964; zur Strassen, 2003; Stoch, 2003; Marullo & De Grazia, 2013), Spain (zur Strassen, 2003; Trdan et al., 2005). Marullo (1993) describes this species as widespread spread throughout the Mediterranean basin. This species is also recorded from North Africa (Vierbergen, 2013), though the author did not specify the countries where this species was collected from.

Records from the Maltese Islands: *Aeolothrips melisi* is a new record to the Maltese Islands.

Aeolothrips tenuicornis **Bagnall, 1926**

Common name: -

Material examined: MALTA: Għammieri, 19.xii.1996, on *Galium* sp., 2 ♀♀ (sm), DM; M'Scala, 02.ii.1997, on *Hedysarum coronarium* sp., 2 ♀♀ (sm), DM; Siġġiewi, private garden 1, 04.xi.2015, 2 ♀♀ (sm) on *Rosa* sp., GD; Siġġiewi, private garden 1, 28.x.2015, 1 ♀ (sm) on *Rosa* sp., GD; Wied Ħesri, 15.i.2016, 1 ♂ (sm) on *Silene colorata*, GD; Siġġiewi, 1, 29.iii.2016, 4 ♀♀ (sm) and 2 ♂♂ (sm) on *Ranunculus asiaticus*, GD; Siġġiewi, Triq it-Tank, 04.iv.2016, 1 ♀ (sm) and 1 ♂ (sm) copula pair on *Glebionis coronaria*, GD; Wied Ħesri, 15.iv.2016, 1 ♀ (sm) on *Convolvulus arvensis*, GD; Wied Qirda, 06.iv.2016, 2 ♀♀ (sm) on *Glebionis coronaria*, GD; Wied Ħesri, 22.iv.2016, 1 ♀ (sm) on *Capparis orientalis*, GD; Kunċizzjoni, 22.iv.2016, 1 ♂ (sm) on *Reichardia picroides*, GD; Siġġiewi, Triq it-Tank, 23.v.2016, 1 ♀ (sm) on *Glebionis* *coronaria*, GD; Siġġiewi, Triq it-Tank, 21.vi.2016, 3 ♀♀ (sm, aga) on *Glebionis coronaria*, GD; Msida, Junior College grounds, 08.x.2016, 1 ♀ (sm) on *Cynodon dactylon*, GD; Lapsi 09.i.2017, 1 ♀ (sm) on *Periploca angustifolia*, GD; Siġġiewi, Triq Dr. Nikola Zammit, 21.iv.2017, 1 ♀ (sm) on *Argyranthemum frutescens*, GD; Mellieħa road l/o Popeye Village, 29.iv.2017, 1 ♂ (sm) on *Convolvulus althaeoides*, GD; Wied Ħesri, 30.iv.2017, 1 ♀ (sm) on *Gladiolus communis*, GD; Pembroke, 05.xi.2018, 1 ♀ (sm) on *Reichardia picroides*, GD. **GOZO**: Ramla Bay, 18.iv.2017, 1 ♀ (sm) on *Malva arborea*, GD.

Body length: ♀: 1900 - 2400 μm; ♂: 1200 - 1680 μm.

Wing type: Both sexes are macropterous.

Further notes on species by: Priesner, 1960 (as *A. ghabni*)**,** Priesner (1964), Marullo (1993), Kirk (1996), zur Strassen (2003), Moritz (2006) and Mound et al. (2018).

zur Strassen (2003) is the only author to provide body lengths, which, for this species seem to be marginally larger than the local specimens. The coloration of antennae in pale specimens matches the description of pale specimens of this species by zur Strassen (2003).

Diagnosis: This species can be distinguished from other local congeners by the following features: the yellow distal apex of fore tibia and fore tarsi; the reticulated sculpture and microtrichia on femora; the occasional lack of sculpture on abdominal tergite I; the short and semi-circular dorsal plate of tergite IX; the distance between median marginal pair in sternite VII (S_1 - S_1) being smaller than the distance between successive marginal setae (S_1 - S_2); the paired accessory setae on sternite VII which arise further from the margin than their length; the irregular tubercles on male tergites; the bifurcate claspers as well as the pair of lateral, long and curved setae on tergite IX in males; and the distance between medial setae on tergite IX in males which is greater than the length of these setae.

A. tenuicornis can be distinguished from *Aeolothrips gloriosus* and *A. intermedius* by having a dark fore wing wing-tip vein which contrasts with the light wing membrane areas particularly at the wing tip. *A. melisi* also has a dark wing-tip vein, but the colour of the pronotum in *A. melisi* is yellow, while that of *A. tenuicornis* is brown. Moreover, *A. tenuicornis* is the only local species in this genus there the distance between S_1 - S_1 setae on sternite VII is smaller than S_1 - S_2. In all other local *Aeolothrips* species, the distance between S_1 - S_1 setae on this sternite is larger than S_1 - S_2.

Mound et al. (2018) described this species as belonging to a Eurasian species-complex, with the females being particularly similar to those of *A. propinquus*, a species which has not been recorded locally, but is a likely recorded given its geographical distribution to include many countries in the Mediterranean basin including Sicily, as well as the plants that this species was recorded on (*Verbascum* sp.) which occur in the Maltese Islands.

Franklinothrips megalops and *Melanthrips ficalbii* also have banded fore wings, however they differ in a number of characters as previously described in the "Diagnosis" section under the description of *Aeolothrips gloriosus*.

Biology: No literature could be traced that describes the duration of the life cycle for this species.

Marullo (1993), zur Strassen (2003), Moritz (2006), Marullo & De Grazia (2013) and Mound et al. (2018) all described this species as having predatory tendencies, with Mound et al. (2018) stating that its life cycle is similar to that of *A. intermedius*. Adults are found on a range of flowers on a number of unrelated plant species including yellow-flowered Asteraceae, Brassicaceae and Fabaceae, (Mound et al., 1976; Moritz, 2006), such as *Hedysarum coronarium* (zur Strassen & Kuslitzky, 2012) but also on *Taraxacum* sp. (Kirk, 1996), *Citrus* sp. (Fallahzadeh et al., 2011), *Crataegus* sp. (Tunc et al., 2012), *Triticum aestivum* (Fallahzadeh et al., 2011), *Verbascum* sp. (Priesner, 1964), *Vitis* sp. and *Zilla spinosa* (Priesner, 1960). In the Maltese Islands, this species was also found in a range of different habitats on the flowers of a rather wide range of unrelated indigenous plants such as *Capparis orientalis*, *Convolvulus arvensis*, *C. althoides*, *Cynodon dactylon Glebionis coronaria*, *Galium* sp., *Gladiolus communis*, *Malva arborea*, *Silene colorata*, *Periploca angustifolia* and *Reichardia picroides*, as well as cultivated plants such as, *Argyranthemum frutescens, Rosa* sp. and *Ranunculus asiaticus*.

This species has no record as an agricultural pest, nonetheless the species was mentioned by Moritz (1994) in his work on European thrips of economic importance. This author does not justify his choice of species included as economically important in his work.

Distribution data: *Aeolothrips tenuicornis* was the most frequently encountered *Aeolothrips* species in this work, and is possibly the most abundant species in the Maltese Islands. According to Priesner (1964), Marullo (1993), zur Strassen (2003), Moritz (2006), Vierbergen (2013) and Mound et al. (2018), *A. tenuicornis* occurs in Central and South, Southwestern and Western Europe, countries of the Middle East and the Mediterranean area, Atlantic Islands (Azores, Madeira, Canaries). Marullo (1993), zur Strassen (2003), Moritz (2006) and Mound et al. (2018), also described this species as preferring countries with warmer climates. This species has been found in the UK (Mound et al., 1976; Mound et al., 2018; Kirk, 1996), Belgium (Lock, 2006), Andorra, Germany, France, Malta, Portugal, Switzerland, Ukraine (Vierbergen 2013), Iberian Peninsula, Italy including Sicily, the Netherlands (Stoch, 2003; Trdan et al., 2005; Marullo & de Grazia, 2013), the Canary Islands (Priesner, 1960), the Aegean region and Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016). The species has also been recorded from Israel (zur Strassen & Kuslitzky, 2012), Egypt, Palestine (Priesner, 1960), and Iran (Alavi et al., 2007; Bhatti et al., 2009; Fallahzadeh et al., 2011).

Records from the Maltese Islands: This species was first described from the Maltese Islands by the website "*Fauna Europaea*" (Vierbergen, 2013).

Genus *Franklinothrips* Back, 1912

Common name: Vespiform Thrips

This is a genus with a tropical to subtropical geographical distribution, accommodating 14 species. Species belonging to this genus are typically predatory, and are known to show ant mimic tendencies (Mound & Reynaud, 2005). One species has been recorded from the Maltese Islands in the current study. Features typical of the locally occurring *Franklinothrips* species include: both sexes are macropterous; abdominal segments I and II are considerably narrower than the other segments giving the impression that the insect is narrow waisted (fig. 4.4e); the bicoloured body, with abdominal segments I - IV being paler than the other segments (fig.4.4e); antennal segment III being about five times longer than segment II (fig. 4.4a) segment IV being about four times longer than segment II (fig. 4.51a); sensoria on III and IV with a row of multiple spherical sensorial pits lined parallel to length of antennae (fig 4.4b) antennal segments VI - IX which are fused, long and linear; head which is approximately twice as wide as long and, in females, recessed into the prothorax (fig. 4.51b); the pronotum which narrows at posterior side; the wings which are narrow, banded and with two dark and wide bands alternating with two wide pale bands; the wing tip which has a narrow dark band (fig. 4.4c); the row of setae on leading edge and the incomplete rows of setae on central veins; the trichobothria on segment IX which are as large as the setal bases on the same tergite; and the long and b rown mid leg, with tibiae longer than the meso and metathorax together (fig.51c).

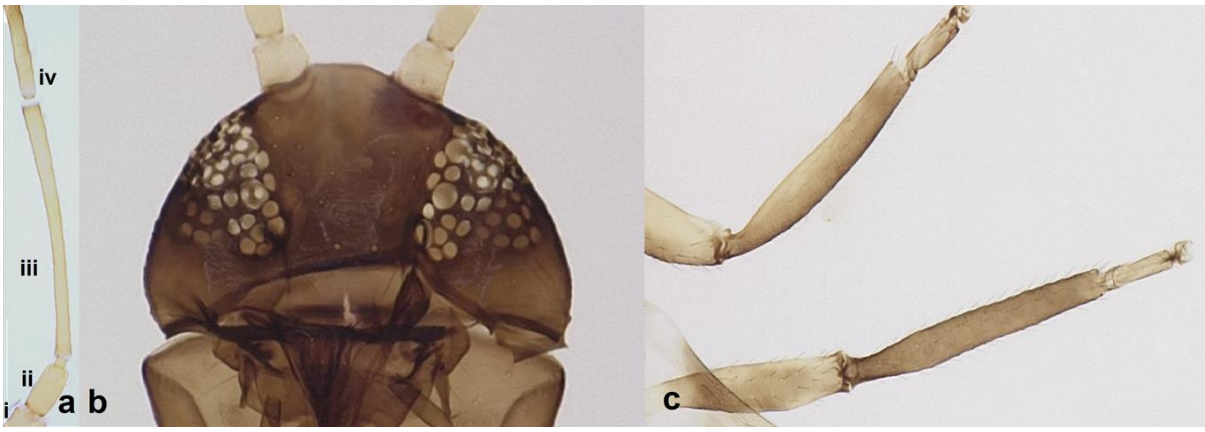

Figure 4.51: ***Franklinothrips* features**: (**a**) antennal segments I – IV; (**b**) head and pronotum; (**c**) mid leg (long and brown).

***Franklinothrips megalops* (Trybom, 1912)**

Common name: -

Material examined: MALTA: Msida, University of Malta grounds, 04.11.2016, 1 ♀ (sm) on *Rosmarinus officinalis*, DM; Fawwara, 22.v.2017, 1♀ (sm) from Malaise trap, DM.

Body length: ♀: 2380 - 2480 μm, ♂: no records.

Wing type: ♀: macropterous; ♂: no records.

Further notes on species by: Priesner (1960: 1964, as *F. myrmicaeiformis*), Palmer (1990), zur Strassen (2003), Mound and Reynaud (2005), and Moritz et al. (2014). The latter author and Mound and Reynaud (2005) described males as being similar to females but smaller and with an elongated abdomen, paler wings, and having tergite I with pair of longitudinal ridges terminating in square or rounded apex overhanging tergite II. zur Strassen (2003) described the body length for males of this species to be 1900 - 2300 μm.

Diagnosis: *F. megalops* differs from *F. vespiformis*, which has been recorded from Tunisia (Belaam-Kort et al., 2020) and which is a likely future record to the Maltese Islands given its current geographical distribution and population dynamics (Mound & Reynaud, 2005; Belaam-Kort et al., 2020), in that the abdominal segment IV in *F. vespiformis* is pale like segments V - IX, while this is dark as in segments I - III in *F. megalops.*

This species has a unique shape resembling no other local species. The particularly long legs and antennae also make this species distinct from other local species. The species of the genus *Aeolothrips* also have banded fore wings, however, the wing has only two dark bands rather than three as in *Franklinothrips*. *Aeolothrips* species also have a pale coloured wing tip in *Aeolothrips*, while that in *Franklinothrips* is dark. The antennal sensoria in *Aeolothrips* consist of sensorial grooves lined parallel to the length of the antennal segment, while those of *Franklinothrips* consist of a row of a number of spherical sensorial pits. The head in *Aeolothrips* is not recessed into the pronotum and the pronotum is not narrowed posteriorly, features which are found in the genus *Franklinothrips*.

Biology: According to Moritz et al. (2014), the life cycle of this species takes between two to three weeks to complete at 25^{o}C.

The study of the physiology and behaviour of this and of other members of this genus shows that this species is likely to be an obligate predator, unlike species of the genus *Aeolothrips* (Mound & Reynaud, 2005). *Franklinothrips megalops* has in fact been observed to feed on other small arthropods including juvenile and adult stages of other Thysanoptera (Priesner, 1960; zur Strassen, 2003) such as *Heliothrips haemorrhoidalis* and *Thrips* spp., species which have been recorded in the Maltese Islands in the current study. The genus *Franklinothrips* can be sometimes associated with trees (ThripsWiki, 2021).

F. megalops does not have a record as an agricultural pest.

Distribution data: According to Mound and Reynaud (2005), *Franklinothrips megalops* belongs to part of a cline across the Old-World tropics., and from countries including Spain, Israel, Libya, Tunisia, India, Indonesia, Yemen, Kenya, S. Africa (Priesner, 1964; zur Strassen, 2003; Mound & Reynaud, 2005; Belaam-Kort et al., 2020), Palestine (Priesner, 1960; 1964; Mound & Reynaud, 2005), Somalia, Uganda, Rwanda, Tanzania, Transvaal, Mozambique, Angola and Nigeria (Mound & Reynaud, 2005). It has also been identified by the author from unpublished material obtained from Sicily (Angelo Ditta, pers. comm., 02.02.2020).

Further notes: This species is a new record to the Maltese Islands.

Genus *Rhipidothrips* Uzel, 1895

Common name: -

A genus with species that are found on various species of flowers but probably feeding on grasses (ThripsWiki, 2021). This genus is mainly distributed in Europe and consists of six species, four of which have been recorded from the Maltese Islands in this work. Their body length ranges from 1240 to 2250 μm, with females being larger than males. Features of locally occurring species include: the sensoria on segments III and IV which consist of a series of lens-like structures that are oriented both horizontally and vertically with respect to the length of the segments (figs. 4.5b); head with no long setae; fore wings narrow, being more than six times as long as broad and not banded (as compared to the other locally occurring genera of Aeolothripidae); and the trichobothria on tergite IX which are as large as setal bases on the same tergite.

***Rhipidothrips brunneus* Williams, 1913**

Common name: -

Material examined: MALTA: Wied Ħesri, 24.ii.2017, 2 ♀♀ (micropterous) (sm) on *Bromus diandrus*, GD.

Body length: ♀: 1880 - 2060 μm; ♂: no records.

Wing type: ♀: micropterous; ♂: no records.

Further notes on species by: Priesner (1964), zur Strassen (2003), Mirab-balou et al. (2012), Mound et al. (2018) and Mound et al. (2019).

Both sexes for this species are described by Mound et al. (2018) as being either macropterous or macropterous and having tergite I with paired longitudinal ridges scarcely one third as long as tergite. The two specimens collected from the Maltese Islands were micropterous.

Diagnosis: This species can be distinguished from other local congeners by the following features: mesonotum with irregular sculpture and without microtrichia; metanotum with reticulate sculpture but with no microtrichia; fore wings stub-shaped as long as femora.

Rhipidothrips brunneus is the only species with brachypterous females found locally as well as the only *Rhipidothrips* species not bearing microtrichia on the meso- and metanotal sculpture. *R. brunneus* also differs from *R. gratiosus* and *R. unicolor* in having a dark brown antennal segment II. *R. niveipennis* also has dark brown antennal segment II, but this species bears microtrichia on the mesothoracic sculpture. *R. gratiosus*, also differs from *R. brunneus* in having little to no sculpture on the tergites. Lastly *R. niveipennis* and *R. unicolor* have uniformly brown leg segments, which tend to be paler at extremities in *R. brunneus*.

Females of the genera *Melanthrips* and *Aeolothrips* also have an ovipositor which curves upwards towards the abdominal segments, however, the locally occurring species of the genus *Aeolothrips* have banded fore wings and sensorial grooves in antennal segments III and IV which run parallel to length of segment. Moreover, species of the genus *Melanthrips* have antennal segments with constricted bases on segments V - IX and sensorial grooves on segments III and IV that are perpendicular to the length of the segment.

Biology: No literature could be traced that describes the duration of the life cycle of this species.

This species is described as phytophagous, feeding on the flowers of grasses (Poaceae) (Priesner, 1964; Mound et al., 2018), often in damp habitats (Mound et al., 2019). According to Mound et al. (2018) this species has been described to have predatory tendencies, though there needs to be more evidence provided to support such a claim. *R. brunneus* has been recorded on Poaceae including *Avena sativa* (Tunc et al., 2011; zur Strassen, 2003), *Bromus sterilis* (Mound et al., 1976; zur Strassen, 2003), *Phalaris coerulescens*, and *Triticum repens* (zur Strassen, 2003). In the Maltese Islands, *R. brunneus* has also been recorded in valley habitats close to a water course from the *Bromus diandrus* (Poaceae).

Rhipidothrips brunneus has not been recorded as an agricultural pest.

Distribution data: According to Priesner (1964) and zur Strassen (2003), *R. brunneus* is distributed throughout the Western Palearctic, especially in the Mediterranean region, and has been imported to North America and Australia, where it has become established. Vierbergen (2013) also described this species from the East Palaearctic, Nearctic and Australian Regions as well as the Near East and North Africa without specifying the countries where this species was recorded from. *Rhipidothrips brunneus* has been recorded in the UK (Mound et al., 1976; Mound et al.2018), Finland (Gertsson, 2015), the Netherlands, Russia (Trdan et al., 2005), Spain (Goldarazena in Ramos, 2001), Norway, Portugal, France, Switzerland (Vierbergen, 2013), Italy (Stoch, 2004; Trdan et al., 2005; Marullo & De Grazia, 2013), Greece (zur Strassen, 1986) and Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016). It has also been recorded in Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014) and Iran (Alavi et al., 2007; Bhatti et al., 2009).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

***Rhipidothrips gratiosus* Uzel, 1895**

Common name: -

Material examined: MALTA: Wied Ħesri, 03.iv.2016, 1 ♀ (sm) on *Avena sterilis*, GD; Wied Ħesri, 22.iv.2016, 2 ♀♀ (sm) on *Avena sterilis*, GD; Fiddien, 14.iv.2016, 1 ♀ (sm) on *Avena* sp., GD; Wied Għollieqa 02.xii.2016, 1 ♂ (micropterous) (sm) on *Cynodon dactylon*, GD; Wied Ħesri, 03.iv.2017, 4 ♀♀ (sm, aga) on *Gladiolus communis*, GD; Fiddien, 24.iv.2017, 1 ♀ (sm) on *Avena* sp., 1 ♀ (sm) on *Medicago* sp., GD; Wied Qirda, 17.iii.2017, 1 ♀ (sm) on *Medicago* sp., GD.

Body size: ♀: 1900 - 2120 μm; ♂: 1240 μm.

Wing type: ♀: macropterous; ♂: micropterous.

Further notes on species by: Priesner (1960: 1964), Moritz (1994), zur Strassen (2003), Mound et al. (2018) and Mound et al. (2019).

zur Strassen (2003) and Mound et al. (2018) claim that males of this species are also macropterous, however the specimen collected locally which identity has been confirmed with Professors Lawrence Mound and Adriano Cavalleri was micropterous. A photo of a micropterous male specimen captured from the Biskra region in Algeria was also published in the work by Razi et al. (2013). Local specimens seem to be marginally smaller than those described by from continental Europe by zur Strassen (2003).

Diagnosis: This species can be distinguished from other local species of the same genus by the following features: the pale coloration of antennal segment II; the yellow pronotum, which in some specimens bears a brown centre spot and with some transverse sculpture lines medially; the abdominal tergites with little to no sculpture.

Other local *Rhipidothrips* species tend to also have a darker body coloration. *R. gratiosus* has pale brown antennal segment II, unlike *R. brunneus* and *R. niveipennis*. Moreover, *R brunneus* is different from *R. gratiosus* in that it lacks microtrichia on the metathoracic sculpture and has prominent sculpture on tergites. *R. niveipennis* has uniformly coloured leg segments unlike in *R. gratiosus* where the segments have pale brown extremities. *R. unicolor* also has pale brown antennal segment II but like *R. niveipennis*, it also has uniformly coloured leg segments.

Melanthrips and *Aeolothrips* species are similar to *Rhipidothrips* species in having an upwards-curving ovipositor, however they differ in a number of characters as previously described in the “Diagnosis” section under the description of *Rhipidothrips brunneus*.

Biology: No literature could be traced that describes the duration of the life cycle of this species.

According to zur Strassen (2003) and Mound et al. (2018) *Rhipidothrips. gratiosus* is phytophagous on flowers, mostly grasses (Poaceae). In fact, it has been recorded *Avena* sp. (Priesner, 1960; Tunc et al., 2012; Alavi et al., 2007), *Avena sativa* (Priesner, 1964), *Hordeum vulgare* (Alavi et al.., 2007), *Lolium* sp. and *Triticum aestivum* ((Priesner, 1960; Tunc et al., 2012; Alavi et al., 2007), but also on other plants including *Erysimum cheiranthoides* (Mirab-balou et al., 2012) and *Vicia faba* (Razi et al., 2013). In the Maltese Islands, this species has been recorded on Poaceae such as *Avena sterilis* and *Cynodon dactylon*, but also on other flowering plants such as *Gladiolus communis* and *Medicago.* No larvae were found on these last two species of plants so these records are probably accidental. Mound et al. (2018) recorded this species as having predatory tendencies, though there needs to be more evidence provided to support such a claim.

R. gratiosus is not recorded as being an agricultural pest.

Distribution data: Priesner (1964) and zur Strassen (2003) described the distribution of this species to extend across the Western Palaearctic, though absent in Northern countries, and imported to North America, where it has become established. Vierbergen (2013) also claimed that this species is found in the East Palaearctic, the Near East and North Africa without specifying which country it was recorded from. *Rhipidothrips gratiosus* has been recorded in the UK (Mound et al., 1976; Mound et al., 2018), Bulgaria (Karadjova & Krumov, 2015), Romania (Sierka et al.,, 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Hungary (Jenser, 2011), Austria, Bosnia & Herzegovina, Central European Russia, Czech Republic, Germany, former Yugoslav Republic of Macedonia, Slovenia, Switzerland, Ukraine, (Vierbergen, 2013), Spain (Goldarazena in Ramos, 2001), France (Pizzol et al., 2014), Italy (Stoch, 2004; Marullo & De Grazia, 2013), Cyprus (Priesner, 1960; 1964; Srour, 2015), and

Turkey (Priesner, 1964; Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016). It has also been recorded in Israel (zur Strassen & Kuslitzky, 2012), Egypt (Priesner, 1960; zur Strassen, 2014) and Algeria (Razi et al., 2013).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Rhipidothrips niveipennis **Reuter, 1899**

Common name: -

Material examined: MALTA: Wied Ħesri, 04.iv.2016, 1 ♀ (sm) on *Avena sterilis*, GD; Wied Ħesri, 22.iv.2016, 1 ♀ (sm) on *Avena sterilis*, GD; Gudja, l/o Malta International Airport, 26.ix.2016, 1 ♀ (sm) on *Ficus microcarpa*, GD.

Body size: ♀: 2000 - 2014 µm; ♂: no records.

Wing type: ♀ macropterous; ♂ no records.

Further notes on species by: zur Strassen (2003). According to this author, males for this species are unknown. Although locally collected specimens are macropterous, micropterous individuals have been described by zur Strassen (2003). Local specimens are larger than those recorded by zur Strassen (2003).

Diagnosis: This species can be distinguished from other local congeners by the following features: antennal segment II dark brown; the metanotum with irregular sculpture lined with microtrichia.

Like in *R. gratiosus* and *R. unicolor, R. niveipennis* has the meso- and metathoracic sculpture lined with microtrichia. However, it differs from these species in that, like in *R. brunneus*, this species has dark antennal segments II. *R. niveipennis* also has uniformly coloured leg segments, unlike in *R. brunneus*.

Rhipidothrips niveipennis also differs from *R. gratiosus* in the darker body colour as well as the prominent sculpture of the tergites.

Melanthrips and *Aeolothrips* species are similar to *Rhipidothrips* species in having an upwards-curving ovipositor, however they differ in a number of characters as previously described in the "Diagnosis" section under the description of *R. brunneus*.

Biology: No literature could be traced that describes the duration of the life cycle of this species.

This species is described to be phytophagous on different grasses (Poaceae) such as *Alopecurus pratensis* and *Avena* sp. (zur Strassen, 2003). In the Maltese Islands, specimens were collected from on *Avena* sp. and on *Ficus microcarpa* along with *Gynaikothrips ficorum*. *Avena* was growing in the vicinity of the *Ficus microcarpa* where this specimen was collected.

R. niveipennis is not recorded as being an agricultural pest.

Distribution: zur Strassen, (2003) described the range for this species to include Finland, Sweden, the French Alps, and Spain. *R. niveipennis* has also been recorded in Norway (Gertsson, 2015).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

***Rhipidothrips unicolor* zur Strassen, 1965**

Common name: -

Material examined: MALTA: Għajn Tuffieħa, 29.iv.2017, 7 ♀♀ (sm, aga) and instar larva (sm) on *Stipa capensis*, GD.

Body size: ♀: 1760 – 2250 μm; ♂: no records.

Wing type: Both sexes are macropterous.

Further notes on species by: zur Strassen (2003). This author described the length of male specimens to be 1080 - 1180 μm. Local female specimens seem larger than those recorded by zur Strassen (2003).

Diagnosis: This species can be distinguished from other local species of the same genus by the following features: dark brown antennal segment II with pale distal region; metanotum with a series of (transverse on mesonotum, longitudinal on metanotum) sculpture lines bearing microtrichia and median setae near posterior margin; abdominal tergites with transverse reticulation.

This species stands out from other local *Rhipidothrips* species in being smaller, with uniformly coloured legs, and with a bicoloured antennal segment II. It is also the only local species to be exclusively recorded on *Stipa capensis*.

Melanthrips and *Aeolothrips* species are similar to *Rhipidothrips* species in having an upwards-curving ovipositor, however they differ in a number of characters as previously described in the “Diagnosis” section under the description of *R. brunneus*.

Biology: No literature exists that describes the duration of the life cycle of this species. zur Strassen (2003) described *Rhipidothrips unicolor* from *Stipa capensis*. Marullo (2002) claimed that this species can be commonly found in large numbers on the host plant. Locally, both adults and larvae were collected from *Stipa capensis,* indicating that this species is used locally as a host plant.

Rhipidothrips unicolor is not recorded as an agricultural pest.

Distribution data: According to zur Strassen (2003) this species is found in Greece, Sicily, Spain, Morocco and the Canary Islands. Marullo (2002) and Stoch (2003) recorded this species from Italy. This species has also been recorded in Iran (Bhatti et al., 2009). Vierbergen (2013) also described this species from North Africa without specifying the countries where it was recorded from.

Records from the Maltese Islands: *Rhipidothrips unicolor* is a new record to the Maltese Islands.

Family Melanthripidae

The family Melanthripidae includes 69, mostly dark coloured, phytophagous species which occur mainly, though not exclusively, on flowers. Melanthripids tend to pupate in the soil (ThripsWiki, 2021). Species from this family are found throughout the world. They are medium sized to large species, with body length for local female specimens ranging between 1540 and 2300 μm. Like in Aeolothripidae, members of this family also probably pupate underground and spin a cocoon around the pupa (Mound, & Tree, 2020). Species in this family have nine-segmented antennae (as in Aeolothripidae and Stenurothripidae); sensorial grooves oriented in a transverse, or obliquely transverse direction to the length of antennal segments III and IV (4.2b); antennae with indentations between segments VII - IX making segments distinct from each other (fig. 4.3b);.and trichobothria which are slightly larger than setal bases in tergite IX. The female ovipositor also curves upwards towards the abdominal segments as in Aeolothripidae (fig. 4.2e). Formerly classified as part of the family Aeolothripidae, species from the Melathripidae differ from the Aeolothripidae in the shape of abdominal sternite VII in females, having two lobes each with two setae (Mound et al., 2019) as well as in the orientation of the sensorial groove on antennal segments III and IV. Moreover, unlike aeolothripids, which can be facultative predators, the melanthripids are exclusively phytophagous. The family Melanthripidae is currently composed of four genera worldwide. In the Maltese Islands, this family is represented by four species, all accommodated under the genus *Melanthrips*.

Genus *Melanthrips* Haliday, 1836

Common name: Mediterranean flower thrips

This genus is represented by 36 described species, distributed generally in temperate countries, mostly the in Mediterranean region, with a few species also occurring in India, South Africa and southwestern USA (Mound et al., 2018). Common features for this genus include: both sexes being macropterous; antennal segments V-IX distinct from each other (fig. 4.3a); head and pronotum bearing long setae; metanotum with concentric lines bearing microtrichia (fig. 4.52a); inner apex of the fore tibia with a stout apical seta (fig. 4.52b).

***Melanthrips ficalbii* Buffa, 1907**

Common name: -

Material examined: GOZO: Victoria, Triq Mro. Dirjanu Lanzon, 20.iv.2019, 2 ♀♀ (sm) on *Galium aparine*, GD.

Body length: ♀**:** 1840 - 1960 µm; ♂: no records.

Wing type: ♀**:** macropterous; ♂: no records.

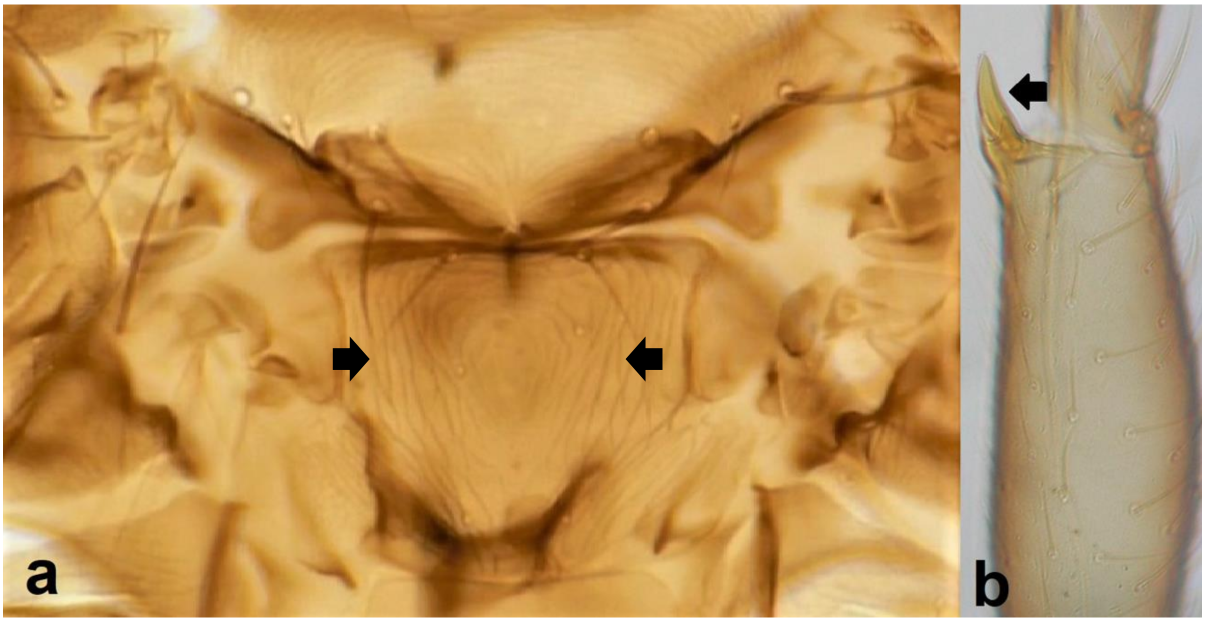

Figure 4.52: *Melanthrips* features: (**a**) mesothorax showing concentric lines bearing microtrichia; (**b**) fore tibia with prominent tooth.

Further notes on species by: Priesner (1964), Kirk (1996), zur Strassen (2003), Moritz (2006) and Mound et al. (2018).

zur Strassen (2003) describes males of this species as being macropterous. Locally recorded females were are slightly longer than those described by zur Strassen (2003), with lengths of 1840 - 1960 μm. Males are described as similar to females but with a slender abdomen (zur Strassen, 2003; Mound et al., 2018). zur Strassen (2003) described male specimens for this species to be 1050 - 1300 μm long.

Diagnosis: This species can be distinguished from other local species of the same genus by the following features: fore wings banded with two pale and two dark bands, the wing tip being dark; antennal segments VIII and IX are approximately equal in length (in other *Melanthrips* species, antennal segment VIII is slightly shorter or slightly longer than IX).

Locally occurring *Aeolothrips* spp. as well as *Franklinothrips megalops* also have banded fore wings like *Melanthrips ficalbii*, however, in the local *Aeolothrips* spp., the fore wing tip is pale (it is generally dark in *M. ficalbii* and in *F. megalops*). *M. ficalbii* differs from *F. megalops* in that the abdominal segments I - IV are considerably narrower than the other subsequent segments, giving the insect a vespiform waist. This feature does not occur in *M. ficalbii*.

Biology: No literature could be traced that describes the duration of the life cycle of this species.

Moritz (2006) described larval stages as occurring on Rubiaceae indicating that plants belonging to this family are host plants for this thrips species. zur Strassen (2003) described *Melanthrips ficalbii* as phytophagous and recorded this species from *Galium* sp., (Rubiaceae) as well as *Euphorbia cyparissias*, *Reseda* sp., as well as on Poaceae. In the current study, *M. ficalbii* has been recorded from *Galium aparine* (Rubiaceae).

This species has not been described as an agricultural pest; however, it was listed by Moritz (1994) in his work on European thrips of economic importance. This author does not explain his choice of species deemed “of economic importance” in his work.

Distribution data: Priesner (1964), zur Strassen (2003) and Moritz (2006) all claimed that this species is widespread in western Europe and the western Mediterranean region. Vierbergen (2013) also recorded this species from the East Palaearctic and North Africa. *Melanthrips ficalbii* has been recorded in the UK (Mound et al., 1976), Belgium (Lock, 2006), France, Germany, the Netherlands, Portugal, Ukraine (Vierbergen, 2013), Spain (Goldarazena in Ramos, 2001) and Italy (Stoch, 2003; Marullo & De Grazia, 2013).

Records from the Maltese Islands: *Melanthrips ficalbii* is a new record to the Maltese Islands.

***Melanthrips fuscus* Sulzer, 1776**

Common name: -

Material examined: MALTA: Siġġiewi, private garden 1, 04.xi.2015, 3 ♂♂ (sm) on *Rosa* sp., GD; Siġġiewi, private garden 1, 12.i.2016, 3 ♀♀ and 3 ♂♂ (sm) on *Rosa* sp., GD; Siġġiewi, private garden 1, 15.i.2016, 2 ♀♀ (sm) and 2 ♂♂ (sm) on *Mercurialis annua*, GD; Wied Ħesri, 15.i.2016, 1 ♀ (sm) on *Silene colorata*, GD; Wied Qirda, 29.i.2016, 2 instar larvae (aga) and 1 ♂ (sm) on *Brassica rapa*, GD; Siġġiewi, private garden 1, 29.iii.2016, 1 ♀ (sm) and 1 ♂ (sm) on *Ranunculus asiaticus*, GD; Siġġiewi, private garden 1, 16.x.2016, 1 ♀ (sm) on *Lobularia maritima*, GD; Wied Qirda, 17.iii.2017, 1 ♂ (sm) on *Asphodelus ramosus*, GD;

Wied Ħesri, 03.iv.2017, 2 ♀♀ (sm) and 1 ♂ (sm) on *Acacia saligna*, GD; Dingli Cliffs, 27.iv.2017, 1 ♂ (sm) on *Brassica rapa*, GD; Lapsi, 09.x.2017, 1 ♂ (sm) on *Potentilla reptans*, GD; Wied Baqqiegħa, 22.i.2018, 1 ♀ (sm) on *Cerinthe major*, GD.

Body length: ♀: 1540 - 2140 μm; ♂: 1360 - 1560 μm.

Wing type: Both sexes are macropterous.

Further notes on species by: Priesner (1960; 1964), Moritz (1994: 2006), Kirk (1996), zur Strassen (2003), and Mound et al. (2018). Locally-recorded female specimens were found to be sometimes shorter than those described by zur Strassen (2003). According to Priesner (1960), hind tibiae can, on rare occasions, bear two long setae. All locally recorded specimens had one long seta on the hind tibia.

Diagnosis: This species can be distinguished from other local species of the same genus by having hind tibiae with only one long pre-apical tibial seta.

Melanthrips fuscus differs from *M. ficalbii* in having wings which are uniformly brown rather than banded. Moreover, it can be distinguished from *M. knechteli* by having two rows of setae on the leading edge of the forewing between the cross veins; and from *M. libycus* since this species has several long pre-apical tibial setae emerging from the hind tibia.

Like in the genus *Melanthrips*, females of the genera *Aeolothrips* and *Franklinothrips* also have upwards pointing ovipositors. However, species from both these genera have: banded fore wings, while *Melanthrips fuscus* has uniformly brown wings; fused antennal segments V - IX, while these segments are clearly defined in *M. fuscus*; and sensorial grooves in *Aeolothrips* which are lined in parallel with length of segments III and IV, while those of *Franklinothrips* consist of a row of spherical pits lined in parallel to the length of the segment. In *M. fuscus*, these sensoria are perpendicular to the length of the segment. Finally, *Franklinothrips* species have the upper abdominal segments which are considerably narrower than the other subsequent abdominal segments. No such proportions occur in the abdominal segments of *M. fuscus*.

Biology: The life cycle for this species is not well known (Goldarazena, pers. comm. 08.08.2019).

This species is phytophagous and although it has been mainly associated with Brassicaceae (Priesner, 1960; 1964; Mound et al., 1976; zur Strassen, 2003; Moritz, 2006; Fallahzadeh et al., 2011; Tunc et al., 2012). It has been recorded from a wide variety of plant species ranging from annual plants e.g. *Galium* sp. (zur Strassen, 1986), *Poterium sanguisorba* (Mound et al., 1976; Moritz, 2006), and *Vicia* sp. (Fallahzadeh et al., 2011; Tunc et al., 2012) to trees e.g. *Cupressus sempervirens Olea europaea*, and *Prunus persica* (Tunc, 1991) to grasses e.g. *Triticum aestivum* (Tunc, 1991). In the Maltese Islands, *Melanthrips* larvae were collected in large numbers only on Brassicaceae such as *Brassica rapa,* suggesting that these are the host plants used by this species. Since the morphology of the larval stages of *M. fuscus* is not known, it is also possible that these larvae could belong to *M. libycus*. In any case it seems that, in the Maltese Islands, both species use Brassicaceae as host plants. Adults of *M. fuscus* have also been collected from the flowers of a variety of unrelated indigenous plant species including, *Asphodelus ramosus*, *Cerinthe major*, *Lobularia maritima*, *Mercurialis annua*, *Potentilla reptans* and *Silene colorata*, as well as cultivated species such as *Acacia saligna, Ranunculus asiaticus* and *Rosa* sp.

Melanthrips fuscus has not been described as an agricultural pest, but the species was mentioned by Moritz (1994) and by Marullo (2003) in their work on European thrips of economic importance. This author does not explain his choice of species deemed “of economic importance” in his work.

Distribution data: *Melanthrips fuscus* is the most frequently encountered species in the Maltese Islands and likely the most abundant. This is a species which is very widespread in many parts of the world. Priesner (1960; 1964), Andjus et al. (2001), zur Strassen (2003) and Moritz (2006) claimed that the species is found across Europe, and the Palaearctic, Near East and Nearctic. The species has been recorded in the UK (Mound et al., 1976), Sweden and Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Poland, Slovakia, Romania (Sierka et al., 2008; Zvarikova et al., 2020), Serbia (Andjus et al., 2001), Slovenia (Trdan, 2001), the Netherlands where it was first recorded in greenhouses but subsequently also settled in the open (Vierbergen, 2001), Italy (Stoch, 2003; 2004; Marullo & De Grazia, 2013), Greece (zur Strassen, 1986), Hungary (Jenser, 2011), Belgium (Lock, 2006), Albania, the Azores, Germany, Norway, Central, Northwest and East European Russia, Croatia, France, Lithuania, Latvia, Moldova, Crete, the Canary Islands, Malta, Portugal, Switzerland, Ukraine, (Vierbergen, 2013), Spain (Goldarazena in Ramos, 2001) and Cyprus (Srour, 2015). This species has also been found in Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016), Tunisia (Priesner, 1928; Belaam-Kort et al., 2020), Israel (zur Strassen & Kuslitsky, 2012), Algeria (Razi et al., 2013), Egypt (zur Strassen, 2014) and Iran (Bhatti et al., 2009; Fallahzadeh et al., 2011). It has also been intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003a).

Records from the Maltese Islands: This species was first recorded from the Maltese Islands by the website "*Fauna Europaea*" (Vierbergen, 2013).

***Melanthrips knechteli* Priesner, 1936**

Common name: -

Material Examined: MALTA: Siġġiewi, private garden 1, 15.i.2016, 1 ♀ (sm) on *Mercurialis annua*, GD; Siġġiewi, private garden 1, 29.iii.2016, 1 ♂ (sm) on *Ranunculus asiaticus*, GD; Wied Xkora, 30.x.2017, 1 ♂ (sm) on *Mercurialis annua*, GD; Wied Baqqiegħa, 22.i.2018, 1 ♀ (sm) on *Cerinthe major*, GD.

Body length: ♀: 1580 μm; ♂: 1160 - 1240 μm.

Wing type: Both sexes are macropterous.

Further notes on species: Priesner (1964) and zur Strassen (2003).

Diagnosis: *Melanthrips knechteli* can be distinguished from other local species of the same genus by the leading edge of the fore wings which has only one row of setae between cross veins. All other locally occurring *Melanthrips* species have two rows in this wing region.

Females of the genera *Aeolothrips* and *Franklinothrips* also have upwards pointing ovipositors like in *Melanthrips knechteli,* however they differ in a number of characters as previously described in the "Diagnosis" section under the description of *M. fuscus*.

Biology: No literature occurs that describes the duration of the life cycle of this species.

Melanthrips knechteli is a phytophagous species which has often been recorded from *Cerinthe major* (Boraginaceae) and *Thymus* sp. (Lamiaceae) (Priesner, 1964; zur Strassen, 2003). In the Maltese Islands, it has also been recorded on *Cerinthe major*, but also on unrelated plants (e.g. *Mercurialis annua* and *Ranunculus asiaticus*). *M. knechteli* has not been recorded as an agricultural pest.

Distribution data: Priesner (1964) and zur Strassen (2003) described the geographical distribution for this species to include Turkey, Bulgaria, Romania, Albania, Czech Republic (Moravia), Spain and also Iran. The species was also subsequently recorded from Romania (Sierka et al., 2008), Turkey (Tunc & Hastenpflug-Vesmanis, 2016) and from Bulgaria (Karadjova & Krumov, 2015).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

***Melanthrips libycus* Priesner, 1936**

Common name: -

Material examined: MALTA: Siġġiewi, private garden 1,12.i.2016, 1 ♀ (sm) and 1 ♂ (sm) on *Rosa* sp., GD; Wied Ħesri, 15.i.2016, 1 ♀ (sm) and 2 ♂♂ (sm) on *Silene colorata*, GD; Wied Qirda, 29.i.2016, 1 ♀ (sm) on *Trifolium nigrescens*, 1 ♀ (sm) on *Brassica* sp., GD; Qormi, private farm, 07.ii.2016, 1 ♀ (sm) on *Brassica oleracea* var. *botrytis*, GD; Wied Qirda, 24.ii.2016, 1 ♀ (sm) on *Bromus diandrus*, GD; Ta' Qali, 27.ii.2016, 5 instar larvae (aga) and 2 ♀♀ (sm) on *Diplotaxis tenuifolia*, SF; Siġġiewi, private garden 1, 29.ii.2016, 1 ♀ (sm) on *Ranunculus asiaticus*, GD; Wied Qirda, 17.iii.2017, 1 ♀ (sm) on *Medicago* sp., GD; Wied Ħesri, 03.iv.2017, 1 ♀ (sm) on *Acacia saligna*, GD; Dingli Cliffs, 29.x.2017, 1 ♀ (sm) on *Brassica rapa*, GD. **GOZO**: Ramla Bay, 18.iv.2017, 1 ♂ (sm) on *Cakile maritima*, GD.

Body length: ♀: 1600 - 2300 μm; ♂: 1400 - 1725 μm.

Wing type: Both sexes are macropterous.

Further notes on species by: Marullo (2003), and zur Strassen (2003).

The long setae on the head were described by Marullo (2003) and zur Strassen (2003) to be as long as three pairs of postocular setae, but were somewhat slightly shorter than this in locally collected specimens.

Diagnosis: This species can be distinguished from other local congeners by the hind tibia bearing longitudinal rows of setae, several of which being stout setae and at least two being prominently long on the outer side, the proximal seta being slightly shorter than the distal one. Only one such long seta is found on the hind tibia of *M. fuscus*.

Females of the genera *Aeolothrips* and *Franklinothrips* also have upwards pointing ovipositors like in *Melanthrips libycus,* however they differ in a number of characters as previously described in under the “Diagnosis” section of *M. fuscus*.

Biology: No literature that describes the duration of the life cycle of this species could be traced. The species has been collected from Poaceae (Priesner, 1960) and Brassicaceae (Priesner, 1960; Marullo, 2003; Stoch, 2003) and also from *Citrus* x *paradisi* and *Erucaria hispanica*, (zur Strassen & Kuslitzky, 2012). In the current study, larval forms of *Melanthrips* were only found accompanying adults on Brassicaceae, mostly on *Diplotaxis erucoides,* indicating this species as a host-plant. Since the larval forms of *M. fuscus* and *M. libycus* have not been diagnosed, these larvae could not be identified, however it is likely that, in the Maltese Islands, both these species use *Brassicaceae* and other related species as host plants. Adults of *M. libycus* have also been recorded on a number of unrelated plants, shrubs and trees such as *Acacia saligna, Brassica rapa, Bromus diandrus, Silene colorata,* and *Trifolium nigrescens*.

Melanthrips libycus has not been described as an agricultural pest.

Distribution data: This species is widely recorded across southern Europe and the Mediterranean basin including South Italy and Sicily, Spain (zur Strassen, 2003; zur Strassen & Kuslitsky, 2012), Morocco, Egypt (Priesner, 1960; zur Strassen, 2003; 2014; zur Strassen & Kuslitzky, 2012), Algeria and Libya (zur Strassen, 2003; zur Strassen & Kuslitzky, 2012) and Israel (zur Strassen & Kuslitzky, 2012).

Records from the Maltese Islands: This species was first described from the Maltese Islands by zur Strassen (2003) and subsequently by zur Strassen & Kuslitsky (2012).

Family Stenurothripidae

The family Stenurothripidae, formerly part of the Adiheterothripidae, is a small family with three genera, two of which (*Hertatyothrips* & *Oligothrips*) occurring in western North America, while the third, *Holarthrothrips*, has a geographical distribution spanning from the Mediterranean region up to India (ThripWiki, 2021). Species belonging to this family have nine-segmented antennae, females have a downwards- pointing ovipositor (i.e. away from abdominal segments) and cone shaped sense cones on antennal segment III and IV (fig. 4.15e).

Genus Holarthrothrips Bagnall, 1927

A genus with four species, two of which recorded from India, one from Israel and Oman and one from the Mediterranean region. All species are associated with *Phoenix* spp. where they feed on pollen. Typical features of this genus include the following combination of morphological characteristics: Pronotum with seven to eight pairs of long postero-marginal setae (fig. 4.53a); postero-marginal microtrichial comb on abdominal tergites II-IV medially incomplete (fig. 4.53b), but complete on tergite VIII (fig. 4.53c); ovipositor is very wide at the base (fig. 4.53d). This genus is locally represented by one species.

Holarthrothrips tenuicornis Bagnall, 1927

Common name: -

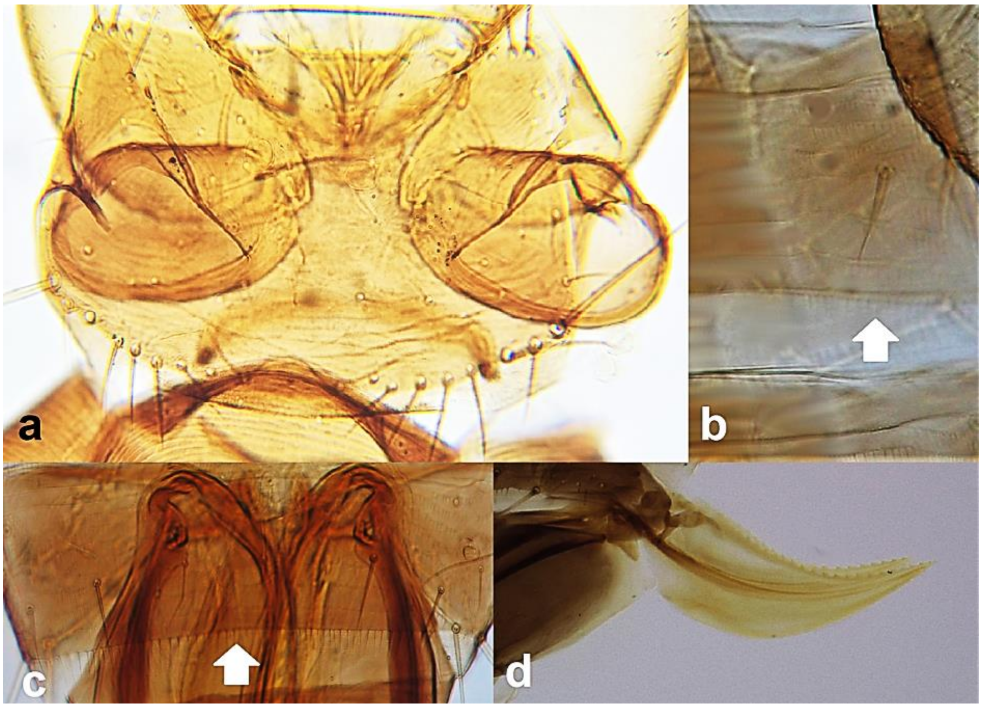

Figure 4.53: ***Holarthrothrips*** **features:** (**a**) pronotum with seven prominent postero marginal setae; (**b**) abdominal tergite IV with medially incomplete microtrichial combon posterior margin; (**c**) abdominal tergite VIII with complete microtrichial comb on posterior margin; (**d**) downwards curving female ovipositor with a very wide base.

Material examined: MALTA: Qormi, roundabout, Triq il-Mitħna, 14.ix.2017, 13 ♀♀ (sm, aga) on male *Phoenix dactylifera*, GD; Qormi, roundabout, Triq il-Mitħna, 03.x.2017, 13 ♀♀ (sm, aga) on male flowers of *Phoenix dactylifera*, GD; Msida, Junior College grounds, 10.x.2017, 1 ♀ on male flowers of *Phoenix dactylifera*, GD; Siġġiewi, private garden 3, 30.vii.2018, 2 ♀♀ (sm), 10 ♀♀ (aga) and 1 ♂ (sm), 1 ♂ (aga) on male flowers of *Phoenix dactylifera*, GD.

Body length: ♀: 1550 - 1820 μm; ♂: 1260 μm.

Wing type: Both sexes macropterous.

Further notes on species by: Priesner (1964) and zur Strassen (2003).

Locally recorded female specimens show a slightly smaller range of body length values when compared to those described by zur Strassen (2003).

Diagnosis: *Holarthrothrips tenuiocornis* is the only thrips species occurring in Malta having cone shaped sensoria on antennal segments III and IV and cannot be confused with any other locally occurring species.

Biology: No data exists on the life cycle of this species. Species of this genus have been mostly found on male flowers of *Phoenix* trees (ThripsWiki, 2021; zur Strassen & Kuslitzky, 2012) which is most likely the host-plant of *Holarthrothrips tenuicornis*. However, adults of this species was also recorded on *Citrus, Rubia* spp and *Vitis*. (Priesner, 1964; zur Strassen, 2003; Marullo & De Grazia, 2013). In the Maltese Islands, both adults and larvae of *H. tenuicornis* were found on only on *Phoenix dactylifera*, confirming that this plant is used as a host plant.

Holarthrothrips tenuicornis is not an agricultural pest, however, for no reason, it was included in the work on European thrips of economic importance by Moritz (1994).

Distribution data: *Holarthrothrips tenuicornis* has been recorded across the Mediterranean basin, specifically from Greece, southern France and Corsica, Spain, Canary Islands (Priesner, 1960; zur Strassen, 2003), Portugal (Vierbergen, 2013), South Italy and Sicily (Priesner, 1964; Stoch, 2003; zur Strassen, 2003; Marullo & De Grazia, 2013) and Israel (zur Strassen & Kuslitzky, 2012).

Records from the Malres islands: This species is a new record for the Maltese Islands.

Family Thripidae

This is a very large and diverse family with over 2000 species found worldwide. It includes species of different sizes ranging from 860 μm in small males to 2200 μm in large females. Members of this family live on both flowers and leaves with some species that can act as serious pest species causing harm to crops and cultivated plants both directly as well as by transmitting plant orthotospoviruses. Antennae of species of the family Thripidae can be six-, seven-, or even eight-segmented and the ovipositor in females points downwards (as described in the family Stenurothripidae). Palpi are three-segmented in most species. The family Thripidae subdivides into four main subfamilies, of which three are represented by species found in the Maltese Islands in this work.

Subfamily Dendrothripinae

Members of this subfamily have a large, lyre-shaped metathoracic endofurca that is believed to be attached to the muscles which give the insect the ability to jump suddenly out of view (Mound & Tree, 2020) and make them rather more difficult than other species to capture. 12 genera are recognized under this subfamily and locally, it was found to be represented by one genus in this work.

Genus *Dendrothrips* Uzel, 1895

This is a genus of Old-World thrips which live and breed on leaves. Features typical of this genus include: metathoracic endofurca lyre-shaped extending into mesothorax (fig. 4.16a); median setae on abdominal tergites II - VIII long and set close together (fig. 4.16c). 36 species are recorded worldwide (ThripsWiki, 2021) while one species recorded from the Maltese Islands in the current study.

Dendrothrips saltator Uzel, 1895

Common name: -

Material examined: MALTA: Wied Babu, 15.xii.1996, 7 ♀♀ (sm) on *Ferula melitensis*, DM; Wied Qirda, 06.iv.2016, 13 instar larvae (aga) on *Foeniculum vulgare*, GD; Maqluba, l/o Qrendi, 08.iv.2016, 9 ♀♀ (sm, aga) on *Foeniculum vulgare*, GD; Qormi, Triq il-Ħammieri, 19.iv,2016, 1 instar larva (aga) on *Ferula melitensis*, GD; 09.vii.2018, 6 ♀♀ (sm, aga) and 1 ♂ (sm) on *Foeniculum vulgare*, GD.

Body length: ♀: 1260 - 1440 μm; ♂: 860 μm**.**

Wing type: Both sexes are macropterous.

Further notes on species by: Priesner (1964), zur Strassen (2003) and Mound et al. (2018).

Diagnosis: No other local species have the large lyre-shaped metathotacic endofurca AND median setae on abdominal tergites II - VIII long and set close together as in this species.

Biology: This species is quite active and tends to jump across large distances, making it rather difficult to collect.

No literature could be traced that describes the duration of the life cycle of this species. Priesner (1964) described the larvae of this species also from *Eupatorium* sp. zur Strassen (2003) and Mound et al. (2018) recorded this species from leaves of various deciduous trees and unrelated plants, namely *Abies* sp., *Thuja* sp. and *Tamarix* sp., as well as Apiaceae (*Anthriscus* sp., *Ferula* sp., *Peucedanum* sp.). This species has also been described from *Artemisia sp.* (zur Strassen, 2003), *Olea europaea, Triticum aestivum*, as well as from various Fabaceae (Tunc et al., 2012). In the Maltese Islands, adults and larvae of *Dendrothrips saltator* were collected *Ferula melitensis* and *Foeniculum vulgare* (both in Apiaceae), suggesting that these are the host plants for this thrips species.

Dendrothrips saltator has not been recorded as an agricultural pest.

Distribution data: This species is widespread in Europe and much of Siberia (zur Strassen, 2003). Vierbergen (2013) described this species Oriental region and the Near East without specifying which country it was collected from. *Dendrothrips saltator* has been recorded from the UK (Mound et al., 1976; Mound et al., 2018), Scandinavia (Gertsson, 2015), Poland, Romania, Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Bulgaria (Karadjova & Krumov, 2015), Slovenia (Trdan, 2001), Albania, Austria, Central, Northwestern and Southeastern European Russia, Croatia, Cyprus, Czech Republic, Germany, France, Lithuania, former Yugoslav republic of Moldova, Switzerland, the Netherlands, Ukraine (Vierbergen 2013), Spain (Goldarazena in Ramos, 2001), Italy including Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Greece (zur Strassen, 1986; 2003), and Turkey (Tunc et al., 2012; Tunc, & Hastenpflug-Vesmanis, 2016). The species has also been recorded from Israel (zur Strassen, & Kuslitzky, 2012), NW India (zur Strassen, 2003) and Iran (zur Strassen, 2003; Bhatti et al., 2009). *D. saltator* has even been intercepted in US from Europe (Nickle, 2003a; 2009).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Subfamily Panchaetothripinae

Thrips species belonging to this subfamily usually have the head, thorax and fore femora covered by a reticulate (net-like) texture as well as the first vein of the fore wing being positioned in close proximity to the costal region of the wing (Wilson, 1975). Other typical features of the subfamily Panchaetothripinae include: a fore wing clavus which lacks discal setae; an additional long simple sense cone on antennal segment IV; two extra pairs of setae towards the posterior margin of sternite VII; and the distalmost antennal segments ending in a pointed tip (fig. 4.17c). 43 genera are recognised under this subfamily worldwide, of which two have been recorded from the Maltese Islands in the current study.

Genus *Heliothrips* Haliday, 1836

A genus of leaf-feeding and breeding species of tropical (mostly South American - Mound et al., 2018) origins. Some species considered pests on cultivated plants. The genus lists three species worldwide (Mound et al., 2018) and one species has been recorded from the Maltese Islands in this work. This species is distinguished from others by the following features: head with reticulate texture and with no occipital ridge (fig. 4.54b); antennal segment III and IV with simple sensoria (fig. 4.54a); maxillary palps two-segmented; antennal segment VIII slender and around three times as long as VII; tarsi 1-segmented (fig. 4.18a); fore wing with only one row of setae on anterior margin, missing the strong setae and with straight setae on posterior margin of wing (fig. 4.18c).

Loomans et al. (1997) described the wasp species *Ceranisus thripobius semiluteus Entedonastichus gaussi* and *Goethana shakespearei* (= *Dasyscapus parvipennis*) (Eulophidae) as parassitoid species for adults of this genus from subtropical countries. According to Lewis (1973), Loomans et al. (1997) and Kuslitzky (2003), and claimed that

Megaphragma mymaripenne (Trichogrammatidae) has been found to parasitise to the eggs of this genus in subtropical countries, and the Hawaiian Islands.

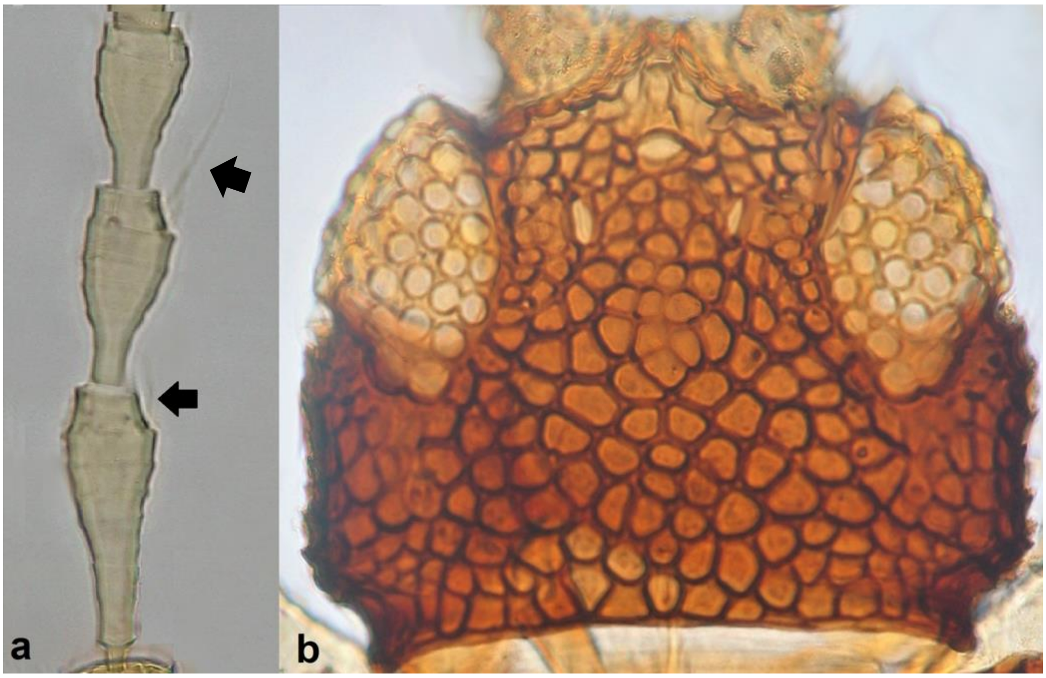

Figure 4.54: ***Heliothrips* features:** (**a**) antennal segments III-IV with simple sense cones (**b**) head with a reticulate sculpture.

***Heliothrips haemorrhoidalis* (Bouchè, 1883)**

Common name: Greenhouse Thrips

Material examined: MALTA: Żabbar, 06.v.1996, 1 ♀ (sm) on *Viburnum* sp., CF; Msida, University of Malta grounds, 28.iv.2017, 1 ♀ (sm) on *Apium graveolens*, GD.

Body length: ♀: 1660 -1900 μm; ♂: no records.

Wing type: ♀: macropterous; ♂: no records.

Further notes on species by: Priesner (1960; 1964), Stannard (1968), Wilson (1975), Palmer (1990), Marullo (1993; 2003), Moritz (1994; 2006), Kirk (1996), zur Strassen (2003), Moritz et al. (2014), Mound et al. (2016), Mound et al. (2018) and Mound et al. (2019).

Males of this species are very rare, except in Peru (Nakahara et al., 2015). None have been recorded locally. Males are described by Mound et al. (2018) as being similar to females in colour and structure with following exceptions: Antennal segments VI and VII with almost no trace of brown, abdominal tergite IX dark brown at sides and apex; Moderately large glandular areas on abdominal sternites, being largest on sternite III and decreasing in size to the smallest on sternite VII. Male body length was described by zur Strassen (2003) as being 1200 - 1360 μm.

Diagnosis: This species has 1-segmented tarsi and prominent reticulate texture of the triangle extending from the metasternum and straight post-marginal setae. *Hercinothrips femoralis* differs in having 2-segmented tarsi, little texture on the triangle extending from the metasternum and wavy post-marginal cilia on the fore wing. Moreover, the wing setae in *Heliothrips haemorrhoidalis* are pointed. *Echinothrips americanus*, which also superficially resembles this species has setae which are capitate.

Biology: The life cycle of this species can take between 30 – 40 days depending on environmental temperatures (Moritz et al., 2014).

This species has been described by different authors (e.g. Priesner, 1960; 1964; Mound et al., 1976; Moritz, 2006; Moritz et al., 2014) as being polyphagous. It has been recorded on *Mangifera indica,* on which it can potentially inflict a lot of damage, *Acalypha*, *Croton* and *Camellia* in conservatories*, Laurus nobilis*, *Prunus persica,* and *Vitis vinifera,* (Priesner, 1960), as well as on crops such as avocado, banana, citrus, cocoa, coconut, coffee, cotton, date palm, pomegranate, mango passion fruit, peach and tea (Moritz et al., 2014). This species has also been recorded from *Pinus* (Mound et al., 2018), *Citrus* (Conti et al., 2001), *Azalea, Dracaena, Ficus, Rosa,* (Marullo, 2003), *Viburnum* sp. (Trdan, 2001; Marullo, 2003), as well as plants that are water stressed (Mound et al., 2018). In the Maltese Islands, *Heliothrips hemorrhoidalis* was recorded from *Viburnum* as well as from plants with low levels of nitrogen (Mifsud & Watson, 1999). In the current study this species was collected from *Apium graveolens* and from *Viburnum* sp.

Moritz et al. (2014) also claimed that this species is preyed upon by *Franklinothrips megalops.*

Heliothrips haemorrhoidalis has been widely recorded as a pest, inflicting damage which can be serious to greenhouse plants and, in countries with warmer climates such as the Maltese Islands, also to crops and cultivated plants in open fields. Priesner (1964) described this species as a pest on *Citrus* trees in the Palestine region. According to Moritz et al. (2014), this species feeds on the underside of leaves causing distortion, curling, silvering and a covering with black spots. Severely affected leaves eventually turn brown. These authors also claimed that *H. haemorrhoidalis* affects fruits such as avocado (*Persea americana*), making them become bronzed and under severe infestation cracked. According to Howard et al., (2001)**.** *H. haemorrhoidalis* occasionally attacks palms inflicting damage on foliage.

Literature describes a number of parasitoid wasps which attack this species namely *Dasyscapus parvipennis* (= *Goethana shakespearei*) (Eulophidae) as a parassitoid species from subtropical countries (Lewis, 1973), *Megaphragma maripenne* (Trichogrammatidae) and *Thripobius semiluteus* (Eulophidae) recorded from Israel, Hawaii and subtropical regions Lewis (1973), Loomans et al. (1997) and Kuslitzky (2003) and *Megaphragma amalphitznum* (Trichogrammatidae) recorded from south Italy (Viaggiani & Bernardo, 1997).

Moritz et al. (2014) also claim that *Heliothrhips haemorrhoidalis* can transmit the parasitic fungus *Puccinia graminus uredia* in cereal plantations.

Distribution data: *Heliothrips haemorrhoidalis* is believed to have originated from South America, probably Peru (Nakahara et al., 2015) and is widespread around the world in tropical and subtropical areas (Priesner, 1960). It has been introduced to many parts of the world with exotic cultivated ornamental plants. According to zur Strassen (2003), this species thrives in North Europe in greenhouses and indoor areas, on various ornamental plants, but can be found in S. Europe out in the open. Vierbergen (2013) described this species from the Afrotropical, Australian, Neartic, Neotropical and Oriental regions.The species had been recorded from the UK (Mound et al., 1976), Slovenia (Trdan, 2001), Slovakia (Zvarikova et al., 2020), Scandinavia and Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Belgium (Lock, 2006), Austria, Central northwest and south European Russia, Cyprus, Czech republic, European Turkey, Greece, Latvia, Moldova, Poland, Spain, Switzerland, the Netherlands, Ukraine (Vierbergen, 2013), Italy and Islands (Conti et al. 2001; Stoch, 2003; Marullo & De Grazia, 2013) France, (Pizzol et al., 2014), Georgia, Albania, Portugal as well as the Azores, Madeira and Canary Islands (zur Strassen, 2003). This species was also recorded from Morocco (zur Strassen, 2003), Libya (Fathy

Mohammed & Saurub, 2010), Israel (zur Strassen & Kuslitzky, 2012), Egypt (Priesner, 1960; zur Strassen, 2014) and Iran (Bhatti et al., 2009). It has been intercepted in US from Europe, and the Mediterranean and Africa (Nickle, 2003a; 2009).

Records from the Maltese Islands: *Heliothrips haemorrhoidalis* was first described from the Maltese Islands by Mifsud and Watson (1999).

Genus *Hercinothrips* Bagnall, 1932

This is another genus of species that feed and breed on leaves. This genus originates from Africa and lists 10 species, one of which has been recorded locally in this work. Features of the locally occurring species include: head with reticulate texture and with a transverse occipital ridge (fig. 4.55b); antennal segments III and IV with forked sense cones (fig.4.55a); tarsi two-segmented (fig. 4.18b); fore wing with two complete rows of setae, and wavy postero-marginal cilia (fig.4.18d).

Loomans et al. (1997) described the wasp species *Ceranisus thripobius semiluteus, Entedonastichus gaussi* and *Goethana shakespearei* (= *Dasyscapus parvipennis*) (Hymenoptera: Eulophidae) as parassitoid species for adults of this genus from subtropical countries.

***Hercinothrips femoralis* (Reuter, 1881)**

Common name: Banded greenhouse thrips, Sugar-beet thrips

Material examined: MALTA: Msida, University of Malta grounds, 04.v.2016, 1 ♀ (sm) on *Origanum majorana*, GD; Siġġiewi, private garden 1, 05.xi.2016, 14 ♀♀ (sm, aga) and 1 instar larva (aga) on *Hippeastrum* sp., GD; Birguma, 20.viii.2020, 13 ♀♀ (sm, aga) on *Ocimum basilicum*, NY; Siġġiewi, private garden 1, 04.xi.2020, 8 ♀♀ (sm, aga) on *Calendula officinalis,* GD.

Body length: ♀: 1320 - 1580 μm: ♂: no records.

Wing type: ♀: macropterous: ♂: no records.

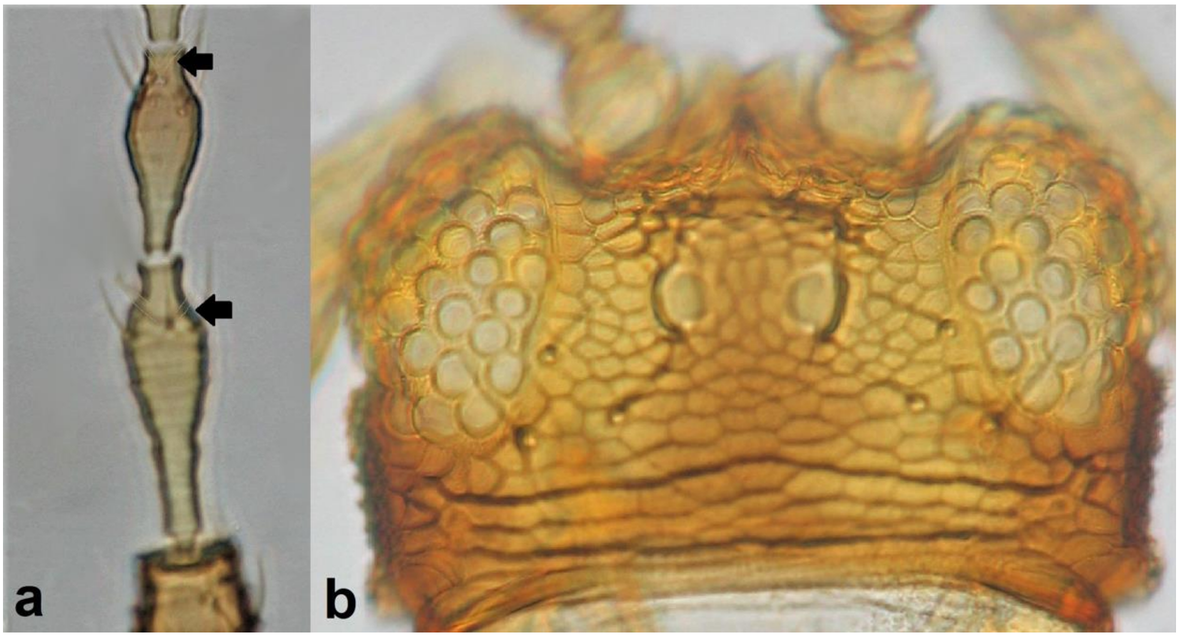

Figure 4.55: ***Hercinothrips* features**: (**a**) antennal segments III – IV with forked sense cones; (**b**) head with reticulate and transverse occipital ridge.

Further notes on species by: Priesner (1964), Stannard (1968), Wilson (1975), Moritz (1994; 2006), Kirk (1996), Marullo (2003), zur Strassen (2003), Moritz et al. (2014), and Mound et al. (2018) and Mound et al. (2019).

Males of this species are relatively rare and have been described by Mound et al. (2018) to have minute sternal marginal setae, and sternites III - VII to have slender transverse pore plates. Body length is described by zur Strassen, (2003) to be 1100 - 1350 μm.

Diagnosis: *H. femoralis* differs from *Heliothrips hemorrhoidalis* in that it has two rows of postero-marginal cilia, little texture of the triangle extending from the metasternum, two segmented tarsi, and different fore wing coloration. Wing setae in *H. femoralis* are pointed. *Echinothrips americanus*, which also superficially resembles this species has setae which are capitate.

Biology: According to Moritz et al. (2014), the life cycle of this species under experimental conditions and a temperature of 27°C lasted between 18 - 20 days.

Hercinothrips femoralis has beem described as polyphagous on herbs and cultivated plants mostly in greenhouses (Priesner, 1964; Mound et al., 1976), and often on Amaryllidaceae (zur Strassen, 2003). It has also been recorded on *Zanthedesca aethiopica*, *Chrysanthemum* sp., *Ficus* spp., and on crops like banana, cotton, cowpea, cucumber, maize, peanut, sugar beet, sugar cane and tomato. This species has locally been recorded from *Calendula officinalis, Hippeastrum* sp. and from herbs including *Ocimum basilicum* and *Origanum majorana,* however larvae were found on *Hippeastrum,* indicating that this plant is what is being used as a host. *H. femoralis* adults were found on plants recently purchased from local plant nurseries, suggesting that these places are likely acting as a source of the spreading of this species. Although this species was recorded in Europe from greenhouses, it was found in plants grown outside in the Maltese Islands, probably due to the warmer climate of the archipelago. *Hercinothrips femoralis* has been recorded as a pest, inflicting damage on greenhouse cultivars.

Moritz et al. (2014) claimed that this species can cause mechanical distribution of phytopathogenic fungi and bacteria that can dwell on the lesions caused by the feeding thrips.

Distribution data: Originally from Africa, *Hercinothrips femoralis* is widespread around the world in tropical and subtropical areas (zur Strassen, 2003; Moritz, 2006; Mound et al., 2018). Vierbergen (2013) also described this species from the Near East, without specifying what countries it was collected from, as well as from the Nearctic, Neotropical, Oriental and Australian regions. In Europe it has been recorded from the UK (Mound et al. 1976), Scandinavia and Denmark (Gertsson, 2015), Hungary (Jenser, 2011), Belgium (Lock, 2006), Slovakia (Zvarikova et al., 2020), Canary Islands, Central European Russia, Croatia, Czech Republic, France, Germany, Latvia, Moldova, Poland, Slovenia, The Netherlands, Ukraine (Vierbergen, 2013), Spain (Goldarazena in Ramos, 2001; zur Strassen, 2003), Italy (Stoch, 2003). It has also been recorded from Israel (zur Strassen & Kuslitzky, 2012).

Records from the Maltese Islands: *H. femoralis* is a new record to the Maltese Islands.

Subfamily Thripinae

This very large subfamily is the only paraphyletic one in the family Thripidae. It includes a large number of very diverse species both in habits as well as in morphology. This subfamily accommodates 230 genera worldwide. In present study, 16 genera belonging to this subfamily have been recorded from the Maltese Islands.

Genus *Anaphothrips* Uzel, 1895

A genus of grass-inhabiting thrips of worldwide distribution. This genus lists 86 species worldwide, seven of which recorded in Europe (Mound et al., 2018), and one species recorded from the Maltese Islands in this work. Typical features of the locally occurring species include: the eight-segmented antennae; the lack of long setae on the pronotum; fore wings pale yellow but with dark medial cross band (fig.4.26a); the dark brown abdominal segments I - II and VII - X dark brown and yellow antennal segments III - VI yellow; the "C" shaped pore plates on the male sternites as well as the pairs of stout, thorn-like setae on male tergite IX (Zhang et al., 2018).

***Anaphothrips sudanensis* Trybom, 1911**

Common names: Wheat [ear] thrips, Maize thrips

Material examined: MALTA: Wied Ħesri, 04.xi.2016, 1 ♀ (sm) on *Cynodon dactylon*, GD.

Body length: ♀: 1340 µm: ♂: n/a.

Wing type: the locally collected female specimen is macropterous.

Further notes on species by: Priesner (1960), zur Strassen (2003), Moritz (2006), Mirab-balou et al. (2014), Moritz et al. (2014) and Mound et al. (2019).

Micropterous specimens have been described from other countries by Mirab-balou et al. (2014) and Mound et al. (2019). Five colour varieties are recorded for this species in Japan, (Nakao et al., 2001). Metathoracic campaniform sensilla were absent in the locally collected specimen, but can be found in some specimens according to Mound et al. (2019). Male specimens have been described to be similar to micropterous females by zur Strassen (2003), Mirab-balou et al. (2014), Moritz et al. (2014) and Mound et al. (2019), but to have the following structural features: variable body colour, with bicoloured males occurring in Australia, yellow males studied from India and northern Africa and two colour varieties are recorded in Japan, (Nakao et al., 2001). Legs are paler and the pterothorax usually largely yellow. Tergite IX with two pairs of stout thorn-like setae medially; sternites III - VIII with large "C" shaped pore plate. Body length for males is described by zur Strassen (2003) to be 1030 - 1140 μm.

Diagnosis: This species is similar to other *Anaphothrips* species not recorded locally, however females of *A. sudanensis* are bicoloured, unlike those of other species of this genus.

A. sudanensis superficially resembles other local bicoloured species such as *Bregmatothrips dimorphus* males, however, females of *B. dimorphus* are not bicoloured; the brown band on the fore wing present in *A. sudanensis* is absent on *B. dimorphus*.; and the pale body regions in *B. dimorphus* include the pterothrorax and abdominal segment I, while in *A. sudanensis*, these include abdominal segments III – VI.

Biology: *Anaphothrips sudanensis* has a life cycle which is dependent on environmental temperatures, but which usually ranges from 11 - 28 days (Moritz et al., 2014). Adults usually live for about a month and can produce several generations annually again depending on the environmental temperatures.

This species is leaf-feeding and found on Poaceae (Priesner, 1960). It is commonly found in the leaf axils and tend to leave streaks on leaves as these expand and mature (Mound et al., 2019). *A. sudanensis* has been recorded on various grasses, particularly *Panicum maximum*, *Pennisetum* sp., *Sorghum halepense*, *Zea mays* (zur Strassen, 2003; Moritz et al., 2014), *Saccharum officinarum* (zur Strassen, 2003; Moritz et al., 2014; Mound et al., 2019) *Pennisetum purpureum*, rice (*Oryza sativa*), but also on *Allium cepa* (Fallahzadeh et al., 2011), as well as *Tagetes minuta* (Asterales: Asteraceae) (Moritz et al., 2014). *A. sudanensis* has locally been recorded from the grass *Cynodon dactylon*.

A. sudanensis can also be preyed upon by *Aeolothrips intermedius* (Moritz, 2006). Moritz et al. (2014) claimed that this species can cause whitening of leaves resulting from concentrated feeding by larvae and adults.

Distribution data: Vierbergen (2013) described this species from the East Palaearctic Afrotropical, Australian, Neotropical and Oriental Regions. *Anaphothrips sudanensis* has been recorded from Cyprus (zur Strassen, 2003; Srour, 2015), Spain (zur Strassen, 2003), South

Turkey (zur Strassen, 2003; Tunc & Hastenpflug-Vesmanis, 2016). The species was also described from Israel, Morocco, Egypt, (zur Strassen, 2003; 2014; Moritz et al., 2014), Libya (Moritz et al., 2014), Sudan (Priesner, 1960, Moritz et al., 2014), Kenya, Mozambique, Nigeria, Senegal, South Africa, Zimbabwe (Moritz et al., 2014) and Iran (Bhatti et al., 2009; Fallahzadeh et al., 2011; Mirab-balou et al., 2013). zur Strassen (2003) described *Anaphothrips sudanensis* as having a circum-subtropical geographical distribution. The author also described the species from the Southern Mediterranean area. *A. sudanensis* has been intercepted in US from the Mediterranean and Africa (Nickle, 2003a).

Records from the Maltese Islands: *Anaphothrips sudanensis* is a new species record to the Maltese islands.

Genus *Aptinothrips* Haliday, 1836

This is a genus of Holarctic distribution (ThripsWiki, 2021) which includes species that are usually associated with grasses (Mound et al., 2018). Five species are recognized under this genus, of which one is here recorded for the first time. Members of this genus have a narrow body which, in many species, is yellow to golden yellow in colour. Typical features of the locally occurring species include: both sexes being typically apterous, with a reticulate body texture and with no ocelli (fig. 4.56a); six-segmented antennae (fig. 4.15d); "W" shaped mesothoracic endofurca and "U" shaped metathoracic endofurca (fig. 4.56b).

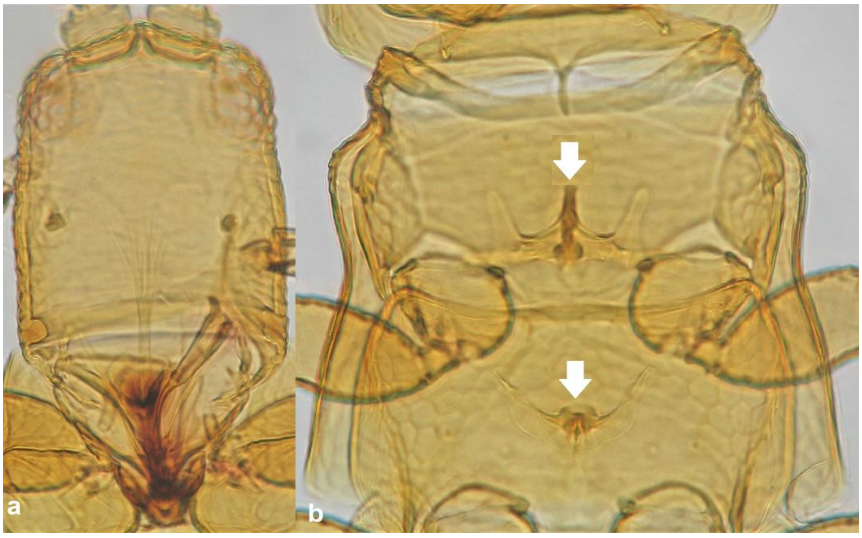

Figure 4.56: ***Aptinothrips* features**: (**a**) head with no ocelli; (**b**) pterothorax with "W" shaped mesothoracic endofurca and "U" shaped metathoracic endofurca.

***Aptinothrips rufus* (Haliday, 1836)**

Common name: Red grass Thrips

Material examined. MALTA: Wied Ħesri, 04.iv.2016, 1 ♀ (sm) and 1 instar larva (aga) on *Hyparrhenia hirta* and 4 ♀♀ (sm) and 1 instar larva (aga) on *Avena sterilis*, GD; Wied Qirda, 06.iv.2016, 1 ♀ (sm) on *Plantago major*, GD; Maqluba l/o Qrendi, 15.iv.2016, 8 ♀♀ (sm) on *Triticum aestivum*, GD; Wied Ħesri, 15.iv.2016, 1 ♂ (sm) on *Convolvulus arvensis*, GD; Msida, Junior College grounds, 27.iv.2016, 1 ♀ (sm) and 2 instar larvae (aga) on *Hordeum leporinum*, GD; Kunċizzjoni, 22.i.2017, 1 ♀ (sm) on *Hordeum leporinum*, GD; Msida, Junior College grounds, 03.iv.2017, 2 ♀♀ (sm) on *Hordeum leporinum*, GD; Għajn Tuffieħa, 29.iv.2017, 1 ♀ (sm) on *Stipa capensis*, GD. **GOZO**: Ramla Bay, 18.iv.2017, 1 ♀ (sm) on *Medicago marina*, GD.

Body length: ♀: 1460 - 1700 μm: ♂: 900 μm.

Wing type: Both sexes are apterous.

Further notes on species by: Priesner (1960; 1964), Stannard (1968), Palmer (1975), Moritz (1994; 2006), Kirk (1996), zur Strassen (2003), Moritz (2006), Mirab-balou et al. (2014), Moritz et al. (2014), Mound et al. (2016) and Mound et al. (2018) Mound et al. (2019).

Priesner (1964), zur Strassen (2003) and Mound et al. (2018) described individuals developing on halophytic plants as having a darker body colour (f. *nitidula*). All locally recorded specimens had a golden-yellow coloured body. In his descriptions, zur Strassen (2003) is the only author to include body lengths for this species, describing female specimens to be slightly smaller than those recorded locally.

Diagnosis: *Aptinothrips rufus* is similar to *Aptinothrips elegans*, a species which could potentially occur in the Maltese Islands since it is found in Italy and North Africa on locally-occurring grasses, in that both species have six-segmented antennae. In A. elegans however, antennal segment II is more slender and narrowed at the base (Mound et al., 2018). In all other *Aptinothrips* species, antennae are eight- rather than six-segmented.

Like in *Aptinothrips rufus*, both sexes of *Prosopothrips nigriceps* are apterous, however, this species can be distinguished from *A. rufus* from the ridge found at the tip of the head between antennal segments which is absent in *A. rufus* and from the dark brown coloured head (*A. rufus* is entirely golden-yellow in colour). Moreover, the tarsi in *P. nigriceps* are two-segmented, while those of *A. rufus* are one-segmented.

Biology: The life cycle of this species is also temperature dependant but generally lasts for about 40 days (Moritz et al., 2014). This species is mostly found feeding on the leaves of Poaceae. It has been specifically recorded on grasses such as *Cynodon dactylon* (Priesner, 1960; Moritz et al., 2014), *Bromus* sp., *Coronilla varia*, *Lolium perenne, Melica transilvanica*, *Triticum aestivum*, (Raspudić et al., 2009), *Ammophila littoralis*, *Avena barbata*, *Brachypodium retusium*, *Dactylis hispanica*, *Dasypyrum villosum*, *Hordeum murinum*, *Gastridium venticosum*, *Limonium vulgare*, *Malcolmia, Microcalyx scyria, Pipatherum miliaceum*, *Polypogon monspeliensis*, *P. maritimus*, *Stipa capensis*, (zur Strassen, 1986) and *Hyparrhenia hirta* (zur Strassen, 1986; zur Strassen, & Kuslitzky, 2012), but also on other plants including *Ampelodesma* sp., (Marullo & De Grazia, 2013), *Calycotome* sp., *Othonopsis* sp., *Thymus* sp., (Jenser, 1982), *Rumex* sp., *Trifolium* sp. (Tunc et al., 2012), *Launeaea cornuta* and *Phaseolis vulgaris* and (Moritz et al., 2014). In the Maltese Islands, *A. rufus* adults and larvae have been found on grasses including *Avena sterilis*, *Hordeum leporinum, Hyparrhenia hirta* and *Triticum aestivum*, indicating that these three species of grasses are used as host plants. Adults were also found on *Convolvulus arvensis, Medicago marina* and *Stipa capensis.*

This species tends to be infected by parasitic nematodes such as *Anguillina aptini* (Tylenchida) recorded from Britain (Lewis,1973) and *Thripinema nickelwoodii* (Tylenchida) (Loomans et al., 1997).

Aptinothrips rufus is described by Priesner (1960; 1964) as a pest of meadow grasses. The species was also mentioned by Moritz (1994) in his work on European thrips of economic importance. However, the more recent work by Moritz et al. (2014) claimed that there is little evidence that this species actually damages grass crops, despite being abundant in pastures.

These authors however spoke about the likelihood of this species being responsible for the mechanical distribution of phytopathogenic fungi and bacteria.

Distribution data: According to zur Strassen (2003), Moritz (2006) and Mound et al. (2017), *Aptinothrips rufus* originated from Europe, but has become widespread in temperate regions around the world, which is commonly found anywhere up to altitudes of more than 3300 m. In fact, Vierbergen (2013) described this species from the East Palaearctic, Afrotropical, Australian, Nearctic, Neotropical and Oriental regions and north Africa, without specifying which countries in this region it has been recorded from. *Aptinothrips rufus* has been recorded in the UK (Mound et al., 1976), Scandinavia, Denmark and Iceland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), the Netherlands as a glass house species in which settled in the open (Vierbergen, 2001), France (Pizzol et al., 2014), Hungary (Jenser, 2011), Belgium (Lock, 2006), Albania, Austria, the Azores, Bosnia & Herzegovina, Canary Islands, Central and Northwest European Russia, Croatia, Czech Republic, Germany, Ireland, Lithuania, Luxembourg, Portugal, Slovenia, Switzerland, Ukraine, (Vierbergen 2013), Italy (Stoch, 2003; Marullo & De Grazia, 2013), Greece (zur Strassen 1986), Spain (Goldarazena in Ramos, 2001), Cyprus (Priesner, 1960; Srour, 2015), and Turkey (Tunc et al., 2012, Tunc & Hastenpflug-Vesmanis, 2016). *Aptinothrips rufus* has also been recorded in Tunisia (Jenser, 1982), Israel (zur Strassen & Kuslitzky, 2012), Egypt, (zur Strassen, 2014), Iran (Bhatti et al., 2009; Mirab-balou, Minaei & Chen, 2013), India, North America and Hawaii (Priesner, 1960). *A. rufus* has also been intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003a; 2009).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Genus *Asphodelothrips* zur Strassen, 1995

Species belonging to this genus have been formerly placed under the genus *Taeniothrips* (zur Strassen, 1995). Two species are listed under the genus *Asphodelothrips;*

A. croceicollis and *A. hissaricus* (ThripsWiki, 2020), both of which can be found on both flowers and leaves and one of which has been recorded from the Maltese Islands in the current study. Features of the locally occurring species include: both sexes being micropterous; two pairs of ante-ocellar setae (fig. 4.57a); ocelli as small as the ommatidia (fig. 4.57a); post-ocular setae S_2 only slightly shorter than the long inter-ocellar setae (fig. 4.57a); antennae eight-segmented (fig.4.15b); pronotum with two to three pairs of postero-marginal setae (fig. 4.57b); mesofurca with spinula (fig. 4.57c); microtrichial comb on posterior margin of tergite VIII absent; males with one pore plate on sternites III-VII (fig. 4.57d); males with tergite IX bearing two pairs of thorn like setae (fig. 4.57e).

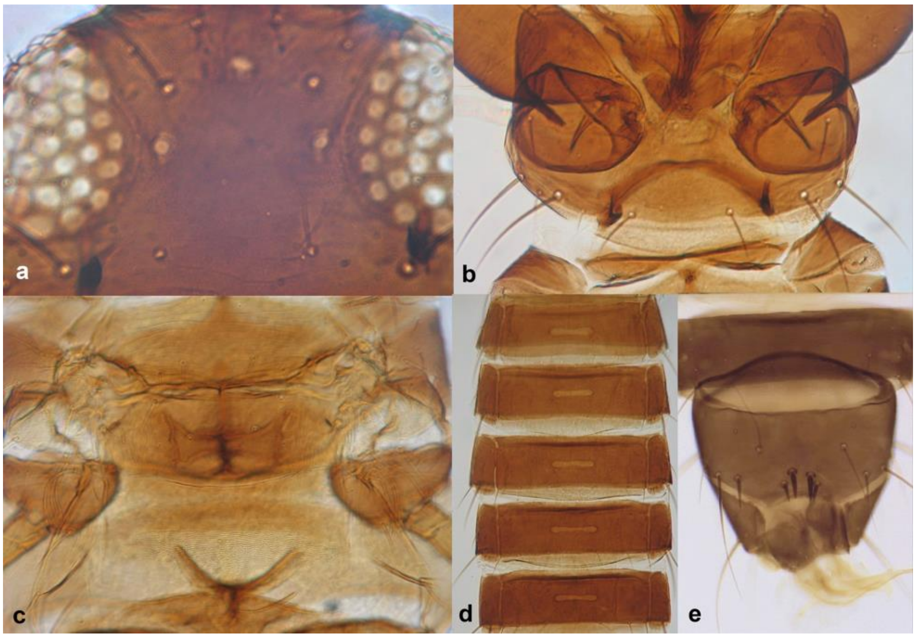

Figure 4.57: ***Asphodelothrips* features:** (**a**) head with two pairs of ante ocellar setae and with ocelli as small as ommatidia; (**b**) pronotum with two pairs of long postero-marginal setae; (**c**) mesonotum showing furca with spinula; (**d**) male sternites III-VIII with pore plate; (**e**) male tergite IX bearing two pairs of thorn like setae.

***Asphodelothrips croceicollis* (Karny, 1914)**

Common name: -

Material examined: MALTA: Dingli Cliffs, 27.i.2016, 4 ♂♂ (sm) on *Asphodelus ramosus*, GD; Buskett, 19.ii.2016, 2 instar larvae (aga) on *Asphodelus ramosus*, GD; Dingli Cliffs, 24.i.2017, 5 ♀♀ (sm) on *Asphodelus ramosus*, GD; Kunċizzjoni, 28.i.2017, 2 ♀♀ (sm) and 1 ♂ (sm) on *Asphodelus ramosus* and 1 ♀ (sm) on *Erica multiflora*, GD; Wied Ħesri, 24.ii.2017, 1 ♀ (sm) and 1 ♂ (sm) and on *Asphodelus ramosus*, GD; Buskett, 23.ii.2018, 2 ♀♀

(sm) on *Asphodelus ramosus*, GD; Kunċizzjoni, 29.i.2018, 1 ♀ (sm) on *Glebionis coronaria*, GD.

Body length: ♀: 1760 - 2160 μm; ♂: 1000 - 1580 μm.

Wing type: Locally collected males and females micropterous.

Further notes on species by: zur Strassen, 2003. This author described micropterous specimens as having their body entirely dark brown. Locally recorded female specimens are micropterous and also entirely dark brown, while males tend to have a pale brown pterothrorax. zur Strassen (2003) also described paler specimens to have pale antennal segments I, II and VI; and legs which are entirely yellow. Locally recorded specimens have legs with yellow fore tibiae and otherwise brown leg segments with paler extremities. Macropterous individuals were described by zur Strassen (2003) to have largely grey wings with the main vein in the distal half with 1 + 2 or 2 + 2 setae and clavus with three to five setae.

Diagnosis: The fact that this species is the only one locally with a bicoloured body pattern in males and the micropterous state in both sexes of this species makes it unique. Other bicoloured species such as *Anaphothrips sudanensis* and *Bregmatothrips dimorphus* are distinctly smaller in size (1340 μm in *A. sudanensis*, 1140 - 1460 μm in *B. dimorphus* as compared to 1000 - 2160 μm in *A. croceicollis*). In *A. sudanensis*, the bicoloured morph is the female, with paler abdominal segments III – VI. Both *A. sudanensis* and *B. dimorphus* have females which are predominantly macropterous.

Biology: No literature could be traced that describes the duration of the life cycle of this species.

zur Strassen (2003) described this species from the damp base of the inner leaves of *Asphodelus* species (Asphodelaceae). Marullo and De Grazia (2013) also described this species from *Asphodelus* sp. In the Maltese islands, *Asphodelothrips croceicollis* larvae have been found on *Asphodelus ramosus* (Asphodelaceae), indicating that it is used as a host. Adults of *A. croceicollis* were also found on *Erica multiflora* and *Glebionis coronaria.*

This species has not been recorded as an agricultural pest.

Distribution data: According to zur Strassen (2003) *Asphodelothrips croceicollis* is found throughout the Ponto-Mediterranean area and the Canary Islands, occurring up to 1500 m altitude. Vierbergen (2013) also recorded this species from the Near East and North Africa, without specifying the countries where it was collected from. This species has been recorded from Bulgaria (Karadjova & Krumov, 2015), Greece (zur Strassen, 1986), Italy and islands (Stoch, 2003; Marullo & De Grazia, 2013), Cyprus (Srour, 2015), Croatia, France (Vierbergen, 2013), Spain (Goldarazena in Ramos, 2001) and Turkey (Tunc & Hastenpflug-Vesmanis, 2016). The species has also been recorded from Israel (zur Strassen & Kuslitzky, 2012).

Records from the Maltese Islands: *Asphodelothrips croceicollis* is a new species recorded to the Maltese Islands.

Genus *Bregmatothrips* Hood, 1912

Ten species are recognized under this grass-inhabiting genus, one of which is of North American origin, while the others from Africa and Asia (Zhang et al., 2018). One species is recorded locally in this work. Features of the locally occurring species include: monocoloured, winged females and bicoloured, micropterous males; eight-segmented antennae; head with slight projection on anterior edge between antennae (fig. 4.58a); sensoria on antennal segments III and IV simple (fig. 4.58b); antennal segment V longer than VII and VIII together (fig. 4.58c); spinula on thoracic endofurcae absent; fore wing in females with two distal setae on first vein and long marginal setae on anterior edge (fig. 4.58d); Tergites II-VIII with a craspedum (flap-like structure) on posterior margin (fig. 4.60d); sternite II with three pairs of postero-marginal setae (fig. 4.58e).

***Bregmatothrips dimorphus* (Priesner, 1919)**

Common name: -

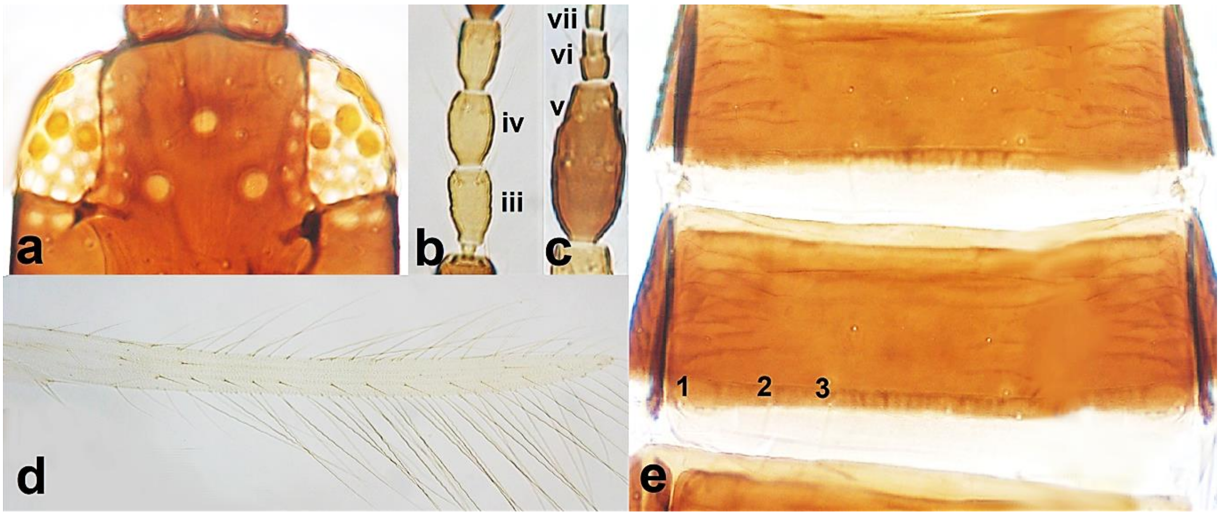

Figure 4.58: ***Bregmatothrips* features:** (**a**) convex anterior margin of head and with slight projection between antennal bases; b. antennal segments III – IV with simple sense cones; (**c**) antennal segment V longer than VII and VIII together; (**d**) fore wing with two distal setae on first vein and long marginal setae on leading edge; (**e**) abdominal sternite II with three pairs of marginal setae.

Material Examined: MALTA: Wied Ħesri, 15.i.2016, 5 ♀♀ (aga) and 4 ♂♂ (sm, aga) on *Pipatherum milliaceum*, GD; Buskett, 03.ii.2016, 1 ♀ (sm) on *Cynodon dactylon*, 3 ♀♀ (sm, aga) and 2 ♂♂ (sm, aga) on *Pipatherum milliaceum*, GD.

Body length: ♀: 1440 - 1460 μm; ♂: 1140 - 1240 μm.

Wing type: ♀: macropterous; ♂: micropterous

Further notes on species: Priesner (1964), zur Strassen (2003), Masumoto (2010), Elimem et al. (2012), Moritz et al. (2014) and Mound et al. (2016).

Micropterous females also exist according to Moritz et al. (2014). All locally recorded female specimens were macropterous.

Diagnosis: *B. dimorphus* has simple sense cones and segments III - V light-coloured, while the other dark brown. Other *Bregmatothrips* species may have forked sense cones on antennal segments III and IV and a different colour pattern of segments (ThripsWiki, 2020), but these species have a different geographical distribution than that of *B. dimorphus* and have not been recorded locally.

The bicoloured males superficially resemble *Anaphothrips sudanensis* and *Asphodelothrips croceicollis*, however, in *A. sudanensis*, the pale body regions are abdominal segments III - VI while in *B. dimorphus* these include the pterothorax. The fore wing in *A.*

sudanensis female has a dark brown band which is absent in *B. dimorphus*. *A. croceicollis* is a larger species (♀: 1760 - 2160 μm; ♂: 1000 - 1580 μm) and has a spinula on the mesofurca. This is absent in *B. dimorphus*. Moritz et al. (2014) also claimed similarity of this species to those of the grass feeding genera *Chirothrips* and *Limothrips*. The locally recorded *Chirothrips* species have an asymmetrical antennal segment II. This is symmetrical in *B. dimorphus*. *Limothrips* species have a stout pair of setae on abdominal segment X, which is absent in *B. dimorphus*.

Biology: Lewis (1973) claimed that the life cycle for this species takes about 15 days to complete, but that this duration depends on environmental temperature. *Bregmatothrips dimorphus* is found mostly on Poaceae such as *Cynodon dactylon* (Tunc et al., 2012). Locally, this species was recorded on *Cynodon dactylon* and *Pipatherum milliaceum* in maquis and woodland habitats.

This species has not been recorded as an agricultural pest, nonetheless it has been described by Moritz et al. (2014) as a possible mechanical vector to phytopathogenic fungi and bacteria.

Distribution data: This species is widespread in Europe but also Yemen, Sudan and southern Africa (Priesner, 1964; zur Strassen, 2003; Moritz et al*.,* 2014). Vierbergen (2013) also described this region from the East Palaearctic and Afrotropical Regions together with the Near East and North Africa. The author does not specify which countries the specimens from these last two regions were taken from. *Bregmatothrips dimorphus* has been recorded in Bulgaria (Karadjova & Krumov, 2015), Croatia (zur Strassen, 2003), Italy including Sicily (zur Strassen, 2003; Stoch, 2003; Marullo & De Grazia, 2013), Central European Russia (Vierbergen, 2013), France (zur Strassen, 2003; Pizzol et al., 2014), Spain (zur Strassen, 2003) and Turkey (Tunc & Hastenpflug-Vesmanis, 2016). *Bregmatothrips dimorphus* has also been recorded in Algeria (zur Strassen, 2003; Moritz et al.; 2014), Tunisia (Elimem et al., 2012), Mozambique, Sudan and South and East Africa (Moritz et al., 2014).

Records from the Maltese Islands: *Bregmatothrips dimorphus* is a new record to the Maltese Islands.

Genus *Ceratothrips* Reuter, 1899

This is a genus which lists only one species. It was formerly associated with species currently placed under the genera *Taeniothrips* and *Tenothrips* (Mound et al., 2018). Features of this species include: eight-segmented antennae; Head slightly wider than long; and with three pairs of ocellar setae, pair III arising outside ocellar triangle and longer than the distance between hind ocelli (fig. 4.59a); Pronotum with five to six pairs of postero-marginal setae (fig. 4.59b); mesothorax with weak spinula on endofurca (fig. 4.59c); Fore legs without tooth-like formations (fig. 4.59d); Fore wing first vein in females with 1 + 2 setae in the distal half of wing (fig. 4.59e); with 1 + 2 setae; clavus with six marginal setae (fig. 4.59f).

Figure 4.59: ***Ceratothrips* features:** (**a**) head with three pairs of ante-ocellar setae of; (**b**) pronotum with six pairs of postero marginal setae; (**c**) mesothorax with weak spinula on endofurca; d. fore legs with no tooth-like formations; (**e**) clavus with six marginal setae; (**f**) distal half of fore wing with 1 + 2 setae.

Ceratothrips ericae **(Haliday, 1836)**

Common name: -

Material examined: MALTA: Lapsi, 9.x.2017, 1 ♀ (sm) on *Limbarda crithmoides*, GD. **GOZO**: Qbajjar, 31.iii.2018, 1 ♀ (sm) on *Helichrysum melitense*, GD.

Body length: ♀: 1200 - 1460 μm; ♂: no records

Wing type: ♀: macropterous, ♂: no records

Further notes on species: Moritz (1994: 2006), Kirk (1996), zur Strassen (2003), and Mound et al. (2018).

Mound et al. (2018), state that the pronotum has no sculpture lines and the second vein has 10 - 12 setae. The microtrichial comb can be completely absent according to zur Strassen (2003) and Mound et al. (2018). Local specimens had a comb with microtrichia found laterally but not medially. No male specimens for this species have been recorded in this study. Males are described by zur Strassen (2003) and Mound et al. (2018) as being apterous and larviform, with yellow to brownish-yellow body colour and with sternites III - VIII each having one long and two short transverse pore plates. Male body length according to these authors is 1060 - 1240 μm

Diagnosis: *Ceratothrips ericae* differs from the genera that also have microtrichia on abdominal tergites VIII anterior to the spiracle instead of ctenidia in having only one pair of long postero-angular setae. All other locally occurring genera, namely *Odontothrips*, *Oxythrips*, *Taeniothrips* and *Tenothrips* have two pairs.

Biology: No literature could be traced that describes the duration of the life cycle of this species.

Different authors (e.g. zur Strassen, 2003; Mound et al., 2018; Kirk, 1996; Trdan, 2001; and Marullo & De Grazia, 2013) described this species from a large variety of unrelated plants including *Anethum graveolens*, *Calendula officinalis, Calluna* sp., *Crepis setosa*, *C. biennis*, *Chondrilla juncae*, *Cichorium intibus*, *Convolvulus arvensis*, *Cucurbita pepo*, *Daucus carota, Deschampisia flexuosa, Erica* sp., *Gladiolus gandavensis*, *Inula britannica*, *I. crithmoides,* *Lactuca sativa*, *Nepeta cataria*, *Picris hieracioides*, *Sonchus arvensis*, *Scabiosa ochroleuca*, *Spirea salicifolia*, *Taraxacum officinale*, *Vitex agnus-castus* and *Zea mays* (Raspudić et al., 2009). According to zur Strassen (2003), this species also occurs on *Arctostaphylos* sp. and on *Vaccinium* sp. In the Maltese Islands, this species was collected from *Limbarda crithmoides* and from *Helichrysum melitense*.

According to Garcia-Fayos, & Goldarazena (2008), *Ceratothrips ericae* is an important pollinator, especially so in areas where larger pollenators do not occur. *C. ericae* has not been recorded as an agricultural pest, but the species is mentioned by Moritz (1994) in his work on European thrips of economic importance. This author does not explain his choice of species of economic importance in his work.

Distribution data: According to zur Strassen (2003) this species is of Euro-Siberian origin, but has been imported to other parts of the world. According to Vierbergen (2013) This species is also found in the Australian region, the Near East, but without specifying which countries it was collected from. *Ceratothrips ericae* has been recorded from the UK (Mound et al., 1976; Kirk, 1996), Scandinavia, Denmark and Iceland (Gertsson, 2015), Slovenia (Trdan, 2001), the Netherlands (Vierbergen, 2001), Poland (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Hungary (Jenser, 2011), Italy (Stoch, 2003; Marullo & De Grazia, 2013), Belgium (Lock, 2006), Austria, Central and Northwest European Russia, Croatia, Czech Republic, Estonia, European Turkey, Germany, Ireland, Latvia, Lithuania, Portugal, Switzerland, France (Vierbergen, 2013), Greece (zur Strassen,1986), Spain (Goldarazena in Ramos, 2001) and Turkey (Tunc & Hastenpflug-Vesmanis, 2016). It has also been intercepted in US from Europe (Nickle, 2003a).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Genus *Chirothrips* Haliday, 1836

This genus includes species that typically inhabit grasses. Originally from the Holarctic region, species from this genus have also been introduced to Australia, New Zealand and

Hawaii (Mound et al., 2018). The genus is easy to distinguish from others from the trapezoidally-shaped pronotum, however species are not always easy to distinguish from each other. The genus lists 42 species, three of which have been recorded from the Maltese Islands in the current study. Features of the locally occurring species include: eight-segmented antennae; head relatively smaller and narrower than the pronotum and with anterior margin extended in front of compound eyes (fig. 4.60a); and between base of antennae; antennal segments short and compact, with segment II asymmetrical to different degrees depending on the species (figs. 4.19a-b); Pronotum is trapezoidal (fig. 4.60a); with no long anterior marginal and with about five to eight pairs of postero-marginal setae; Fore wing in macropterous individuals is narrow, 15-20 times as long as wide in the middle (fig. 4.60b). Campaniform sensilla of the tergites found between the sub-basal line and central pair (S_1) of setae (fig. 4.60c); Posterior margin of tergite with a craspedum (fig. 4.60c).

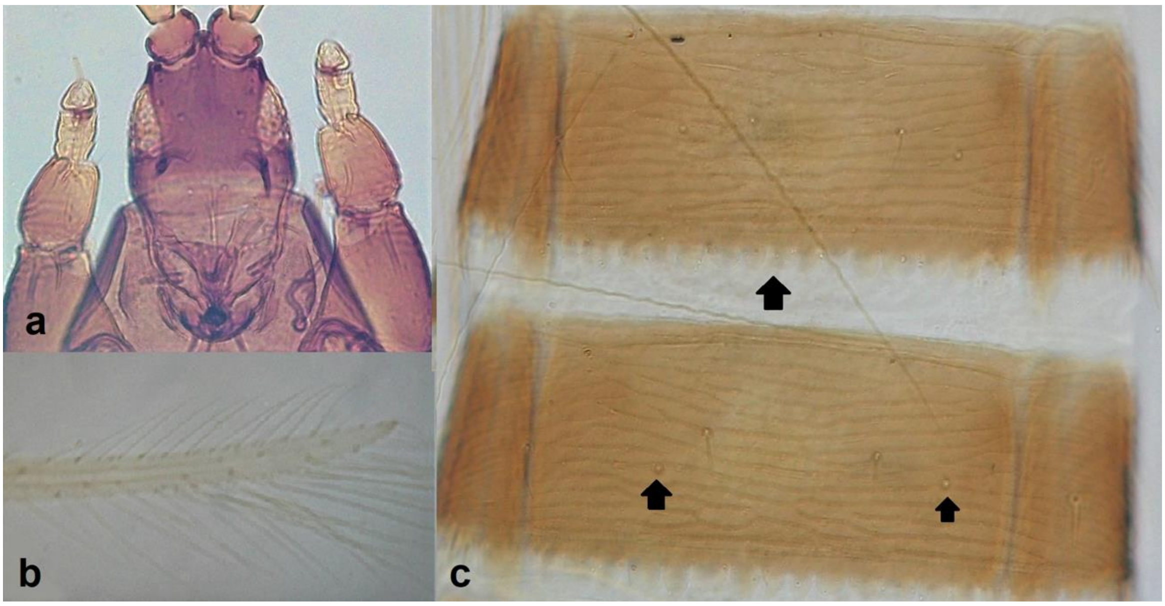

Figure 4.60: ***Chirothrips* features:** (**a**) head and pronotum with posterior margin considerably narrower than posterior; (**b**) fore wing; (**c**) tergites showing campaniform sensilla and craspedum.

***Chirothrips hamatus* Trybom, 1895**

Common name: -

Material examined: GOZO: Xlendi, 21.vii.1956, 1 ♀ (sm) on *Lithospermum arvense* (JIS & ERS), (BMNH).

Body length: ♀: 1453 μm ♂: no records.

Wing type: ♀: macropterous; ♂: no records

Further notes on species: Mound et al. (1976); zur Strassen (2003) and Mound et al. (2018). Males are described by these authors as being micropterous. zur Strassen (2003) describes the body length for females to be larger than the specimen recorded locally. The author describes the length for male specimens to be 1290-1670 μm.

Diagnosis: This species is distinguished from other local congeners by the following features: antennal segment II in both sexes symmetrical and considerably narrower than segment I. Sternites III- VII (rarely also VIII according to zur Strassen, 2003) with very large, transverse prominent pore plate (166-184 μm across, occupying 60-70% of sternite width).

Priesneriella mavromoustakisi is superficially similar to the genus *Chirothrips*, however, since this is a tubuliferan, has prominent maxillary stylets above the mouth cone and a tube-shaped abdominal segment X. Locally collected female specimens of *P. mavromoustakisi* were also apterous. Moritz et al. (2014) compare *Chirothrips* species to *Bregmatothrips dimorphus*. The latter species however has symmetrical antennal segments II while both the locally occurring *Chirothrips* spp. have antennal segment II with lateral projections, making them asymmetrical. Also, males of *B. dimorphus* have yellow coloured pterothorax and abdominal segments I and II. These are brown in the locally occurring *Chirothrips* species.

Biology: The duration of the life cycle for this species has not been described.

Chirothrips hamatus is mostly associated with Poaceae. It has been recorded in wetter places particularly on *Alopecurus pratensis* (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018). In the Maltese Islands, it was locally collected on *Lithospermum arvense* (Boraginaceae), this plant cannot be considered a host plant for thuis species, given that no larvae were found.

C. hamatus has not been recorded in the current study. It has not been recorded as an agricultural pest.

Distribution data: According to zur Strassen (2003) and Mound et al. (2018) this species is widespread in Europe but excluding the southern areas as well as western Siberia. It has also been imported to North America. Vierbergen (2013) also describe this species from the Nearctic region and the the Near East but without specifying the countries where it was collected from. *Chirothrips hamatus* has specifically been recorded in the UK, (Mound et al., 1976; Mound et al., 2018), Scandinavia, Denmark (Gertsson, 2015; zur Strassen, 2003), Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Austria, Central European Russia, Croatia, Czech Republic, French Mainland. Germany, Liningrad Region, Latvia, Lithuania, North and Northwest European Russia, the Netherlands, Ukraine (Vierbergen, 2013). It has also been found in Iraq (Abdul-fatah Hammoodi & Abdul-Rassool, 2004).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

***Chirothrips manicatus* (Haliday, 1836)**

Common name: Timothy thrips

Material examined: MALTA: L/o Siġġiewi, private farm, 03.v.2016, 1 ♀ and 1 ♂ (sm) on *Koeleria cristata*, GD; Wied Ħesri, 02.xi.2016, 1 ♂ (sm) on *Phragmites australis*, GD; Wied Ħesri, 04.xi.2016, 4 ♀♀ (sm, aga) and 5 ♂♂ (sm, aga) on *Arundo donax*, GD; Naxxar, road, 29.iv.2017 1 ♂ (sm) on *Triticum aestivum*, GD; Wied Qirda, 31.v.2018, 1 ♂ (sm) on *Hyparrhenia hirta*; Fiddien 1♀ (sm) 16.vi.2021 on *Avena sterilis*, GD.

Body length: ♀: 1400 - 1700 μm. ♂: 960 - 1440 μm.

Wing type: ♀: macropterous; ♂: micropterous.

Further notes on species: Priesner (1964), Stannard (1968), Moritz (1994: 2006), Kirk (1996), Marullo (2004), zur Strassen (2003), Moritz et al. (2014), Mound et al. (2016), Mound et al. (2018) and Mound et al. (2019).

According to Mound et al. (2018), micropterous females also exist, though all locally collected females were macropterous. zur Strassen (2003) claimed that this species seems to be very variable in length. Local male specimens show a wider range of length than those quoted by zur Strassen (2003). Pore plates on male sternites can also be occasionally found on sternite VIII according to zur Strassen (2003). Sternite VIII of locally recorded male specimens did not have a pore plate on segment VIII.

Diagnosis: This species is distinguished from other local species of the same genus by the following features: antennal segment II asymmetrical with prolonged external margin bearing terminal seta-like sensorium and with antennal segment II with curved outer edge; Sensoria on III and IV segments III - V each with one simple, stout sense cone; Ovipositor not so pronounced and with shallow teeth.

C. meridionalis has forked sense cones on antennal segment IV, antennal segment II with a less pronounced outer edge, making the segment less distinctly asymmetrical, a long abdominal segment X and a pronounced ovipositor with prominent teeth.

Priesneriella mavromoustakisi and *Bregmatothrips dimorphus* are superficially similar to the genus *Chirothrips*, however they differ in a number of characters as previously described in the “Diagnosis” section under the description of *Chirothrips hamatus*.

Biology: According to Lewis (1973), the life cycle of this species can take from less than a week to over one month depending on environmental temperature. Females lay eggs in flowers of single grasses, where the larvae feed and pupate within a single floret.

Chirothrips manicatus is also mostly associated with Poaceae and Cyperaceae (Priesner, 1964). It has been specifically recorded on cereals such as *Agrostis* sp., *Alopecurus pratensis*, *Cyperus badius, Dactylis glomerata*, *Phleum pratense*, *Poa pratensis* (zur Strassen, 2003), *Polypogon monspeliensis* (zur Strassen, 1986), *Lolium perenne, Sorgum halepense*, *Sorgum bicolor* (Raspudić, et al., 2009), *Triticum aestivum* (Kirk, 1996; Tunc et al., 2012) and *Zea mays* (Trdan et al., 2005; zur Strassen & Kuslitzky, 2012; Marullo & De Grazia, 2013), but also on other plants such as *Calamagrostis epigeios, Deschampisia flexuosa*, *Erigeron annuus*, *Festuca heterophylla*, *Nepeta pannonica*, *Malva alcea*, *Malus* sp., *Sinapis arvensis,* (Raspudić, et al., 2009), *Juncus* sp. (Jenser, 1982) and also on a wide range of dicotyledonous plants (zur Strassen, 2003) such as *Asparagus officinalis* (Trdan et al., 2005), *Agrostis palustris*, *Amygdalus communis*, *Chenopodium* sp., *Crataegus* sp., *Echinochloa crus-galli*, *Malva* sp., *Olea europaea*, *Pinus* sp., *Pyrus elaeagnifolia*, *Spartium junceum*, *Solanum melanogena*, (Tunc et al., 2012), *Tagetes minuta*, *Tephrosia villosa* ssp. *ehrenbergiana* (Moritz et al., 2014), *Agropyron* sp., *Arundo* sp. (Vierbergen, 2013) and *Medicago* (Baderitakis et al., 2015). In the Maltese Islands, *Chirothrips* larvae were found on *Arundo donax* but it could not be determined if these belonged to *C. manicatus* or to *C. meridionalis*. In any case, this still confirms that both these species use Poaceae as host plants. *C. manicatus* adults were collected from grasses including *Arundo donax, Hyparrhenia hirta*, *Koeleria cristata*, *Phragmites australis* and *Triticum aestivum*.

Trdan et al. (2012) claimed that *C. manicatus* is preyed upon by *Aeolothrips intermedius*.

According to Marullo (2003), *C. manicatus* may attack some cultivated Cyperaceae. Moritz et al. (2014) stated that this species may possibly mechanically transmit phytopathogenic bacteria and fungi.

Distribution data: zur Strassen (2003) described this species to be of Holarctic, originally probably Palearctic origin. Vierbergen (2013) described this species from the East Palaearctic, Australian, Nearctic, Neotropical, and Oriental regions as well as the Near East and North Africa, but without specifying the countries of these last two regions where it was collected from. zur Strassen (2003) claimed that *C. manicatus* is nowadays a semi-cosmopolitan species, found in most temperate parts of the world. It has been specifically recorded from the UK (Mound et al., 1976; Kirk, 1996), Scandinavia and Denmark (Gertsson, 2015), Poland, Romania (Sierka et al.,, 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Bulgaria (Karadjova & Krumov, 2015), Slovenia, Croatia & Montenegro (Trdan et al., 2005), Serbia (Andjus et al., 2001; Trdan et al., 2005), the Netherlands where it is recorded as a glasshouse species which settled in the open (Vierbergen, 2001), Hungary (Jenser, 2011), Belgium (Lock, 2006), Albania, Austria, Azores, North and Northwest European Russia, Czech Republic, Estonia, France, Germany, Ireland, Latvia, Lithuania, former Yugoslav republic of Macedonia, Portugal, Switzerland, Ukraine (Vierbergen, 2013), Spain

(Goldarazena in Ramos, 2001), Greece (Jenser & Tsanakakis, 1985; zur Strassen, 1986), Italy including Sicily (Stoch, 2003; Marullo & De Grazia, 2013) and Turkey (Tunc et al., 2012). *Chirothrips manicatus* has also been recorded from Tunisia (Jenser, 1982; Moritz et al., 2014; Belaam-Kort et al., 2020), Morocco, Kenya (Moritz et al., 2014) and Israel (zur Strassen & Kuslitzky, 2012). *C. manicatus* has also been intercepted in US from Europe and the Mediterranean (Marullo, 2003; Nickle, 2003a; 2009).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

***Chirothrips meridionalis* Bagnall, 1927**

Common name: -

Material examined: MALTA: Wied Ħesri, 04.iv.2016, 2 ♂♂ (sm) on *Hyparrhenia hirta*, GD; Wied Qirda, 04.xi.2016, 2 ♀♀ (sm) on *Arundo donax*, GD; Wied Qirda, 31.v.2018, 3 ♀♀ (sm) on *Hyparrhenia hirta*, GD.

Body length: ♀: 1600 - 1680 µm; ♂1240 µm.

Wing type: Both sexes are macropterous.

Further notes on species: Priesner (1960; 1964), zur Strassen (2003, as *Agrostothrips meridionalis*) and Moritz et al. (2014).

Diagnosis: This species is distinguished from others of the same genus by the following features: antennal segment II drawn out into a sharply pointed angle; sense cone emergent and simple on segment III, and forked I on segment IV; ovipositor medially developed and bearing prominent rows of teeth.

Chirothrips meridionalis, although similar in many features to the other *Chirothrips* is distinctly different from the other locally recorded *Chirothrips* species in that it is the only species with a forked sense cone on antennal segment IV, and the only species with macropterous males. It also differs from *C. manicatus* in that antennal segment II is less prominently asymmetrical in *C. meridionalis* than in *C. manicatus* and the ovipositor inn females is medially developed and with prominent teeth.

Priesneriella mavromoustakisi and *Bregmatothrips dimorphus* are superficially similar to the genus *Chirothrips*, however they differ in a number of characters as previously described in the "Diagnosis" section under the description of *Chirothrips hamatus*.

Moreover, males of this species are typically macropterous while in *Bregmatothrips dimorphus*, males are micropterous.

Biology: The life cycle duration and details of this species is similar to that of *Chirothrips manicatus* (Lewis, 1973).

This species is also one that has been associated with Poaceae. It has been recorded from *Andropogon halepense* (Priesner, 1960; 1964; zur Strassen, 2003), *Brachypodium ramosum*, *Cenchrus* sp., *Heteropogon contortus*, *Hyparrhenia hirta*, *Sorghum halepense* (zur Strassen, 2003), *Polypogon monspeliensis and Zea mays*, (Priesner, 1960:1964; Moritz et al., 2014). In the Maltese Islands, *Chirothrips* larvae, alongside adults of both *Chitothrips manicatus* and *C. meridionalis* were collected from *Arundo donax* and *Hyparrhenia hirta*. It could not be determined if these larvae belonged to *C. meridionalis* or to *C. manicatus,* though this suggests that both these species use these grass plants as host plants.

Chirothrips meridionalis has not been recorded as an agricultural pest, however, Moritz et al. (2014) described this species as a likely source of mechanical transmission of phytopathogenic bacteria and fungi.

Distribution data: This species has been recorded from South Europe (Priesner, 1960), and is widespread across the Mediterranean area, Madeira, Canary Islands, also India, Pakistan, Iran, Yemen, Nigeria and S. Africa (zur Strassen, 2003). It has been recorded from France (Vierbergen, 2013), Spain (Goldarazena in Ramos, 2001), Italy including Sicily, (Marullo & De Grazia, 2013), and Cyprus (Priesner, 1960; 1964). *Chirothrips meridionalis* has also been recorded from Israel (zur Strassen & Kuslitzky 2012), Egypt (Priesner, 1960; 1964; zur Strassen, 2014), Palestine, Yemen (Priesner, 1960; 1964), East Africa (Moritz et al., 2014) South Africa (1964) and Iraq (Abdul-fatah Hammoodi & Abdul-Rassool, 2004). It has also been intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003a).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Genus *Echinothrips* Moulton, 1911

The genus *Echinothrips* originates from the New World and includes leaf breeding and feeding species, some of which can become pests on some crops and cultivated plants as well as greenhouses. Features of the locally occurring species include: eight-segmented antennae. The body and legs of this genus have a reticulated texture (fig 4.61a) and the setae on the body and wings tend to be capitate. Eight species are included in this genus, one of which has been recorded locally in the current study. This species is distinguished from others by the following features: body dark brown, often with a red internal pigment (fig 4.61a); Maxillary palps two-segmented; spinula absent on meso-and metathoracic endofurcae; costal and first vein of fore wing with a complete row of capitate setae (fig 4.61b), while second vein with no setae; clavus with three marginal, capitate setae, and medial setae (S_1) on tergites very close to each other (fig 4.63a).

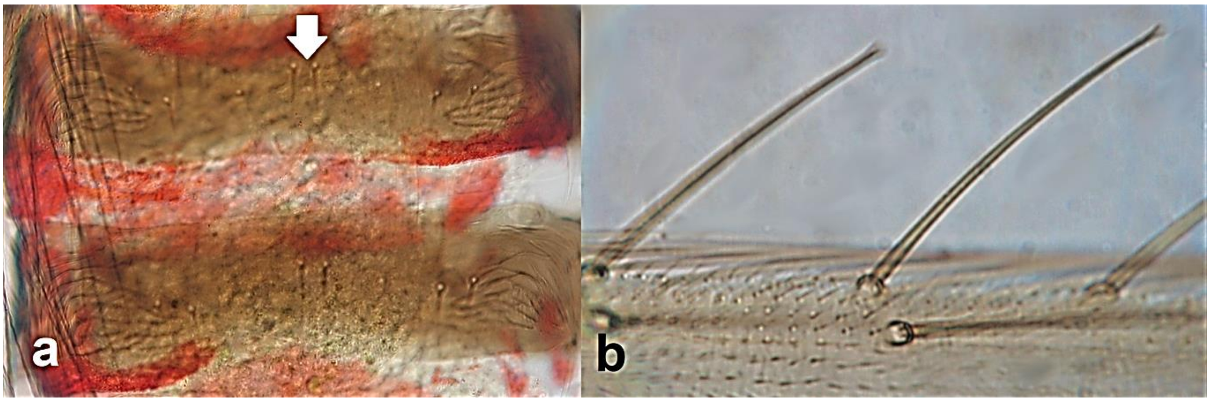

Figure 4.61: ***Echinothrips* features:** (**a**) tergites showing internal red pigment, medial setae set close together and reticulated texture; (**b**) fore wing showing one row of capitate setae.

Echinothrips americanus Morgan, 1913

Common name: Ponsietta Thrips

Material examined: MALTA: L/o Siġġiewi, private farm, 21.v.2017, 1 ♀ (sm) on *Salvia officinalis*, GD; Siġġiewi, private garden 1, 14.vii.2017, 13 ♀♀ (sm, aga) on *Azalea indica*, GD; Siġġiewi, private garden 1, 16.vii.2017, 8 ♀♀, 3 instar larvae (aga) on *Azalea indica*, GD.

Body length: ♀: 1100 - 1340 µm; ♂: no records

Wing type: ♀: macropterous; ♂: no records

Further notes on species: Stannard (1968), Wilson (1975), zur Strassen (2003), Marullo (2003b), Moritz (2006), Mound et al. (2018) and Mound et al. (2019). zur Strassen (2003) describes females to be slightly longer than the locally recorded specimens. No male specimens have been recorded in this study. Males of this species have been described by zur Strassen (2003) and Mound et al. (2018) to be similar to, but smaller than females and to have abdominal sternites III - VIII each with up to 100 small circular pore plates. zur Strassen (2003) described the body lengths for males of this species to be 1090 - 1350 µm.

Diagnosis: *Echinothrips americanus* is superficially similar to species belonging to the subfamily Panchaetothripinae in that its body is covered with a reticulate texture and because of the narrow shape of the antennal segments. It differs from the Panchaetothripinae in having capitate setae on pronotum and on fore wings, and it also does not have any setae on the second vein of fore wing.

Biology: No literature could be traced that describes the duration of the life cycle of this species.

This leaf feeding species has been recorded from on different plants, such as vegetables (ThripsWiki, 2020) and often on *Dendranthema* (Araceae), *Euphorbia* (Euphorbiaceae) and *Impatiens* (Balsamaceae) (Moritz, 2006). It is believed to have been introduced to many countries in the world along with imported ornamental plants especially Araceae such as *Dieffenbachia*, *Homalonema*, *Philodendron*, *Schefflera* and *Syngonium* (zur Strassen, 2003). Locally, this species has been found on *Azalea indica* as well as on *Salvia officinalis*. A, indica was freshly obtained from a flower nursery, which could imply the possibility that these places can harbour populations of this species within their greenhouses.

This species has been recorded as a pest on cultivated plants such as Araceae, Balsamiaceae, and Euphorbiaceae (Marullo, 2003; Moritz, 2006). In the Maltese Islands, it has been observed to infest *Azalea indica*. Larvae were also found on this plant indicating it is being used as a host by this thrips species, It.has also been collected from *Salvia officinalis.*

Distribution data: *Echinothrips americanus* is native to eastern North America and has been imported with ornamental plants to Europe (zur Strassen, 2003; Moritz, 2006). Vierbergen (2013) also described this species from the Nearctic, Neotropical and Oriental regions. This species has been recorded from the UK (Mound et al., 2018), Sweden, Norway, Denmark (zur Strassen, 2003; Gertsson, 2015), Hungary (Jenser, 2011), Bulgaria (Karadjova & Krumov, 2015), Slovakia (Zvarikova et al., 2020), the Netherlands (Vierbergen, 2001; zur Strassen, 2003), Belgium (zur Strassen, 2003; Lock, 2006), Austria, Central European Russia, Croatia, Finland, Ireland, Poland, Romania, (Vierbergen, 2013), Czech Republic, Slovenia, Germany, France, and Italy (zur Strassen, 2003). It has also been recorded from Israel (zur Strassen & Kuslitzky, 2012), Canada, Mexico, and Bermuda Islands (Marullo, 2003).

Records from the Maltese Islands: *E. americanus* is a new record to the Maltese Islands.

Genus *Frankliniella* Karny, 1910

This is a large genus which is recognized within the *Frankliniella* - genus group, together with ten other genera (Wang, Mound & Tong, 2019). Features of locally occurring species include: both sexes being macropterous; typically have a pair of setae present foremost of the ocelli; and paired ctenidia on abdominal tergites, which are found antero-laterally to the spiracles on Tergite VII (Zhang et al., 2018). The genus *Frankliniella* includes species which typically inhabit flowers. A number of species, including the locally recorded species, are pests, some of which can be orthotospovirus vectors. Currently 230 species (ThripsWiki, 2020) are recognised under this genus worldwide. Two species have been recorded locally in this work. Features of the locally occurring species include: eight-segmented antennae; prominent ante-ocellar setae S_1 (fig. 4.62a); pronotum with five to six long postero-marginal setae (fig. 4.62b); mesothorax with spinula; metathoracic medial setae on anterior margin (fig. 4.35a-b); fore wing pale and with two longitudinal veins with complete rows of setae (fig. 4.62c); Ctenidia of tergites VI-VIII well developed with those of tergite VIII standing anterolaterally of spiracle (fig. 4.32a).

The parassitoid eupholid wasps *Ceranisus americanus*, *C. lepidotus*, *C. loomansi* and *C. menes* (all in Eulophidae) have been recorded on *Frankliniella* species in North America and Europe (Loomans, 2006).

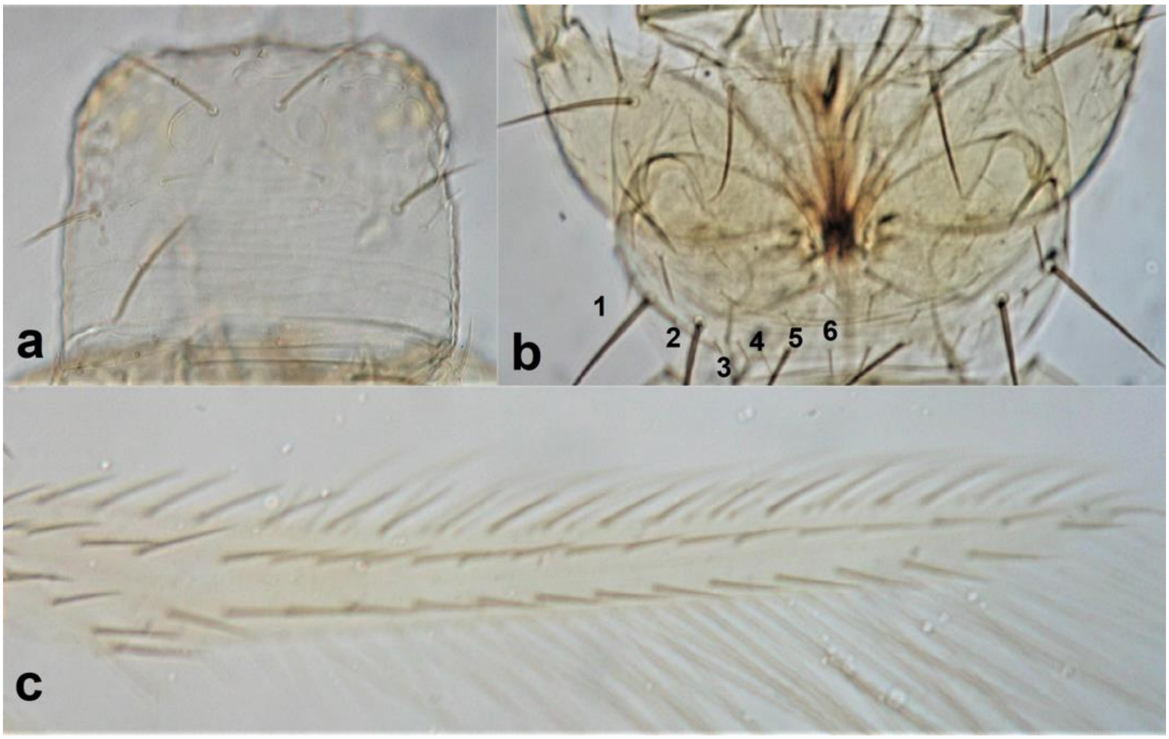

Figure 4.62: ***Frankliniella* features:** (**a**) head with three pairs of ante-ocellar setae; (**b**) pronotum with five pairs of long postero marginal setae; (**c**) fore wing showing veins with two complete rows of setae.

***Frankliniella occidentalis* (Pergande, 1895)**

Common name: Western Flower thrips

Material examined: MALTA: Żabbar, 11.iii.1994, 2 ♀♀ (sm) (BMNH) on *Gerbera* sp., DM; St. Paul's Bay, 14.iii.1994, 2 ♀♀ (sm) (BMNH) on *Solanum melanogena*, GW; St. Paul's Bay, 14.iv.1994, 1 ♀ (sm) (BMNH) on *Dianthus caryophyllus*, JWI; St. Paul's Bay, 14.iv.1994, 2 ♀♀ (sm) (BMNH) on *Chrysanthemum* sp., JWI; St. Paul's Bay (glasshouse), 14.iii.1994, 2 ♀♀ (sm) (BMNH) on *Fragraria* x *ananassa*, GW; Żabbar, 13.i.1997, 1 ♀ (sm) (dark form) on *Dianthus caryophyllus*, DM; Siġġiewi, Triq it-Tank,, 14.x.2015, 1 ♀ (sm) (yellow form) on *Diplotaxis tenuifolia*, GD; Siġġewi, private garden 1, 29.i.2016, 1 ♀ (sm) (yellow form) on *Narcissus tazzetta*, GD; Wied Qirda, 06.iv.2016, 1 ♂ (sm) on *Matricaria chamomilla*, GD; Wied

Ħesri, 04.iv.2016, 1 ♂ (sm) on *Avena sterilis*, GD; Siġġiewi, private garden 1, 13.iv.2016, 1♀ (sm - yellow form) on *Foeniculum vulgare*, GD; Manikata, 21.iv.2017, 1 ♂ (sm) on *Pallenis spinosa*, GD; Mellieħa road l/o Popeye Village, 21.iv.2017, 1 ♀ (sm) (yellow form), 1 ♀ (sm) (dark form) on *Tamarix africana*, GD; Il-Ballut, l/o M'Xlokk, 05.v.2017, 1 ♀ (sm) (yellow form), 1 ♀ (sm) (dark form) on *Malva arborea*, GD; road, l/o Wied Ħesri , 07.viii. 2017, 1 ♀ (sm) (yellow form), 3 ♀♀ (aga) on *Ipomoea carnosa*, GD; Qormi, Triq Ħal-Luqa, 18.viii.2017, 1 ♀ (sm) (yellow form), 3 ♀♀ (aga) (yellow form) on *Yucca gloriosa*, GD; l/o San Ġwann, private farm, 29.x.2018, 2 ♀♀ (sm) (yellow form), 3 ♀♀ (aga) (yellow form) and 1 ♂ on *Lactuca sativa*, GD; Wied Ħesri, 12.iii.2018, 2 ♀♀ (sm) (dark form) on *Trifolium nigrescens*, GD; Fiddien, 16.v.2021, 1 ♀ (sm) on *Avena sterilis*, GD.

Body length: ♀: 1440 - 1800 μm; ♂: 1080 - 1300 μm.

Wing type: Both sexes are macropterous.

Further notes on species: Marullo & Tremblay (1993), Moritz (1994; 2006), Kirk (1996), Mound and Marullo (1996), Marullo (2003), zur Strassen (2003), Moritz (2006), Cavalleri and Mound (2012), Moritz et al. (2014), Skarlinsky and Funderburk (2016), Mound et al. (2018) and Mound et al. (2019).

According to Mound et al. (2018), the extent of brown colour pattern of the antennae and indeed the colour intensity of the specimen is possibly dependent on temperature, with darker specimens developing in cooler temperatures. Both dark and pale forms were collected locally, with most dark specimens obtained during the cooler moths of the year and the paler specimens obtained during Summer and Autumn. Mound et al. (2018) also claimed that the world-wide strain which has pest tendencies on crops is also pale. Locally specimens collected from cultivated *Lactuca sativa* in greenhouses were of this type of coloration. Male body length values are larger than those described by zur Strassen (2003).

Diagnosis: This species is distinguished from other local congeners by the following features: campaniform sensilla present on metanotum; microtrichial comb on posterior margin of tergite VIII complete, with widely placed, short microtrichia arising from triangular bases.

Mound et al. (2018) claimed that *Frankliniella* occidentalis is very similar to *F. intonsa,* a species which is a likely recorded locally due to its geographical distribution that extends to other neighbouring Mediterranean countries and to the plants on which it has been recorded (e.g. *Triticum aestivum*, *Rosa* spp., *Citrus* spp. and *Helianthus annus* amongst others), a number of which occur in the Maltese Islands. *F. intonsa* usually has shorter post-ocular setae and usually no metathoracic campaniform sensilla. The locally recorded *F. schultzei* differs in that post-ocular setae pair IV are as long as the distance between hind ocelli (they are longer in *F. occidentalis*), in the presence of microtrichia on the fore coxae, the absence of the microtrichial comb on posterior margin of abdominal tergite VIII and also in that the metathoracic campaniform sensilla are absent.

Species of the genus resemble those of the genus *Thrips,* however *Thrips* species have ctenidia on tergite VII which are postero-medially oriented, rather than antero-laterally as in *Frankliniella* spp. with respect to the spiracle. Moreover, species of the genus *Thrips* only have only one pair of ante-ocellar setae (S_2), while in *Frankliniella* species, both S_1 and S_2 are present.

Biology: Moritz et al. (2014) described the life cycle of this species to last from 15 days (at 30ºC) to 44 days (at 15ºC), with the adult stage lasting between 28 to 71 days. According to these authors, different diets can affect oviposition rates in females.

This species is polyphagous and found on both flowers and leaves of different plant species (Marullo & De Grazia, 2013). It has been described on many different plants, including numerous crops such amaranth, babycorn, beans, beetroot, broccoli, cabbage, capsicum, cassava, chillies, courgettes, cucumber, aubergines, kale, leek, maize, onion, papaya, peas, potato, squash, tomato, sunflower and wheat amongst others (Moritz et al., 2014). *F. occidentalis* has also been recorded on *Chrysanthemum* hybrids (Kirk, 1996), *Dianthus caryophyllus* (Trdan, 2001), *Brassica oleracea* var. *botrytis*, *Calla palustris*, *Capsicum annuum*, *Chrysanthemum sinense*, *Fragaria* sp., *Galega officinalis*, *Helianthus annuus*, *Pelargonium peltatum*, *Plobium hirsutum*, *Rosa* sp., *Solanum melanogena, Stellaria media*, *Taraxacum officinale*, (Raspudić et al., 2009), *Vicia faba* (Razi et al., 2013), *Medicago sativa*, *M. marina, M. arborea* (Baderitakis, Thanopoulos, Fantinou &. Emmanouel, 2015), *Achyranthes aspera*, *Ajuga remota*, *Bidens pilosa*, *Chenopodium* sp., *Conyza bonariensis*, *Crotolaria* sp, *Datura suaveolens*, *Erlangia calcyna*, *Galinsoga parviflora*, *Nycandra physaloides*, *Senna didymobotrya*, *Sonchus oleraceus*, *Tagetes minuta* and *Tithonia diversifolia* (Moritz et al., 2014). Mifsud & Watson (1999) described the species to occur locally on seed crops, cut flowers such as *Dahlia*, *Dianthus* and *Gerbera*, nursery stock, peaches plums, nectarines, strawberries, sweet peppers, grapes, cotton and other crops including tomatoes. This species has been collected from the flowers of variety of indigenous and cultivated herbaceous plants, trees (e.g. vines and cherry trees, Marullo, 2003) and the leaves of crops e.g. peppers, cultivated flowers (Marullo, 2003) and lettuce. In the Maltese Islands, this species was found on a number of indigenous and cultivated herbs, shrubs and trees including *Diplotaxis tenuifolia*, *Dianthus caryophyllus*, *Foeniculum vulgare*, *Ipomoea carnosa*, *Lactuca sativa, Narcissus tazzetta*, *Matricaria chamomilla*, *Pallenis spinosa*, *Trifolium nigrescens, Tamarix africana*, *Malva arborea* and *Yucca gloriosa*.

This species has been widely described to damage crops, fruits and cultivated flowers and is also a vector of orthotospoviruses. Table 4.1 lists the types of orthotospoviruses transmitted by this species as described by literature.

According to Moritz et al. (2014), *F. occidentalis* infestations in East Africa are also responsible for the transmission of *Fusarium moniliforme* (Nectriaceae), a fungus which damages ears of corn, and *Erwinia amylovora* (Enterobacteriaceae), a bacterium that causes fire blight.

Loomans (2006) and Kuslitzky (2013) described the wasp *Ceranisus menes* (Eupholidae) as a parasitoid for this species from Europe. Moritz et al. (2014) and Mound et al. (2017) also claimed that this species feeds on leaf mites and their eggs thus serving as a useful means of biological control. Moreover, Ripa et al. (2001) claimed that the teteropteran bug *Orius insidiosus* (Anthocariidae) acted as a biological control agent to *F. occidentalis*. Reitz (2009) argued that, from a population ecology perspective, *O. insidiosus* shows the ability to regulate flower thrips (*F. occidentalis*) populations, even in heterogeneous environments. From a pest management perspective, naturally occurring populations of *O. insidiosus* have the capacity to suppress pest flower thrips populations below economically damaging levels in certain

Table 4.1: list of orthotospoviruses transmitted by *Frankliniella occidentalis* as described by literature.

Orthotospovirus	Described by
Alstroemeria necrotic streak virus ANSV	Australian Department of Agriculture & Water Resources (2017)
Chrysanthemum stem necrosis virus CSNV	Riley et al. (2011); Moritz et al. (2014) Australian Department of Agriculture & Water Resources (2017)
Groundnut ringspot virus GRSV	Riley et al. (2011); Moritz et al. (2014); Australian Department of Agriculture & Water Resources (2017)
Impatiens necrotic spot virus INSV	Riley et al. (2011); Moritz et al. (2014); Australian Department of Agriculture & Water Resources (2017)
Melon severe mosaic virus MeSV (possible vector)	Australian Department of Agriculture & Water Resources (2017)
Reassortant from Groundnut ringspot virus and Tomato chlorotic spot virus $L_GM_TS_G$	Australian Department of Agriculture & Water Resources (2017)
Tomato chlorotic spot virus TCSV	Riley et al. (2011); Australian Department of Agriculture & Water Resources (2017)
Tomato spotted wilt virus TSWV	Riley et al. (2011); Moritz et al. (2014) Australian Department of Agriculture & Water Resources (2017)

Frankliniella occidentalis has also been described to be a beneficial biological control agent since it has been described to feed on species of mites and their eggs which can be harmful to cultivated plants (Mound & Teulon, 1995).

Distribution data: *Frankliniella occidentalis* is native to the Pacific North America, but has been imported with cultivated plants to virtually all countries in the world during the early 80s, thriving at first only in greenhouses but subsequently spreading out in the open especially in areas with warmer climates such as the Mediterranean region (Moritz, 2006; zur Strassen, 2003). Vierbergen (2013) described this species from the Afrotropical, Australian, East Palaearctic, Nearctic Neotropical, and Oriental regions. *F. occidentalis* has been recorded from the UK (Kirk, 1996; Mound et al., 2018), Scandinavia and Denmark (Gertsson, 2015), Slovenia (Trdan, 2001), Bulgaria (Karadjova & Krumov, 2015), Slovakia (Zvarikova et al., 2020). the Netherlands where it settled in the open from greenhouses (Vierbergen, 2001), Hungary (Jenser, 2011), Belgium (Lock, 2006), Austria, Azores, Canary Islands, Croatia, Crete, Czech Republic, Estonia, Germany, Lithuania, former Yugoslav republic of Macedonia, Portugal, Romania, Switzerland, Ukraine (Vierbergen, 2013), Cyprus (Srour, 2015), Spain (Goldarazena in Ramos, 2001), France, also in greenhouses (Pizzol et al., 2014), Italy and Islands (Stoch, 2003; Rapisarda & Tropea Garzia, 2004), Greece (Baderitakis et al., 2015) and Turkey (Tunc & Hastenpflug-Vesmanis, 2016). It has also been found in Tunisia (Belaam-Kort, Marullo, Attia, & Boulahia-Kheder, 2020), Israel (zur Strassen & Kuslitzky, 2012), Algeria (Razi et al., 2013) and Iran (Bhatti et al., 2009).

Records from the Maltese Islands: *F. occidentalis* was first described from the Maltese Islands by Mifsud (1997) and subsequently by Mifsud & Watson (1999).

***Frankliniella schultzei* (Trybom, 1910)**

Common names: Cotton bud thrips, Tomato Thrips, Common Blossom Thrips

Material examined: MALTA: Siġġiewi, private garden 1, 04.xi.2015, 1 ♀ (sm) on *Rosa* sp., GD.

Body length: ♀:1400 μm; ♂: no records

Wing type: ♀: macropterous; ♂: no records

Further notes on species: Palmer (1990); Vierbergen and Mantel (1991), Marullo and Tremblay (1993), Kirk (1996), Mound and Marullo (1996), Marullo (2003), Moritz (2006), zur Strassen (2003), Masumoto (2010), Cavalleri and Mound (2012), Moritz et al. (2014), Mound et al. (2016), Mound et al. (2018) and Mound et al. (2019).

The specimen collected in the Maltese Islands was yellow. Mound et al. (2018) also described a darker morph with brown body and paler pronotum, tibiae and tarsi paler. Setae on the microtrichial comb may be represented by a few weak lobes according to Mound et al. (2018). The locally recorded specimen had no lateral microtrichia on the comb on tergite VIII.

No male specimens have been recorded in this study. Males are described by Mound et al. (2018) to be macropterous, yellow and smaller than female and to have the following features: Tergite VIII with a few teeth laterally on posterior margin. Sternites III-VII each with a broadly transverse pore plate. zur Strassen (2003) described the body length for males of this species to be 1030 - 1220 μm.

Diagnosis: This species is distinguished from *F. occidentalis* by the following features: campaniform sensilla absent; postero-marginal microtrichial comb on abdominal tergite VIII also absent.

Mound et al. (2018) described the relationships between this and other *Frankliniella* species as unclear, and indeed stated that *F. schultzei* is distinct from other species of this genus. Differences between this species and *F. occidentalis* have been described in the "diagnosis" section for *F. occidentalis*.

Species of the genus resemble those of the genus *Thrips,* however they differ in a number of characters as previously described in the "diagnosis" section under the description of *Frankliniella occidentalis*.

Biology: According to Moritz et al. (2014), the life cycle for this species lasts between two to five weeks.

This species has been described on on the flowers and leaves of a wide variety of different unrelated plants (zur Strassen, 2003; Marullo & De Grazia, 2013; Mound et al., 2018; Tyagi & Kumar, 2020) *Pinus* and even stored bulbs (Mound et al., 1976) on *Achyranthes aspera*, *Ajuga remota*, *Bidens pilosa*, *Chenopodium* sp., *Datura suaveolens*, *Dyschoriste radicans*, *Erlangea calycina*, *Galinsoga parviflora*, *Guitotia scabra*, *Hermannia oliveri*, *Lantana camara*, *Malvaviscus grandifloras*, *Melhania velutina*, *Nicandra physaloides*, *Sesbania sesban*, *Solanum incanum*, *Sonchus oleraceus*, *Tagetes minuta*, *Tithonia diversifolia* (Moritz et al., 2014) and *Rosa* sp. (Moritz, 2006), as well as on crops such as legumes, cotton, onions, sweet potatoes, tomatoes, coffee plants (Marullo, 2003), beetroot, broccoli, cabbage, capsicum, cassava, chillies, coriander, cotton, courgette, gourd, aubergines, leek, kale, maize, onion, peanut, potato, pumpkin, sunflower, sweet potato, tomato, watermelon and wheat amongst others (Moritz et al., 2014). In the current study, this species was collected in the Maltese Islands from *Rosa* hybrid sp.

Frankliniella schultzei has been widely described to cause damage to plant crops. Similar to *Frankliniella occidentalis*, it is also an orthotospovirus vector. The dark form in the tropics transmits the TSWV (zur Strassen, 2003), while according to Mound et al. (2018) a yellow bisexual form of this species is a main orthotospovirus vector in Australia. Table 4.2 lists the orthotospoviruses for which this species is a vector, together with the literature that describes it. It also feeds on leaf mites of which it can be a useful biocontrol agent (Mound et al., 2018).

Table 4.2: list of orthotospoviruses transmitted by *Frankliniella schultzei* as described by literature.

Orthotospovirus	Described by
Capsicum chlorosis virus CaCV	Riley et al. (2011); Moritz et al. (2014) Australian Department of Agriculture & Water Resources (2017)
Chrysanthemum stem necrosis virus CSNV	Riley et al. (2011); Moritz et al. (2014) Australian Department of Agriculture & Water Resources (2017)
Groundnut bud necrosis virus GBNV	Riley et al. (2011); Report on orthophosphovirus vectors (2017)
Groundnut ringspot virus GRSV	Riley et al. (2011); Moritz et al. (2014); Australian Department of Agriculture & Water Resources (2017)
Impatiens necrotic spot virus INSV	Riley et al. (2011); Moritz et al. (2014); Australian Department of Agriculture & Water Resources (2017)
Tomato chlorotic spot virus TCSV	Riley et al. (2011); Moritz et al. (2014) Australian Department of Agriculture & Water Resources (2017)
Tomato spotted wilt virus TSWV	Riley et al. (2011); Moritz et al. (2014) Australian Department of Agriculture & Water Resources (2017)

According to Moritz et al. (2014), this species is also known to carry spores, mildews, rusts and other fungi, however, it is also an effective means of control as a mite predator on crops like cotton.

Distribution data: According to Mound et al. (2018), this species is generally considered to be from South America, but could be possibly from Africa. It has been described as widespread in circum-tropical and subtropical regions, where it is a common pest (zur Strassen, 2003). Vierbergen (2013) described this species from the Afrotropical, Australian, Neotropical, and Oriental regions and also from the Near East and North Africa, but without specifying the countries where it was recorded from.

Frankliniella schultzei has been recorded from the UK (Mound et al., 1976; Mound et al., 2018; zur Strassen, 2003), Denmark (zur Strassen, 2003; Gertsson, 2015), the Netherlands (zur Strassen, 2003), Romania (Sierka et al., 2008) and Spain (Goldarazena in Ramos, 2001; zur Strassen, 2003). It has also been recorded from the Canary Islands, Morocco (zur Strassen, 2003), Israel (zur Strassen, 2003; zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2003; 2014), Iran (Bhatti et al., 2009), Iraq (Abdul-fatah Hammoodi, & Abdul-Rassoul., 2004) and India (Kumar et al., 2008; Tyagi & Kumar, 2020).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Genus *Limothrips* Haliday, 1836

This genus originates from the European region but has been recorded in other countries such as Iran and the USA (ThripsWiki, 2020). It includes species which largely feed on grasses and cereal crops, possibly acting as pests if in large numbers. Eight species are recognised under this genus (ThripsWiki, 2020), two of which have been recorded locally in the present study. Typical features include: Body generally dark brown; eight-segmented antennae; head longer than wide and with two pairs of ante-ocellar setae on anterior margin of compound eyes (fig. 4.63a). Maxillary palps two-segmented. Pronotum with a pair of long postero marginal setae (fig. 4.63b); Mesofurca without spinula; the stout, dark pair of setae on abdominal segment X (fig. 4.21a). Loomans (2006) listed the wasps *Ceranisus lepidotus* and *C. loomansi* (Eulophidae) as a parasitoids for this genus from Europe.

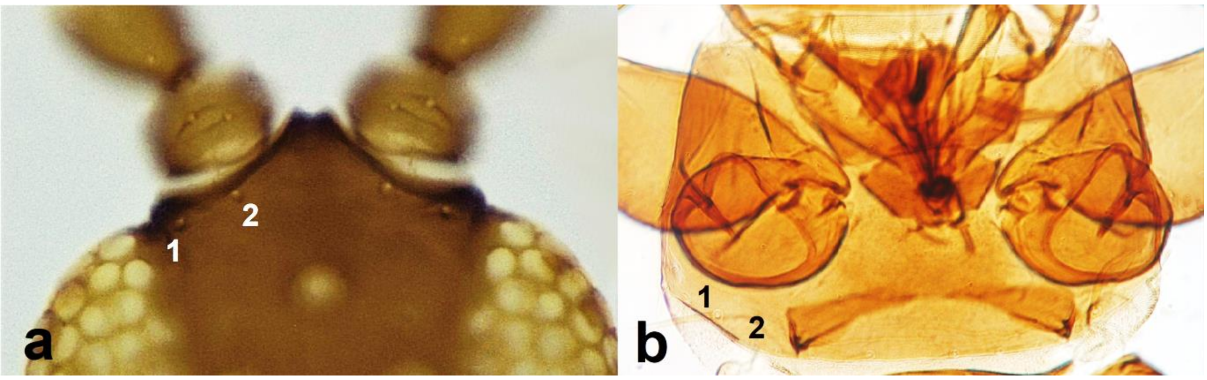

Figure 4.63: ***Limothrips*** **features:** (**a**) head with 2 pairs of ante-ocellar setae; (**b**) pronotum with one pair of long postero marginal setae.

Limothrips angulicornis **Jablonowski, 1894**

Common name: -

Material examined: MALTA: Fiddien, 24.iv.2017, 1 ♀ (sm) on *Avena* sp., GD.

Body length: ♀: 2080 μm; ♂: no records.

Wing type: ♀: macropterous; ♂: no records

Further notes on species: Priesner (1960; 1964), zur Strassen (2003), Masumoto (2010), Mirab-balou (2013) and Mound et al. (2019).

Specimens of this species described by Mound et al. (2018) to have yellowish third antennal segments. The locally recorded specimen had brown antennal segments. According to these authors, the second vein of forewing has about nine setae. The locally recorded specimen had 12 setae on the second vein. No male specimens for this species have been recorded in this work. Males are described by zur Strassen (2003) and Mound et al. (2019) as being macropterous and with the following features: Head with no ocelli. Tergite IX pair of stout thorn-like setae on tubercles situated medially and also with a pair of short and stout postero-lateral setae. Sternites III - VII with small, sub-circular pore plate. Body length according to zur Strassen (2003) is 1360 - 1700 μm.

Diagnosis: This species is distinguished from others of the same genus by the following facts: antennal segment III and IV each have a forked sensorium (as compared to simple sensoria in *L. cerealium*); antennal segment II is asymmetrical, having the external margin apically prolonged apically into a tooth shape. This segment is symmetrical in *Limothrips cerealium*.

The genera *Odontothrips* and *Taeniothrips* also includes large dark brown species, but in both these genera, the head is wider than long and the stout setae on abdominal segment X found in *Limothrips* are absent in these genera. Moreover, the species of the genus *Odontothrips* have a sensorium on antennal segment VII with base that is wider than long. These are absent in *Limothrips* spp. Moritz et al. (2014) also compared species of the genus *Limothrips* with those of *Chirothrips* and *Bregmatothrips*, but these genera also lack the stout setae on abdominal segment X typically found in *Limothrips* spp.

Biology: No literature could be traced that describes the duration of the life cycle of this species.

This species, like other *Limothrips*, is found breeding on leaves and leaf axils of grasses. It has been recorded on *Avena sativa, Bromus* sp. (Tunc et al., 2012), *Hordeum* sp. (Priesner, 1960; zur Strassen, 1986; 2003; Marullo & De Grazia, 2013) and *Triticum aestivum* (Fallahzadeh et al., 2011; Tunc et al., 2012), but also on other plants such as *Populus* sp. and *Pinus* sp. (Tunc et al., 2012). In the current study, this species was collected in the Maltese Islands from *Avena* sp.

Limothrips angulicornis has not been recorded as an agricultural pest.

Distribution data: This species originates from the West Palearctic, especially in warmer areas, but has been imported to other parts of the world such as Western Asia (Priesner, 1960), California, Chile, and southern Australia where it has become established (Priesner, 1964; zur Strassen, 2003; Mound et al., 2018). Vierbergen (2013) described this species from the East Palaearctic, Australian and Neotropical regions as well as from Near East and North Africa, without specifying the countries in these two regions where this species was collected from. *Limothrips angulicornis* has been recorded from Sweden and Finland (Gertsson, 2015), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Greece (zur Strassen, 1986), Cyprus (Srour, 2015), Azores, Canary Islands, Central European Russia, France, former Yugoslav Republic of

Macedonia, Poland, Portugal, Romania, Ukraine (Vierbergen, 2013), Spain (Goldarazena in Ramos, 2001), Italy (Stoch, 2003; Marullo & De Grazia, 2013), and Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016). It has also been recorded from Egypt (Priesner, 1960; zur Strassen, 2014), Israel (zur Strassen & Kuslitzky, 2012), and Iran (Bhatti et al., 2009; Fallahzadeh et al., 2011).

Records from the Maltese Islands: *Limothrips angulicornis* is a new record to the Maltese Islands.

***Limothrips cerealium* (Haliday, 1836)**

Common names: Grain Thrips, Barley Thrips

Material examined: MALTA: Wied Qirda, 10.iv.2016, 2 ♀♀ (sm) on *Bromus diandrus*, GD; Wied Ħesri, 22.iv.2016, 1 ♀ (sm) on *Hyparrhenia hirta*, GD; Wied Speranza, 26.iv.2016, 1 ♀ (sm) on *Mentha pulegium*, GD; Junior College grounds, 27.iv.2016, 1 ♀ (sm) on *Hordeum leporinum*, GD; Dingli Cliffs, 24.v.2016, 1 ♀ (sm) on *Brassica rapa*, GD; Dingli Cliffs, 27.v.2016, 1 ♀ (sm) on *Glebionis coronaria*, GD; Fiddien, 24.iv.2017, 2 ♀♀ (sm) on *Avena* sp., GD; Naxxar, Triq San Pawl, 29.iv.2017, 1 ♀ (sm) on *Avena sterilis* and 1 ♂ (sm) on *Triticum aestivum*, GD; Wied Ħesri, 12.iii.2018, 1 ♀ (sm) on *Trifolium nigrescens*, GD.

Body length: ♀: 1520 - 2200 μm; ♂: 1260 μm.

Wing type: ♀: macropterous; ♂: micropterous.

Further notes on species: Priesner (1960; 1964), Stannard (1968), Kirk (1996), Marullo (2003), zur Strassen (2003), Moritz (2006), Masumoto (2010), Minaei and Mound (2010), Mirab-balou (2013), Moritz et al. (2014), Mound et al. (2018) and Mound et al. (2019). Priesner (1964) also described a smaller form of this species from Sardinia and an apterous female form from Sicily. Locally recorded specimens did not resemble these varieties and were in fact macropterous.

Diagnosis: This species is distinguished from other local congeners the following morphological characters: antennal segments III and IV each have a simple sensorium (as compared to forked sensoria in *L. angulicornis*); fact that antennal segment II is symmetrical, though but antennal segment III asymmetrical. Antennal segment II is asymmetrical in *L. angulicornis* as well as in other species such as *L. denticornis*, which has not been recorded locally.

The genera *Odontothrips* and *Taeniothrips* also includes large dark brown species, however they differ in a number of characters as previously described in the "diagnosis" section under the description of *Limothrips angulicornis*. The same applies for the genera *Chirothrips* and *Bregmatothrips*.

Biology: This species also gives the name "thunder flies" to thrips because of mass flights of these insects, in summer (zur Strassen, 2003). These mass lights are often reputably associated with thundery weather.

Moritz et al. (2014) described the life cycle of *Limothrips cerealium* to take about 30-35 days to complete, depending on the environmental temperature.

Limothrips cerealium can inflict damage when present in large enough numbers. This species is associated with cereals such as barley, maize, oats rye and wheat (Moritz et al. 2014), but also on grasses such as *Alopecurus agrestis, Agrostis verticillata, Avena fatua, Cynodon dactylon, Hordeum hexastichon, Hordeum maritimum, Hordeum vulgare, Imperata cylindrica, Panicum turgidum, Phalaris paradoxa, Phragmites communis, Polypogon monspeliensis, Saccharum officinarum, Sorghum halepense* (Prienser, 1960)*, Avena sativa, Secale cereale*, (Jenser & Tsanakakis, 1985), *Triticum aestivum* (Kirk, 1996; Tunc et al., 2012), *Triticum vulgare* (Priesner, 1960; Jenser & Tsanakakis, 1985; Trdan, 2001) and *Zea mays.* This species has been recorded to breed on *Avena sativa* (Mound et al, 2018). *L. cerealium* has also been collected from *Salix* sp. (Tunc et al., 2012). In the current study, this species was collected from Poaceae such as *Avena* and *Triticum aestivum*, but also from unrelated herbaceous plants such as *Brassica rapa* and *Glebionis coronaria*.

According to Trdan et al. (2012) this species is preyed upon by *Aeolothrips intermedius*.

Limothrips cerealium can cause damage to grain crops, causing “silvering” on leaves (Priesner, 1964; Marullo, 2003). Moritz et al. (2014) described this species as a possible mechanical vector phytopathogenic bacteria and fungi.

Distribution data: *Limothrips cerealium* probably originates from the indigenous Atlantic-West-European region, but has been introduced to many parts of the world and can now be considered a semi-cosmopolitan species (zur Strassen, 2003). Vierbergen (2013) in fact, described this species from the Afrotropical, Australian, Nearctic, Neotropical and Oriental regions, as well as from the Near East and North Africa, but without specifying the countries in these regions where it was recorded from. This species is widespread in Europe, being recorded from the UK (Mound et al., 1976; Kirk, 1996), Scandinavia and Denmark (Gertsson, 2015), Slovenia (Trdan, 2001), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Bulgaria (Karadjova & Krumov, 2015), the Netherlands (Vierbergen, 2001), Cyprus (Priesner, 1964; Srour, 2015), Canary Islands (Priesner, 1960), Spain (Goldarazena in Ramos, 2001), France (Pizzol et al., 2014), Hungary (Jenser, 2011), Belgium (Lock, 2006), Austria, Azores, Central European Russia, Croatia, Czech Republic, Germany, Ireland, Luxemburg, Poland, Switzerland, Ukraine (Vierbergen, 2013), Italy and Islands (Priesner, 1964; Stoch, 2003; Marullo & De Grazia 2013), Greece (Jenser & Tsanakakis 1985), Aegean region and Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016). *L. cerealium* has also been recorded from Tunisia (Belaam-Kort et al., 2020), Morocco, Libya (Moritz et al., 2014), Egypt (zur Strassen, 2014; Moritz et al., 2014), Israel (zur Strassen & Kuslitzky, 2012), Iran (Mirab-balou et al., 2013), Seychelles, South Africa (Priesner, 1960; Moritz et al., 2014), Syria and Palestine, Hawaii and North America (Priesner, 1960). This species has also been intercepted in US from Europe, and the Mediterranean and Africa (Nickle, 2003a; 2009).

Records from the Maltese Islands: *Limothrips cerealium* is a new record to the Maltese Islands.

Genus *Odontothrips* Amyot & Serville, 1843

All the species in this genus except two are from the Holarctic region, 19 of which are recorded from Europe. The genus includes species which are largely found on Fabaceae. Females of this genus are often difficult to distinguish from each other and, in some cases, species have to be told apart from the shape of the male endotheca. Eight species are listed in this genus (Mound et al., 2018), of which one species and possibly two others (that could not be fully identified to species level in the current study) have been recorded from the Maltese Islands in this work. Typical features of the locally occurring species include: both sexes macropterous; body usually dark brown; eight-segmented antennae; head with two pairs of ante-ocellar setae and prominent, long inter-ocellar setae (fig. 4.64b); antennal segment I with two setae medially on distal margin (fig. 4.64a); the sensorium on antennal segment VI which base is wider than antennal segment VII (fig. 4.29a); pronotum with two pairs of long postero-angular setae (fig. 4.64c); fore tibiae often with teeth or protrusions on distal margin (fig. 4.64d) which are diagnostic of different species; spinula present on mesothoracic endofurca (fig. 4.64e); fore wing with an almost complete to complete row of setae (fig. 4.64f); tarsi one-segmented; tergite VIII lacking ctenidia, these being replaced by a number of microtrichia placed above and laterally to the spiracle (fig. 4.30a); microtrichial comb on tergite VIII usually interrupted medially (fig. 4.64g); and the lack of pore plates on male sternites. Loomans et al. (1997) listed the wasp *Ceranisus pacuvius* (Eupholidae) as a parasitoid for this genus from Europe.

Odontothrips meliloti Priesner, 1951

Common name: -

Material examined: MALTA: Wied Qirda, 17.iii.2017, 1 ♀ (sm) on *Hedysarum coronarium*, GD; Fiddien, 24.iv.2017, 1 ♀ (sm) on *Medicago* sp., GD; Il-Ballut l/o M'Xlokk, 05.v.2017, 1 ♀ (sm) on *Medicago arborea*, GD; Siggiewi, private house, 18.iii.2018, 1 ♀ on glass window pane, GD. **GOZO**: Xlendi, 31.iii.2016, 2 ♀♀ (sm) on *Lotus ornithopodioides*, GD; Ramla Bay, 17.iii. 2017, 1 ♂ (sm) on *Medicago marina*, GD.

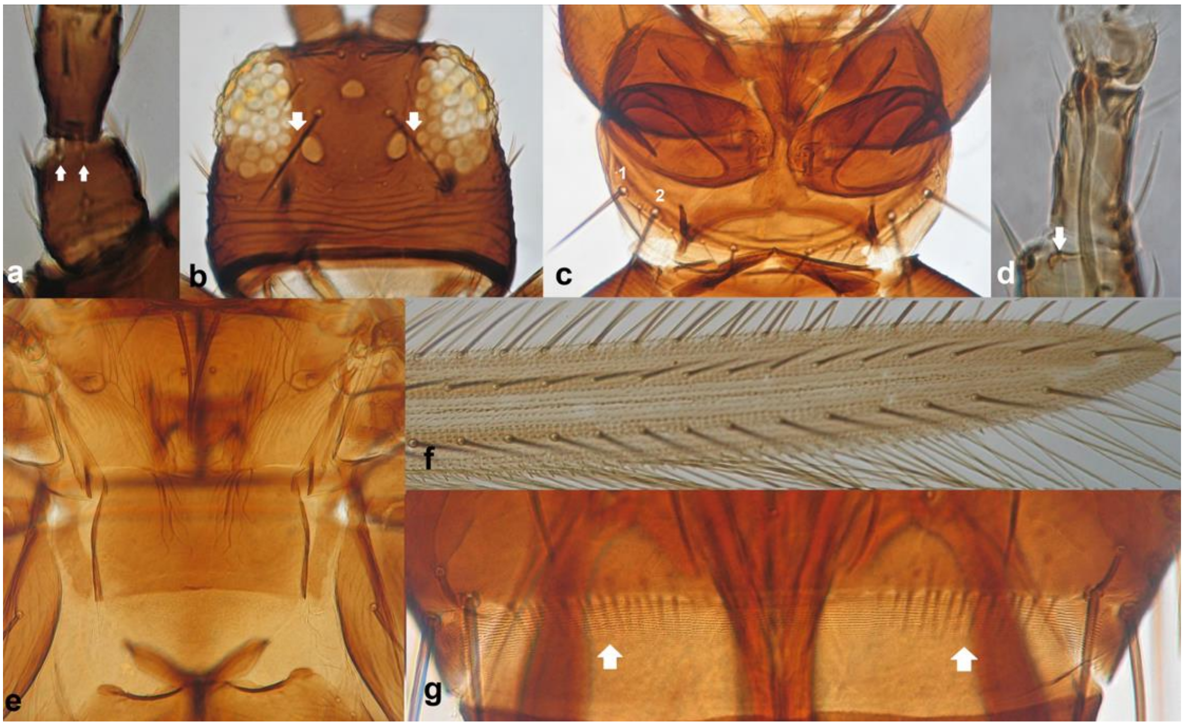

Figure 4.64: ***Odontothrips* features:** (**a**) head with prominent inter-ocellar setae; (**b**) antennal segment I with two setae on distal margin; (**c**) pronotum with two long pairs of postero marginal setae; (**d**) fore tibia with protrusion on distal margin of tibia; (**e**) mesonotum with spinula on mesofurca; (**f**) fore wing with two complete rows of setae on veins; (**g**) tergite VIII with medially incomplete row of microtrichia on comb.

Body length: ♀: 1900 - 2460 μm; ♂: 1500 μm.

Wing type: Both sexes are macropterous.

Further notes on species: Priesner (1964), Pitkin (1972), zur Strassen (2003), Collins (2006), Moritz (2006) and Mound et al. (2018).

Diagnosis: This species is distinguished from other congeners by the fact that no claws are present on the apex of fore tibiae, but these have a small tubercle ventrally and a major seta set at inner apical margin, not arising from a tubercle.

According to Mound et al. (2018), the fore tibial apex of *Odontothrips meliloti* is essentially similar to that of *O. loti,* a likely occurrence to the Maltese Islands (see the section "*Non-Identified Species*" in this section), however, in *O. meliloti*, the major setae at the inner apex are not found on an obvious tubercle, as is the case in *O. loti*. *O meliloti* differs from *O. karnyi,* another possible occurrence to the Maltese islands (also see the section "*Other Terebrantia*" in this section), in that *O. karnyi* possesses a tooth on distal margin of the fore tibiae and fine sculpture lines on the pronotum. Both these features are absent in *O. meliloti*.

The genera *Ceratothrips, Oxythrips, Taeniothrips and Tenothrips picipes* also lack ctenidia on tergite VIII, however this species can be distinguished from these genera by the presence short wide sensorium on antennal segment VII, which is typical of the genus *Odontothrips.*

Biology: No literature could be traced that describes the duration of the life cycle of this species. This species is recorded to feed and breed on the flowers of Fabaceae, Specifically those of *Melilotus,* specifically on *M. albus* and *M. officinalis* (Priesner, 1960; Moritz, 2006, Mound et al, 2018). In the Maltese Islands, this species has also been collected from flowers of Fabaceae, namely *Hedysarum coronarium*, *Lotus onithopodioides* and *Medicago* spp.

This species has not been recorded as an agricultural pest.

Distribution data: This species has a Euro-Siberian distribution zur Strassen (2003) and is widespread in central and southern Europe. Vierbergen (2013) also described this species from the East Palaearctic. It has been recorded in the UK (Mound et al., 1976), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Austria, Bosnia & Herzegovina, Czech Republic, France, Germany, Poland, Switzerland, the Netherlands, Ukraine (Vierbergen, 2013), Italy (Stoch, 2003) and Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). It has also been recorded from Iran (Bhatti et al., 2009).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Genus *Oxythrips* Uzel, 1895

Species belonging to this genus are distributed worldwide, though most species are of Holarctic origin (ThripsWiki, 2020). The genus *Oxythrips* belongs to the *Anaphothrips*- genus complex (Zhang et al., 2018). Species under this genus possess only one long pair of setae on the posterior pronotal margin. This genus lists 39 species, of which 18 have been recorded in Europe (Mound et al., 2018). One species has been recorded locally in the present study.

Features common to the locally occurring species include: both sexes macropterous; eight-segmented antennae; head with two pairs of ante-ocellar setae (fig. 4.65a); pronotum with one pair of long postero-angular setae (fig. 4.31b); fore tarsi with small tooth on first segment (fig. 4.65b); mesothroracic endofurca with spinula; tergite VIII with no micrtotrichial comb; abdominal tergites with no sculpture medially; male tergite IX with two median pairs of short, thorn-like setae arising close to each other (fig. 4.65c), male sternites III-VI each with a round pore plate (fig. 4.65d).

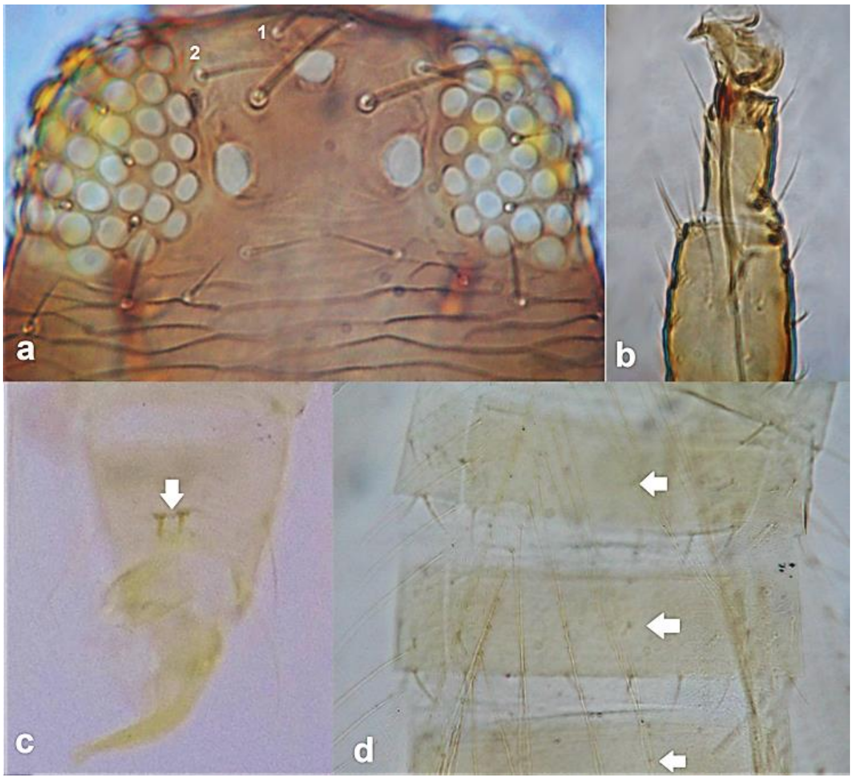

Figure 4.65: ***Oxythrips*** **features:** (**a**) head with two pairs of ante-ocellar setae; (**b**) fore tarsi with tooth on first segment; (**c**) male tergite IX; (**d**) male sternites III – VI showing pore plates.

Oxythrips ajugae **Uzel, 1895**

Common name: -

Material examined: MALTA: Wied Għollieqa, 10.iii.2017, 10 ♀♀ (aga, sm) on *Pinus halepensis*, GD; Wied Qirda, 17.iii.2017, 6 ♀♀ (aga, sm) on *Pinus halepensis*, GD; Kunċizzjoni, 29.i.2018, 5 ♀♀ (sm) and 3 ♂♂ (sm) on *Pinus halepensis*, GD; Xemxija, 03.iii.2018, 5 ♀♀ (sm) on *Pinus halepensis*, GD.

Body length: ♀: 1500 - 1700 μm; ♂: 920 μm.

Wing type: Both sexes are macropterous.

Further notes on species: Priesner (1964), Conti et al. (2003), zur Strassen (2003), Moritz (2006), Kucharzyk and Kucharzyk (2013) and Mound et al. (2018).

Both zur Strassen (2003) and Mound et al. (2018) indicate that *Oxythrips ajugae* is somewhat bicoloured, with head and thorax slightly paler than abdominal segments. However, entirely pale brown specimens were found in the Maltese Islands. zur Strassen (2003) described the male pore plates on sternites III - VI to occasionally be oval in shape. All locally recorded specimens had round pore plates. According to Mound et al. (2018) the lack of sculpture is found on abdominal tergites V - VIII.

Diagnosis: The small tooth on the fore tarsal pulvillus distinguishes this species from other *Oxythrips* species not recorded locally (Mound et al., 2018).

According to Masumoto and Okajima (2017), the genus may be related to related to the genus *Anaphothrips*. *Oxythrips* however, differs from *Anaphothrips* in having only a single pair of pronotal postero-angular setae. *Oxythrips ajugae* does not have ctenidia in the vicinity of the spiracle on abdominal segment VIII, just like the genera *Ceratothrips*, *Odontothrips*, *Taeniothrips* and *Tenothrips.* However, unlike species under these genera, *Oxythrips ajugae* has sternites with discal setae.

Biology: Kucharzyk and Kucharzyk (2013) described this species as having only one generation a year. The authors claimed that the species overwinters as a pupa or and imago, a fact which has also been reported by Priesner (1964). Towards the end of April and beginning of May, adult insects leave the wintering place, feed on the developing leaf buds and lay eggs within the easy reach of main veins on the underside of young leaves. Larvae incubate after approximately two weeks, feed intensively and, during June they move in to the soil underneath the base of trees. Propupae and pupae usually develop at a soil depth of 5-20 cm.

According to Kucharzyk and Kucharzyk (2013), *Oxythrips ajugae* is a dendrophilous foliivore (tree living foliage feeding species). This species has been recorded on Pinaceae namely *Pinus* sp. (zur Strassen, 2003) and *Cupressus* sp. (Tunc et al., 2001; Marullo & De

Grazia, 2013). It has also been collected from a number of hardwoods and on herbaceous plants, specifically on *Bellis perennis, Citrus sinensis, Cupressus* sp., *Crataegus* sp., *Euphorbia* sp., *Spartium junceum and Vitis vinifera,* (Tunc et al., 2001). In the Maltese Islands, adults and larval forms of this species have been recorded in spring on *Pinus halepensis*, indicating that this plant is used as a host.

Oxythrips ajugae has not been recorded as an agricultural pest.

Distribution data: This species is widespread in Europe (zur Strassen, 2003) and Asia (Moritz, 2006). Vierbergen (2013) also described this species from the East Palaearctic and Nearctic regions, as well as from North Africa, but without specifying the countries in this region where it was collected from. *Oxythrips ajugae* has been recorded from the UK (Mound et al., 1976), Scandinavia, Denmark (Gertsson, 2015), Ukraine (Moritz, 2006), Poland (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), France (Pizzol et al., 2014), Austria, Central and Northwest European Russia, Czech Republic, Germany, Latvia, Luxembourg, Moldova, Portugal, Romania, the Netherlands (Vierbergen, 2013), Italy including Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Greece (zur Strassen, 1986), Spain (Goldarazena in Ramos, 2001) and Turkey (Priesner, 1964; Moritz, 2006; Tunc et al., 2012). This species has also been found in Israel (Priesner, 1964; zur Strassen & Kuslitzky 2012).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Genus *Pezothrips* Karny, 1907

The genus *Pezothrips* includes nine species, all of which, with the exception of *P. kellyanus,* originate from central and eastern Europe (Mound et al., 2018). All species are found in flowers, and some can act as pests. One species has been recorded from the Maltese Islands in this work. Features common to the locally occurring species include: antennae eight-segmented; pronotum with two pairs of long postero-angular setae (fig. 4.28a); spinula present on mesofurca; fore wing with two setae on distal half (fig. 4.66a); clavus with five marginal setae; medial setae S_1 of tergites II-V shorter and weaker than lateral setae S_2 (fig. 4.66b); male antennal segment VI exceptionally long, as long as segments IV and V together (fig. 4.28c); male sternites III-VII each bearing around 25 small circular pore plates (fig. 4.28e).

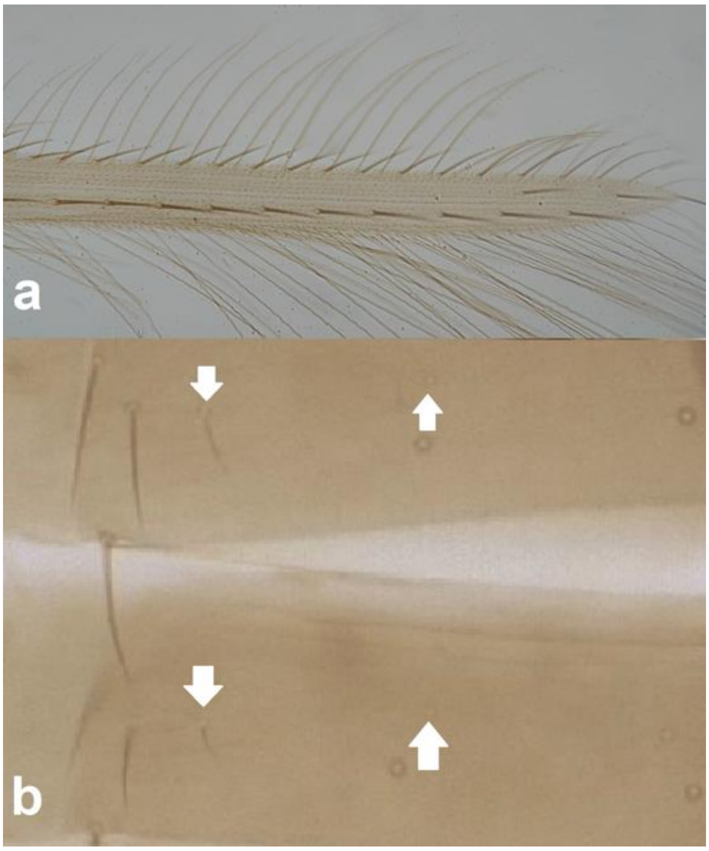

Figure 4.66: ***Pezothrips*** **features:** (**a**) fore wing with two setae on distal half; (**b**) tergites II-IV.

Pezothrips kellyanus **(Bagnall, 1916)**

Common name: Kelly's citrus thrips

Material examined: MALTA: Siġġiewi, private garden 1, 04.xi.2015, 3 ♂♂ (sm) on *Rosa* sp.

Body length: ♀: no records; ♂: 1460-1660 μm.

Wing type: ♀: no records; ♂: macropterous.

Further notes on species: zur Strassen (2003), Marullo (2003), Moritz (2006), Navarro Campos (2013), Mound et al. (2017) and Mound et al. (2019).

zur Strassen (2003) also provides body lengths for this species, describing male specimens to be smaller (1200-1360 μm) than those collected locally.

Diagnosis: Just like in *Echinothrips americanus*, *Pezothrips kellyanus* males also have a number of small pore plates on the sternites**.** However, in *E. americanus*, the body has prominent reticulate sculpture and the body wing setae tend to be capitate.

According to Mound et al. (2019), *Pezothrips. kellyanus* was formerly placed under the genera *Taeniothrips* and *Megalurothrips*. The authors however argue that *P. kellyanus* does have subtle structural differences that distinguish it from species of both these genera.

Biology: Navarro Campos (2013) described the duration of the life cycle for this species is temperature dependent, varying between two weeks in summer to three months in winter, and under laboratory conditions to take about 10 days at 32.5ºC and 40 days at 15ºC (Varikou et al., 2009).

Pezothrips kellyanus has been recorded to occur and breed on highly scented, white flowers (Vassiliou, 2010; Mound et al., 2019) especially on *Citrus* sp. (Rutaceae) (Conti et al., 2001; zur Strassen, 2003; Marullo, 2003; Vassiliou, 2010; Marullo & De Grazia, 2013; Mound et al., 2019), but also on other plants such as *Gardenia* sp. (Vassiliou, 2010), *Jasminum* sp. (zur Strassen, 2003; Moritz, 2006; Vassiliou, 2010; Marullo & De Grazia, 2013; Navarro Campos, 2013; Mound et al., 2019), *Lonicera japonica* (Navarro Campos, 2013); *Olea europaea* (Tunc et al., 2012) and *Pittosporum* (Moritz, 2006; Marullo & De Grazia, 2013; Navarro Campos, 2013; Mound et al., 2019). In the Maltese Islands, this species was collected from the flowers of *Rosa* sp*.* found in close proximity of *Citrus* trees*.*

According to Vassiliou (2010) the larvae of this species are only found on lemon, grapefruit (Rutaceae), *Jasminum* (Oleaceae)*,* and *Gardenia* (Rubiaceae) flowers.

This species has been described as an agricultural pest, (Conti et al., 2001; Marullo, 2003), causing scarring on fruits, particularly on citrus trees. According to Varikou et al. (2009), *P. kellyanus* can be found in flowers of *Camellia, Chrysanthemum, Jasminum, Prunus, Passiflora* spp. *and Rosa* which can sustain breeding of this species in times when citrus plants are not in bloom and at times when the climate becomes unfavourable, to then reinfest citrus trees when the climate temperature becomes warmer and the citrus trees bloom again.

Distribution data: This species, which according to Mound et al. (2019) may have originated from Australia, has been introduced into a number of countries, particularly in Europe. Vierbergen (2013) also described this species from the Near East but without specifying the countries where this species was collected from. It has been recorded from the Netherlands (zur Strassen, 2003), France (Pizzol et al., 2014; Moritz, 2006), Spain (Goldarazena in Ramos, 2001), Portugal (zur Strassen, 2003), Italy including Sicily, (Conti et al. 2001; zur Strassen, 2003; Moritz, 2006; Marullo & De Grazia 2013), Greece (zur Strassen, 2003; Moritz, 2006), Cyprus (Moritz, 2006),) the Aegean region and Turkey (zur Strassen, 2003; Tunc et al., 2012). It has also been recorded from Tunisia (Belaam-Kort et al., 2020), Israel (zur Strassen, 2013; zur Strassen & Kuslitzky 2012), New Zealand and New Caledonia (zur Strassen, 2003; Mound et al., 2019).

Records from the Maltese Islands: *Pezothrips kellyanus* is a new record to the Maltese Islands.

Genus *Prosopothrips* Uzel, 1895

This genus includes grass feeding species. Just like in the genus *Aptinothrips*, to which they are related, species of this genus are also apterous and have no ocelli, however unlike in *Aptinothrips*, the anterior most part of the head has a small ridge between the base of the antennae. Nine species are listed under this genus, one of which has been recorded locally in the current study. This species is distinguished from others by the following features: both sexes apterous; body yellow with dark brown head and antennal segments I and VI-VIII and with prominent honeycomb-patterned sculpture (fig. 4.67a); antennae eight-segmented; ocelli missing; Head with extension in front of compound eyes present with a central depression in between antennae and with bulged behind compound eyes (fig. 4.25a); sensoria on antennal segments III and IV short and simple (fig. 4.67b); pronotum with no long setae; posterior margin of tergites II-VII with divided open arch like craspeda (fig. 4.67c); tergite VIII with no ctenidia antero-laterally to spiracle but with sculpture which fuses medially (fig. 4.67d).

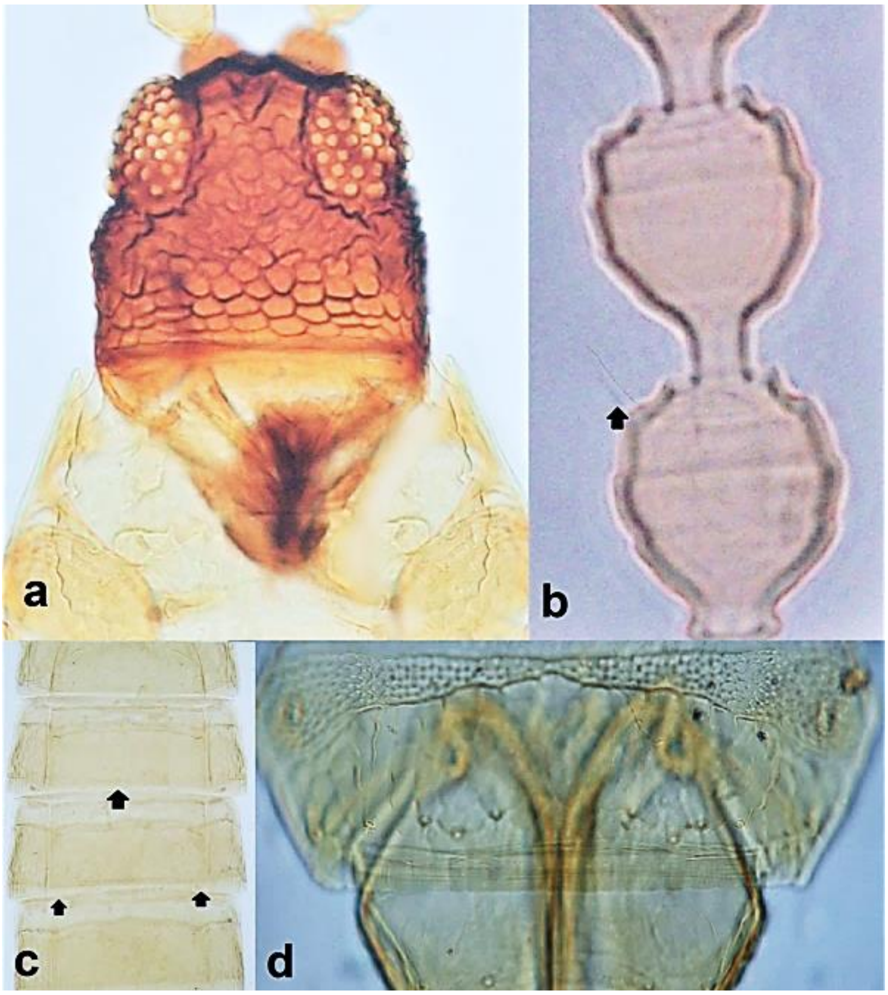

Figure 4.67: ***Prosopothrips*** **features:** (**a**) reticulate body sculpture and head with no ocelli and with ridge on anterior margin of head between base of antennae; (**b**) antennal segments III-IV with short simple sensoria; (**c**) tergites II-VI with craspeda; (**d**) tergite VIII with sculpture which fuses medially.

Prosopothrips nigriceps **Bagnall, 1927**

Common name: -

Material examined: MALTA: Pembroke, 05.xi.2018, 1 ♀ (sm) on *Reichardia picroides*, GD; Xrobb l-Għaġin, 14.iii.2018, 2 ♀♀ (aga) on *Hedysarum glomeratum*, GD. **GOZO**: Ramla Bay, 18.iv.2017, 6 ♀♀ (aga, sm) on *Silene colorata*, GD (1 ♀ ar).

Body length: ♀: 1340 - 1500 µm; ♂: no records.

Wing type: ♀: apterous; ♂: no records.

Further notes on species: zur Strassen (2003).

No male specimens were recorded in this work. These are described by zur Strassen (2003) to have the following features: apterous; head and antennal segment I brown to dark brown as in females; abdominal sternites III - VIII each with a bean-shaped pore plate. Body length for males of this species according to zur Strassen (2003) is 910 - 1060 μm.

Diagnosis: *Prosopothrips nigriceps* is similar to *Aptinothrips rufus*, both morphologically as well as in the fact that it can be found on grasses. However, it varies from *A. rufus* by the coloration of the head and antennal segment I, both of which are dark brown in *P. nigriceps* and golden yellow in *A. rufus*, from the number of antennal segments (eight in *P. nigriceps*, six in *A. rufus*) and from the body sculpture (present and prominent in *P. nigriceps*, absent in *A. rufus*). *A rufus* also lacks the ridge on the anterior most apex of the head between the antennal bases present in *P. nigriceps*. Moreover, the latter species is more likely to be found in coastal regions.

Biology: No literature could be traced that describes the duration of the life cycle of this species.

This species is recorded from the coastal area, mostly on dune grasses such as *Lygeum spartum* and *Poa annua*, as well as from and from low-growing vegetation (zur Strassen, 2003). It has also been recorded on *Olea europaea* (Tunc et al., 2012). In the Maltese Islands, this species has been recorded mostly from coastal areas on a number of different unrelated plants such as *Hedysarum capitatum* (Fabaceae), *Reichardia picroides* (Asteraceae), and *Silene colorata* (Caryophyllaceae). No larvae were found on these plants, indicating that these are not host plants for this species.

Prosopothrips nigriceps has not been recorded as an agricultural pest.

Distribution data: This species is distributed across the Mediterranean basin. It has been recorded from Spain, (zur Strassen, 2003), France (zur Strassen, 2003), Italy including Sicily (zur Strassen, 2003; Stoch, 2003; Marullo & De Grazia, 2013), Cyprus (zur Strassen, 2003, Srour, 2015), the Aegean region and Turkey (Tunc et al., 2012). It has also been recorded from Israel (zur Strassen, 2003; zur Strassen & Kuslitzky, 2012) and Egypt (zur Strassen, 2003; 2014). *Prosopothrips nigriceps* has been intercepted in US from Europe and the Mediterranean (Nickle, 2003).

Records from the Maltese islands: This species is a new record to the Maltese Islands.

Genus *Tenothrips* Bhatti, 1967

This genus includes species which are associated with the flowers of Asteraceae (Mound et al., 2018; ThripsWiki Contributors, 2021). Species under this genus originate from the Mediterranean region, but some have been introduced to most parts of the world (Mound et al., 2018; ThripsWiki Contributors, 2021). Eighteen species are recognised under this genus (ThripsWiki Contributors, 2021).

zur Strassen (2003) describes diagnostic features for this genus to include: Head with two pairs of ante-ocellular setae, postocular setae weak; Ocelli larger than ommatidia; Antennae eight-segmented, with the dorsal setae on apical margin of segment I widely spaced; Furca of the mesothorax with spinula; main vein the fore wing in the distal half with 1 + 2 setae; clavus with five vein setae; S_1 of the tergites lying approximately in the middle between the anterior and posterior edges of these sclerites; Tergite VIII laterally without ctenidium; Setae S_1 on sternite VII in ♀ far removed from the posterior edge; Sternites III-VII in males each with a mostly oval, occasionally rounded pore plate.

***Tenothrips discolor* (Karny, 1907)**

Common name: -

Material Examined: MALTA: St. Paul's Bay, vii.1956, 1 ♀ (sm) (BMNH) on *Limbarda crithmoides*, ERS.

Body length: ♀: 1200 µm; ♂: no records

Wing type: ♀: macropterous; ♂: no records

Further notes on species: zur Strassen (2003). This author also described both sexes as being macropterous and quotes the body lengths for this species to be: 1100 - 1380 µm for females and 740 - 1020 µm for males.

Diagnosis: *Tenothrips discolor* differs from the genera *Taeniothrips*, *Oxythrips*, *Odontothrips* and *Ceratothrips* (all of which lack ctenidia on tergite VIII being replaced by a region of microtrichia), in that it has five marginal setae on the clavus while the others have six.

Biology: No literature could be traced that describes the duration of the life cycle of this species.

Tenothrips discolor has been described as polyphagous (zur Strassen, 2003) and has been recorded on a number of Asteraceae such as *Carthamus lanatus, Centaurea raphanina mixta*, *Galactites tomentosa,* (zurStrassen, 1986), *Centaurea jacea* (Trdan, 2001), *Anthemis* sp., *Tripleurospermum* sp. (Tunc et al., 2012) and *Helichrysum* sp. (Marullo & De Grazia, 2013), but also on a number of other unrelated plants including *Anthyllis hermanniae*, C*istus monspeliensis*, *Coridothymus* sp., *Daucus carota*, *Echium plantagineum*, *Origanum onites*, *Reseda lutea*, *Salvia trilobata*, *Scolymus hispanicus* (zurStrassen, 1986), floweing plants and turf, (Jenser,1982), *Chenopodium* sp., *Olea europaea*, *Pinus* sp. and *Solidago* sp. In the Maltese Islands, this species was also collected from Asteraceae, specifically on *Limbarda crithmoides*. It has not been recorded in the current study.

Distribution data: According to zur Strassen (2003) this species is found in the Ponto-Mediterranean area, extending to Kyrgyzstan and the Canary Islands. Vierbergen (2013) described this species from the East Palaearctic and from North Africa, but without specifying the countries in this region where it was recorded. *Tenothrips discolor* has been found in Bulgaria (Karadjova & Krumov, 2015), Hungary (2011), Romania (Sierka et al., 2008), Slovenia (Trdan, 2001), Italy including Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Greece (zurStrassen, 1986), France (Pizzol et al., 2014), Cyprus (Srour, 2015), Corsica, Crete, Spain (zurStrassen, 2003; Vierbergen, 2013), Albania, Croatia, Macedonia the former Yugoslav Republic of, Malta, Moldova Republic of, Portugal, Ukraine (Vierbergen, 2013) and Turkey (Tunc et al., 2012). It has also been recorded from Tunisia (Jenser, 1982), Iran (zur Strassen, 2003; Bhatti et al., 2009), Israel (zurStrassen & Kuslitzky, 2012) and Egypt (zurStrassen, 2014). It was also intercepted in US possibly from Europe and the Mediterranean (Nickle, 2003).

Records from the Maltese Islands: *Tenothrips discolor* was first recorded from the Maltese Islands by Mound and Palmer (1974) and subsequently by Vierbergen (2013) in the website "Fauna Europaea".

Genus *Thrips* Linnaeus, 1758

By far the genus with the largest number of species in the subfamily Thripinae, and the second largest genus of the family Thysanoptera (Mound et al., 2018), the genus *Thrips* is widespread throughout the world except in the Neotropics (ThripsWiki, 2020). Like in the genus *Frankliniella*, members of the genus *Thrips* are equipped with paired ctenidia on tergites IV-VII, but unlike in *Frankliniella*, the ctenidia of Tergite VII are placed postero-medially of the spiracles. Three hundred and three extant species are listed under this genus (ThripsWiki, 2020), with four species being recorded in the Maltese Islands in this study. Most species are found on flowers, with some species found on leaves and leaf buds (ThripsWiki, 2020). Some species are pests and a few species are also orthotospovirus vectors. Features of locally recorded species include: All local species possess seven-segmented antennae; head with only one pair of ante-ocellar setae (S_2) which are shorter and thinner than the inter-ocellar setae (fig. 4.68a); sensoria on antennal segments III and IV forked; pronotum with two pairs of long postero-marginal setae (fig. 4.68b); mesothoracic endofurca with spinula; fore tarsi lacking teeth on the anterior margin; sternite II with three or four (in *Thrips australis*) marginal setae. Loomans (2006) listed *Ceranisus americanus*, *C. loomansi* and *C. menes* (Hymenoptera: Eupholidae) as parasitoids for this genus from North America and Europe.

***Thrips australis* (Bagnall, 1915)**

Common name: Gum Tree Thrips

Material examined: MALTA: Wied Ħesri, 10.x.2015, 6 ♀♀ (sm) and 2 ♂♂ (sm) on *Sambucus nigra*, GD; Wied Ħesri, 16.iv.2016, 1 ♀ (sm), 5 ♀♀ (aga) and 1 ♂ (sm) on *Schinus* *terebinthifolius*, GD; Dingli Cliffs, 27.i.2017, 1 ♂ (sm) on *Asphodelus ramosus*, GD; Wied Musa l/o Siġġiewi, 30.x.2017, 1 ♀ (sm) on *Smilax aspera*, GD; Rabat Triq il-Vitorja, 23.xi.2017, 2 ♀♀ (sm) on *Ceratonia siliqua*, GD; Luqa, Triq l-Avjazzjoni,14.i,2018, 1 ♀ (sm) on *Solandra maxima*, GD; l/o Siġġiewi, private farm, 29.i.2018, 3 ♀♀ (sm) and 5 ♀♀ (aga) on *Eriobotrya japonica*, GD.

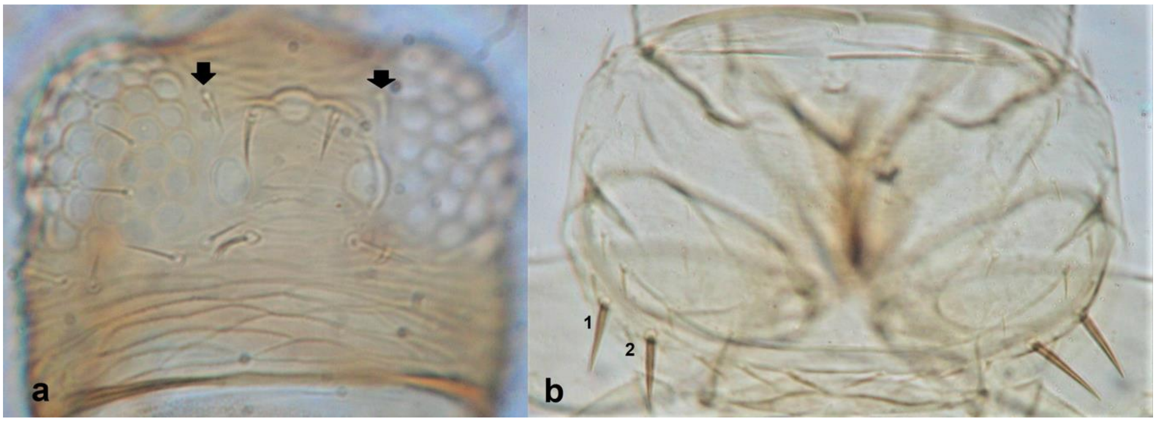

Figure 4.68: Thrips features: (**a**) head with one pair of ante-ocellar setae; (**b**) pronotum with two pairs of postero-marginal setae.

Body length: ♀: 1330 - 1540 μm; ♂: 800 - 1260 μm.

Wing type: Both sexes are macropterous.

Further notes on species: Nakahara (1994), Kirk (1996), zur Strassen (2003), Moritz (2006), Minaei (2013), Moritz et al. (2014) and Mound et al. (2017).

According to Mound et al. (2017), the inter-ocellar setae pair III arise outside ocellar triangle and are almost as long as the distance between the hind and top ocellus, while the inter-ocellar setae pair III ocellar setae III arise from inside ocellar triangle. Also, according to Mound et al. (2017) abdominal sternites each bear 15 - 40 discal setae. zur Strassen (2003) provides body lengths for the species, describing male specimens to be larger than the locally recorded specimens.

Diagnosis: This species can be distinguished from others of the same genus by the following features: abdominal tergite II bearing four lateral setae; clavus with six setae; discal setae on tergites.

Species of the genus *Thrips* superficially resemble those of the genus *Frankliniella*. *Thrips* spp. are distinguished from *Frankliniella spp.* from the lack of inter-ocellar setae pair I, and from the position of the ctenidia on tergite VIII, which are found postero-mesal to the spiracle (usually found antero-lateral to the spiracle in *Frankliniella*).

Biology: According to Lewis (1973), the life cycle of this species is dependent on temperature and can take between 15 days to a month.

Thrips australis is mostly, though not exclusively, associated with *Eucalyptus* and other Myrtaceae, but may disperse to other species, particularly those with white flowers (e.g. *Melaleuca* sp.) once the flowers of *Eucalyptus* die (Mound et al., 2017). This species has also been recorded on crops like banana, capsicum, citrus, flax, French bean, sunflower and tomato (Moritz et al., 2014). *T. australis* was also recorded on *Juncus* sp. (Jenser, 1982), *Lantana* sp., *Pentasania ouranogyne* (Moritz et al., 2014) and *Acacia* (Moritz et al., 2014; Thrips Wiki, 2020). In the Maltese Islands, this species was never collected on *Eucalyptus* flowers, but was always found on white flowers of unrelated trees and shrubs such as *Ceratonia sliliqua, Eriobotrya japonica*, *Sambucus nigra*, *Schinus terebinthifolius* and *Smilax aspera*, though eucalyptus trees are widely planted throughout the Maltese Islands.

Elimem and Chermiti (2014) claim that *Thrips australis* does not act as an agricultural pest on the plants it frequents. According to Moritz et al. (2014), in East Africa, this species does damage *Eucalyptus* flowers as well as those of other Myrtaceae, though it is not reported as a major pest. These authors also claimed that *T. australis* can also act as a possible mechanical vector of Phytopathogenic fungi and bacteria.

Garcia-Fayos & Goldarazena (2008) describe*d Thrips australis* is an important pollinator.

Distribution data: Originating from Australia, this species is also found in New Zealand and in other parts of the world where *Eucalyptus* is grown (Mound et al., 2017). *Thrips australis* is largely host specific on *Eucalyptus*, and it has been spread around the world by the global horticultural trade (Moritz et al., 2004). It has been recorded from Spain

(Goldarazena in Ramos, 2001), France (Pizzol et al., 2014), Italy (Stoch, 2003), Greece (Vierbergen, 2013), Cyprus (Moritz et al., 2014; Srour, 2015). It has also been recorded from Tunisia (Jenser, 1982; Elimem & Chermiti, 2014; Moritz et al., 2014), Egypt (zur Strassen, 2014; Moritz et al., 2014), Kenya, Malawi, Morocco, South Africa, Zimbabwe, Japan, Brazil (Moritz et al., 2014), Israel (zur Strassen & Kuslitzky, 2012; Moritz et al., 2014) and Iran (Minaei, 2013). *T. australis* has also been intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2008).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

***Thrips major* Uzel, 1895**

Common name: European Rubus Thrips

Material examined: MALTA: Wied Babu, 15.xii.1996, 2 ♀♀ (sm), on *Erica multiflora*, DM; Siġġiewi, private garden 1, 04.xi.2015, 4 ♀♀ (sm) on *Rosa* sp., GD; Siġġiewi, private garden 1, 12.i.2016, 1 ♀ (sm) on *Rosa* sp., GD; Siġġiewi, private garden1, 29.i.2016, 4 ♀♀ (sm) on *Narcissus tazzetta*, GD; Siġġiewi, private garden 1, 21.iii.2016, 2 ♀♀ (sm) on *Pittosporum tobira*, GD; Buskett, 19.iv.2016, 1 ♀ (sm) on *Laurus nobilis*, GD; Żabbar, private garden 2, 05.iv.2016, 1 ♀ (sm) on *Stephanotis floribunda*, GD; Wied Qirda, 15.iv.2016, 1 ♀ (sm) on *Bromus madritensis*, GD; Siġġiewi, Triq M.A. Azzopardi, 20.iv.2016, 3 ♀♀ (sm) on *Olea europaea*, GD; Wied Speranza, 26.iv.2016, 1 ♀ (sm) on *Tropaeolum majus*, GD; Siġġiewi, private garden 1,10.v.2016, 2 ♀♀ (sm) on *Lonicera caprifolium*, GD; Siġġiewi, Triq it-Tank, 21.viii.2016, 3 ♀♀ (sm) on *Glebionis coronaria*, GD; Msida, University of Malta grounds, 11.x.2016, 3 ♀♀ (sm) on *Quercus robur*, GD; Siġġiewi, private garden 1, 21.x.2016, 4 ♀♀ (sm) on *Rosa* sp., GD; Kuncizzjoni, 19.i.2017, 1 ♀ (sm) on *Erica multiflora*, GD; Dingli Cliffs, 27.i.2017, 2 ♀♀ (sm) on *Asphodelus ramosus*, GD; Msida, University of Malta grounds, 28.iv.2017, 2 ♀♀ (sm) on *Olea europaea*, GD; Luqa, Triq l-Avjazzjoni, 14.i.2018, 1 ♀ (sm) on *Solandra maxima*, GD; Siġġiewi, private garden 1, 14.vii.2017, 1 ♀ (sm) on *Azalea indica*, GD; I/0 Siġġiewi, private farm, 29.i.2018, 4 ♀♀ (sm) on *Eriobotrya japonica*, GD; Buskett, 20.ii.2018, 1 ♀ (sm) on *Rhamnus alaternus*, GD; Wied Għollieqa, 11.iv.2018, 2 ♀♀ (sm) on *Cercis silquastrum*, GD; Wied Għollieqa, 14.iv.2018, 1 ♀ (sm) on *Cercis silquastrum*, GD; Għaxqet l-Għajn, l/o Naxxar, 28.iv.18, 2 ♀ (sm) on *Pistacea lentiscus*, GD; l/o San Ġwann, private farm, 05.vii. 2019, 2 ♀♀ (sm) on *Cucurbita* sp., GD; Siġġiewi, private garden 1, 22.iv.2020, 1 ♀ (sm) on *Citrus limon*, GD; Mġiebaħ l/o Xemxija, 2.iii.2018, 2 ♀♀ (sm) on *Tamarix africana*, GD; Siġġiewi, private garden 1, 22.iv.2020, 4 ♀♀ (sm) on *Prunus persica*, GD.

Body length: ♀: 1300 - 1580 μm; ♂: no records.

Wing type: ♀: macropterous; ♂: no records.

Further notes on species: Priesner (1964), Kirk (1996), Marullo (2003), Moritz (1994), Kirk (1996), Canale et al. (2003), zur Strassen (2003), Moritz (2006), Alavi et al. (2007), Smith-Pardo and O'Donnell (2016) and Mound et al. (2018).

No male specimens were found in this work. Males are rarer, macropterous, smaller than females and yellow in colour. They are described by zur Strassen (2003) and Mound et al.(2018) to have the following features: macropterous; tergite VIII with no postero-marginal microtrichial comb; seta S_1 on tergite IX standing either between the two median campaniform sensilla, or a little further before the level of these sensilla, setae S_2 significantly behind this level; tergite IX with slender median pair setae, these arising anterior to lateral pair and anterior to campaniform sensilla; sternites III - VII each with a broad transverse pore plate. Body length 940 - 1130 μm (zur Strassen, 2003).

Diagnosis: This species can be distinguished from others of the same genus by the fact that it has an incomplete microtrichial comb on tergite VIII.

Mound et al. (2018) state that this species is very similar to *Thrips fuscipennis,* a species which is not recorded locally but is a likely recorded since its geographical distribution includes many Mediterranean countries including Sicily (zur Strassen, 2003; Vierbergen, 2013) and many of the plants on which it has been recorded occur in the Maltese Islands. *Thrips major* differs from *T. fuscipennis* in that the former species has three lateral marginal setae on abdominal tergite II and ciliate rather than dentate cilia on pleurotergites. *T. major* is different from *T. australis* also from the three (rather than four) lateral marginal setae on abdominal tergite II and from the lack of discal setae on sternites and pleurotergites, as well as from the fact that the clavus has five not six marginal setae. It differs from *T. tarfayensis* and from *T. tabaci* in having a medially incomplete postero-marginal microtrichial comb on tergite VIII. Moreover, *T. tabaci* has pleurotergites lined with microtrichia.

Species of the genus *Thrips* superficially resemble those of the genus *Frankliniella,* however they differ in a number of characters as previously described in the "Diagnosis" section under the description of *Thrips australis*.

Biology: No literature could be found that describes the duration of the life cycle of this species.

Thrips major is found in flowers and occasionally leaf buds of numerous plant species, including woody ones (zur Strassen, 2003; Mound et al., 2018). It has been recorded on a number of Rosaceae (Mound et al., 1976), *Anthyllis hermanniae* (zur Strassen, 1986), *Clematis vitalba,* (Trdan, 2012)*, Calystegia sepium*, *Ranunculus acris* (Kirk, 1996), *Pyracantha* sp., *Salyx babylonica* (Jenser & Tsanakakis, 1985)*, Olea europaea* (zur Strassen, 2003; Tunc et al., 2012), *Allium scorodoprasum*, *Avena sativa, Centaurea cristata*, *C. jacea*, *Cirsium canum, Cichorium intybus*, *Convolvulus arvensis*, *Cucumis sativus*, *Galium mollugo*, *G. palustre, Inula helenium*, *Leucanthemum ircutianum*, *Lithosperum arvense, Lunaria rediviva, Lychnis flos-cuculi*, *Lythrum salicaria*, *Malva sylvestris*, *Matricaria chamomilla*, *Phaseolus vulgaris, Picris hieracioides, Ranunculus acris*, *Serratula tinctoria*, *Trifolium pratense*, *Triticum aestivum*, *Ranunculus arvensis*, (Raspudić et al., 2009), *Coronilla varia*, *Eleagnus* sp., *Eucalyptus* sp., *Pyrus elaeagnifolia*, (Tunc et al., 2012; Marullo & De Grazia, 2013), *Acacia cyanophylla*, *Berberis* sp., *Citrus aurantium*, *C. reticulata*, *C. sinensis*, *Crataegus* sp., *Nerium oleander*, *Prunus armeniaca*, *P. avium*, *Quercus* sp., *Spartium junceum*, *Styrax* sp., *Rosa* sp., (Tunc et al., 2012), *Arbutus* and *Lobularia* spp. (Marullo & De Grazia, 2013). In the Maltese Islands, this species has been collected from the flowers and leaves of a wide variety of unrelated indigenous and cultivated shrubs and trees such as *Bromus diandrus*, *Cercis silquastrum*, *Citrus limon, Erica mutiflora*, *Eriobotrya japonica*, *Glebionis coronaria*, *Laurus nobilis*, *Lonicera caprifolium*, *Olea europaea*, *Pistacea lentiscus*, *Pittosporum tobira*, *Prunus persica*, *Quercus robur*, *Rhamus alaternus*, *Rosa* sp., *Solandra maxima*, *Stephanotis floribunda* and *Tamarix africana*, but also indigenous and cultivated herbaceous plants such as *Azalea indica, Cucurbita* sp. and *Tropaeolum majus.*

Thrips major can attack the flowers inside which it occurs. It has been recorded to inflict damage to strawberries and peaches (Marullo, 2003). It is also mentioned by Moritz (1994) in his work on thrips of economic importance. Garcia-Fayos and Goldarazena (2008) described *Thrips major* is an important pollinator.

Distribution data: This species is distributed across the Palaearctic region and one of the most common thrips species found on flowers (zur Strassen, 2003). Vierbergen (2013) also described this species from the East Palaearctic region as well as from North Africa, but without specifying the countries in this region where this species was collected from. *Thrips major* has been recorded from the UK (Mound et al., 1976; Kirk, 1996), Scandinavia, Denmark (Gertsson, 2015), Slovenia (Trdan, 2001), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Bulgaria (Karadjova & Krumov, 2015), Croatia (Raspudić et al., 2009), the Netherlands as a glass house species in which settled in the open (Vierbergen, 2001), Spain and Balearic Islands (Goldarazena in Ramos, 2001), Hungary (Jenser, 2011), Belgium (Lock, 2006), Albania, Austria, Central and North to Northwest European Russia, Czech Republic, Estonia, Germany, Ireland, Latvia, Lithuania, Luxembourg, former Yugoslav Republic of Macedonia, Portugal, Switzerland, Ukraine (Vierbergen, 2013), France (Pizzol et al., 2014), Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Greece, Crete, (Jenser & Tsanakakis, 1985; zur Strassen 1986), Cyprus (Srour, 2015) and Turkey (Tunc et al., 2012). This species has also been recorded from Tunisia (Belaam-Kort et al., 2020), Israel (zur Strassen & Kuslitzky, 2012), Algeria (Priesner, 1946; Moritz, 2006), Canary Islands (Moritz, 2006) and Iran (Bhatti et al., 2009). *Thrips major* has been intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2008).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

***Thrips simplex* (Morison, 1930)**

Common name: Gladiolus thrips

Material examined: MALTA: 3.vi.1959, 1♀ (sm - BMNH) on *Gladiolus* sp., ERS; St. Paul's Bay, 14.iv.1994, 1♀, *Gladiolus* sp., JWI;

Body length: ♀: 1697 μm; ♂: no records,

Wing type: ♀: macropterous; ♂: no records.

Further notes on species: zur Strassen (2003), Kirk (1996), Moritz et al. (2014) and Mound et al. (2018). zur Strassen (2003) describes the lengths for this species to be 1570-1980 μm for female and 1220-1440 μm for male specimens.

Diagnosis: This species is distinguished from others of the same genus by the fact that it is the only locally occurring species of the genus *Thrips* with eight-segmented antennae.

Species of the genus *Thrips* superficially resemble those of the genus *Frankliniella,* however they differ in a number of characters as previously described in the "Diagnosis" section under the description of *Thrips australis*.

Biology: According to Lewis (1973) and to Moritz et al. (2014) the life cycle of this species takes between 15 days to a month depending on ambient temperature. It can take less time when the larvae develop within greenhouses.

Trdan (2001), zur Strassen (2003). Trdan et al. (2005) and Mound et al. (2018) described this species from *Gladiolus* sp. The species has also been recorded on other plants such as *Calla*, *Pancratium*, *Protea*, *Vitis* (zur Strassen, 2003) and *Dianthus* spp. (Trdan et al., 2005). In the Maltese Islands, *Thrips simplex* has been collected from cultivated *Gladiolus*. It has not been recorded in the current study.

Trdan et al. (2005) listed *Thrips simplex* as a prey species for *Aeolothrips intermedius* in Slovenia.

This species has been described as an agricultural pest by Moritz et al. (2014), who claimed that it can cause deformities and discolorations of flowers and can also damage corms rendering them soft and making them more prone to decay. According to these authors, *Thrips simplex* can also act as a mechanical vector of phytopathogenic fungi and bacteria.

Distribution data: According to Mound et al. (2018), this species originated from southern Africa, but has become locally common around the world wherever *Gladiolus* flowers are grown. zur Strassen (2003) and Vierbergen (2013) describe *Thrips simplex* as a semi-cosmopolitan species, occurring in the Afro-tropical, Nearctic, Neotropical, Oriental and Australian Regions and which has become widespread in Europe after introduction. It has been recorded in the UK (Mound et al., 2018), Sweden, Norway (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary, Slovakia (Zvarikova et al., 2020), Slovenia (Trdan, 2001; Trdan et al., 2005), Croatia (Trdan et al., 2005), South Italy (Stoch, 2003), France and Spain (zur Strassen, 2003; Vierbergen, 2013), Austria, Azores, Canary Islands, Czech Republic, Germany, Poland, Portugal, Romania, Switzerland, the Netherlands, Ukraine (Vierbergen, 2013) and Turkey (Tunc & Hastenpflug-Vesmanis, 2016). It has also been recorded from Israel (zurStrassen & Kuslitzky, 2012), Egypt (zurStrassen, 2014), Morocco, Angola, Ethiopia, Kenya, Lesotho, South Africa, Sudan, Uganda and Zimbabwe (Moritz et al., 2014).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Thrips tabaci **Lindeman, 1889**

Common name: Onion Thrips – Nemusa tal-Basal

Material examined: MALTA: St. Paul's Bay, vii.1956, 1 ♀ (sm – BMNH) on *Limbarda crithmoides* (JIS & ERS); Żabbar, 11.iii.1994, 2 ♀♀ (sm - BMNH) on *Matthiola bicornis*, GW; Armier, 14.vi.1994, 1 ♀ (sm – NMNH) on *Fragraria* x *ananassa*, GW; Lapsi, 26.i.1997, 1 ♀

(dark form) on *Asphodelus ramosus*, DM; Siġġiewi, private garden 1, 21.iii.2016, 1 ♀ (dark form) on *Pittosporum tobira*, GD; Żabbar, private garden 2, 2, 05.iv.2016, 1 ♀ (dark form) on *Stephanotis floribunda*, GD; Siġġiewi, private garden 2, 13.iv.2016, 2 ♀♀ (dark form - sm) on *Foeniculum vulgare*, GD; Wied Ħesri, 16.iv.2016, 1 ♀ (dark form) on *Schinus terebinthifolius*, GD; Dingli, Buskett, 19.iv.2016, 1 ♀ (pale form - sm) on *Laurus nobilis*, GD; Wied Speranza, 26.iv.2016, 2 ♀♀ (dark form - sm) on *Tropaeolum majus*, and 3 ♀♀ (dark form - sm) on *Parietaria judaica*, GD; Siġġiewi, private garden 2, 10.v.2016, 1 ♀ (dark form - sm) on *Prunus persica*, GD; Wied Ħesri, 15.v.2016, 2 ♀♀ (pale form - sm) on *Hypericum sinuatum*, GD; Wied Qirda, 30.v.2016, 1 ♀ on *Hyparrhenia hirta*, GD; Msida, University of Malta grounds, 11.x.2016, 1 ♀ (dark form - sm) on *Quercus robur*, GD; Dingli Cliffs, 27.i.2017, 1 ♀ (dark form - sm) on *Asphodelus ramosus*, GD; Fiddien, 24.iv.2017, 2 ♀♀ (dark form - sm) on *Medicago* sp., GD; Mellieħa road l/o Popeye Village, 29.vii.2017, 1 ♀ (pale form - sm) on *Tamarix africana*, GD; Siġġiewi road, l/o Wied Ħesri, 07.viii.2017, 3 ♀♀ (pale form - sm) on *Ipomoea carnosa*, GD; l/o Siġġiewi, private farm, 13.xi.2017, 1 ♀ (pale form - sm) on *Eriobotrya japonica*, GD; Xemxija, 03.iii.2018, 7 ♀♀ (dark form - sm) on *Anacamptis urvilleana*, GD; Qormi, private farm, 7.vii.2018, 1 ♀ (pale form - sm), 3 ♀♀ (dark form - sm) on *Foeniculum vulgare*, GD; Pembroke, 05.xi.2018, 1 ♀ (dark form - sm) on *Reichardia picroides*, GD. **GOZO**: Ramla Bay, 02.vii.2018, 2 ♀♀ (pale form - sm) on *Pancratium maritimum*, GD.

Body length: ♀: 1060 - 1360 μm; ♂: no records.

Wing type: ♀: macropterous; ♂: no records.

Further notes on species: Priesner (1960; 1964), Stannard (1968), Palmer (1990:1992), Marullo (1993), Moritz (1994), Nakahara (1994), Kirk (1996), Mound and Marullo (1996), Marullo (1997), zur Strassen (2003), Marullo, (2003), Moritz (2006), Mound (2010), Bărbuceanu and Vasiliu-Oromulu (2012), Moritz et al. (2014), and Mound et al. (2016), Mound et al. (2018) and Mound et al. (2019).

According to zur Strassen (2003) adult females vary greatly in size and colour, being larger and darker or smaller and paler, depending on the available environmental temperature during the developmental phase. Mound et al. (2018) explain that the warmer local climate from that of the continent may have been a contributor to the sizes of local specimens. In fact, these authors claim that the colour of the adult is determined by the available climate temperature during the developmental stages of the insect, with specimens developing in cooler temperatures becoming darker coloured and vice versa. During the current study, most of the pale specimens were collected during the hotter months of the year between May and October. Darker specimens were collected between late autumn to early spring. Also, according to Mound et al. (2018), the inter-ocellar setae pair III arise on anterior margins or just within ocellar triangle; also, the first vein of the fore wing bears two to six setae on distal half. No male specimens were recorded for this species in this work. These have been described by zur Strassen (2003) and Mound et al. (2018) to be rarer than females, macropterous, small and yellow and to have the following features: Body setae generally light brown or grey-brown. Tergite IX is mostly colourless. Tergite VIII bears a postero-marginal microtrichial comb with only a few irregular microtrichia. Sternites III - V with narrow transverse pore plate about six times as wide as long. Pore plates on sternite IV 28 - 40 μm wide (zur Strassen, 2003). Male body length: 850 - 1040 μm (zur Strassen, 2003).

This species tends to perform thelytokous reproduction, where most individuals of the species are female and where the species can also reproduce by parthenogenesis (Khan et al., 2022). Consequently, males of this species are always very rare, which accounts for the fact that in the current study, despite the large number of specimens collected for this species, no male specimens were found.

Diagnosis: This species differs from others of the same genus by the following features: no red pigment around ocelli; complete microtrichial comb on tergite VIII; closely spaced rows of ciliate microtrichia on the pleurotergites.

This species differs from *Thrips australis* in having no discal setae on sternites and also in having three rather than four lateral marginal setae on abdominal tergite II and five rather than six marginal setae on the clavus. It differs from *T. major* in having a complete postero-marginal microtrichial comb on tergite VIII, and from *T. tarfayensis* in having closely spaced rows of ciliate microtrichia on the pleurotergites.

Species of the genus *Thrips* superficially resemble those of the genus *Frankliniella,* however they differ in a number of characters as previously described in the "Diagnosis" section under the description of *Thrips australis*.

Biology: The duration of the life cycle for this species is temperature dependent and takes between 15 days to a month (Lewis, 1973). According to Priesner (1960) males of this species are very scarce and reproduction occurs mainly by parthenogenesis. Indeed, in the current study, although a relatively large amount of specimens of this species were collected, all were in fact female.

Thrips tabaci is a polyphagous species, being recorded on an enormous number of unrelated plants, particularly Asteraceae (Mound et al., 1976). It has been recorded on crops such as banana, beans, beetroot, broccoli, cabbage, capsicum, carrot, chillies, coriander, cotton, squash, aubergine, garlic, grapes, kale, leek, maize, mulberry, okra, onion, orange potato, spinach, tomato, watermelon, and wheat (Moritz et al., 2014). It has also been recorded on *Allium spp.* (Jenser, 1982; Kirk, 1996; Trdan et al., 2005; Fallahzadeh et al., 2011), *Ferula* sp. (Jenser, 1982), *Olea europaea* (Jenser & Tsanakakis, 1985; Tunc et al., 2012), *Anthemis maritima, Euphorbia agrarian*, *Isatis tinctoria*, *Lepidum draba*, *Pittosporum tobira*, *Rumex acetosella*, *Triticum vulgare*, (Jenser & Tsanakakis, 1985), *Anthyllis hermanniae*, *Ruta chalepensis*, *Sinapis arvensis* (zur Strassen, 1986), *Taraxacum officinale* (Kirk, 1996), *Galium verum* (Trdan, 2001), *Pisum sativum* (Trdan et al., 2005; Tunc et al., 2012), *Beta vulgaris*, *B. vulgaris* var. *saccharifera, Dianthus* spp., *Gladiolus* spp., *Helianthus annuus*, *Medicago sativa*, *Phaseolus vulgaris*, *Sambucus nigra, Trifolium pratense*, *T. repens*, (Trdan et al., 2005), *Allium cepa*, *Allium* sp., *Anethum graveolens*, *Achillea millefolium*, *Artemisia absinthium*, *Cactus* sp., *Calystegia sepium*, *Centaurea cyanus*, *Cephalaria leucantha*, *Cirsium arvense, Chrysanthemum* spp., *Capsella bursa-pastoris*, *Conyza canadensis*, *Crepis setosa*, *Cucurbita pepo*, *Daucus carota*, *Dorycnium herbaceum*, *Echium plantagineum*, *Erigeron annuus*, *Eryngium amethystinum*, *Ficus carica, Fragaria vesca*, *Filipendula vulgaris*, *Galium verum*, *G. mollugo, Genista tinctoria*, *Gladiolus gandavensis, Glycine max*, *Helianthus annuus*, *Hydrangea hortensis, Inula conyza*, *I. crithmoides*, *Lavandula latifolis*, *Leucanthemum ircutianum*, *Lotus corniculatus*, *Lycopersicon esculentum Malva sylvestris*, *Matricaria discoidea*, *Medicago falcata*, *M. sativa*, *Melilotus alba, Nigella arvensis, Olea sativa, Origanum vulgare, Punica granatum*, *Plantago altissima*, *Reseda lutea, Rosa* sp., *Rubus hirtus*, *Rumex crispus*, *Ruta graveolens, Sambucus ebulus*, *S. nigra*, *Sinapis arvensis*, *Solidago gigantiea*, *S. virgaurea, Sorgum bicolor*, *S. halepense*, *Spartium junceum, Tripleurospermum indorum*, *Tagetes patulus, Trifolium repens*, *Triticum aestivum*, *Verbascum sinuatum, Vicia* sp., *Zea mays*, (Raspudić et al., 2009), *Lepidium draba, Hirchfeldia incana*, *Raphanus* sp., *Reseda lutea*, *Sisymbrium irio*, *Tagetes lucida*, (Fallahzadeh et al., 2011; Tunc et al., 2012), *Phragmites australis* (Kucharzyk & Sałapa, 2011), *Althaea* sp., *Amygdalus communis*, *Anthemis* sp., *Arachis hypogaea*, Asteraceae, *Avena sativa*, *Berberis* sp., *Boreava orientalis*, *Chenopodium* sp., *Carthamus* sp., *Citrus reticulata, Convolvulus* sp., *Crataegus* sp., *Cydonia vulgaris*, *Datura* sp., *Echinochloa crus-galli*, *Eucalyptus* sp., *Euphorbia* sp., *Lamium* sp., *Malus communis*, *Morus alba*, *Papaver somniferum*, *Prunus domestica*, *Quercus* sp., *Salvia* sp., *Solanum melongena*, *Sinapis* sp., *Tagetes* sp., *Tripleurospermum* sp., *Triticum aestivum*, *Verbascum* sp., *Vicia sativa*, *Vitex agnus-castus*, *Vitis vinifera*, *Zea mays*, *Hordeum sativum*, *Malva* sp., *Melilotus* sp., *Salix* sp., *Sonchus* sp., *Prunus avium*, *Citrus sinensis*, *Raphanus* sp., *Rosa* sp., (Tunc et al., 2012), *Ageratum conyzoides*, *Aloe vera*, *Bidens pilosa*, *Bothriocline longipes*, *Datura suaveolens*, *Eracastrum arabicum*, *Galinsoga parviflora*, *Gamolepsis chrysantrhemoides*, *Ocimum* sp, *Raphanus raphanastrum*, *Rumex acetosella*, *Senecio mesogrammoides*, *Tagetes minuta*, *Tithonia diversifolia* and *Vernonia lasiopus* (Moritz et al., 2014). In the Maltese Islands, it has been locally found on *Allium* (Saliba, 1968) and, in the current study, on a number of indigenous and cultivated unrelated herbaceous annuals and trees including *Anacamptis urvilleana*, *Asphodelus ramosus*, *Eriobotrya japonica, Foeniculum vulgare*, *Hyparrhenia hirta*, *Hypericum sinuatum*, *Ipomoea carnosa*, *Laurus nobilis*, *Medicago* sp., *Pancratium maritimum, Parietaria judaica*, *Pittosporum tobira*, *Prunus* *persica*, *Quercus robur*, *Reichardia picroides*, *Schinus terebinthifolius*, *Stephanotis floribunda*, *Tamarix africana* and *Tropaeolum majus*.

According to Trdan et al. (2005) this species is preyed upon by *Aeolothrips intermedius*. Kuslitzky (2003) and Loomans (2006) listed *Ceranisus C. menes* (Hymenoptera: Eupholidae) as a parasitoid for this species from Europe. Lewis (1973) mentioned the wasp *Thripoctenus brui* (Eulophidae) as a larval parassitoid for this species from Japan, Switzerland and Germany, while Samson, Ramakers & Oswald (1978) describe the parasitic fungus *Entomophthora thripidium* (Entomophthoraceae) on *Thrips tabaci* specimens from greenhouses in the Netherlands.

This species is a widely described pest, causing both direct damage to crops and cultivated plants as well as acting as a vector to orthotospoviruses. Table 4.3 lists the types of orthotospoviruses transmitted by this species.

Table 4.3: list of orthotospoviruses transmitted by *Thrips tabaci* as described by literature.

Orthotospovirus	Described by
Iris yellow spot virus IYSV	Riley et al. (2011); Moritz et al. (2014) Australian Department of Agriculture & Water Resources (2017)
Tomato necrotic spot-associated virus (syn. Tomato necrotic spot virus) TNSaV	Report on orthophosphovirus vectors (2017)
Tomato spotted wilt virus TSWV	Riley et al. (2011); Moritz et al. (2014) Report on orthophosphovirus vectors (2017)
Tobacco streak virus (TSV)	Moritz et al. (2014)
Tomato yellow fruit ring virus TYRV	Riley et al. (2011); Moritz et al. (2014) Report on orthophosphovirus vectors (2017)
Tomato yellow ring virus (TYRV)	Moritz et al. (2014)

According to Moritz et al. (2014), *Thrips tabaci* also aids the transmission of *Alternaria porri*, a fungus that causes purple blotch on onion and of powdery mildew on various crops and cutflowers such as strawberries, grape and rose. Garcia-Fayos and Goldarazena (2008) described *T. tabaci* is an important pollinator.

Distribution data: *Thrips tabaci* is a very common and widespread species, probably originating from the Eastern Mediterranean. It has been distributed all over the world, wherever onion and garlic are grown (Mound et al., 2018). Vierbergen (2013) described this species from the East Palaearctic Afrotropical, Australian and Oriental regions as well as from North Africa, but without specifying the countries in this region where this species was collected from. T. tabaci was recorded from the UK (Mound et al., 1976; Mound et al., 2018; Kirk, 1996), Scandinavia, Denmark, Iceland (Gertsson, 2015), Poland, Romania, Slovakia (Sierka et al., 2008), Slovakia (Zvarikova et al., 2020), Slovenia (Trdan, 2001; Trdan et al., 2005), Serbia (Andjus, Spasic & Dopudja, 2001; Trdan et al., 2005), Croatia & Montenegro (Trdan et al., 2005; Raspudić, et al., 2009), the Netherlands as a glass house species which settled in the open (Vierbergen, 2001), Poland (Kucharzyk & Sałapa, 2011), Spain and Balearic Islands (Goldarazena in Ramos, 2001), Hungary (Jenser, 2011), Belgium (Lock, 2006), Albania, Austria, the Azores, Bulgaria, Canary Islands, Central, North-western and Southern European Russia, Corsica, Czech Republic, Crete, Estonia, Germany, Ireland, Latvia, Lithuania, former Yugoslav Republic of Macedonia, Portugal, Switzerland, Ukraine (Vierbergen, 2013), Malta (Saliba, 1968; Mifsud, 1997; Mifsud & Watson, 2000), Italy including Islands, (Stoch, 2003; Rapisarda & Tropea Garzia, 2004), France (Pizzol et al., 2014), Greece (Jenser & Tsanakakis, 1985; zur Strassen, 1986) and Turkey (Tunc et al., 2012). This species has also been recorded from Tunisia (Jenser, 1982; Moritz et al., 2014; Belaam-Kort et al., 2020), Egypt (zur Strassen, 2014; Moritz et al., 2014), Algeria, Botswana, Congo, Ghana, Kenya, Morocco, Nigeria, South Africa, St. Helena, Sudan, Zimbabwe (Moritz et al., 2014), Israel (zur Strassen & Kuslitzky, 2012), India (Kumar, Tyagi, & Bhatti, 2008), Iran (Bhatti et al., 2009; Mirab-balou et al., 2013) and Iraq (Abdul-fatah Hammoodi & Abdul-Rassoul, 2004). *T. tabaci* was also intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2008).

Records from the Maltese Islands: *Thrips tabaci* is the species which has been recorded in the largest amount of literature. It has been first described from the Maltese Islands by Saliba (1968), then subsequently by Farrugia (1997), and by Mifsud (1997).

***Thrips* cf. *tarfayensis* (zur Strassen, 1968)**

Common name: -

Material examined: MALTA: Siġġiewi, Triq it-Tank, 14.x.2016, 1 ♀ (sm) on *Diplotaxis tenuifolia*, GD; Siġġiewi, private garden 1, 04.xi.2015, 1 ♀ (sm) on *Rosa* sp., GD; Il-Ballut l/o M'Xlokk, 05.v.2017, 1 ♀ (sm) on *Nerium oleander*, GD; Siġġiewi, l/o Wied Ħesri, 07.viii.2017, 1 ♀ (sm) on *Ipomoea carnosa*, GD.

Body length: ♀: 1060 -1560 μm; ♂: no records,

Wing type: ♀: macropterous; ♂: no records.

Further notes on species: zur Strassen (2003). No male specimens were found for this species in the current study. These have been described by zur Strassen (2003) to be macropterous, smaller than females, brown to dark brown in colour and to have the following features: Pleurotergites without discal setae. Sternite discal setae usually only found lateral to the pore plate. zur Strassen (2003) described the body length of male specimens to be 870-990 μm.

Diagnosis: This species is distinguished from others of the same genus by the following features: tergite VIII with complete microtrichial comb; pleurotergites with no mictotrichia.

This species differs from *Thrips australis* in having three rather than four lateral marginal setae on abdominal tergite II and five rather than six marginal setae on the clavus. It differs from *T. major* in having a complete postero-marginal microtrichial comb on tergite VIII (the microtrichial comb is medially incomplete in *T. major*) and from *T. tabaci* in that this species has pleurotergites lined with microtrichia. These are absent in *T. tarfayensis*.

Species of the genus *Thrips* superficially resemble those of the genus *Frankliniella,* however they differ in a number of characters as previously described in the "Diagnosis" section under the description of *Thrips australis*.

Biology: No literature occurs that describes the duration of the life cycle of this species.

It has been described by zur Strassen (2003) on *Pulicaria crispa.* This species has locally been collected from *Diplotaxis tenuifolia, Nerium oleander, Ipomoea carnosa* and *Rosa sp. Thrips tarfayensis* has not been recorded as an agricultural pest.

Distribution data: This species has been recorded from Morocco (zurStrassen, 2003).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Species of Terebrantia identified to genus level

A number of specimens identified as terebrantians were also collected from the Maltese Islands in this work but for different reasons could not be identified to species level. These were not included in the species descriptions or in the dichotomous key for the Thysanoptera of the Maltese Islands included in this chapter. Such specimens include:

***Chirothrips* sp.**

Material examined: MALTA: Maqluba, l/o Qrendi 20.vii.2016 1 ♂ (sm) from *Cynodon dactylon,* GD*.*

Body length: 871μm

Wing type: apterous

Comments: This specimen could possibly be *Chirothrips pallidicornis* Priesner (1925), but it was too bad a stateof preservation to be identified beyond genus level.

***Odontothrips* sp.**

Material Examined: GOZO: Ramla Bay, 22.i.1997, 1 ♀ (sm) from *Tamarix africana,* DM; Wied Qirda, Żebbuġ, 17.iii.2017 1 ♀ (sm) on *Hedysarum coronarium*, GD.

Body length: 2280- 2282 μm

Wing type: macropterous

Comments: The first specimen was originally identified by the late Richard zur Strassen as *Odontothrips Karny* Priesner (1925), but since this genus is typically found on

Fabaceae, and since female species of the genus *Odontothrips* are very similar to each other, the identity of this specimen could not be confirmed, also because as no male specimens were recorded.

***Odontothrips* sp.**

Material Examined: MALTA: Wied Ħesri, 15.i.2016, 1 ♂ (sm) on *Silene colorata*, GD; Manikata, 03.v.2017, 1 ♂ (sm) on *Bituminaria bituminosa,* GD.

Body length: 1720 - 1867 μm

Wing type: macropterous

Comments: Owing to the shape of the endothecal structures, these were tentatively identified as *Odontothrips loti* (Haliday, 1852), but the identity could not be confirmed owing to the bad state of preservation of the specimens.

***Tenothrips* sp.**

Material Examined: MALTA: Wied Qirda, 20.v.2016, 1 ♂ (sm) on *Hyparrhenia hirta*; Msida, University of Malta grounds, 28.iv.2017, 1 ♀ (sm) on *Citrus limon*, GD; Il-Ballut l/o M'Xlokk, 05.v.2017, 1 ♂ (sm) on *Medicago arborea*, GD.

Body length: ♀: 2200 μm; ♂: 1350 μm

Wing type: Both species are macropterous

Comments: As was the case for the above described species, the identity could not be confirmed owing to the bad state of preservation of the specimens.

***Thrips* sp.**

Body length: 1060 μm

Wing type: macropterous

Material Examined: MALTA: Siġġiewi, private garden 1, 29.iv.2016, 1 ♂ (sm) on *Ranunculus asiaticus*, GD.

Comments: Again, owing to the bad state of preservation, this specimen could only be identified to genus level.

Suborder Tubulifera

This is a suborder which includes thrips species which can grow quite large (some locally recorded females being over 3000 μm long) and that deposit eggs on plant structures such as undersides of leaves or in sheltered cracks and crevices. Many species are found in soil or in areas where fugal growths can occur. Females of these species may or may not have a simple ovipositor and lay eggs within cracks and crevices near or on vegetation. Segment X consists of a tubular structure which gives name to group. All tubuliferan species belong to one family, representatives of which have been recorded from the Maltese Islands in this work.

Family Phlaeothripidae

This is the largest family of the order Thysanoptera with 3600 recognised species. The Phlaeothripidae subdivides into two subfamilies, both of which are represented by species from the Maltese Islands represented in this work.

Subfamily Idolothripinae

A subfamily of thrips which is characterized by having broad maxillary stylets, presumably because they feed on fungal spores. Most phlaeothripids are found in tropical countries, and are usually associated with leaf litter and dead leaves and branches or at the base of dead vegetation. In local phlaeothripid species, the maxillary stylets are wide never being narrower than 5 μm. Moreover, the macropterous species have no wing retaining setae on tergites. 82 genera have been recorded to belong to this subfamily worldwide, three of which, belonging to two separate genera have also been recorded from the Maltese Islands in the current study.

Genus *Bolothrips* Priesner, 1926

This genus includes wingless, sporophagous species that are usually found feeding on fungi at the base of sedges and grasses (Mound et al., 2018). The 17 species belonging to this genus are typically found in the Northern Hemisphere, although three species are recorded from South Africa (Mound et al., 2018). Two species have been recorded from the Maltese Islands in the current study. Features of these species include: both sexes apterous; head with curved compound eyes containing a number of ommatidia, some of which coloured (fig. 4.69a); ocelli absent; The “V”-shaped maxillary stylets (fig. 4.69a); eight-segmented antennae; antennal segment IV with three sense cones; epimeral sutures on pronotum complete (fig. 4.69b); females with no fore tarsal tooth, which is present in males (fig. 4.69c); abdominal tergites with no wing retaining setae; tube dark brown, 0.3 times as wide as long and 0.25 times as long as head (fig. 4.69d).

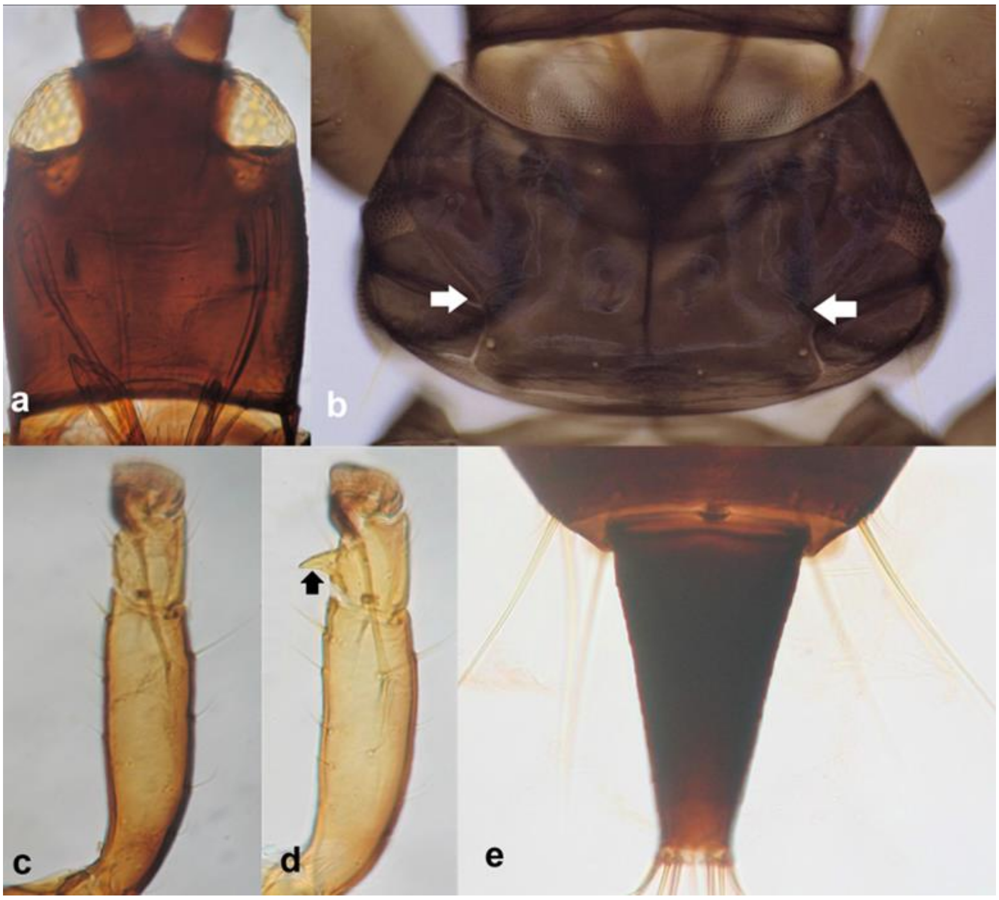

Figure 4.69: ***Bolothrips*** **features**: (**a**) head with curved compound eyes bearing some coloured ommatidia; b. pronotum with complete epimeral sutures; fore tarsi (**c,d**): (**c**) not-toothed (♀); (**d**) toothed (♂); (**e**) dark brown tube, 0.3 times as wide as long and 0.25 times as long as head.

Bolothrips dentipes **(Reuter, 1880)**

Common name: -

Material examined: MALTA: Il-Ballut, l/o M'Xlokk, 03.v.2017, 5 ♀♀ (sm, aga) and 2 ♂♂ (sm, aga) on *Arthrocnemum macrostachyum*, GD; Ta' Sabbara woodland, 19.v.2017, 5 ♀♀ (sm, aga) on dried *Gastridium ventricosum*, GD.

Body length: ♀: 2360 - 2800 μm; ♂: 2300 μm.

Wing type: Both sexes are apterous.

Further notes on species: Stannard (1957, as *Nesothrips dentipes*), Mound (1974) and Mound et al. (2018).

Diagnosis: *Bolothrips dentipes* can be distinguished from *B. insularis* from the fact that the ventral length of eyes about 1.6 times the dorsal length or more. In *B. insularis* the ventral length is about 1.3 times the length of the dorsal length. Mound et al. (2018) also described two similar *Bolothrips* species in Europe; *B. bicolor* and *B. cingulatus.* Neither of these species have been recorded locally but since both species can be found in habitats frequented by *B. dentipes*, and because their geographical distribution spans across Mediterranean countries close to the Maltese Islands, these two species are a likely record to the Maltese Islands. Unlike *B. dentipes*, both *B. bicolor* and *B. cingulatus* have a bi-coloured body.

Priesneriella mavromoustakisi is also wingless and with no ocelli or wing retaining setae, body colour in *P. mavromoustakisi* is pale to mid-brown, while in *Bolothrips dentipes*, the body is usually dark brown. *P. mavromoustakisi* (local specimens being 1680 - 1800 μm) is also distinctly smaller than *B. dentipes* (local specimens measuring 2300 - 2800 μm).

Biology: No literature could be traced that describes the duration of the life cycle of this species.

This species is spore feeding and found at the base of some plants, mainly grasses. It has been found feeding on fungal spores at base of *Carex, Juncus,* and *Spartina* (Mound et al., 1976; Mound et al., 2018), as well as on *Phragmites australis* (Kucharczyk & Sałapa, 2011). In the Maltese Islands, both adults and larvae of this species were collected at the base of dried *Gastridium ventricosum* as well as at the base of the halophytic caryophyllate

Arthrocnemum macrostachyum (Amaranthaceae). This indicates that all life stages of this species feed on the spores of the same fungi which grow at the base of these plants. From analysis of spores found in the stomach of some specimens, it isl likely that the fungus on which this species is feeding on belongs to the genus *Psathyrella* (Agaricales) (Stephen Mifsud pers. comm).

This species has not been recorded as an agricultural pest.

Distribution data: *Bolothrips dentipes* is widespread in Europe. It has been recorded from the UK (Mound et al., 1976), Scandinavia, Denmark (Gertsson, 2015), Bulgaria (Kucharczyk & Sałapa, 2011; Karadjova & Krumov, 2015), Poland (Kucharczyk & Sałapa, 2001), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Hungary (Jenser, 2011), Spain (Goldarazena in Ramos, 2001), Albania, Austria, Central and Northwest European Russia, Czech Republic, Estonia, France, Germany, Ireland, the Netherlands (Vierbergen, 2013) and Italy and Sardinia (Stoch, 2003; Marullo & De Grazia, 2013).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

***Bolothrips insularis* (Bagnall, 1914)**

Common name: -

Material examined: MALTA: Wied Speranza, 26.iv.2016, 1 ♂ (sm) from *Convolvulus elegantissimus*, GD.

Body length: ♀: no records; ♂: 2270 μm.

Wing type: ♀: no records; ♂: apterous.

Further notes on species: Mound (1974), Marullo (1999) and zur Strassen (1986).

Diagnosis: *Bolothrips insularis* can be distinguished from *B. dentipes* from the fact that the ventral length of eyes about 1.3 times the dorsal length. In *B. dentipes* the ventral length is about 1.6 times the length of the dorsal length, sometimes even more.

Priesneriella mavromoustakisi is also wingless and with no ocelli or wing retaining setae, however it differs from the genus *Bolothrips* in a number of characters as previously described in the "diagnosis" section under the description of *Bolothrips dentipes*.

Biology: No literature could be traced that describes the duration of the life cycle of this species.

Marullo & De Grazia (2013) described this species as spore feeding and found at the base of some plants, mostly Poaceae. It has been recorded from *Brachypodium retusum*, *Juncus acutus*, *Polygonium spp.*, *P. monspeliensis*, *P. maritimus*, *Pipatherum miliaceum, Stipa capensis,* (zur Strassen, 1986) and *Hyparrhenia hirta* (zur Strassen, 1986; Marullo, 1999). The locally recorded specimen was collected from the flowers of *Convolvulus elegantissimus*.

Bolothrips insularis has not been recorded as an agricultural pest.

Distribution data: *Bolothrips insularis* is described by Mound (1974) as restricted to the Mediterranean area between the Canary Islands and Syria. It has been recorded from France, (Vierbergen, 2013), Spain (Goldarazena in Ramos, 2001), Italy including Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Greece (zur Strassen, 1986) and Cyprus (Mound, 1974). This species has also been recorded from Egypt (Mound, 1974; zur Strassen, 2014).

Records from the Maltese islands: This species is a new record to the Maltese Islands.

Genus *Priesneriella* Hood, 1927

This genus includes spore feeding, mostly wingless species that are typically found in the soil and leaf litter but often at the base of vegetation. According to Mound et al. (2019) the genus accommodates nine species. Formerly named *Parallothrips*, species of the genus *Priesneriella* are rather similar to those of the genus *Allothrips*, and can be distinguished by the fact that unlike in *Allothrips*, antennal segments VI and VII appear fused together, as well as by the fact that the tarsi are one segmented. In *Allothrips,* the tarsi are typically two segmented. One species has been recorded from the Maltese Islands in this study. Features of this species include: both sexes apterous; ocelli absent; compound eyes consisting of very few ommatidia (fig. 4.70a); Head with one pair of post-ocular setae just behind the eyes; trapezoidal pronotum; seven-segmented antennae with segments VI and VII appearing fused (fig. 4.70b); pronotum with five pairs of pointed, major setae; antennal segment III with two sense cones; segment VI subequal in length to VII-I-VIII; meso- and metanota fused (fig. 4.70c); pelta with wide but slender base and median lobe, (fig. 4.76d); sternite IV with four discal setae (fig. 4.70d); tube golden yellow, conical and relatively short, being 1.4 times as long as base width and 0.2-0.25 times as long as head (fig. 4.76e).

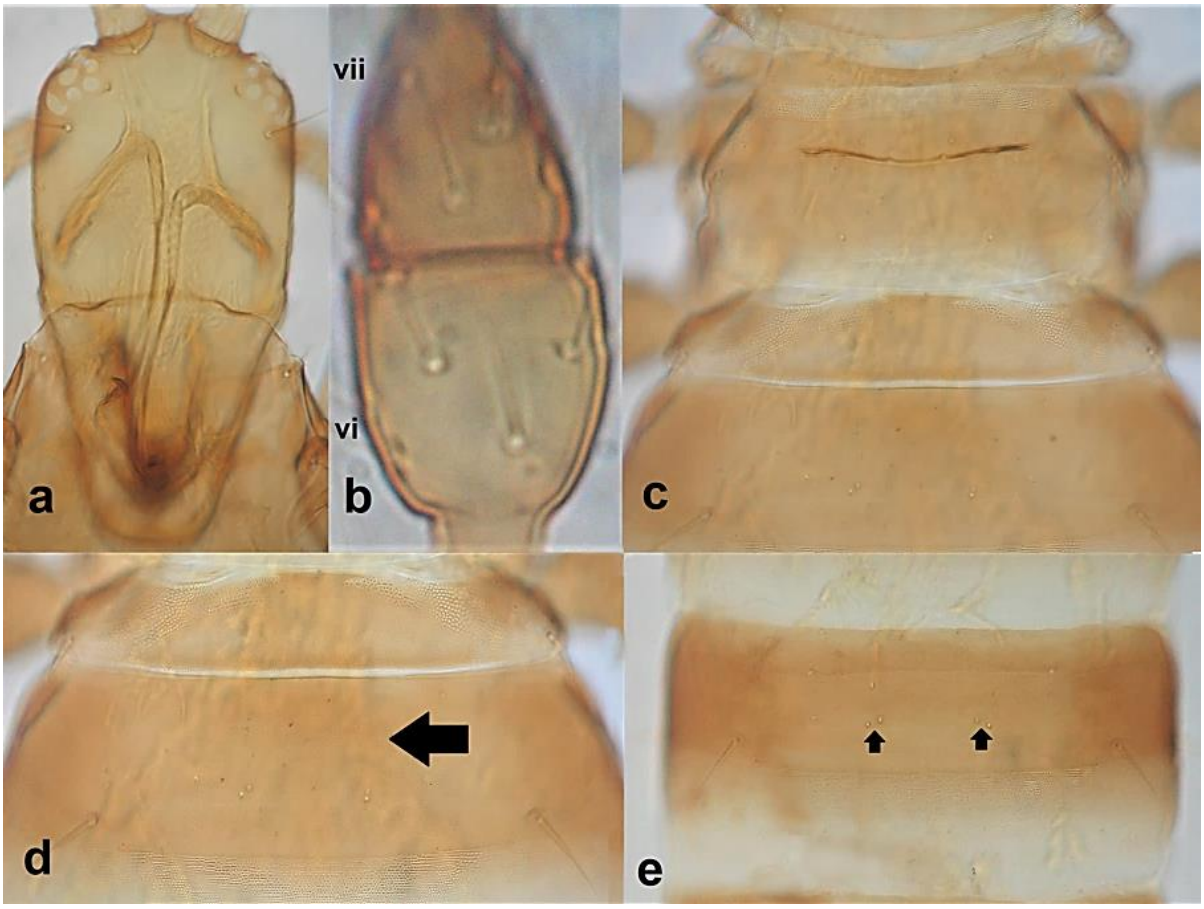

Figure 4.70: ***Priesneriella* features**: (**a**) head showing compound eyes with few ommatidia and one pair of post-ocular setae; (**b**) 7-segemented antennae with fused segments VI-VII; (**c**) pterothorax with fused meso- and metanota; (**d**) pelta with wide but slender base and median lobe; (**e**) sternite IV with four discal setae.

Priesneriella mavromoustakisi **(Crawford, 1948)**

Common name: -

Material examined: MALTA: Xrobb l-Għagin, 24.ii.2016, 1 ♀ (sm) on *Hyparrhenia hirta*, GD; Wied Għollieqa, 16.iv.2018. 1 ♀ (sm) on *Ornithogalum arabicum*, GD.

Body length: ♀: 1680 - 1800 μm; ♂: no records.

Wing type: ♀: apterous; ♂: no records

Further notes on species: Priesner (1964), Mound & Palmer (1983) and zur Strassen (1986).

Priesner (1964) describes males of this species to have tarsi which are thickened and possessing a tooth. No male specimens for this species were collected in the current study.

Diagnosis: This species superficially resembles *Chirothrips* species owing to the trapezoidal shape of the pronotum and the micropterous nature of the species.
However, in most *Chirothrips* species it is the male which is micropterous rather than the female, and moreover, since *Chirothrips* belong to the subfamily Terebrantia, these species lack the tubular segment X and females have a serrated ovipositor, which is missing in *Priesneriella mavromoustakisi*. This species is also similar to species of the genus *Bolothrips*, but is distinctly smaller and paler in colour.

Biology: No literature could be found that describes the duration of the life cycle of this species.

According to Priesner (1964), this species is typically found in lawns and on tree bark. Marullo and De Grazia (2013) described this species as mycophagous on fungal spores. *P. mavromoustakisi* has also been recorded from *Atriplex halimus*, *Quercus coccifera* (zur Strassen, 1986) and *Tamarix gallica* (Priesner, 1964). In the current study, this species was collected from the base of *Hyparrhenia hirta* and from the flowers of *Ornithogalum arabicum*.

This species has not been recorded as an agricultural pest.

Distribution data: This species is found across the Mediterranean. Vierbergen (2013) also described this species from North Africa but without specifying the countries where this was collected from. *Priesneriella mavromoustakisi* has been recorded in the Canary Islands, France, (Vierbergen, 2013), Cyprus (Priesner, 1964), Greece, (zur Strassen, 1986), Italy including Sardinia (Marullo & De Grazia, 2013) and Spain (Goldarazena in Ramos, 2001).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Subfamily Phlaeothripinae

This is a very large and complex subfamily, the largest in fact in the order Thysanoptera, with over 3000 species worldwide with a number of subgroups with weakly defined lineages. This subfamily has 374 extant species worldwide (ThripsWiki, 2020), and five genera recorded in the Maltese Islands in the current study.

Genus *Gynaikothrips* Zimmermann, 1900

This genus includes large (2180 - 3700 μm), gall-inducing species which mostly originate from the Oriental region. 41 species are recognized under this genus worldwide, though it is likely that some of these species are conspecifics of the widely distributed *G. ficorum*, which has spread due to the popular practice of cultivation of its host-plant, *Ficus microcarpa* (Mound et al., 2018). In the Maltese Islands, two species have been recorded in this work. Features of the locally occurring species include: dark brown body; both sexes macropterous; eight-segmented antennae; antennal segment III with one sense cone; antennal segment IV with three sense cones; head with ocelli; pronotum with three to four long setae; metanotum with longitudinal lines of sculpture which are twisted into swirls (fig. 4.71a); fore wings with no medial constriction and with around 15 duplicate setae on trailing edge; tergites with two pairs of wing retaining setae (fig. 4.71b); tube dark brown and very long, usually more than twice as long as wide and almost as long as head (fig. 4.71c). Loomans et al. (1997) and Kuslitzky (2003) and listed the parasitic ehupholid wasp species *Pediobius thysanopterus* and *Thripasticus gentilei* (Eupholidae) as parasitoids for this genus, with the first species from Egypt and Israel, while the second from subtropical regions.

Gynaikothrips ficorum **(Marchal, 1908)**

Common name: Cuban Laurel Thrips

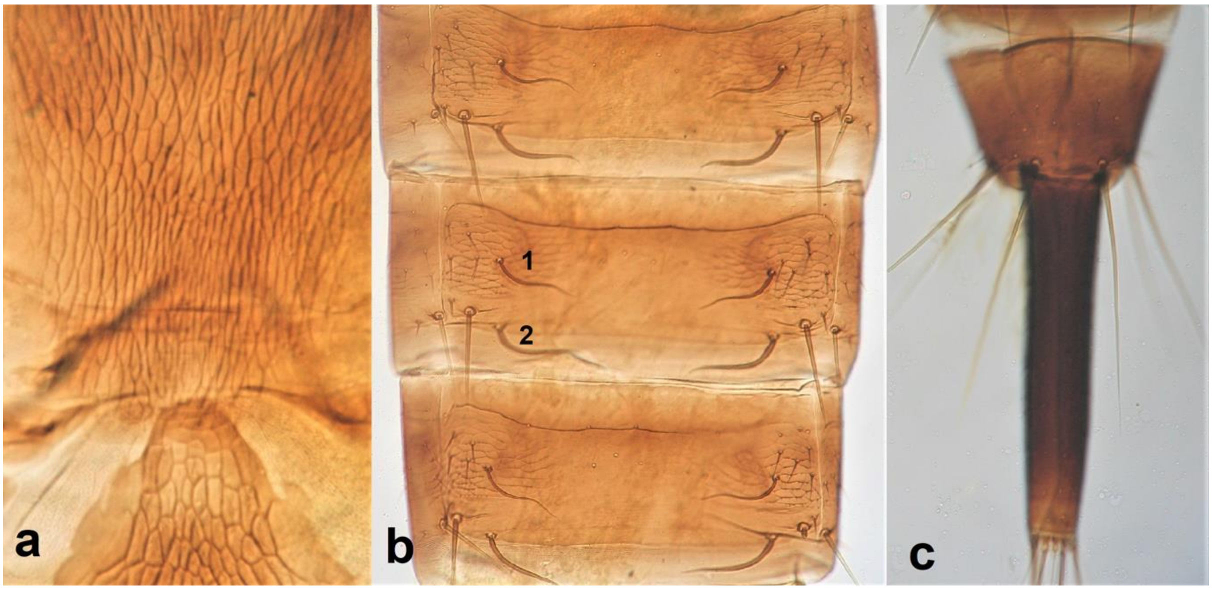

Figure 4.71: ***Gynaikothrips*** **features**: (**a**) metanotum with longitudinal lines of sculpture which are twisted into swirls; (**b**) tergites with two pairs of wing-retaining setae; (**c**) tube usually more that twice as long as wide.

Material examined: MALTA: Luqa, 25.x.1995, 1 ♀ (sm) on *Ficus microcarpa*, DM; Msida, University of Malta grounds, 20.viii.2016, 13 ♀♀ (sm, aga) and 8 ♂♂ (sm, aga) on *Ficus microcarpa* leaf gall, GD; Msida, Junior College grounds, 20.viii.2016, 9 ♀♀ (sm, aga) and 10 ♂♂ (sm, aga) on *Ficus microcarpa* leaf gall, GD; Gudja, l/o Malta International Airport, 26.ix.2016, 2 ♀♀ (sm) and 1 larva (sm) on *Ficus microcarpa* leaf gall, GD

Body length: ♀: 2400 - 3280 μm; ♂**:** 2180 - 2580 μm.

Wing type: Both sexes are macropterous.

Further notes on species: Priesner (1960), Marullo (2003), Denmark et al. (2004), Moritz (2006), Moritz et al. (2014), Funderburk et al. (2017), Mound et al. (2018) and Mound et al. (2019).

According to Mound et al. (2018) the fore tarsal tooth is lacking in males. In local specimens this feature was small but present.

Diagnosis: This species can be distinguished from *G. uzeli*, the other local congener following feature: Head with post ocellar setae i 05 - 1 times as long as post ocellar setae ii; post ocellar setae II not overlapping posterior margin of compound eye; postero-angular setae as long as discal setae (20 μm) and epimeral setae long (130 μm). In *G. uzeli*, post ocellar setae and postero angular setae are longer than as described for this species.

Gynaikothrips uzeli is extremely similar to *G. ficorum*, differing only in the length of the postero-angular and epimeral setae on the pronotum, with the postero-angulars in *G. uzeli* being approximately as long as the epimerals.

Liothrips also have fore wings with no medial constriction like in the genus *Gynaikothrips*, however they differ by the fact that the upper ocellus is found on top of the projection in front of the compound eyes, and the fact that the mouth cone in *Gynaikothrips* is broadly rounded while the mouth cone tapers to a point in *Liothrips* spp.

Biology: The life cycle of this species has been described to take between two to four weeks (Denmark et al., 2004).

Gynaikothrips ficorum is a gall inducing species described from *Ficus* spp. All stages in the life cycle of this species are found in the leaf galls of *Ficus microcarpa* (Moraceae), but adults have also been described from *Ficus elastica* (Mound et al., 1976), *F. benjamina* (Marullo & De Grazia, 2013) and *F. microcarpa* (Moritz et al., 2014). Locally adults were recorded from both *Ficus microcarpa* and *F. benjamina*. This species is commonly preyed upon by bugs of the genera *Orius* and *Macrotracheliella* (Anthocoridae) (Moritz, 2006), *Montandoniola confusa* (Funderburk et al., 2017) and *M. moraguesi* (both in Anthocoridae) (Pluot-Sigualt et al., 2009; Tavares et al., 2013). Indeed, according to Pluot-Sigualt et al. (2009) in some countries such as the Philipines, this insect is used as a means of biological control for *G. ficorum*. Mifsud et al. (2012) has recorded the presence of *M. moraguesi* in the Maltese islands. In the current study, bugs of the genus *Orius* have been recorded inside or in proximity of leaf galls produced by *G. ficorum*. Funderburk et al. (2017) also mention *Androthrips ramachandrai*, a Tubuliferan thrips, as a predator of *G. ficorum*. *A. ramachandrai* originates from India but has spread to countries where *G. ficorum* is currently found. *A. ramachandrai* has not been recorded locally.

G. ficorum has been widely recorded as a pest on *Ficus microcarpa*, forming leaf galls in summer and autumn. Moritz et al. (2014) also claimed that this species could also be a source of mechanical transmission of phytopathogenic bacteria and fungi. Kuslitzky (2013) and Loomans et al. (1997) listed the wasp *Pediobius thysanopterus* (Eulophidae) as a parasitoid for this species from Egypt and Israel.

Distribution data: This species originates from Southeast Asia (specifically India according to Priesner, 1960), but has been imported to many parts of the world with the exportation of its host plant. Vierbergen (2013) described this species from the Australian, Nearctic Neotropical and Oriental regions, the Near East and from North Africa, but without specifying which countries it was collected from. In the Euro Mediterranean region, it has been recorded from the UK (Mound et al., 1976; Mound et al., 2018), Italy and islands (Stoch, 2003; Marullo & De Grazia, 2013), Corsica (Reynaud, 2010), Slovakia (Zvarikova et al., 2020), Spain, (Priesner, 1960; Goldarazena in Ramos, 2001), Czech Republic, Malta, Crete, Greece, Portugal, the Netherlands (Vierbergen, 2013), and Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). This species was also recorded from Algeria (Priesner, 1960; Mound et al., 1976; Moritz et al., 2014), Egypt (Priesner, 1960; Moritz et al., 2014), Morocco, Libya, South Africa (Moritz et al., 2014), Israel (zur Strassen & Kuslitzky, 2012), India, Sumatra, Java, Taiwan, North America, Mexico, and the Canary Islands (Priesner, 1960). It has even been Intercepted in US from Africa (Nickle, 2003a).

Records from the Maltese Islands: *G. ficorum* was first described from the Maltese Islands by Mifsud *et al*., (2012) and is also recorded in the Maltese Islands by the website "*Fauna Europaea*" (Vierbergen, 2013).

Gynaikothrips uzeli **(Zimmermann, 1900)**

Common name: Weeping Fig Thrips

Material examined: MALTA: Msida, University of Malta grounds, 20.viii.2016, 1 ♀ (sm) on *Ficus microcarpa* leaf gall, 14 ♀♀ (sm, aga) and 2 instar larvae on *Ficus benjamina* leaf gall, GD; Msida, University of Malta grounds, 26.viii.2016, 1 ♂ (sm) and 5 ♀♀ (aga) on *Ficus benjamina* leaf gall, GD; Gudja, l/o Malta International Airport, 26.ix.2016, 2 ♂♂ (sm) on *Ficus microcarpa* leaf gall, GD.

Body length: ♀: 3200 - 3700 μm; ♂: 2800 - 2900 μm.

Wing type: Both sexes are macropterous.

Further notes on species: Moritz (2006), Borbon and Agostini (2011), Moritz et al. (2014), Yasseen Ali (2014), Collins and Philippou (2016) and Mound et al. (2019).

Mound et al. (2019) claim that the fore tarsal tooth in both sexes for this species is absent. Local specimens of both sexes of this species did however possess a fore tooth, albeit very small, on the fore tarsus.

Diagnosis: This species is different from *Gynaikothrips. ficorum*, the other locally found congener by the following features: Head with post ocellar setae i 03 - 0.5 times as long as post ocellar setae ii; post ocellar setae II considerably overlapping posterior margin of compound eye; Pronotum with a long pair of postero-angular (155 μm) and epimeral (130 μm) setae. In G. ficorum, post ocellar setae and postero angular setae are shorter than as described for this species.

Liothrips also have fore wings with no medial constriction like in the genus *Gynaikothrips,* however they differ in a number of characters as previously described in the “Diagnosis” section under the description of *G. ficorum*.

Biology: According to Moritz et al. (2014) the life cycle of this species takes 30 days to complete.

This species induces galls on the leaves of *Ficus benjamina* (Moraceae). Adults have also been recorded on *F. microcarpa*, *F. obtusa* and *F. pilosa* (Moritz et al., 2014). Locally adults have also been found on both *F. microcarpa* as well as *F. benjamina.* Bugs of the genus *Orius* (Anthocoridae) were observed inside or in proximity of the galls produced by *Gynaikothrips uzeli* in the current study. Yasseen Ali (2015) and Collins and Philippou (2016) described the Tubuliferan thrips *Androthrips ramachandrai*, a species which preys on *G. ficorum* and *G. uzeli* from Syria (Yasseen Ali, 2015) and Cyprus (Collins & Philippou, 2016). *A. ramachandrai* originates from India, but has spread to various countries where *G. uzeli* is found. *Androthrips ramachandrai* has not been recorded locally.

Lewis (1973) described the wasp *Thripasticus gentilei* (Eulophidae) as a parassitoid for this species from Italy, France and Puerto Rico.

Gynaikothrips uzeli has been observed to cause the formation of leaf galls on *Ficus benjamina*, particularly in summer and autumn. Like in the case of *G. ficorum*, Moritz et al. (2014) claimed that this species could also be a source of mechanical transmission of phytopatogenic bacteria and fungi.

Distribution data: This species originates from south East Asia where it is widespread, but has spread into other parts of the world where *Ficus benjamina* has been imported. In Europe, it has been recorded in greenhouses in Germany, and subsequently in Cyprus (Collins & Philippou, 2016). The species is also found in Southern USA, Latin America, Australia, New Caledonia (Mound et al., 2019), Indonesia, North America, Hawaii, Trinidad, Costa Rica and Kenya (Moritz et al., 2014).

Records from the Maltese islands: This species is a new record to the Maltese Islands.

Genus *Haplothrips* Amyot & Serville, 1843

This genus is one of the largest of the order Thysanoptera, listing 245 species worldwide, with most species found in the Holarctic and Old-World tropics and 80 of them recorded from Europe (Mound et al., 2018; ThripsWiki, 2020). Most of these species thrive in flowers, while some can be predatory (ThripsWiki, 2020). Five species have been recorded from the Maltese Islands in the present work. This genus includes very similar and variable species which are hard to distinguish from each other. Species belonging to this genus have the following features: a maxillary bridge linking the stylets like in the genus *Karnyothrips* (fig. 4.40c); eight-segmented antennae; no to two sense cones on antennal segment III and four on antennal segment IV; a basantra on the pronotum which is usually broader than long (fig. 4.41d); and fore wings which have a constriction in the middle (fig. 4.40a), like in the genus *Karnyothrips* and abdominal tergites (II - VII) with two pairs of sigmoid, wing retaining setae. Moreover, according to Minaei & Mound (2008), the features which distinguish the different species of this genus include: The number of sense cones on antennal segments III; the number of prominent setae on pronotum; the colour of the fore wing base; the number of duplicate cilia on the trailing edge of the fore wing; the texture of the fore wing apical cilia (whether smooth or barbed - fig. 4.46a - b); the size of the fore tarsal tooth (fig. 4.72a); the distance between campaniform sensilla on tergites VII and VIII and the presence or absence of microtrichia on the tergites (fig. 4.72b); the length of the setae S_1 on abdominal tergite VII and VIII; the length: breadth ratio of the tube (fig. 4.72c); and the shape of the male genitalia, whether pointed or spoon-shaped (fig. 4.72d). Other distinctive features according to the key by Mound et al. (2018) include: the length of the setae behind the compound eyes; as well as the shape of the extremity of the setae on the body and wings (whether pointed, blunt or capitate).

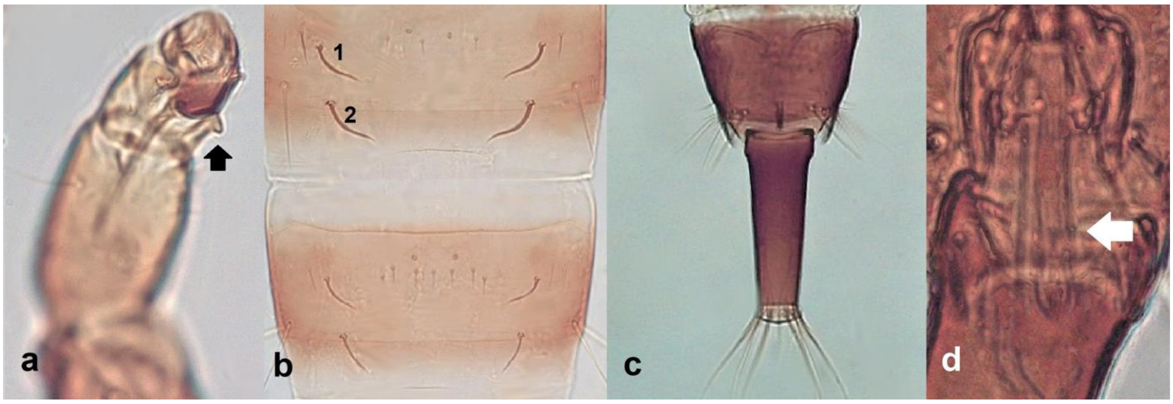

Figure 4.72: *Haplothrips* features: (**a**) fore tarsus with tooth; (**b**) abdominal tergites VII – VIII showing wing retaining segments and microtrichia; (**c**) tube; (**d**) male aedeagus.

***Haplothrips acanthoscelis* (Karny, 1910)**

Common name: -

Material examined: MALTA: Wied Għollieqa, 02.xii.2016, 4 ♀♀ (sm) on *Amaranthus viridis*, GD; Msida, University of Malta grounds 02.iv.2016, 2 ♀ (sm) on *Mercurialis annua*, GD; Wied Għollieqa, 16.iv.2018, 1 ♀ (sm) on *Ornithogalum arabicum*, GD. **GOZO:** Dwejra, 13.ix.2016, 2 ♀♀ (sm) and 3 ♂♂ (sm) on *Limonium zeraphae*, GD.

Body length: ♀: 1800 - 2240 μm; ♂: 1300 - 1560 μm.

Wing type: Both sexes are macropterous.

Further notes on species: Priesner (1964) and zur Strassen (1986).

Diagnosis: This species can be distinguished from others of the same genus by the following features: Antennal segment III with two sense cones; Head and pronotal setae have a capitate tip. In all other *Haplothrips* species except *H. tritici*, these setae have a pointed tip. In *H. setiger*, the pronotal setae are blunt-tipped, but the post ocular setae have a pointed tip. Also, in *H setiger*, the tube is 2.5 times as long as wide, while in *H. acanthoscelis*, the tube is twice as long as wide. In *H. tritici*, the post ocular setae are blunt tipped but the pronotal setae also have a pointed tip. Moreover, the brown area at the base of the fore wing and the fore tarsal tooth in *H. acanthoscelis* are very small or even absent. In *H. tritici*, these features are small but present. Species belonging to the genera *Karnyothrips* and *Neoheegeria* are similar to those of the genus *Haplothrips*, since species from both genera have wings with medial constriction as well as prominent pre-pectal plates on the pronotum. In *Karnyothrips* species, the length and breadth of the prosternal basantra are equal, while in those of the prosterna genus *Haplothrips,* the prosternal basantra is broader than long. Also, locally occurring *Karnyothrips* spp. have three sense cones on antennal segment IV, while local *Haplothrips* spp., have four sense cones on this segment. In *Neoheegeria* spp., antennal segment III bears three sense cone while antennal segment III bears none to two in *Haplothrips* spp. Moreover, In *Neoheegeria*, the number of duplicate setae on the trailing edge of the fore wing us usually 13 - 20. In *Haplothrips* species, the number duplicate setae ranges between four and nine.

Biology: No literature occurs that describes the duration of the life cycle of this species.

Haplothrips acanthoscelis was recorded from a number of different plants such as *Dianthus barbatus* (Trdan, 2001), *Frankenia hirsuta*, ?*Lactuca* sp. and.*Trigonella* cf. *rechingeri* (zur Strassen, 1986). In the Maltese Islands, this species was found on *Amaranthus viridis, Limonium zeraphae*, *Mercurialis annua* and *Ornithogalum arabicum*.

No records of this species acting as an agricultural pest exist.

Distribution data: *Haplothrips acanthoscelis* seems to be distributed throughout Europe but not including the British Isles. Vierbergen (2013) also described this species from the East Palaearctic region. This species has been recorded from Scandinavia, Denmark

(Gertsson, 2015), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Bulgaria (Karadjova & Krumov, 2015), Slovenia (Trdan, 2001), Hungary (Jenser, 2011), Albania, Austria, Central and South European Russia, Croatia, Czech Republic, France, Germany, Latvia, Lithuania, Former Yugoslav Republic of Macedonia, Poland, Switzerland (Vierbergen, 2013), Spain (Goldarazena in Ramos, 2001) Greece (zur Strassen,1986) and Italy including Islands (Stoch, 2003).

Records from the Maltese Islands: This species is a new record to the Maltese islands.

***Haplothrips aculeatus* (Fabricius, 1803)**

Common name: Grass thrips

Material examined: MALTA: Wied Qirda 06.iv.2016, 1 ♂ (sm) on *Bromus diandrus*, GD; Wied Speranza, 26.vi.2016, 1 ♂ (apterous - sm) on *Convolvulus elegantissimus*, GD; Wied Ħesri, 04.xi.2016, 1 ♂ (sm) on *Cynodon dactylon*, GD; Wied Ħesri, 04.xii.2016, 1 ♀ (sm) on *Hypericum sinuatum*, GD; Siġġiewi, private garden 1, 02.xi.2017, 1 ♂ (sm) on *Rosa* sp., GD.

Body length: ♀: 1800 - 2300 μm: ♂: 1300 - 2040 μm.

Wing type: Females are macropterous; Locally collected male was apterous.

Further notes on species: Priesner (1964), zur Strassen (1986), Moritz (2006), Minaei and Mound (2008) and Mound et al. (2018).

Diagnosis: This species can be distinguished from others of the same genus by the following features: compound eyes in some specimens have some red pigment. This feature is not found in any other locally recorded *Haplothrips* species; post ocular setae generally short (18 μm). In other species these setae are on average about 55 μm long; antennal segment III is distinctly asymmetrical and bears only one sense cone. In all other locally recorded *Haplothrips* species, antennal segment III bears two sense cones; the antero-marginal setae in *Haplothrips aculeatus* are as long as the discal setae. In all other locally recorded *Haplothrips* species these setae are distinctly longer than the discal setae.

Species of the genera *Karnyothrips* and *Neoheegeria,* like those of the genus *Haplothrips*, also have wings with medial constriction as well as prominent pre pectal plates on the pronotum however they differ in a number of characters as previously described in the “Diagnosis” section under the description of *Haplothrips acanthoscelis*.

Biology: No literature occurs that describes the duration of the life cycle of this species.

This species has been recorded on a large number of unrelated plants, implying that it is polyphagous. It has been recorded on, Cyperaceae, Juncaceae and Poaceae (Mound et al., 1976), such as *Cyperus badus* (zur Strassen, 1986), *Cynodon dactylon* and *Juncus* sp. (Tunc et al., 2012), *Hordeum distichum* (Trdan, 2001), *Avena sativa*, *Hordeum vulgare*, *Triticum aestivum*, and *Zea mays* (Trdan et al., 2005; Raspudić, et al., 2009), *Phragmites australis* (Kucharczyk & Sałapa, 2011) and also other plants including *Cichorium intybus, Cirsium arvensis, Crataegus* sp, *Dactylis glomerata, Daucus carota*, *Echinocloa crus-galli*, *Erigeron annuus, Eucalyptus* sp., *Ligustrum* sp., *Medicago sativa, Phaseolus vulgaris*, (Raspudić, et al., 2009), *Sinapis* sp., *Typha* sp.,*Verbascum* sp., *Vitis vinifera*, (Tunc et al., 2012) and *Medicago* sp. (Baderitakis et al., 2015). In the Maltese Islands, this species was found on a number of species including *Bromus diandrus*, *Convolvulus elegantissimus* *Cynodon dactylon*, *Hypericum sinuatum*, *Mercurialis annua* and *Rosa* sp.

Trdan et al. (2005) described this species as a typical prey species for *Aeolothrips intermedius*.

According to Moritz (2006), *Haplothrips aculeatus* can be found as air plankton at heights up to up to 2000 m. The author also claimed that this species can be found in coniferous cones, under bark, even in mouse nests, and barn detritus in hollow stalks, under bark and overwintering in mushrooms growing on trees.

Mound & Teulon (1995), and Moritz (2006) also described this species as a pest on cereals in Europe.

Distribution data: *Haplothrips aculeatus* is widespread in Europe and extends to Japan (Mound et al., 1976; Minaei & Mound, 2008). Vierbergen (2013) also described this species from the East Palaearctic, Nearctic and Oriental regions. It has been recorded from the UK (Mound et al., 1976; Mound et al.2018), Scandinavia, Denmark, Iceland (Gertsson, 2015), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Bulgaria (Karadjova & Krumov, 2015), Serbia & Montenegro (Andjus et al., 2001; Kucharczyk & Sałapa, 2011), Slovenia, Croatia (Trdan, 2001; Trdan et al., 2005), Poland (Tunc et al., 2012; Sierka et al., 2008), Hungary (Jenser, 2011), Belgium (Lock, 2006), Albania, Austria, the Azores, Bosnia & Herzegovina, Central, Northwest and South European Russia, Czech Republic, Estonia, France, Germany, Latvia, Lithuania, Luxembourg, Former Yugoslav Republic of Macedonia, Portugal, Switzerland, the Netherlands, Ukraine (Vierbergen, 2013), Spain (Goldarazena in Ramos, 2001), Greece (zur Strassen, 1986), Italy and Islands (Stoch, 2003) and Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016).). This species has also been recorded from Iran (Minaei & Mound, 2008; Bhatti et al., 2009), Sumatra and Java (Moritz, 2006). This species has even been intercepted in US from Europe (Nickle, 2003).

Records from the Maltese islands: This species is a new record to the Maltese islands.

***Haplothrips setiger* Priesner, 1921**

Common name: -

Material examined: MALTA: Dingli Cliffs, 11.iv.2016, 3 ♀♀ (sm) on *Glebionis coronaria*, GD; Dingli Cliffs, 24.v.2016, 2 ♀♀ (sm) on *Glebionis coronaria*, GD. **GOZO.** Qbajjar, 31.iii.2018, 1 ♀ (sm) and 1 ♂ (sm) on *Helichrysum melitense*, GD.

Body length: ♀: 2060 - 2380 μm; ♂: 2040 μm.

Wing type: Both sexes are macropterous.

Further notes on species: Priesner (1964), Moritz (2006) and Mound et al. (2018).

Diagnosis: This species can be distinguished from others of the same genus by the following features: antennal segment III pale brown to brown. In all other locally recorded

Haplothrips species, this segment is yellow in colour. Unlike in *H. aculeatus*, this segment carries two segments instead of one; fore wing tip cilia barbed, unlike all other locally recorded species except for *H. hispanicus*. In the latter species, however, the tube is only twice as long as wide, while in *H. setiger*, the tube is 2.5 times as long as wide.

Species of the genera *Karnyothrips* and *Neoheegeria,* like those of the genus *Haplothrips*, also have wings with medial constriction as well as prominent pre pectal plates on the pronotum, however they differ in a number of characters as previously described in the “Diagnosis” section under the description of *Haplothrips acanthoscelis*.

Biology: No literature occurs that describes the duration of the life cycle of this species.

Moritz (2006) described this species to occur in the flowers of deciduous Asteraceae, *such as Achillea, Crepis*, *Matricaria* and *Senecio* spp. (Mound et al.,1976) preferring dry habitats. *Haplothrips setiger* has also been recorded on *Ammophila littoralis*, *Asteriscus aquaticus,* Caryophylliaceae, (zur Strassen, 1986), *Knautia arvensis* (Trdan, 2001), *Persea americana* (zur Strassen & Kuslitzky, 2012), *Matricaria chamomilla*, *Triticum aestivum* (Raspudić et al., 2009), *Inula, Leontodon* spp., *Pyrethrum and Senecio jacobaea* (Priesner, 1964). In the Maltese Islands, adults and larvae of this species were recorded on *Glebionis coronaria* implying that this species is used as a host plant. Adults were also recorded from *Helichrysum melitense* (Asteraceae)**.** Garcia-Fayos and Goldarazena (2008) described *Haplothrips setiger*, is an important pollenator.

This species has not been recorded as an agricultural pest.

Distribution data: *Haplothrips setiger* has been recorded in Europe (Priesner, 1964; Moritz, 2006; Mound et al., 1976). Vierbergen (2013) also described this species from the East Palaearctic region and North Africa but without specifying the countries it was collected from. *H. setiger* been recorded from the UK (Mound et al., 1976), Norway, Denmark (Gertsson, 2015), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Bulgaria (Karadjova & Krumov, 2015), Slovenia (Trdan 2001), Serbia (Andjus et al., 2001), Hungary (Jenser, 2011), Croatia (Raspudić et al., 2009), Belgium (Lock, 2006), Albania, Austria, Canary Islands, Central European Russia, Cyprus, Czech Republic, France, Germany, Ireland, Sweden, Ukraine, (Vierbergen, 2013), Spain, (Goldarazena in Ramos, 2001), Italy and Islands (Stoch, 2003), Greece (zur Strassen, 1986) and Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). This species has also been recorded from Israel (zur Strassen & Kuslitzky, 2012). *H. setiger* has even been intercepted in the US from Europe (Nickle, 2003).

Records from the Maltese Islands: This species is a new record to the Maltese islands.

***Haplothrips tritici* (Kurdjimov, 1912)**

Common name: -

Material Examined: MALTA: Wied Qirda, 31.v.2016, 1 ♀ (sm) on *Hyparrhenia hirta*, GD; Pembroke, 05.xi.2018, 5 ♀♀ (sm, aga) on *Reichardia picroides*, GD.

Body length: ♀: 1760 - 2500 μm; ♂: no records.

Wing size: ♀: macropterous; ♂: no records.

Further notes on species: Priesner (1960; 1964), Minaei and Mound (2008) and Moritz (2006).

Diagnosis: This species can be distinguished from others of the same genus by the following features: post ocular setae have blunt tips. In *H. acanthoscelis*, these setae are capitate, as are the pronotal setae. In *H. tritici*, these are pointed; antennal segment III bears two sense cones, unlike in *H. aculeatus* which bears one sense cone on this segment; fore wing tip with smooth cilia, unlike *H setiger*, where these cilia are barbed. Tube twice as long as wide unlike in *H. setiger* which has a tube that is 2.5 times as long as wide.

Species of the genera *Karnyothrips* and *Neoheegeria,* like those of the genus *Haplothrips*, also have wings with medial constriction as well as prominent pre-pectal plates on the pronotum, however they differ in a number of characters as previously described in the “Diagnosis” section under the description of *Haplothrips acanthoscelis*.

Biology: No literature occurs that describes the duration of the life cycle of this species.

Haplothrips tritici has been recorded from a number of Poaceae, namely *Avena sativa* (Jenser & Tsanakakis, 1985; zur Strassen, 1986; Tunc et al., 2012), *Bromus* sp., *Hordeum sativum* and *H. vulgare* (Tunc et al., 2012), *Secale cereale* (Jenser & Tsanakakis, 1985), *Triticum aestivum* (Priesner, 1964; Trdan et al., 2005; Moritz, 2006; Tunc et al., 2012), 2009) and *T. vulgare* (Trdan, 2001). *H. tritici* has also been recorded from *Matricaria chamomilla* (Raspudić et al.,2009), *Crataegus* sp., *Euphorbia* sp., and *Quercus* sp. (Tunc et al., 2012). Locally, this species was recorded on Poaceae such as *Hyparrhenia hirta* and on *Reichardia picroides*.

Haplothrips tritici has also been recorded as a prey species for *Aeolothrips intermedius* (Trdan et al., 2005).

According to Priesner (1960; 1964), and Mound and Teulon (1995) this species has been recorded as a cereal pest in Europe.

Distribution data: *Haplothrips tritici* is widespread throughout Europe extending south through Turkey to Iran and Iraq (Minaei & Mound, 2008), but also occurs in the East Palaearctic according to Vierbergen (2013). It has been recorded from Scandinavia (Gertsson, 2015), Serbia & Montenegro (Andjus et al., 2001; Trdan et al., 2005), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvarikova et al., 2020), Croatia (Raspudić et al., 2009), Bulgaria (Karadjova & Krumov, 2015), Hungary (Priesner, 1964; Jenser, 2011), Slovenia (Trdan, 2001; Trdan et al., 2005), Albania, Austria, Belgium, Bosnia & Herzegovina, Central, Northwest and East European Russia, Czech Republic, France, Germany, Lithuania, Former Yugoslav Republic of Macedonia, Moldova, Poland, Portugal, the Netherlands, Ukraine (Vierbergen, 2013), Spain (Priesner, 1964; Goldarazena in Ramos, 2001), Italy including Sicily (Priesner, 1964; Stoch, 2003), Greece (Jenser & Tsanakakis, 1985; zur Strassen,1986) and Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016). This species has also been described from Tunisia (Belaam-Kort et al., 2020), Morocco, Syria (Priesner, 1960), Egypt (zur Strassen, 2014 as *H. cerealis*), Israel (Priesner, 1960; 1964), Iran (Bhatti et al., 2009) and from Iraq (Minaei & Mound, 2008). Moritz (2006) and Vierbergen (2013) also described this species from the Near East and North Africa, but without specifying which countries it was collected from. *H. tritici* has been intercepted in the US from the Mediterranean (Nickle, 2003).

Records from the Maltese islands: This species is a new record to the Maltese Islands.

Genus *Karnyothrips* Watson, 1923

This genus *Karnyothrips* genus is one which is weakly defined (ThripsWiki,2021). This genus shares a number of common features with the genus *Haplothrips* and includes species, such as the presence of the maxillary bridge between the stylets and the medial constriction in the fore wing, but differ in the shape of the fore tarsal tooth, and length of anal setae (Stannard, 1957; Mound et al., 2018). The pronotal basantra also tends to be squarish in shape (fig. 4.79a), being more or less as broad as long (Mound & Kibby, 1993). Species of the genus *Karnyothrips* have a Pantropical distribution and most are generally found on flowers, while others may have predatory habits. 48 species have been recognised under this genus worldwide (ThripsWiki, 2021), although (2018) and Mound et al. (2019) put doubts as to whether some of these species are correctly listed under this genus. Two species have been recorded from the Maltese Islands in this study. Features common to the locally occurring species include: both sexes macropterous; body largely dark brown; head longer than wide, with slight projection in front of compound eyes and with a pair of post ocular setae (fig. 4.79b); eyes larger dorsally than ventrally; maxillary bridge complete as in *Haplothrips* spp.; antennal segment III with two sense cones and segment IV with three (sometimes four in *Karnyothrips flavipes* according to Mound et al., 2019); pronotum with one pair of antero-lateral, two pairs of medio lateral and two pairs of postero-angular, setae; fore tarsus with a tooth which is small in females and larger in males; fore wing base clear and with a row of three pointed sub-basal setae (fig. 4.73a); abdominal tergites (II - VII) with two pairs of sigmoid, wing retaining setae, with second pair being slightly larger than the first pair on tergites III – V (fig. 4.73b); Tube which is about 0.67 times as long as wide about as long as 0.25 times the length of the head (fig. 4.73c).

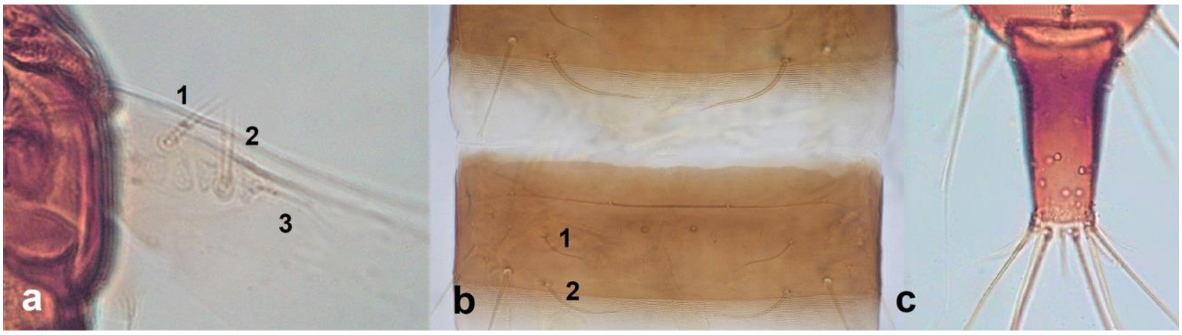

Figure 4.73: ***Karnyothrips* features:** (**a**) fore wing base with three marginal setae; (**b**) abdominal tergites II – VII with two pairs of wing retaining setae; (**c**) tube which is about 0.67 times as long as wide.

***Karnyothrips flavipes* (Jones,1912)**

Common name: -

Material Examined: MALTA: Għammieri, 16.xii.1996, 1 ♀ (sm) on dead *Coccoidea* on *Morus alba*, CF; Msida, University of Malta grounds, 11.viii.2016, 4 ♀♀ (sm, aga) on fungus possibly *Erysiphe euonymi-japonici* on *Euonymus japonicus* leaves, GD; Siġġiewi, private garden 3, 30.10.2017, 4 ♀♀ (sm, aga) on fungus, possibly *Erysiphe euonymi-japonici* on *Euonymus japonicus* leaves, GD.

Body length: ♀: 1780 - 2180 μm: ♂: no records

Wing type: ♀: macropterous; ♂: no records

Further notes on species by: Priesner (1964), Moritz et al. (2014) and Mound et al. (2019).

Diagnosis: This species differs from others of the same species by the following features: head with a pair of long (50 μm) capitate post ocular setae close to the posterior margin of the compound eye. These are shorter and more distanced from the posterior margin of the eye in the other *Karnyothrips* sp.; pronotum with five pair of prominent capitate setae. These setae are pointed in *Karnyothrips* sp.; fore wings only reach as long as abdominal segment V when closed. In the other *Karnyothrips* sp. the fore wing tip reaches up to segment VI or VIII; fore wing base clear and with a row of three capitate setae.

Haplothrips spp. share a number of common features such as the prominent prepaectal plates, the maxillary bridge and the medial constriction in the fore wing, however, the prosternal basantra is wider than long in *Haplothrips* spp. and square shaped in

Karnyothrips spp. Also, like in species of the genus *Karnyothrips*, *Liothrips* spp. also have a pair of medial posterior setae on tergites II – VII. However, *Liothrips* spp. have no medial constriction on fore wings, a feature which is clearly visible in *Karnyothrips* spp. Also, in *Liothrips* spp., the prosternal basantra is nor easily discernible. This is prominently visible in *Karnyothrips* spp.

Biology: Lewis (1973) described the life cycle for this species to be temperature dependent and to take about 15 days to complete.

Palmer and Mound (1991) described this species as a predator of Diaspididae (Hemiptera; Coccoidea). Moritz et al. (2014) claimed that *Karnyothrips flavipes* feeds on mites (Arachnida), whiteflies (Hemiptera: Aleyrodoidea), and other thrips. Moritz et al. (2014) and Mound et al. (2019) described this species as mainly predatory on small arthropods, though it can be found on dead branches, leaves, grasses and even occasionally on flowers. This species has also been associated with bamboo and Poaceae (Priesner, 1964) as well as on canopy of fruit trees feeding on scale insects (Hemiptera: Coccoidea), mites and herbivorous thrips (Hoddle et al., 2002). In the current study, this species was collected from *Morus alba*, where it was found on scale insects, and from *Erysiphe euonimi-japonici* (Erysiphales: Erysiphaceae), a parasitic fungus which grows on the cultivated shrub *Euonymus japonicus*. It may possibly have been feeding on small arthropods that may have been attracted to the fungus.

This species has not been recorded as an agricultural pest.

Distribution data: *Karnyothrips flavipes* is a species which is found across the Mediterranean. Vierbergen (2013) also described this species from the East Palaearctic, Afrotropical, Australian, Neotropical and Oriental regions, the Near East and from North Africa but without specifying the countries where it was collected from. This species has been recorded from Albania, Cyprus, Portugal, (Vierbergen 2013), Spain (Goldarazena in Ramos, 2001), Italy and Sardinia (Stoch, 2003; Marullo & De Grazia, 2013) and Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). It has also been recorded from Egypt (Moritz et al., 2014; zur Strassen, 2014), Kenya, Tanzania, Uganda (Moritz et al., 2014) and Israel, (zur Strassen &

Kuslitzky, 2012) as well as from Hawaii (Mound & Matsunaga, 2017). *K. flavipes* has even been intercepted in US from Europe (Nickle, 2003a).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Genus *Liothrips* Uzel, 1895

This is another large genus with over 280 species described worldwide. It is a relatively little-known genus of leaf feeding species. Six species have been recorded from Europe (Mound et al., 2018) while two species have been identified from the Maltese Islands in current study. Features common to these species include: head with the anterior-most ocellus situated on a projection in front of the compound eyes and also with short post-ocular setae (fig. 4.74a); antennal segment III with one and segment IV with three sense cones; pronotum with five pairs of major setae; metathorax with longitudinal lines of sculpture (fig. 4.74b); fore tarsi lacking tooth (fig. 4.47c - d); fore wing with no medial constriction and with duplicate setae on trailing edge (fig. 4.40b); tergites with two pairs of wing retaining setae; tube around twice as long as the base width (fig. 4.47c). Loomans et al. (1997) listed the eupholid wasp species *Entedonastichus gaussi* and *Thripasticus gentilei* (Eupholidae) as parasitoids for this genus.

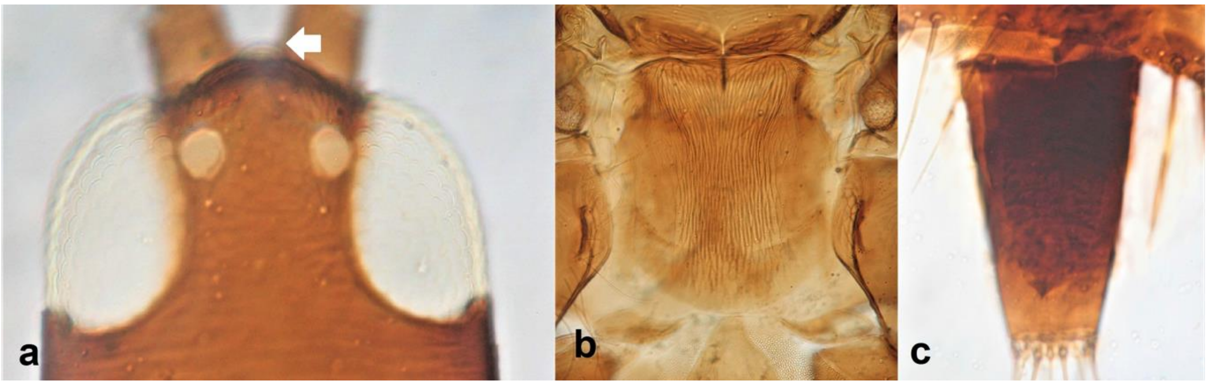

Figure 4.74: ***Liothrips* features:** (**a**) head showing top ocellus on a projection at anterior tip of head; (**b**) metathorax showing sculpture; (**c**) tube approximately twice as long as the base width.

***Liothrips oleae* (Costa, 1857)**

Common name: -

Material examined: MALTA: Msida, University of Malta, 29.ix.2016, 2 ♀♀ (sm) from *Olea europaea* leaf gall, GD.

Body length: ♀: 2000 μm; ♂: no records

Wing type: ♀: macropterous; ♂: no records

Further notes on species: Priesner (1964), Marullo and Vono (2017) and Minaei and Mound (2014).

Diagnosis: This species can be distinguished from *L. reuteri*, the other local congener, by the following features: post ocular setae well developed. These are very short in *Liothrips reuteri*; antennal segment III about 1.3 times longer than segment IV. This segment is shorter in *L. reuteri*; fore tibiae pale. Legs are uniformly dark in *L. reuteri*; medial posterior setae on tergites II-VII missing. These are present in *L. reuteri*.

The local *Karnyothrips spp.* also has a pair of medial posterior setae on tergites II – VII, Species of the genus *Karnyothrips* have medially constricted fore wings and a clearly distinct basantra on the pronotum. Neither of these features are present in *Liothrips* spp. *Gynaikothrips* spp. like *Liothrips* spp., have wings with no medial constriction, however, in *Liothrips* spp., the topmost ocellus is found on top of a projection on the foremost region of the head, just behind the base of the antennae. This feature is absent in *Gynaikothrips* spp. Also, Mouthparts in *Gynaikothrips* spp. are usually rounded but pointed in *Liothrips* spp., while, the tips of body setae on *Gynaikothrips* spp. are pointed. In *Liothrips* spp., tips of body setae are capitate.

Biology: Marullo and Vono (2017) described the life cycle for this species to take around 35 days at environmental temperatures of 20 to 28 °C.

This species overwinters in cracks in the bark of *Olea europaea* (Oleaceae) and reproduces in spring (Marullo, 2003; Marullo & Vono, 2017). Locally, the species was also collected from *Olea europaea*.

Liothrips oleae has been described as a pest on olive trees where it causes the formation of leaf galls (Priesner, 1964; Marullo, 2003; Marullo & Vono, 2017). Lewis (1973) lists the fly *Adelgimyza tripidiperda* (Cecidomyiidae) and wasp *Tetractichus gentilei*

(Eulophidae) as parasitoids for this species, with the first being recorded in Italy, while the second in Italy, France and Puerto Rico. Loomans et al. (1997) described the wasp *Entedonastichus gaussi* (Eulophidae) as a parassitoid for this species from Central Europe.

Distribution data: This species is widespread in the Mediterranean region. Vierbergen also described this species from the Near East and from North Africa, but without specifying the countries where it was collected from. It has been specifically recorded from Canary Islands, Croatia, France including Corsica, Poland, Portugal, (Vierbergen 2013), Spain (Goldarazena in Ramos, 2001), Italy (Stoch, 2003; Marullo & De Grazia, 2013; Marullo & Vono, 2017; 2019) and Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). *Liothrips oleae* has also been recorded from Tunisia (Belaam-Kort et al., 2020), Israel (zur Strassen & Kuslitzky, 2012), Kenya and Ethiopia (Marullo, 2003).

Records from the Maltese Islands: This species was however described from the Maltese Islands by Haber and Mifsud (2010). In their work, the authors describe collected material including specimens for this species. This material could not be traced in the current study.

***Liothrips reuteri* (Bagnall, 1913)**

Common name: -

Material examined: GOZO: Ramla Bay, 14.viii.2017, 5 ♀♀ (sm, aga) and 2 ♂♂ (sm) on *Tamarix africana*, GD.

Body length: ♀: 2600 μm; ♂: 2120 - 2380 μm.

Wing type: Both sexes are macropterous.

Further notes on species: Priesner (1960; 1964), De Marzo and Ravazzi (2005, as *Ataliothrips reuteri*) and Minaei and Mound (2014). The latter author also described the presence of micropterous individuals. All specimens collected in the current study were macropterous.

Diagnosis: This species is different from *Liothrips oleae*, the other local congener, by the following features: post ocular setae very short. These are well developed in *L. oleae*;

antennal segment III about 1.1 times longer than segment IV. This segment is longer in *L. oleae*; legs are uniformly dark. Fore tibiae are pale. in *L. oleae*; medial posterior setae on tergites II-VII present. These are missing in *L. oleae*.

The local *Karnyothrips spp.* also has a pair of medial posterior setae on tergites II – VII, Species of the genus *Karnyothrips* have medially constricted fore wings and a clearly distinct basantra on the pronotum. However, they differ in a number of characters as previously described in the "diagnosis" section under the description of *Liothrips oleae*.

Biology: No literature occurs that describes the duration of the life cycle of this species.

Various authors (e.g. Priesner, 1960; De Marzo & Ravazzi, 2005; Marullo & De Grazia, 2013) described this species from *Tamarix africana* (Tamaricaceae). Jenser (1982) also recorded this species from *Juncus* sp. Locally this species was collected from leaves and twigs of *Tamarix africana*.

This species has not been recorded as an agricultural pest.

Distribution data: This species is widespread in South Europe (Priesner, 1960:1964) and across the Mediterranean basin, including North Africa, India and Yemen (De Marzo & Ravazzi, 2005). It has been recorded from Spain (Goldarazena in Ramos, 2001) and South Italy (De Marzo & Ravazzi, 2005; Marullo & De Grazia, 2013). *L. reuteri* has also been recorded from Tunisia (Jenser, 1982), Morocco, Algeria (Priesner, 1960), Egypt (Priesner, 1960; zur Strassen, 2014), India (Priesner, 1960) and Israel (zur Strassen & Kuslitzky, 2012).

Records from the Maltese islands: This species is a new record to the Maltese Islands.

Genus Neoheegeria Schmutz, 1909

A genus of large sized thrips species (2800 - 3400 μm) that are described from South-eastern Europe (Mound et al., 2018) and Iran (ThripsWiki, 2020) on flowers of Lamiaceae. Antennal segment III typically has three sense cones. Mound et al. (2018) mention five species placed in the genus *Neoheegeria* (Minaei et al., 2018). One species has been recorded from the Maltese Islands in the current study. Features common to these species include: both sexes macropterous; head with pointed post-ocular setae; antennal segment III with three and segment IV with four sense cones; pronotum with five pairs of pointed setae; fore wing with small brown area, with three pointed sub-basal setae arranged in a triangle and with 12-18 duplicate cilia; abdominal setae with two pairs of wing retaining setae; Tergites VII with no microsetae and with distance between campaniform sensilla about 0.5 times distance of sensilla on segment VIII; S_1 on tergite VII longer than S_1 on tergite VIII (fig.4.75a); Tube longer than twice tube base width and about 0.25 times the length of head (fig.4.75b); Aedeagus with pointed tip (fig.4.75c).

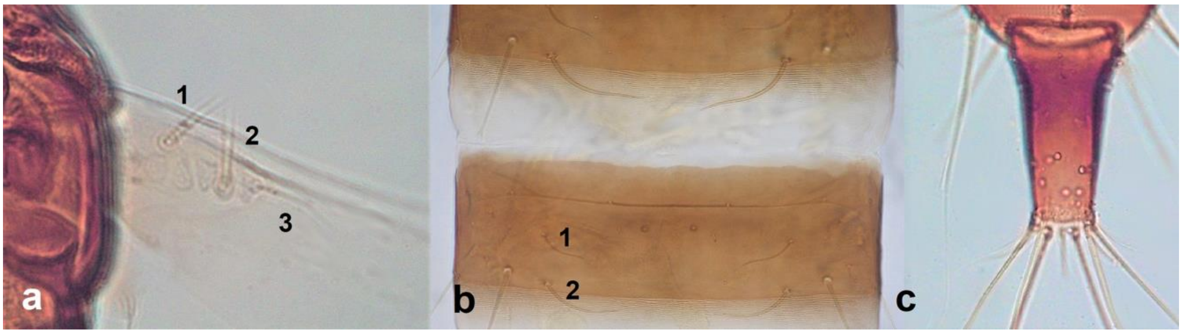

Figure 4.78: *Neoheegeria* features: (**a**) tergites VII-VIII showing setae; (**b**) tube longer than twice base width and about 0.25 times the length of head; (**c**) male aedeagus with pointed tip.

***Neoheegeria dalmatica* Schmutz, 1909**

Common name: -

Material examined: MALTA: Wied Ħesri, 15.iv.2016, 9 ♀♀ (sm) on *Phlomis fruticosa*, GD; Wied Ħesri, 20.iv.2017, 2 ♀♀ (sm) and 1 ♂ (sm) on *Phlomis fruticosa*, GD; Wied Ħesri, 03.04.2018, 6 ♀♀ (sm) and 1 ♂ (sm) on *Phlomis fruticosa*, GD; Għaxqet l-Għajn l/o Naxxar 28.04.2018, 1 ♀ (sm), 3 ♀♀ (sm) and 1 ♂ (sm) on *Phlomis fruticosa*, GD.

Body length: ♀: 2400 - 3400 μm; ♂: 2760 - 2800 μm.

Wing type: Both sexes are macropterous.

Further notes on species: Priesner (1960), Minaei et al. (2007) and Mound et al. (2018).

Diagnosis: This species has fore wings which are constricted in the middle and the maxillary stylets have a maxillary bridge, like in the Genera *Haplothrips* and *Karnyothrips*, the fore wing is constricted in the middle. However, unlike in *Karnyothrips*, the length: breadth ratio of the basantra in this genus is wider than long. Species of the genus Haplothrips also have tha same length: breadth ratio in the basantra, but the number of sense cones in antennal segment III of *Neoheegeria* is three rather than one or two (as in *Haplothrips*).

Biology: No literature occurs that describes the duration of the life cycle of this species.

This species is found on Lamicaeae (Mound et al., 2018). Priesner (1960) states that in southern Europe, this species occurs in the flowers of *Phlomis fruticose* (Lamiaceae). In the Maltese Islands, both adults and larvae were collected from this plant. Implying that this plant is used as a host by this species.

Neoheegeria dalmatica has not been described as an agricultural pest.

Distribution data: This species is distributed in South Eastern Europe (Priesner, 1960; Mound et al., 2018). Vierbergen (2013) also described this species from the Near East and North Africa but without specifying the countries where it was collected from. This speces has been recorded from Spain (Goldarazena in Ramos, 2001), Hungary (Jenser, 2011), Albania, Croatia, Czech Republic, France, Germany, Greece, Crete, Poland, Romania, the Netherlands (Vierbergen, 2013) Italy including Sicily (Stoch, 2003) and Turkey (Tunc & Hastenpflug-Vesmanis, 2016). It has also been recorded from Egypt (Priesner, 1960; zur Strassen, 2014), Palestine (Priesner, 1960) and Israel (zur Strassen & Kuslitzky, 2012).

Records from the Maltese Islands: This species is a new record to the Maltese Islands.

Species of Tubulifera identified to genus level

A number of specimens identified as tubuliferans were also collected from the Maltese Islands in the current study but could not be identified to species level. Like in the case of the Terebrantian species that were not identified to species level, these tubuluferan species were also omitted from the species descriptions and the dichotomous key included in this chapter. Such specimens include:

***Karnyothrips* sp.**

Material examined: MALTA: Wied Qirda, 06.iv.2016, 1 ♂ (sm) on *Bromus madritensis*. GD; Wied Qirda, 31.v.2016, 2 ♀♀ (sm) on *Hyparrhenia hirta*. GD; Wied Ħesri, 14.x.2016, 2 ♀♀ (sm) on *Hyparrhenia hirta*, GD; Lapsi, 09.x.2017, 2 ♂♂ (sm) on *Hyparrhenia hirta*, GD.

Body length: ♀: 2020 - 2400 μm; ♂: 1780 - 1940 μm.

Wing type: Both sexes are macropterous.

Comments: This species did not match descriptions of described *Karnyothrips* species recorded in the Mediterranean region. It is likely a new species to science but more research on this species needs to take place involving comparing with type specimens belonging to the same genus.

Diagnosis: Head is longer than wide with sides slightly convex, three short pairs of widely spaced ocellar setae behind posterior ocelli and pair of short (35 μm) pointed post ocular setae as long as distance between base of seat and compound eye. Maxillary stylets "V" shaped and reaching well below the post ocular setae. Palpi 2-segmented and mouth cone extending as far as 0.25 times the length of the pronotum. Pronotum with one pair of anterior (20 μm) and two pairs of long (40 μm, 15 μm) and posterior pairs of setae, all pronotal setae being pointed. Mesopresternum is complete but very thinned out in the middle. Mesonotum with spinula on endofurca. Metanotum with weak sculpture lines medially and with no spinula on endofurca and with medial short median setae towards middle of segment. Metathoracic campaniform sensilla are absent. Fore tarsi 1-segmented and with a small apical tooth in females and large in males. Fore wings with a small brown area at base, with a row of three, pointed sub-basal setae (25 μm) and with seven to eight duplicate cilia on the post margin. S_1 setae on abdominal tergite VIII have a pointed apex and are as long as, or slightly longer than the tube. Abdominal tergite IX with pointed setae, S_1 (65 μm) being slightly longer than tube base width. Tube about 1.8 times longer than tube base width and about 0.25 times the length of head. Anal setae 1.1 times longer than tube. Aedeagus 105 μm long and with tubular pseudovirga (60 μm) with constriction towards tip.

This species can be distinguished from others of the same genus by the following features: head with a pair of short (35 μm) capitate post ocular setae close to the posterior margin of the compound eye. These are longer and situated closer to the posterior margin of the eye in *Karnyothrips flavipes*; pronotum with five pair of prominent pointed setae. These setae are capitate in *K. flavipes and K. melaleucus*, a congener which occurs in Europe but has not been recorded from the Maltese Islands; fore wings reach up to segment VI or VIII when closed. In *K. flavipes*, fore wings only reach up to abdominal segment V; fore wing a small brown area at the base. This area is clear in *K. flavipes*; sub-basal setae are pointed. These are capitate in *K. flavipes;* fore wing with seven to eight duplicate cilia. In *K, melaleucus* the number of duplicate setae is one to two, while in *K. flavipes*, the number of duplicate setae is four; fore tarsal tooth in females is small. In *K. flavipes*, the tooth medium sized in females; tube is about 1.8 times as long as the tube base width and conical in shape. In *K flavipes*, the tube is twice as long as tube base width and only slightly conical in shape; tergite IX with pointed setae, S_1 are 65 μm and only slightly longer than tube base width. In *K flavipes,* these setae are long and about 1.5 times longer than tube base width; anal setae about slightly longer than tube. In this species, anal setae are 1.5 times longer than tube.

Biology: During the current study, this species was recorded on grasses including *Bromus madritensis* and on *Hyparrhenia hirta.* The other species of *Karnyothrips* that were recorded on Poaceae include *K. alpha* (India) on bamboo and sugar cane; *K. expandosus* (Philippines) on *Saccharum*; *K. melaleucus* (subtropical regions including Europe) a predator which is found on grass, bamboo and dead leaves; *K. ochropezus* (Panama) under dead grass and leaves; and *K. yoshi* (Japan) a fungus feeder recorded on *Phragmites communis* tussocks (Thripswiki, 2021).

***Liothrips* sp.**

Material Examined: MALTA: Il-Ballut l/o M'Xlokk, 09.x.1994, 2 ♂♂ (sm) from *Suaeda vera*, DM.

Body length: 2274 - 2344 μm

Wing type: macropterous.

Comments: These specimens could not be identified to species level, in part because they were not recorded from plants where *Liothrips* species typically occur on.

***Macrophthalmothrips* sp.**?

Material examined: MALTA: Fawwara, 22.i.2005 1 ♀ (sm) from malaise trap, DM.

Body length: 1897 μm

Wing type: macropterous.

Comments: This specimen was tentatively identified to belong to the genus *Macropthalmothrips,* from the fact that the eyes were confluent a feature typical of this genus, however, owing to the fact that the specimen was badly mounted and that the genus *Macrophthalmothrips* is one of tropical distribution, the identity of the specimens could not be confirmed.

***Phlaeothrips* sp.**

Material examined: MALTA: Buskett, 29.v.2017, 1 ♀ (sm) from Malaise trap, DM.

Body length: 2779 μm

Wing type: macropterous.

Comments: It was suggested by Dr. Arturo Goldarazena that this specimen may belong to the genus *Phlaeothrips*.

Summary of the Thysanoptera of the Maltese Islands

Table 4.4 summarises the species which have been recorded in the Maltese Islands both in this work as well as from previous literature.

Table 4.4 Table showing a checklist of the thrips species collected in the Maltese Islands

Suborder	Family	Subfamily	Species No.	Species	Status
TEREBRANTIA	Aeolothripidae	-	01	*Aeolothrips gloriosus*	New record
			02	*Aeolothrips intermedius*	New record
			03	*Aeolothrips melisi*	New record
			04	*Aeolothrips tenuicornis*	Vierbergen (2013)
			05	*Franklinothrips megalops*	New record
			06	*Rhipidothrips brunneus*	New record
			07	*Rhipidothrips gratiosus*	New record
			08	*Rhipidothrips niveipennis*	New record
			09	*Rhipidothrips unicolor*	New record
	Melanthripidae		10	*Melanthrips ficalbii*	New record
			11	*Melanthrips fuscus*	Vierbergen (2013)
			12	*Melanthrips knechteli*	New record
			13	*Melanthrips libycus*	zur Strassen (2003)
	Stenurothripidae		14	*Holarthrothrips tenuicornis*	New record
	Thripidae	Dendrothripinae	15	*Dendrothrips saltator*	New record
		Panchaetothripinae	16	*Heliothrips hemorrhoidalis*	Mifsud & Watson (1997)
			17	*Hercinothrips femoralis*	New record
		Thripinae	18	*Anaphothrips sudanensis*	New record
			19	*Aptinothrips rufus*	New record
			20	*Asphodelothrips croceicollis*	New record
			21	*Bregmatothrips dimorphus*	New record
			22	*Ceratothrips ericae*	New record
			23	*Chirothrips hamatus*	New record
			24	*Chirothrips manicatus*	New record
			25	*Chirothrips meridionalis*	New record
			26	*Echinothrips americanus*	New record
			27	*Franklinella occidentalis*	Mifsud & Watson (1997)
			28	*Frankliniella schultzei*	New record
			29	*Limothrips angulicornis*	New record
			30	*Limothrips cerealium*	New record
			31	*Odontothrips meliloti*	New record
			32	*Oxythrips ajugae*	New record
			33	*Pezothrips kellyanus*	New record
			34	*Prosopothrips nigriceps*	New record
			35	*Tenothrips discolor*	Mound & Palmer (1973)
			36	*Thrips australis*	New record
			37	*Thrips major*	New record
			38	*Thrips simplex*	New record
			39	*Thrips tabaci*	Saliba, 1968
			40	*Thrips* cf. *tarfayensis*	New record
TUBULIFERA	Phlaeothripidae	Idolothripinae	41	*Bolothrips dentipes*	New record
			42	*Bolothrips insularis*	New record
			43	*Priesneriella mavromoustakisi*	New record
		Phlaeothripinae	44	*Gynaikothrips ficorum*	Mifsud et al. (2012)
			45	*Gynaikothrips uzeli*	New record
			46	*Haplothrips acanthoscelis*	New record
			47	*Haplothrips aculeatus*	New record
			48	*Haplothrips setiger*	New record
			49	*Haplothrips tritici*	New record
			50	*Karnyothrips flavipes*	New record
			51	*Liothrips oleae*	Haber & Mifsud (1998)
			52	*Liothrips reuteri*	New record
			53	*Neoheegeria dalmatica*	New record

Dietary Preferences

Tables 4.5 - 4.7 summarize the dietary preferences of the Thysanoptera fauna recorded from the Maltese Islands in the current study. Table 4.4 distinguishes between the facultative and obligatory predators, the phytophagous and the mycophagous species (data obtained from literature such as Priesner, 1960; Marullo, 2002; 2004; Marullo & Meduri, 2006; zur Strassen, 2003; and Mound et al., 2018). Table 4.5 describes the preferences of host plants of the facultative predator and phytophagous species. Table 4.6 specifies the plant regions where the thrips species were collected. The data for this table was obtained from the material collected in the current study as well as from literature descriptions (such as Priesner, 1960; zur Strassen, 2003; Mound et al., 2018; and Mound et al., 2019). Data from the collected material as well as from literature matched fully in this exercise.

Table 4.5 Table showing feeding preferences of the Thysanoptera of the Maltese Islands

No.	Species	Obligate predators	Facultative predators	Phytophagous	Mycophagous
01	*Aeolothrips gloriosus*		✓	✓	
02	*Aeolothrips intermedius*		✓	✓	
03	*Aeolothrips melisi*		✓	✓	
04	*Aeolothrips tenuicornis*		✓	✓	
05	*Franklinothrips megalops*	✓			
06	*Rhipidothrips brunneus*			✓	
07	*Rhipidothrips gratiosus*			✓	
08	*Rhipidothrips niveipennis*			✓	
09	*Rhipidothrips unicolor*			✓	
10	*Melanthrips ficalbii*			✓	
11	*Melanthrips fuscus*			✓	
12	*Melanthrips knechteli*			✓	
13	*Melanthrips lybicus*			✓	
14	*Holarthrothrips tenuicornis*			✓	
15	*Dendrothrips saltator*			✓	
16	*Heliothrips hemorrhoidalis*			✓	
17	*Hercinothrips femoralis*			✓	
18	*Anaphothrips sudanensis*			✓	
19	*Aptinothrips rufus*			✓	
20	*Asphodelothrips croceicollis*			✓	
21	*Bregmatothrips dimorphus*			✓	

Table 4.5 Table showing feeding preferences of the Thysanoptera of the Maltese Islands (continued)

No.	Species	Obligate predators	Facultative predators	Phytophagous	Mycophagous
22	*Ceratothruipos ericae*			✓	
23	*Chirothrips hamatus*			✓	
24	*Chirothrips manicatus*			✓	
25	*Chirothrips meridionalis*			✓	
26	*Echinothrips americanus*			✓	
27	*Frankliniella occidentalis*		✓	✓	
28	*Frankliniella schultzei*			✓	
29	*Limothrips angulicornis*			✓	
30	*Limothrips cerealium*			✓	
31	*Odontothrips meliloti*			✓	
32	*Oxythrips ajugae*			✓	
33	*Pezothtrips kellyanus*			✓	
34	*Prosopothrips nigriceps*			✓	
35	*Tenothrips discolor*			✓	
36	*Thrips australis*			✓	
37	*Thrips major*			✓	
38	*Thrips simplex*			✓	
39	*Thrips tabaci*		✓	✓	
40	*Thrips tarfayensis*			✓	
41	*Bolothrips dentipes*				✓
42	*Bolothrips insularis*				✓
43	*Priesneriella mavromoustakisi*				✓
44	*Gynaikothrips ficorum*			✓	
45	*Gynaikothrips uzeli*			✓	
46	*Haplothrips acanthoscelis*			✓	
47	*Haplothrips aculeatus*			✓	
48	*Haplothrips setiger*			✓	
49	*Haplothrips tritici*			✓	
50	*Karnyothrips flavipes*	✓			
51	*Liothrips oleae*			✓	
52	*Liothrips reuteri*			✓	
53	*Neoheegeria dalmatica*			✓	
n: 53 species		**2**	**6**	**48**	**3**

Table 4.6 Table showing feeding preferences of the phytophagous Thysanoptera of the Maltese Islands as found in the present study

Thrips species	Plants* on which thrips were collected during the present study	Plant Family	Mono-phagous	Oligo-phagous	Poly-phagous	Inconclusive Data
Aeolothrips gloriosus	*Laurus nobilis* *Rhamnus alaternus* *Pistacea lentiscus*	Lauraceae Rhamnaceae Anacardiaceae				✓
Aeolothrips intermedius	*Gladiolus* sp. *Glebionis coronaria* ***Pallenis spinosa*** *Asphodelus ramosus* *Avena* sp. *Hyparrhenia hirta*	Iridaceae Asteraceae Asteraceae Asparagales Poaceae Poaceae	✓			
Aeolothrips melisi	*Cakile maritima* *Capparis orientalis* *Tamarix africana* *Medicago marina*	Brassicaceae Capparaceae Tamaricaceae Fabaceae				✓
Aeolothrips tenuicornis	*Galium* sp. *Hedysarum coronarium* *Rosa* sp. *Silene colorata* *Ranunculus asiaticus* *Argyranthemum frutescens* *Glebionis coronaria* *Reichardia picroides* *Capparis orientalis* *Convolvulus arvensis* *Convolvulus althaeoides* *Periploca angustifolia* *Malva arborea* *Gladiolus communis* *Cynodon dactylon* ***Pipatherum milliaceum***	Rubiaceae Fabaceae Rosaceae Caryophyllaceae Ranunculaceae Asteraceae Asteraceae Asteraceae Capparaceae Convolvulaceae Convolvulaceae Apocynaceae Malvaceae Iridaceae Poaceae *Poaceae*	✓			
Rhipidothrips brunneus	*Bromus diandrus*	Poaceae				✓
Rhipidothrips gratiosus	*Medicago* sp. *Gladiolus communis* ***Avena sterilis*** *Cynodon dactylon*	Fabaceae Iridaceae Poaceae Poaceae	✓			
Rhipidothrips niveipennis	*Ficus microcarpa* *Avena sterilis*	Moraceae Poaceae				✓
Rhipidothrips unicolor	***Stipa capensis***	Poaceae	✓			
Melanthrips ficalbii	*Galium aparine*	Rubiaceae				✓
Melanthrips fuscus	*Rosa* sp. *Mercurialis annua* *Silene colorata* ***Brassica rapa*** *Lobularia maritima* *Ranunculus asiaticus* *Acacia saligna* *Potentilla reptans* *Cerinthe major* *Asphodelus ramosus*	Rosaceae Euphorbiaceae Caryophyllaceae **Brassicaceae** Brassicaceae Ranunculaceae Fabaceae Rosaceae Boraginaceae Asparagales	✓			
Melanthrips knechteli	*Mercurialis annua* *Ranunculus asiaticus* *Cerinthe major*	Euphorbiaceae Ranunculaceae Boraginaceae				✓
Melanthrips lybicus	*Rosa* sp. *Silene colorata* *Trifolium nigrescens* *Medicago sp.* *Brassica oleracea* var. *bortyrtis* ***Brassica rapa*** *Cakile maritima* ***Diplotaxis tenuifolia*** *Ranunculus asiaticus* *Bromus diandrus*	Rosaceae Caryophyllaceae Fabaceae Fabaceae Brassicaceae Brassicaceae Brassicaceae Brassicaceae Ranunculaceae Poaceae		✓		
Holarthrothrips tenuicornis	***Phoenix dactylifera*** *(Pennisetum setaceum)*	Arecaceae Poaceae	✓			

Table 4.6 Table showing feeding preferences of the phytophagous Thysanoptera of the Maltese Islands as found in the present study (continued)

Thrips species	Plants* on which thrips were collected	Plant Family	Mono-phagous	Oligo-phagous	Poly-phagous	Inconclusive Data
Dendrothrips saltator	***Ferula melitensis*** ***Foeniculum vulgare***	Apiaceae Apiaceae		✓		
Heliothrips haemorrhoidalis	*Viburnum* sp. *Apium graveolens*	Adoxaceae Apiaceae				✓
Hercinothrips femoralis	***Hippeastrum* sp.** ***Origanum marjorana*** *Ocimum basilicum* *Calendula officinalis*	Amaryllidaeceae Lamiaceae Lamiaceae Asteraceae			✓	
Anaphothrips sudanensis	*Cynodon dactylon*	Poaceae				✓
Aptinothrips rufus	***Hyparrhenia hirta*** ***Avena sterilis*** *Triticum aestivum* *Hordeum leporinum* *Stipa capensis* *Plantago major* *Convolvulus arvensis* *Medicago marina*	Poaceae Poaceae Poaceae Poaceae Poaceae Plantaginaceae Convolvulaceae Fabaceae		✓		
Asphodelothrips croceicollis	***Asphodelus ramosus*** *Erica multiflora* *Glebionis coronaria*	Asparagales Ericaceae Asteraceae	✓			
Bregmatothrips. dimorphus	*Pipatherium milliaceum* ***Cynodon dactylon***	Poaceae **Poaceae**	✓			
Ceratothrips ericae	*Limbarda crithmoides* *Helicrhysum melitense*	Asteraceae Asteraceae				✓
Chirothrips hamatus	*Lithospermum arvense*	Boraginaceae				✓
Chirothrips manicatus	*Koeleria cristata* *Phragmites australis* ***Arundo donax*** *Triticum aestivum* *Hyparrhenia hirta* *Avena sterilis*	Poaceae Poaceae Poaceae Poaceae Poaceae Poaceae	✓			
Chirothrips meridionalis	*Hyparrhenia hirta* ***Arundo donax***	Poaceae Poaceae	✓			
Echinothrips americanus	*Salvia officinalis* ***Azalea indica***	Lamiaceae Ericaceae	✓			
Frankliniella occidentalis	*Gerbera* sp. *Solanum melanogena* *Dianthus caryophyllus* *Chrysanthemum* sp. *Fragraria x ananassia* *Diplotaxis tenuifolia* *Narcissus tazzetta* *Marticaria chamomilla* *Pallenis spinosa* *Avena sterilis* *Foeniculum vulgare* *Tamarix africana* *Malva arborea* *Ipomoea carnosa* *Yucca gloriosa* *Lactuca sativa* *Trifolium nigrescens*	Asteraceae Solanaceae Caryophyllaceae Asteraceae Rosaceae Brassicaceae Amaryllidiaceae Asteraceae Asteraceae Poaceae Apiaceae Tamaricaceae Malvaceae Convolvulaceae Asparagaceae Ulvaceae Fabaceae				✓
Frankliniella schultzei	*Rosa* sp.	Rosaceae				✓
Limothrips angulicornis	*Avena* sp.	Poaceae				✓
Limothrips cerealium	*Bromus diandrus* *Hyparrhenia hirta* *Mentha pulegium* *Hordeum leporinum* *Avena sterilis* *Triticum aestivum* *Brassica rapa* *Glebionis coronaria* *Trifolium nigrescens*	Poaceae Poaceae Poaceae Poaceae Poaceae Poaceae Brassicaceae Asteraceae Fabaceae				✓
Odontothrips meliloti	*Hedysarum coronarium* *Medicago* sp. *Medicago arborea* *Medicago marina* *Lotus ornithopodioides*	Fabaceae Fabaceae Fabaceae Fabaceae Fabaceae				✓

Table 4.6 Table showing feeding preferences of the phytophagous Thysanoptera of the Maltese Islands as found in the present study (continued)

Thrips species	Plants* on which thrips were collected	Plant Family	Mono-phagous	Oligo-phagous	Poly-phagous	Inconclusive Data
Oxythrips ajugae	***Pinus halepensis***	**Pinaceae**	✓			
Pezothrips kellyanus	*Rosa* sp.	Rosaceae				✓
Prosopothrips nigriceps	*Reichardia picroides*	Asteraceae				✓
	Hedysarum capitatum	Fabaceae				
	Silene colorata	Caryopyhllaceae				
Tenothrips discolor	*Limbarda crithmoides*	Asteraceae				✓
Thrips australis	*Sambucus nigra*	Adoxaceae				✓
	Schinus terebinthifolius	Anacardiaceae				
	Asphodelus ramosus	Asparagales				
	Smilax aspera	Smilacaceae				
	Ceratonia siliqua	Fabaceae				
	Solandra maxima	Solanaceae				
	Eriobotrya japonica	Rosaceae				
Thrips major	*Erica multiflora*	Ericaceae		✓		
	Rosa sp.	Rosaceae				
	Prunus persica	**Rosaceae**				
	Eriobotrya japonica	Rosaceae				
	Narcissus tazzetta	Amaryllidiaceae				
	Pittosporum tobira	Pittosporaceae				
	Laurus nobilis	Lauraceae				
	Stephanotis floribunda	Apocynaceae				
	Bromus madritensis	Poaceae				
	Olea europaea	Oleaceae				
	Tropaeolum majus	Tropaeolaceae				
	Lonicera caprifolium	Caprifoliaceae				
	Glebionis coronaria	Asteraceae				
	Quercus robur	Fagaceae				
	Asphodelus ramosus	Asparagales				
	Solandra maxima	Solanaceae				
	Azalea indica	Ericaceae				
	Rhamnus alaternus	Rhamnaceae				
	Cercis silquastrum	Fabaceae				
	Pistacea lentiscus	Anacardiaceae				
	Cucurbita sp.	Cucurbitaceae				
	Citrus limon	Rutaceae				
Thrips simplex	*Gladiolus sp.*	Iridaceae				✓
Thrips tabaci	***Daucus carota***	Apiaceae	✓			
	Foeniculum vulgare	Apiaceae				
	Limbarda crithmoides	Asteraceae				
	Matthiola bicornis	Brassicaceae				
	Fragraria x ananassia	Rosaceae				
	Prunus persica	Rosaceae				
	Eriobotrya japonica	Rosaceae				
	Asphodelus ramosus	Asparagaceae				
	Pittosporum tobira	Pittosporaceae				
	Stephanotis floribunda	Apocynaceae				
	Schinus terebinthifolius	Anacardiaceae				
	Tropaeolum majus	Tropaeolaceae				
	Laurus nobilis	Lauraceae				
	Parietaria judaica	Urticaceae				
	Hypericum sinuatum	Hypericaceae				
	Hyparrhenia hirta	Poaceae				
	Quercus robur	Fagaceae				
	Medicago sp.	Fabaceae				
	Tamarix africana	Tamaricaceae				
	Ipomoea carnosa	Convolvulaceae				
	Anacamptis urvilleana	Orchidaceae				
	Pancratium maritimum	Amaryllidaceae				
	Reichardia picroides	Asteraceae				
Thrips tarfayensis	*Diplotaxis tenuifolia*	Brassicaceae				✓
	Rosa sp.	Rosaceae				
	Nerium oleander	Apocynaceae				
	Iponomoea carnosa	Convolvulaceae				
Gynaikothrips ficorum	***Ficus microcarpa***	Moraceae	✓			
	Ficus benjamina	Moraceae				
Gynaikothrips uzeli	*Ficus microcarpa*	Moraceae	✓			
	Ficus benjamina	Moraceae				

Table 4.6 Table showing feeding preferences of the phytophagous Thysanoptera of the Maltese Islands as found in the present study (continued)

Thrips species	Plants* on which thrips were collected	Plant Family	Mono-phagous	Oligo-phagous	Poly-phagous	Inconclusive Data
Haplothrips acanthoscelis	***Amaranthus viridis*** *Mercurialis annua* *Ornithogalum arabicum* *Limonium zeraphae*	Amaranthaceae Euphorbiaceae Lilliaceae Plumbaginaceae	✓			
Haplothrips aculeatus	*Bromus diandrus* *Cyndon dactylon* *Convolvulus elegantissimus* *Hypericum sinuatum* *Rosa* sp.	Poaceae Poaceae Convolvulaceae Hypericaceae Rosaceae				✓
Haplothrips setiger	***Glebionis coronaria*** ***Helychrysum melitense***	Asteraceae Asteraceae		✓		
Haplothrips tritici	*Hyparrhenia hirta* *Reichardia picroides*	Poaceae Asteraceae				✓
Liothrips oleae	*Olea europaea*	Oleaceae				✓
Liothrips reuteri	***Tamarix africana***	Tamaricaceae	✓			
Neoheegeria dalmatica	***Phlomis fruticosa***	Lamiaceae	✓			
Liothrips oleae	*Olea europaea*	Oleaceae				✓
n: 48 species			**18**	**5**	**1**	**24**

* Species names in bold in bold indicate presence of both larvae and adults. Other names indicate species where only adult specimens were found.

Table 4.7 Table showing the plant region of occurrence of the phytophagous Thysanoptera of the Maltese Islands

Species	Flowers	Stems and leaves	Both
Aeolothrips gloriosus	✓		
Aeolothrips intermedius	✓		
Aeolothrips melisi	✓		
Aeolothrips tenuicornis	✓		
Rhipidothrips brunneus		✓	
Rhipidothrips gratiosus		✓	
Rhipidothrips niveipennis		✓	
Rhipidothrips unicolor		✓	
Melanthrips ficalbii		✓	
Melanthrips fuscus			✓
Melanthrips knechteli	✓		
Melanthrips lybicus	✓		
Holarthrothrips tenuicornis	✓		
Dendrothrips saltator		✓	
Heliothrips hemorrhoidalis			✓
Hercinothrips femoralis		✓	
Anaphothrips sudanensis		✓	
Aptinothrips rufus			✓
Asphodelothrips croceicollis	✓*		
Bregmatothrips dimorphus		✓	
Ceratothrips ericae	✓		

Table 4.7 Table showing the plant region of occurrence of the phytophagous Thysanoptera of the Maltese Islands (continued)

Species	Flowers	Stems and leaves	Both
Chirothrips hamatus	✓		
Chirothrips manicatus	✓		
Chirothrips meridionalis	✓		
Echinothrips americanus		✓	
Frankliniella occidentalis			✓
Frankliniella schultzei	✓		
Limothrips angulicornis	✓		
Limothrips cerealium	✓		
Odontothrips meliloti	✓		
Oxythrips ajugae	✓		
Pezothtrips kellyanus	✓		
Prosopothrips nigriceps	✓		
Tenothrips discolor	✓		
Thrips australis	✓		
Thrips major	✓		
Thrips simplex	✓		
Thrips tabaci			✓
Thrips tarfayensis	✓		
Gynaikothrips ficorum			✓
Gynaikothrips uzeli			✓
Haplothrips acanthoscelis	✓		
Haplothrips aculeatus	✓		
Haplothrips setiger	✓		
Haplothrips tritici			✓
Liothrips oleae		✓	
Liothrips reuteri		✓	
Neoheegeria dalmatica	✓		
Total: 48 species	**28**	**12**	**8**

* According to zur Strassen (2003) this species occurs on at the wet base of inner leaves.

Chorotype Distributions (after Vigna Taglianti et al., 1999).

Tables 4.8 - 4.9 summarize the chorotype distribution of the Thysanoptera fauna recorded from the Maltese Islands in the current study. Data for this exercise was obtained from geographical distributions of the recorded species (such as Priesner, 1960; zur Strassen, 2003; Mound et al., 2018; and Mound et al., 2019).

Table 4.8: Chorotypes for the Thysanoptera of the Maltese Islands (based on data from previously published material)

Species	Chorotype	Notes
Aeolothrips gloriosus	West Palaearctic	
Aeolothrips imtermedius	Asiatic European	
Aeolothrips melisi	Mediterranean	
Aeolothrips tenuicornis	Turano Mediterranean	
Franklinothrips megalops	Afrotropico Mediterranean	
Rhipidothrips brunneus	Palaearctic	also America and Australian regions
Rhipidothrips gratiosus	Palaearctic	
Rhipidothrips niveipennis	European	
Rhipidothrips unicolor	Turano Mediterranean	
Melanthrips ficalbii	Palaearctic	
Melanthrips fuscus	Palaearctic	
Melanthrips knechteli	Turano European	
Melanthrips lybicus	Mediterranean	
Holarthropthips tenuicornis	Mediterranean	
Dendrothrips saltator	Asiatic European	also Oriental region
Heliothrips haemorrhoidalis	Cosmopolitan	
Hercinothrips femoralis	Cosmoplolitan	
Anaphothrips sudanensis	Subcosmopolitan	
Aptinothrips rufus	Cosmopolitan	
Asphodelothrips croceicollis	Turano Europeo Mediterranean	
Bregmatothrips dimorphus	Afrotropico Mediterranean	also East Palaearctic
Ceratothrips ericae	Asiatic European	also Australian region
Chirothrips hamatus	Sibero European	also Great Britain. Does not extend beyond Turkey
Chirothrips manicatus	Subcosmopolitan	
Chirothrips meridionalis	Afrotropico Indo Mediterranean	
Echinothrips americanus	Subcosmopolitan	
Franklinella occidentalis	Cosmopolitan	
Frankliniella schultzei	Subcosmopolitan	
Limothrips angulicornis	Subcosmopolitan	
Limothrips cerealium	Subcosmopolitan	
Odontothrips meliloti	Turano European	
Oxythrips ajugae	Holarctic	
Pezothrips kellyanus	Turano Mediterranean	also the Netherlands and the Australian region
Prosopothrips nigriceps	Turano Mediterranean	
Tenothrips discolor	Turano Europeo Mediterranean	

Table 4.8: Chorotypes for the Thysanoptera of the Maltese Islands (based on data from previously published material) (continued)

Species	Chorotype	Notes
Thrips australis	Afrotropico Mediterranean	also Australian region
Thrips major	Palaearctic	
Thrips simplex	Subcosmopolitan	Also America
Thrips tabaci	Cosmopolitan	
Thrips tarfayensis	West Mediterraneran	
Bolothrips dentipes	Sibero European	
Bolothrips insularis	Turano Mediterranean	
Priesneriella mavromoustakisi	Mediterranean	
Gynaikothrips ficorum	Subcosmopolitan	
Gynaikothrips uzeli	Central Asiatic European	
Haplothrips acanthoscelis	Sibero European	also Middle East
Haplothrips aculeatus	Holarctic	
Haplothrips setiger	Palaearctic	
Haplothrips tritici	Palaearctic	
Karnyothrips. flavipes	Subcosmopolitan	
Liothrips oleae	Turano Europeo Mediterranean	
Liothrips reuteri	Mediterraneaen	also Australian Region
Neoheegeria dalmatica	Turano Europeo Mediterranean	also Australian Region

Table 4.9 Proportion of chorotypes for the Thysanoptera of the Maltese Islands

Region	Terebrantia	Tubulifera	Total
Subcosmopolitan	7	2	**10**
Palaearctic	5	2	**7**
Cosmopolitan	5	0	**5**
Mediterranean	3	2	**5**
Turano-Mediterranean	4	1	**5**
Turano-Europeo-Mediterranean	2	2	**4**
Afrotropico-Mediterranean	3	0	**3**
Asiatic-European	3	0	**3**
Sibero-European	1	2	**3**
Turano-European	2	0	**2**
Holarctic	1	1	**2**
Afrotropico-Indo-Mediterranean	1	0	**1**
Central Asiatic European	0	1	**1**
European	1	0	**1**
W-Mediterranean	1	0	**1**
W-Palaearctic	1	0	**1**
Total	**40**	**13**	**53**

Discussion

Discussion

The Thysanoptera species of the Maltese Islands

In the current study, 53 thrips species, 40 of which are terebrantian species which belong to four families and 22 genera and 13 being tubuliferan species belonging to one family and seven genera, have been identified to species level. Forty-four of these species are new records to the Maltese Islands. This compares well to some islands in the Mediterranean region such as the Cycladic Islands with one, Crete with 25, Corsica with 32, and Sardinia with 38 species (Vierbergen, 2013), but not with others such as Cyprus with 71 (Srour, 2015), Sicily with 79 (Vierbergen, 2013), and the Canary Islands, with 132 species (Berzosa, 2000). This is likely because the latter mentioned islands are considerably larger than the Maltese archipelago and feature a larger variety of habitat types that support different species, particularly the mycophagous ones.

Thrips feeding preferences

Thrips have been described to have three possible feeding preferences: predatory, feeding on small invertebrates including other thrips larval and adult specimens; phytophagous, where they feed on pollen or cell sap; and mycophagous, mostly spore feeding but with some species also feeding on hyphal material. Thrips species recorded in the Maltese Islands were divided into these categories following information by Priesner (1960); zur Strassen (2003); Marullo (2003; 2004); Marullo and Meduri (2006); Marullo and De Grazia (2013) and Mound et al. (2018), as shown in figure 5.1: 48 species are phytophagous, of which six are facultative predators, three species are mycophagous, and two are obligate predators.

The predatory types included species such as those of the genera *Aeolothrips* and *Franklinothrips* (Mound & Reynaud, 2015; Mound et al., 2018), that feed on small arthropods, together with *Frankliniella occidentalis*, *Thrips tabaci*, both of which feed on mites and their eggs (zur Strassen, 2003; Mound et al., 2018) and finally the tubuliferan phlaeothripid *Karnyothrips flavipes* which has been described to feed on armoured scale insects

(Diaspididae) (Mound et al., 2019). Apart from having predatory tendencies, these species also tend to feed on pollen (aeolothripids) or else on plant sap (*F. occidentalis* and *T. tabaci*).

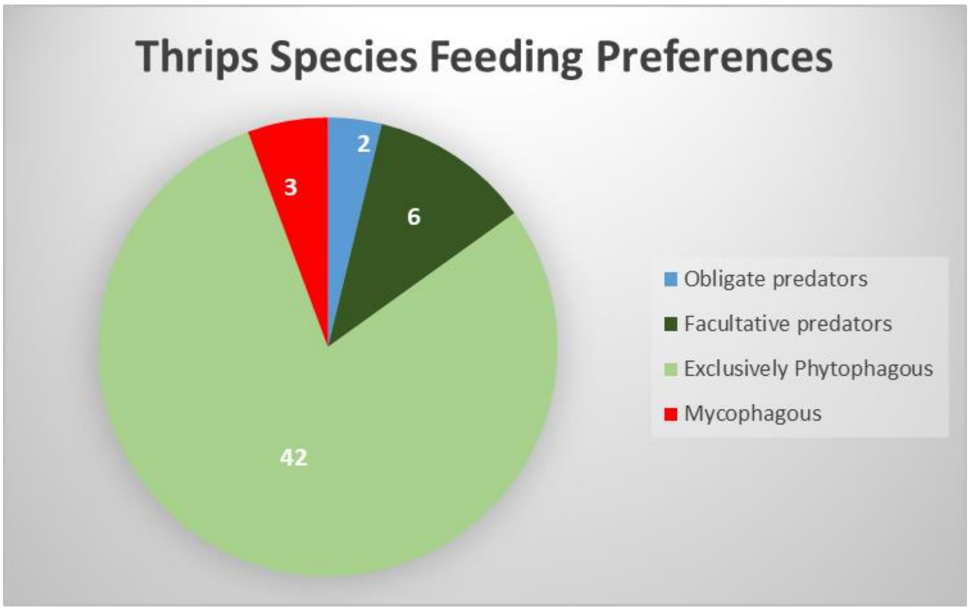

Fig.5.1 Pie chart showing the percentage breakdown for the dietary preferences of the thrips species known from the Maltese Islands. n = 53 species.

Franklinothrips megalops is the only locally recorded species which is exclusively predatory (Mound & Reynaud, 2005).

Forty-two of the phytophagous species feed exclusively on plant matter. Such thrips belong to the genus *Rhipidothrips* (Aeolothripidae), as well as to the locally-recorded species of the families Melanthripidae, Stenurothripidae and Thripidae under the suborder Terebrantia, as well as all species of the subfamily Phlaeothripinae under the suborder Tubulifera. The remaining six phytophagous species consisted of the facultative predators mentioned above.

Of the 42 exclusively phytophagous species, 18 were found to be monophagous, five to be oligophagous and one species showed polyphagous tendencies. Since no larvae were found for the other 24 species, it was not possible for these to be categorized. This happened because of the relatively small number of larval specimens collected in the entire sampling effort. Only 24 of the phytophagous species could in fact be grouped as mono-, oligo- or polyphagous. The results of this exercise are summarized in figure 5.2.

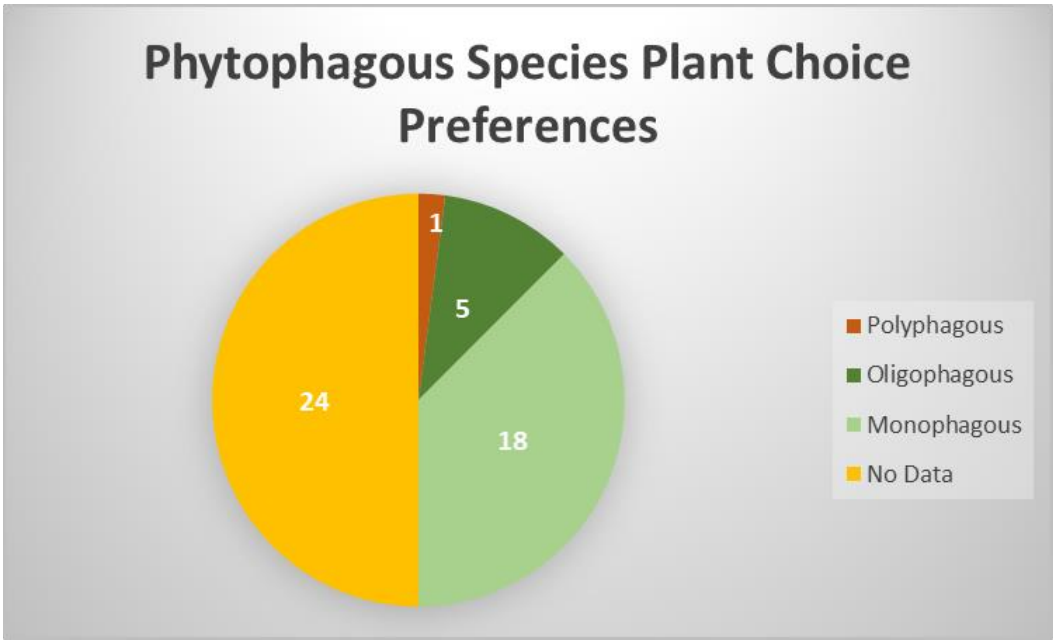

Fig.5.2 Pie chart showing the percentage breakdown of plants species selected by different thrips recorded in the Maltese Islands in the current study. Results were obtained from the material collected. n = 48 species.

Owing to the lack of available literature to distinguish between the larvae of *Melanthrips lybicus* and *M. fuscus*, as well as between *Chirothrips. manicatus* and *C. meridionalis* it was not possible to conclude which species the larvae belonged to. Adults of the first pair however, have both been found exclusively on different Brassicaceae and therefore these thrips were categorized as oligophagous. *Chirothrips* larvae were only found on *Arundo donax* (Poaceae) and since adults of both species have been found on this plant, both were described as being monophagous on this plant. Since both species were found on other species of Poaceae (e.g. *Phragmites australis* and *Hyparrhenia hirta*) both are likely to be oligophagous.

Very few works clearly define the host-plants for species by explicitly making reference to the presence of larvae. Indeed, literature gives information on the host-plants of only 14 species of the 42 phytophagous species recorded in the Maltese islands, as listed in table 5.1. This table also lists the authors who described the host-plants for the species.

Table 5.1 Table showing the categorization of locally recorded phytophagous species (Information obtained from available literature)

Species	Monophagous	Oligophagous	Polyphagous	Authors
Anaphothrips sudanensis		✓		Mound et al., 2019
Ceratothrips ericae		✓		Mound et al., 2018
Echinothrips americanus			✓	Mound et al., 2018
Frankliniella occidentalis			✓	Mound et al., 2019
Gynaikothrips ficorum	✓			Mound et al., 2018
Gynaikothrips uzeli	✓			Mound et al., 2019
Heliothrips haemorrhoidalis			✓	Mound et al., 2018
Liothrips oleae	✓			Marullo & Vono, 2017
Liothrips reuteri		✓		Priesner, 1960; Minaei & Mound, 2014
Neoheegeria dalmatica		✓		Mound et al., 2018
Pezothrips kellyanus			✓	Vassiliou (2010)
Tenothrips discolor			✓	zur Strassen, 2003
Thrips major			✓	Mound et al., 2018
Thrips tabaci			✓	Mound et al., 2018
Total: 14 species	**3**	**4**	**7**	

Most of the species listed in this table include species of agricultural importance, and hence have been studied in order to address the damage inflicted by these species. A number of these such as *Echinothrips americanus, Heliothrips haemorrhoidalis*, and *Thrips tabaci* have been described as polyphagous, unlike the findings according to locally collected data. This could be accounted for by the fact that smaller numbers of larvae were found in the current study.

It is also worth pointing out that some of the plant species where thrips were recorded in literature were either not encountered during fieldwork sessions (e.g. *Typha latifolia* - Typhaceae) even though they have been recorded locally, or else were found but did not yield any thrips specimens when examined (e.g. *Vitex agnus-castus* - Lamiaceae).

Another exercise which was carried out with the phytophagous species was the categorization according to the region of the plant where these species were found, whether in the flower, or on stems and leaves or both regions. The data for this exercise was obtained both from the specimen records obtained in the current study, as well as from the authors used for the exercise described above (i.e. Priesner, 1960; zur Strassen, 2003; Mound et al., 2017; and Mound et al., 2019). Results of this exercise are summarized in figure 5.3.

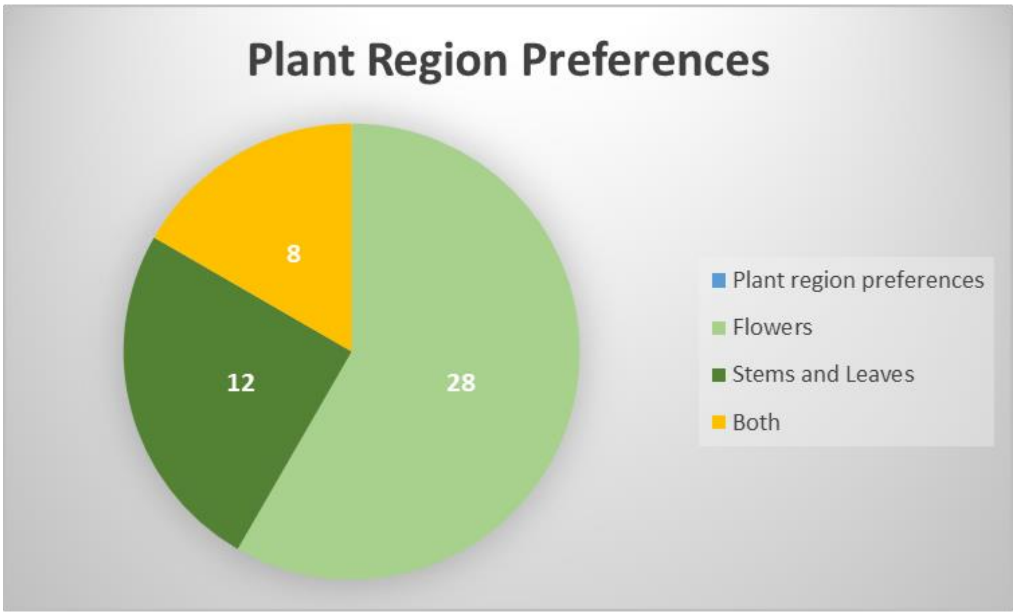

Fig.5.3 Pie chart showing plant site preference for thrips species recorded in the Maltese Islands in the current study. n = 48 species.

28 species of these species were found in flowers, 12 on stems and leaves while 8 species were found on all plant regions. Literature discussing location of thrips on plants (e.g. Marullo, 2002; 2004; 2006; Mound et al., 2018) also completely matched the findings in the current exercise with the exception of *Asphodelothrips croceicollis*, which was described by zur Strassen (2003) to inhabit "*the wet base of inner leaves*" (p. 228).

The species found on leaves and stems of plants e.g. *Echinothrips americanus* and *Hercinothrips femoralis* or on both e.g. *Frankliniella occidetalis* were species of agricultural importance and were likely recorded as pests on crops and cultivated plants.

Mound and Teulon (1995) discussed opportunist species which exploit habits that are unpredictably favourable. Opportunist species tend to be polyphagous, flexible in feeding habits and polyvoltine, being freely able to move about (high vagility) and short generation time. A number of polyphagous species such as *Melanthrips fuscus*, *Thrips major*, and *Thrips tabaci*, were more commonly collected than other species during the current study.

The trends recorded in the current study for the feeding preferences of the species recorded on the Maltese Islands were similar to works which focused on Thysanoptera-plant associations and feeding preferences from Italy (e.g Marullo 2002; 2004; Marullo & Meduri, 2006; Marullo & De Grazia, 2013). Table 5.2 summarizes the findings of such works for the species that were recorded in the current study and compares the occurrence of such species on different plants.

Table 5.2 Table showing Thysanoptera-plant associations as recorded by the works of Marullo (2002; 2004; Marullo & Meduri, 2006) in Italy, and comparisons with the findings in the current study.

Authors	Genus/Species	Associated plants	Plant region	Similar trends in current study	Further notes
Marullo (2004); Marullo & Meduri (2006)	*Aeolothrips gloriosus*	*Pistacea* *Hedera* *Arundo*	flowers flowers leaves/florets	Yes No No	-
Marullo (2004); Marullo & Meduri (2006)	*A. intermedius*	*Diplotaxis* *Crataegus*	flowers flowers	Yes No	-
Marullo (2004); Marullo & Meduri (2006)	*A. melisi*	*Calicotoma* *Cystisus*	flowers flowers	No No	-
Marullo (2002; 2004)	*Rhipidothrips gratiosus*	Cereals *Tordylum*	flowers	Partly No	Locally on Poaceae
Marullo (2002)	*R. unicolor*	Cereals		Partly	-
Marullo (2002); Marullo & Meduri (2006)	*Melanthrips ficalbii*	*Solanum lycopersicum* *Reseda*	flowers	No No	Only in open fields
Marullo (2002: 2004)	*M. fuscus*	*Solanum lycopersicum* *Reseda* *Crataegus*	flowers flowers flowers	No No No	Only in open fields
Marullo & Meduri (2006)	*Holarthrothrips tenuicornis*	*Phoenix*	flowers	Yes	-
Marullo (2004)	*Heliothrips haemorrhoidalis*	*Solanum* *Viburnum* *Ficus* *Rosa* *Citrus*	flowers flowers leaves flowers flowers	No Yes No No No	-
Marullo & De Grazia (2013)	*Anaphothrips*	Poaceae	leaves	Yes	-
Marullo (2002); Marullo & De Grazia (2013)	*Aptinothrips*	Poaceae	leaves	Yes	-
Marullo (2004); Marullo & Meduri (2006)	*A. rufus*	*Ampelodesma* *Agropyron*	leaves leaves/ base of clusters	No No	Locally on other Poaceae
Marullo (2006)	*Asphodelothrips croceicollis*	*Asphodelus*	flowers	Yes	-
Marullo & De Grazia (2013)	*Bregmatothrips*	Poaceae	leaves	Yes	-
Marullo & Meduri (2006)	*Ceratothrips ericae*	*Erica*	flowers	No	Locally on Asteraceae
Marullo (2002); Marullo & De Grazia (2013)	*Chirothrips*	Poaceae	florets	Yes	-
Marullo & Meduri (2006)	*C. manicatus*	*Agropyron* *Arundo*	leaves/ base of clusters leaves	No Yes	-
Marullo (2002); Marullo & Meduri (2006)	*C. pallidicornis*	Cereals *Dactylis*	leaves	Partly Yes	-
Marullo (2004)	*Echinothrips americanus*	*Impatiens*	leaves	No	-

Table 5.2 Table showing Thysanoptera-plant associations as recorded by the works of Marullo (2002; 2004; Marullo & Meduri, 2006) in Italy, and comparisons with the findings in the current study.

Authors	Genus/Species	Associated plants	Plant region	Similar trends in current study	Further notes
Marullo (2002)	*Frankliniella occidentalis*	*Prunus persica* *Solanum lycopersicum* *Heliotropium* *Solanum* *Chenopodium* *Chrysanthemum* *Geranium* *Fragraria* *Prunus* *Vitis*	flowers flowers flowers flowers flowers flowers flowers flowers/ fruits flowers/fruits flowers/fruits	No Yes No Yes No Yes No No No Yes	-
Marullo (2002); Marullo & De Grazia (2013)	*Limothrips*	Poaceae	florets	Yes	-
Marullo & Meduri (2006)	*L. angulicornis*	*Hordeum*	leaves	Yes	-
Marullo (2002: 2004); Marullo & Meduri (2006)	*Limothrips cerealium*	Cereals *Agropyron* *Arundo* *Triticum*	 leaves leaves leaves/florets	Yes No No Yes	-
Marullo & Meduri (2006) Marullo & De Grazia (2013)	*Odontothrips*	Genista Medicago Fabaceae	flowers flowers flowers	No Yes Yes	-
Marullo (2004)	*O. loti*	*Melilotus* *Ononis*	flowers flowers	Yes No	-
Marullo (2004)	*O. meliloti*	*Melilotus* *Ononis*	flowers flowers	No No	-
Marullo (2004); Marullo & Meduri (2006)	*Oxythrips ajugae*	*Pistacea* *Cupressus* *Arbutus* *Eucalyptus*	flowers leaves leaves leaves	No Yes No No	-
Marullo (2004); Marullo & Meduri (2006)	*Pezothrips kellyanus*	*Lonicera* *Jasminum* *Pittosporum* *Citrus*	flowers flowers flowers flowers	No No No No	-
Marullo (2002; 2004); Marullo & Meduri (2006)	*Thrips major*	*Prunus persica* *Pistacea* *Hedera* *Alnus* *Lobularia* *Viburnum* *Calendula* *Arbutus* *Erica* *Quercus* *Eucalyptus*	flowers/fruits flowers leaves leaves flowers flowers flowers leaves flowers leaves leaves	Yes No No No No No No No No Yes No	-
Marullo (2002: 2004); Marullo & Meduri (2006)	*T. tabaci*	*Prunus persica* *Solanum lycopersicum* *Alyssium* *Lobularia* *Rosmarinus* *Eucalyptus* *Reseda*	flowers/fruits flowers flowers flowers flowers leaves flowers	Partly No No No No No No	-
Marullo (2004)	*Bolothrips dentipes*	*Carex*	Fungal spores at base	Partly	-
Marullo (2004)	*B. insularis*	*Ampelodesma*	Fungal spores	No	-
Marullo (2004)	*Priesnerialla mavromoustakisi*	*Chamaerops*	Fungal spores on leaf bases	No	-
Marullo (2002); Marullo & De Grazia (2013)	*Gynaikothrips*	*Ficus*	Galls on leaves	Yes	-
Marullo (2004)	*G, ficorum*	*Ficus*	Galls on leaves	Yes	-
Marullo & De Grazia (2013)	*Haplothrips*	Compositae	flowers	Partly	Some species found on Poaceae
Marullo & Meduri (2006)	*H. hispanicus*	*Eryngium* *Lobularia*	leaves flowers	No No	-
Marullo (2002)	*H. tritici*	Cereals		Partly	found on Poaceae
Marullo (2002)	*Liothrips*	Oleaceae		Yes	-
Marullo (2004)	*L. oleae*	*Olea*	leaves	Yes	-

It would have been ideal to compare the findings from the Maltese Islands with those of other neighbouring countries apart from Italy, particularly those from North Africa. Unfortunately, no such work was found for these countries. Trends found in the current study compare to those found in Italy, particularly in species which are monophagous or oligophagous such as *Asphodelothrips croceicolli*s. Species which tend to show polyphagous tendencies were recorded locally on different plants because the plants on which they were recorded by Marullo (2002; 2004) and Marullo and Meduri (2006) do not occur, or are very rare in the Maltese Islands.

Marullo and De Grazia (2013) claimed that thysanopteran genera *Melanthrips, Odontothrips* and *Haplothrips*, which are species with a mostly European distribution, have a more restricted host range and their life cycle is closely correlated with the flowering period of their major host plant, a non-opportunistic, cyclic strategy. In local works, this may have been reflected in the genera *Odontothips* and *Melanthrips*, where the absolute majority of the specimens of this genus collected locally were obtained in Winter and Spring, but less so in *Haplothrips* species.

Marullo (2002) also argued that in areas where indigenous plants grow, one finds a large number of monophagous or oligophagous species. Locally, very few species were recorded on only one plant species and, while some, such as *Neoheegeria dalmatica*, recorded on *Phlomis fruticosa* (Lamiaceae) and *Oxythrips ajugae,* recorded on *Pinus halepensis* (Pinaceae), were found in undisturbed areas where the majority of plants what occurred were indigenous, other species were discovered on plants which have been imported. Examples of such type of monophagous and oligophagous thrips include *Gynaikothrips ficorum*, recorded on *Ficus microcarpa* (Moraceae) *G. uzeli*, recorded on *F. benjamina* (Moraceae) and *Holarthrothrips tenuicornis*, recorded on *Phoenix dactylifera* (Arecacae).

A number of species described as monophagous in the current study were in fact described by different authors (e.g. zur Strassen, 2003, Marullo & De Grazia, 2013) to feed on more than one species of plant. *Neoheegeria dalmatica*, for example, was locally found exclusively on *Phlomis fruticosa* (Lamiaceae), a finding which matches Priesner (1960) who mentioned this plant as the host plant species for this thrips in southern Europe and the Mediterranean. The same was found in Iran (Minaei et al., 2007). Other studies however, such as Mound et al. (2018); claimed that, in Britain, this species is often associated with other flowers of plants belonging to the Lamiaceae other than *P. fruticosa*. Another thrips species which was exclusively recorded from one plant in the current study is *Oxythrips ajugae*. Larvae and adults of this species were exclusively found on *Pinus halepensis* (Pinaceae) in the current study, however according to authors such as zur Strassen (2003); Marullo and De Grazia (2013); Mound et al. (2018), this species has been recorded in other countries to use a number of other shrubs and trees as host-plants such as *Arbutus, Cupressus* and *Eucalyptus* spp.

It has to also be pointed out that some specimens were found on plants on which these species are not typically recorded e.g. the specimen of *Rhipidothrips niveipennis* found on *Ficus microcarpa.* These records are considered serendipidous i.e. captured by chance on a plant they may have settled on at the time. Some such records may have rendered identification to species level difficult*,* as was the case of the *Odontothrips* sp. specimen found on *Tamarix africanus* (Tamaricales) and suspected to be *O. karnyi*. The identification could not be confirmed, in part because the plant on which the specimen was collected was not the typical recorded Host-plants for this species, usually species belonging to the Fabaceae.

According to Marullo and De Grazia (2013), gall inducing species are ones with the closest host-plant associations amongst Thysanoptera. Observations regarding *Gynaikothrips ficorum* on *Ficus microcarpa* (Moraceae) and *G. uzeli* on *F. benjamina* (Moraceae) in the current study did support this argument. Eggs, juvenile and adult specimens of these species were only found within the galls formed on leaves of *F. microcarpa* and *F. benjamina* in the current study.

Only three species were found to be mycophagous, all three belonging to the subfamily Idolothripinae. None of the locally recorded species identified to species level and belonging to the Phlaeothripinae were mycophagous. More research needs to be carried out on these as these species can be hard to find in fact only few specimens were captured.

According to Marullo and De Grazia (2013), mycophagous species are host dependent though in many cases this host would be unknown. The authors also claimed that *Bolothrips dentip*es (Reuter, 1880) feeds on fungi found on grasses. Similarly, a number of specimens of this species were locally recorded from dried *Cynodon dactylon* and *Gastridium ventricosum* (Poaceae). A number of spores were also visible in the stomach of two specimens of *B. dentipes* captured from *Athrocnemum macrostachyum* (Amaranthaceae). These were identified as belonging to the fungus (?) *Psathyrella* sp. (Agaricales - Stephen Mifsud pers. Comm, 09.10.2022).

Trends in Geographical Distribution

Figure 5.4 shows the chorotype distributions of the Thysanoptera of the Maltese Islands. Information used to plot this chart was obtained from literature and categorized as proposed by Vigna Taglianti *et al*. (1999).

Results showed that 23 of the species recorded in this work have a rather wide geographical distribution. Of these, five species, namely *Aptinothrips rufus, Frankliniella occidentalis, Heliothrips haemorrhoidalis, Hercinothrips femoralis,* and *Thrips tabaci* are considered as cosmopolitan, being spread worldwide, while nine species which include *Anaphothrips sudanensis*, *Chirothrips manicatus, Echinothrips. americanus, Frankliniella schultzei, Gynaikothrips ficorum, Karnyothrips flavipes, Limothrips angulicornis, Limothrips cerealium, Thrips simplex,* and have a subcosmopolitan distribution. The remaining species are either widespread across the Palaearctic region, such as *Melanthrips ficalbii*, *M. fuscus, Haplothrips setiger, H. tritici, Rhipidothrips brunneus*, *R. gratiosus* and *Thrips major*, or across the Holarctic region, namely *Oxythrips ajugae* and *Haplothrips aculeatus,*

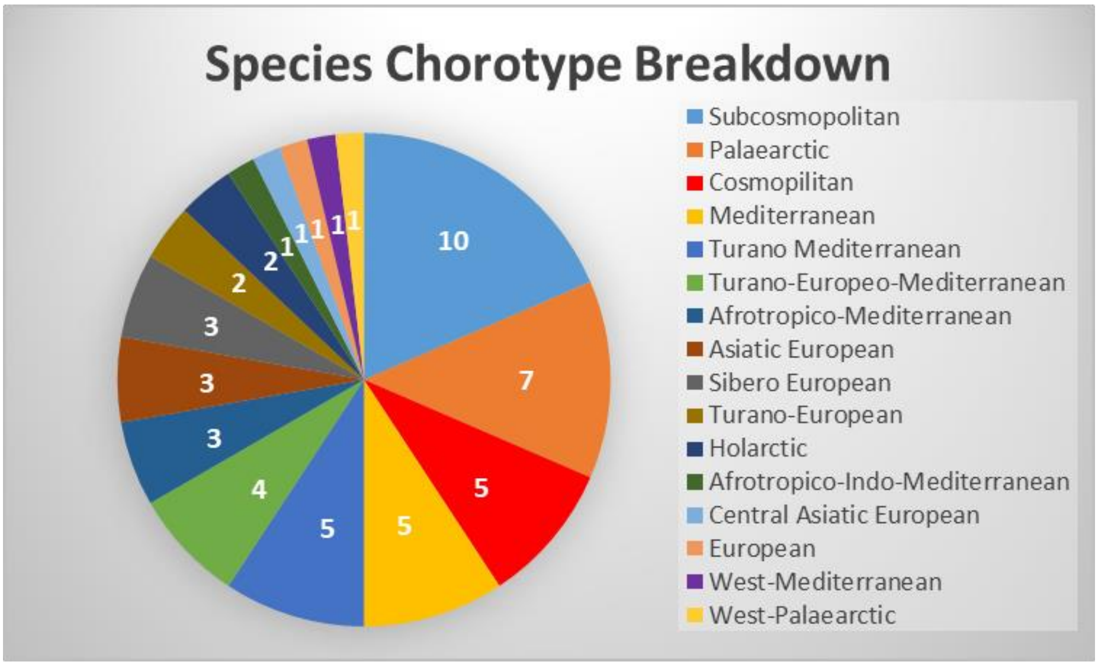

Fig. 5.4 Pie chart showing percentage breakdown of the species recorded in the Maltese Islands in the current study as per chorotypes. n = 53 species.

Sixteen species were found to be of Mediterranean origin. These included: *Aeolothrips melisi*, *Holarthrothrips tenuicornis*, *Liothrips reuteri, Melanthrips lybicus*, *Priesneriella mavromoustakisi* and *Thrips tarfayensis* (Mediterranean / West Mediterranean); *Asphodelothrips croceicollis*, *Liothrips oleae*, *Neoheegeria dalmatica* and *Tenothrips discolor*, (Turano Europeo Mediterranean); *Aeolothrips gloriosus* (Europeo Mediterranean); *Aeolothrips tenuicornis*, *Bolothrips insularis, Pezothrips kellyanus*, *Prosopothrips nigriceps* and *Rhipidothrips unicolor* (Turano Mediterranean).

Another 13 species were found to originate from Europe with the following chorotypes: *Rhipidothrips niveipennis* (European); *Melanthrips knechteli* and *Odontothrips meliloti* (Turano European): *Aeolothrips gloriosus* (Europeo Mediterranean); *Liothrips oleae*, and *Neoheegeria dalmatica* (Turano Europeo Mediterranean); *Bolothrips dentipes, Chirothrips hamatus* and *Haplothrips acanthoscelis* (Sibero European); *Gynaikothrips uzeli* (Central Asiatic European); *Aeolothrips intermedius, Ceratothrips ericae* and *Dendrothrips saltator* (Asiatic European). It is worth pointing out that five of the above-mentioned species, namely: *Aeolothrips gloriosus*, *Asphodelothrips croceicollis*, *Liothrips oleae Neoheegeria dalmatica* and *Tenothrips discolor* were assigned chorotypes which included both European and the Mediterranean Regions.

Six species had geographical distribution that extended from Europe to Asia. These are: *Bolothrips dentipes* and *Haplothrips acanthoscelis* (Sibero European); *Gynaikothrips uzeli* (Central Asiatic European); *Aeolothrips intermedius*, *Ceratothrips ericae, Dendrothrips saltator*, (Asiatic European).

Four species extended their geographical distribution towards Africa. Species with this distribution include: *Bregmatothrips dimorphus, Franklinothrips megalops,* and *Thrips australis* (Afrotropico Mediterranean); *Chirothrips meridionalis* (Afrotropico Indo Mediterranean).

A number of species have also extended their distribution to America, or Australia, or both continents. Such species include: *Anaphothrips sudanensis, Aptinothrips rufus, Chirothrips manicatus, Echinothrips americanus,, Frankliniella occidentalis, F. schultzei, Heliothrips haemorrhoidalis, Hercinothrips femoralis, Limothrips angulicornis, L. cerealium, Rhipidothrips brunneus, Thrips simplex* and *T. tabaci* (America); *Anaphothrips sudanensis, Aptinothrips rufus, Ceratothrips ericae, Chirothrips manicatus, Frankliniella occidentalis, F. schultzei, Heliothrips haemorrhoidalis, Hercinothrips femoralis, Limothrips angulicornis, L. cerealium, Pezothrips kellyanus, Rhipidothrips brunneus, Thrips australis, T. simplex* and *T. tabaci* (Australia).

Some of the species with geographical distributions that extended to continents outside Europe (described by Bhatti et al., 2009; Abdul-fatah Hamodi & Abdul - Rassoul, 2010) were found on indigenous species in the Maltese Islands (e.g. *Thrips tabaci* on *Pancratium maritimum* (Amaryllidaceae) and *Anacamptis urvilleana* (Orchidaceae), However the above-mentioned authors also recorded these species to occur in other countries on plants which are not found locally.

Species of agricultural importance and disease transmission

Twenty-seven species recorded in the Maltese Islands in the current study have been described by literature (e.g. Moritz, 1994; Moritz et al., 2014) being of some form of agricultural importance, three of which also with the potential to transmit disease agents such as orthotospoviruses. An interesting fact is that the majority of the locally recorded species of agricultural importance had a cosmopolitan or subcosmopolitan geographical distribution.

Analysis of the world distribution and the description of the countries of origin of the species of agricultural importance from literature revealed that nine species (17 %) of this group of thrips species were found to be of alien origin. It is highly likely that these were imported through agricultural commerce and with cultivars grown in greenhouses that could survive in the outside locally due to the warm climate. Table 5.3 lists the alien species recorded in the Maltese Islands in the current study, together with the country of origin.

Table 5.3 Table showing list of alien imported species of Thysanoptera recorded from the Maltese Islands in the current study, together with the country of origin.

Species	Country of origin
Echinothrips femoralis	North America
Frankliniella occidentalis	North America
Frankliniella schultzei	South America
Gynaikothrips ficorum	South East Asia
Gynaikothrips uzeli	South East Asia
Heliothrips hemorrhoidalis	South America
Hercinothrips femoralis	Central Africa
Thrips australis	Australia
Thrips simplex	South Africa

Some species, such as *Gynaikothrips ficorum* and *Thrips australis* may have occurred in the Maltese Islands for quite some time, ever since the plants they are typically found on (e.g. *Ficus microcarpa* (Moraceae) for *Gynaikothrips ficorum* and *Eucalyptus gomphocephala* (Myrtaceae) for *Thrips australis* were imported to the Maltese islands as far back as the 1950s, in an attempt to increase the local tree populations in urban environments across the Maltese islands.

An interesting trend was that, with the exception of *Frankliniella occidentalis*, the species considered as alien importations were only found in agricultural scenarios on fruit and vegetable plants as well as cut-flowers and never in indigenous habitats.

Thrips tabaci which is one of the species which is best known for damage it inflicts to crop leaves, was not considered an alien species, despite being widespread across the world. The reason for this was that this species is believed to originate from the Mediterranean.

During the current study, *Echinothrips americanus, Gynaikothrips ficorum*, *G. uzeli*, *Hercinothrips femoralis* and *Thrips australis*, were collected in numbers which are large enough for the species to reach pest status and are thus considered as alien invasives. *E. americanus*, for example, was observed to infest and inflict damage on Azaleas (*Rhododendron* sp.- Ericaceae) in a matter of a few weeks after these plants were accidentally placed next to others bought from a local plant nursery, which likely carried a few specimens of the species.

Other alien and non-alien species such as *Frankliniella occidentalis*, *Heliothrips hemorrhoidalis*, *Limothrips cerealium* and *Pezothrips kellyanus* were recorded albeit in small numbers, certainly not large enough to affect the plants on which they occur. Perhaps if a study is conducted which focuses on the population dynamics of these species more information about the status of these species in the Maltese Islands can be obtained.

Remarkably, and perhaps also fortunately, species of quarantine interest (EPPO, 2022), such as those of the genus *Scirtothrips,* specifically *S. aurantii* Faure (1929), *S. citri*, and *S. dorsalis* Hood (1919), typical pests on plants like *Citrus* spp. (Rutaceae) were not recorded during the current study, despite repeated sampling on citrus trees. *S. longipennis* (Bagnall, 1909) is another species recorded in Sicily as a pest on *Citrus*, though not mentioned by EPPO (2022). Table 5.4 shows a list of species which EPPO (2022) recommends for regulation as quarantine pests.

Other alien species found in neighbouring countries and likely to be found in the Maltese Islands in the future could also include *Androthrips ramachandrai*, *Chaetanothrips orchidii*, *Drepanothrips reuteri* Uzel, 1895, *Neohydatothrips gracilicornis* (Williams, 1916), *Parthenothrips dracenae* (Heeger, 1854), *Pezothrips dianthi* (Priesner, 1921), *Taeniothrips inconsequens* (Uzel, 1895), *Thrips meridionalis* (Priesner, 1926), *T. palmi* and *T. parvispinus*

(Karny, 1922). These species have been recorded in Italy including Sicily (Marullo, 2003), and the plants on which these species were recorded are regularly found or imported to the Maltese Islands.

Table 5.4: Table showing the EPPO list of pests recommended for regulation as quarantine pests and pest alert species, showing the pest status, the world distribution as well as the plants which are affected by these species.

Species	Status	Distribution	Pest on
Ceratothripoides brunneus Bagnall, 1918	A1	Central and south Africa but also in some American and south east Asian countries.	Polyphagous on crops fruits and vegetables and cutflowers.
C. claratris Reyes, 1994	A1	Southeast Asia	Polyphagous on crops fruits and vegetables and cutflowers,
Franklinella occidentalis	A2	Native of Western USA, Spread worldwide	Polyphagous on cutflowwers, fruit and vegetables, vector of TSWV.
Scirtothrips auranti	A1	Africa, Spain and Eastern Australia.	Polyphagous on *Citrus* but also various cutflowers
S. citri	A1	Western USA	Mostly on *Citrus*
S. dorsalis	A2	Central and South America, Middle East and Southeast Asia, Eastern Australia and Europe.	Polyphagous on *Citrus* but also various cutflowers
Selenothrips rubrocintus (Giard, 1901)	Alert List	Africa, Southeast Asia, Southern USA, Mexico, Central and South America, North Australia and Oceanic islands	Polyphagous on a wide range of fruit and ornamental trees and shrubs. A pest on avocado (*Persea americana*), cashew (*Anacardium occidentale*), cocoa (*Theobroma cacao*), grapevine (*Vitis vinifera*) and mango (*Mangifera indica*).
Thrips palmi Karny, 1925	A1	South east Asia, Northwestern Australia, Central and South America.	Polyphagous on cutflowers.

In view of the fact that plants purchased from local plant nurseries were found to carry species of agricultural importance including *Echinothrips americanus*, and *Hercinothrips femoralis,* it is worth conducting a study on the thrips species that can be found these sites to monitor the species which occur in such nurseries. During the current study, some nurseries were contacted asking if it was possible to collect thrips specimens from their premises but unfortunately none gave their consent or access to carry out such sampling. This could possibly have been for fear that a potential discovery of an agriculturally important species could lead to a loss of sale of product from the concerned nursey.

Material collected from Malaise traps

Malaise traps yielded some specimens which were also recorded from other sites in the Maltese Islands (e.g. *Aeolothrips* and *Melanthrips* spp.). However, they also provided unusual specimens that may have been coincidentally captured since thrips make use of wind currents to get carried about even for long distances. Such was the case with two specimens, one of which was tentatively identified to belong to the genus *Phlaeothrips*, which includes fungus-feeding species and the other specimen as possibly belonging to the genus *Macrophtalmothrips,* which includes species of Neotropical origin and distribution. Since the records consisted of single specimens collected from an airborne environment, they may have been purely random accidental finds.

The *Gynaikothrips ficorum/ uzeli* species complex

Gynaikothrips ficorum and *G. uzeli* are very similar to each other, differing only in the length of the epimeral and post-marginal setae on the pronotim as well as the length of the post-ocellar setae. Rodríguez-Arrieta and Retana-Salazar (2010) studied populations of *G. ficorum* and *G. uzeli* in the USA and in Mexico and Costa Rica and found out that specimens of *G. uzeli* from the latter two countries (but not from the USA) showed variations in chaetotaxy that overlap with those of *G. ficorum*. They suggested that *G. ficorum* and *G. uzeli* species form a complex of species that requires further attention from taxonomists. Mound and Tree (2021) also found variability in length of setae in *G. uzeli* and concluded that the recognitions of these two species within the species complex remains questionable. In current study, the lengths the post marginal seta were all distinctly short in *G. ficorum* and long in *G. uzeli*, with no intermediate lengths shown in the latter species, making specimens from the two species distinct. The same applied to the length of the post ocellar setae i, which barely extended over the posterior margin of the compound eye in *G. ficorum* specimens but not in *G. uzeli* specimens, and the length of post ocellar seta ii, which was between 0.5 to 1 times as long as post ocellar setae i in *G. ficorum* and only 0.3-0.5 times as long as post ocellar setae i in *G. uzeli*.

Moreover, Mifsud et al. (2012) conducted a two-year systematic study on all *Ficus* spp. found in the Maltese Islands for the presence of different arthropods. In this work, they recorded for the first time *Gynaikothrips ficorum* as very common on *Ficus microcarpa*, and at that time they never observed similar galls on *Ficus benjamina*. Such galls on *F. benjamina* were only found some five years later (Mifsud, *pers comm* 20.05.2022) and this suggests that *G. uzeli* and *G. ficorum* are distinct from each other, despite the fact that the study by Tree et al. (2015) showed that under laboratory conditions *Gynaikothrips ficorum* can in fact be induced to form galls on *Ficus benjamina.*

Upcoming future for the Thysanoptera of the Maltese islands

In due course, the thrips fauna of the Maltese Islands may change due to factors such as building over natural habitats due to urbanization requirements, the extensive use of plant protection products in agricultural fields, as well as climate change, with the weather of the Maltese Islands becoming hotter and drier. These factors can affect the distribution of certain indigenous plants that serve as hosts or even as food or shelter plants and consequently impact the thrips diversity. Moreover, importation of cultivated plants will continue to introduce additional alien species to the Maltese Islands such as those of the genus *Scirtothrips,* already discussed earlier, which have already become established in Sicily and are nqwadays considered as pests on citrus trees (Marullo, 2003). Without proper quarantine monitoring of imported plant material and the devising of eradication policies, these species can definitely become established in the Maltese Islands in the very near future.

Recommendations for future studies

In view of what was discussed in this chapter, the following are a number of recommendations that can be implemented for further studies on Thysanoptera:

- The identification of a number of specimens under the genus *Odonothrips* were not conclusive. As described in the Results chapter, a female specimen suspected to be *Odontothrips karnyi* was collected on *Tamarix* (Tamaricaceae) sp., though identity could not be confirmed as the plant on which it was collected was not a typical host plant (in this case, various Fabaceae) and no male specimens which are more diagnostic of the species were collected. Two male specimens suspected to be *Odontothrips loti* were also collected, but since they were badly mounted, their identity could not be confirmed. In view of what has been discussed above, more specimens, particularly males, need to be collected and studied.

- A species of *Karnyothrips* could not be identified to species level since the morphological characters did not match those described in literature. It was also compared with specimens from the private collection of Dr. Goldarazena but the identification was still problematic. In order to find out whether this species is new to science, material collected from Malta should be compared with type material of all described *Kamyothrips* spp.
- Literature has described *Gynaikothrips ficorum* and *G. uzeli* as a species complex which requires further research. DNA comparisons, perhaps mitochondrial COI barcoding could be carried out to rule out whether they belong to one or two distinct species.
- More research concerning mycophagous species needs to be carried out and techniques besides sifting soil and leaf debris, such as the use of the Tullgren funnel, used to study the local community of fungus feeding thrips species.
- A lack of knowledge on imported, possibly alien species of thrips associated with ornamental plants exists, in view of the fact that no records were obtained from local plant nurseries. It is suggested that plant nurseries take initiatives and hire experts to conduct studies of thrips populations found in their premises in order to be able to control invasive species and hence reduce their impact.
- In view of the fact that no larvae were found for half of the species described in the current work leaves room for further work concerning the studying of larvae as well as the relationships of these larvae with any possible host-plants.
- More studies focused on agriculture and horticulture e.g. citrus groves and olive trees need to be carried out in order to obtain more information regarding the thrips community

which occurs in this habitat in the Maltese Islands and what impact these species are leaving on this habitat. Activities involving periodical monitoring these sites for possible future alien species occurrences need to take place. Rapisarda and Tropea Garzia (2004) and Riley et al. (2011) recommended using pest risk management strategies such as insect-proof nets, antagonist insects and monitoring using insect traps to keep the pest species under control.

- Local plant quarantine centres should also be contacted and informed about current introductions of the alien species suspected to be found in these nurseries as well as possible future introductions in order to further control entry of these species. It is highly recommended that plants imported from both EU as well as non-EU countries are quarantined at border inspection posts and examined for thrips fauna by properly trained personnel before they are distributed to garden and agricultural centres and pet shops to be sold to the general public. This may necessitate adequate training of personnel in order to carry out such an exercise.

Conclusions

The current work aimed at studying the diversity, dietary preferences and geographical distribution of the thrips (Hexapoda: Thysanoptera) of the Maltese Islands. These insects were collected during a number of around two-and-a-half-hour long fieldwork sessions conducted at 75 different sites all over Malta and Gozo between Spring 2015 and Spring 2022. Selected plants were beaten over a white tray, and the thrips collected by means of a small brush and transferred into an Eppendorf tube filled with a preserving mixture (AGA). They were later macerated, dehydrated and mounted onto glass slides to be identified.

The study has reported the presence of 53 thrips species belonging to 22 genera, with 40 under the suborder Terebrantia and 13 under the suborder Tubulifera. Another species belonging to the genus *Karnyothrips* is possibly new to science. Additionally, eight more species are likely to be present, but the identity of the collected specimens could not be confirmed to species level for different reasons.

Forty-eight of the identified species are described by literature as being phytophagous, with some of these acting as facultative predators. The remaining species are either mycophagous or predatory. Most of the exclusively phytophagous species are oligophagous. Species which were typically recorded on leaves and stems were the ones of agricultural importance.

Twenty-three of the recorded species were found to have a cosmopolitan or subcosmopolitan distribution. The majority of the remaining species are of Europeo-Mediterranean origin, with a few extending their geographical distribution towards Asia and African continent. Nine of the identified species are of alien origin and of possible agricultural importance, although locally they were not found in numbers large enough to reach pest status.

The current study recommends further research to be carried out on genera which proved difficult to identify, as well as on the fungus-feeding thrips species. More studies in order to find out the host plants for many thrips species are also recommended.

Human related activities such as urbanization, increased use of plant protection products and climate change can be contributing factors towards the possible future change in the biodiversity of thrips in the Maltese Islands. Furthermore, the situation concerning thrips species which are likely to be imported with ornamental plants and crops should be constantly monitored in order to reduce the spread of these agriculturally important species.

Glossary of Terms

Glossary of terms (modified from Moritz, G., Brandt, S., Triapitsyn S., & Subramanian, S, 2014b):

ANTEROANGULAR: Anterolateral corner of a sclerite (Latin, anterior = before, to the front of, angular = corner)

ANTEROMARGINAL: (Latin, anterior = before, or to the front of, margo = edge) Narrow part of a surface within the edge, antero-marginal setae: setae inserted on the anterior margin of a sclerite.

BASANTRA: A pair of sclerites on each side of the anterior half of the ventral surface of the prothorax as subparts of the prosternum (well developed in species of the family Phlaeothripidae, =praepectal plates).

CAMPANIFORM SENSILLA: Sense organ that lacks an external process and displays the form of a simple circular pore or hollow cone in the cuticular surface (typical in thrips are the presence or absence of campaniform sensilla of the Mesonotum and the Metanotum craniale).

CHAETOTAXY: The study of occurrence of cilia in the different body regions.

CILIA: Fringes or slender hair-like processes around the margins of the wings (Terebrantia: with 8-shaped socket cells, Tubulifera: without socket cells, fringes arise between the membrane layers of the wings).

CLAVUS: Lobed area at the posterior base of the fore wing.

COMB: A row of closely spaced and slender microtrichia on the posterior margin of tergite VIII.

COMPOUND EYES: The compound eyes consisting of an aggregation of a variable number of ommatidia.

COSTA: A thickened anterior longitudinal margin of the fore wing.

COSTAL VEIN: Most anterior longitudinal vein of the fore wing.

COSTAL CILIA: Cilia along the anterior margin of the fore wing.

COXA: Basal segment of an insect leg.

CRASPEDUM: Thin sclerotized lobes on the posterior margin of abdominal tergites.

CROSS VEIN: Short veins, which connect the longitudinal veins.

CTENIDIA: Typical comb-like structures made up of very short microtrichia on the lateral discal area of tergites.

DISCAL SETAE: Small setae inserted in the middle area but not on the margin of a sclerite.

EPIMERON: Posterior division of the thoracic pleuron, separated from the episternum by the pleural suture (in phlaeothripids often used for the separated posteroangular sclerite of the prothorax).

EPIMERAL SETAE: Setae which arise on the epimeral sclerites of the prothorax.

FEMUR: The 3rd part of an insect leg, following the coxa and trochanter.

FERNA (=probasisternum): A pair of sclerites on the posterior half of the prosternum, just behind the basantra.

FORE WING: Anterior pair of the wings, usually arising on the cranial edges of the mesosternum.

FURCA (=Endofurca): Part of the endoskeleton of the meso- and metathorax (meso- and metafurca), the 2nd and 3rd segment of the thorax developed apodema from the ventral surface of their segment.

GENA: The cheek on each side of the head, lying beneath the compound eyes.

GLANDULAR AREA: Areas of cuticle with an iridescent, porous appearance that are assumed to have some secretory function.

HIND WING: Posterior pair of the wings, arising on the craniolateral edges of the metanotum craniale, tight to the fore wing base.

MANDIBLE: Only the left mandible is developed in larvae and adult thrips. This is a blind stylet used to punch a hole in a leaf surface.

MARGINAL SETAE: Setae found at the margin of sclerites.

MAXILLARY BRIDGE: Endoskeletal connection of the maxillary stylets deep in the head capsule of some phlaeothripid species.

MAXILLARY STYLETS: Paired needle-like structures, elongate part of the maxillae.

MAXILLARY PALPS: Paired sensory appendages attached to the outer apical surface of the stipes (part of maxilla).

MESONOTUM: Main dorsal sclerite plate of the 2nd segment of thorax.

MESOPRESTERNUM: Boat-shaped or laterally reduced triangular sclerites at the anterior margin of the mesosternum.

MESOSTERNUM: Main ventral sclerite plate of the 2nd segment of thorax.

METANOTUM: Main dorsal sclerite plate of the 3rd segment of thorax.

METASTERNUM: Main ventral sclerite plate of the 3rd segment of thorax.

METASCUTELLUM: Posterior sclerite plate of the 3rd segment of the thorax (= Metanotum caudale) behind the Metascutum (Metanotum craniale).

MICROTRICHIA: Rigid projections from the cuticle surface without any nerve supply.

MOUTH CONE: The united parts of labrum, labium, galea and stipes, which contain the stylets (laciniae and mandible).

OCELLAR SETAE: Two or three pairs of setae are commonly found on the head in the region of the ocelli; pair i if present is in front of the fore ocellus; pair ii arise laterally near the inner margin of the compound eyes; pair iii varies in position but is often near the anterolateral margins of the ocellar triangle.

OCELLAR TRIANGLE: Area on the dorsal surface (vertex) of the head of winged adults delimited by the three ocelli.

OCELLI: Simple eyes of adult winged thrips, typically three in a triangle on the vertex, with one anterior median and two lateral ocelli.

OVIPOSITOR: Ventral paired sclerite constructions of the VII and VIII abdominal segment for laying eggs.

PEDICEL: The narrowed base of the 1st antennal segment of the flagellum (=3rd antennal segment).

PLEUROTERGITE: Dorso-lateral sclerite of the two lateral sclerites, closest to the tergite.

POSTEROANGULAR: (Latin, posterior = latter) behind the midline, caudal, angular = corner, for example: postero-angular setae = setae inserted on the posterior corners of a sclerite.

POSTEROMARGINAL: (Latin, posterior = latter) behind the midline, caudal, (Latin, margo = edge) narrow part of a surface within the edge, for example: postero-marginal setae = setae inserted on the posterior margin of a sclerite.

POSTOCCULAR SETAE: Setae arising just behind the compound eyes.

PREMENTUM: The distal end of the labium bearing labial palps, glossae and paraglossae.

PROBASISTERNUM (=FERNA): Pair of sclerites on the posterior half of the prosternum, in Phlaeothripids = Ferna, in Thripids previously referred to as probasisternum.

PRONOTUM: Dorsal region of the first thoracic segment.

SENSE CONE: A circular opening with a bifurcated or single conic process covered by a membrane.

SENSILLUM CAMPANIFORME: A belly formed sense organ that lacks an external process.

SENSORIUM: A circular, oval or band shaped opening covered by a membrane.

SETAE: Hair-like processes with a basal articulation.

SPINE (SPINULA): Median process in some species on the anterior margin of the endofurca on the meso- or/and metathorax.

SPINASTERNUM: An intersegmental sclerite of the thoracic sterna bearing a spina.

STERNITE: Ventral sclerite of the abdomen.

TARSUS: The leg segment distal to the tibia, comprising of one or two tarsomer segments, apically bearing the pretarsal bladder.

TENTORIUM: Internal skeleton of the head, which consists of a tentorium bridge, fore and hind tentorium arms. The anterior tentorial pits are visible below the ventral margin of the compound eyes.

TERGITE: Dorsal sclerite of an abdominal segment.

TIBIA: Leg segment between femur and tarsus.

TRICHOBOTHRIUM: Trichobothria consist of an elongate seta, which arises from a broad and deep cup. Trichobothria occur pairwise on tergite X in species of the families Merothripidae, Melanthripidae and Aeolothripidae.

VEIN: Terebrantia have three longitudinal veins in the forewings, the costa along the front margin, and the first and second vein.

WING RETAINING SETAE: S-shaped setae on the tergites mainly of Phlaeothripidae. These setae enmesh with the marginal cilia on the wings when the wings are not in use.

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Appendices

Appendix I: Thysanoptera species records from Literature

Suborder Terebrantia: Family Aeolothripidae						
Species nº	**Species name**	**Recorded on**	**Plant region**	**Distribution**	**Records from Malta**	**Likely in Malta**
A0001	***Aeolothrips albicinctus*** Haliday, 1836	Grass (probably predaceous) Mound et al., 1976) High grass (Trdan, 2001) obligatory predator on grasses/cultivated plants (Marullo & De Grazia, 2013)	tussocks	UK, Widespread in Europe (Mound et al., 1976; Mound et al., 2018), Slovenia, (Trdan, 2001), all Italy (Stoch,2003; Marullo & De Grazia, 2013); Close to greenhouses in Netherlands (Vierbergen, 2001). French Mainland, Italian Manland (Vierbergen, 2013). Iran (Bhatti et al., 2009), Austria, Germany, Hungary, Iberian Peninsula, Italy, Romania, Serbia & Montenegro, Slovenia, Netherlands (Trdan et al., 2005), Scandinavia + Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015; zur Strassen, 2003), Belgium (Lock, 2006), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
A0002	***Aeolothrips andalusiacus*** zur Strassen, 1973	*Cistus* and *Genista* spp. (ThripsWiki)	flowers	Balearic Islands, Spanish Mainland (Vierbergen, 2013), Iberian Peninsula (Trdan et al., 2005; zur Strassen, 2003)	No	Yes
A0003	***Aeolothrips astutus*** Priesner, 1926	*Trifolium pratense* (Trdan, 2001)	flowers (TripsWiki)	Slovenia (Trdan, 2001), zur Strassen & Kuslitzky (2012) Israel, French Mainland Italian Manland (Vierbergen, 2013) Austria, Germany, Hungary Italy, Poland, Romania Serbia & Montenegro, Slovenia (Trdan et al., 2005), Sweden + Denmark (Gertsson, 2015) Bulgaria (Karadjova & Krumov, 2015) zur Strassen (2003), Hungary (Jenser, 2011), Romania (Sierka et al., 2008), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
A0004	***Aeolothrips balati*** Pelikan, 1958	*Bassia scoparia* (Fallahzedah et al., 2011)	flowers (TripsWiki)	Spanish Mainland (Vierbergen, 2013), Iran (2011) Iberian Peninsula (Trdan et al., 2005), Turkey, Bulgaria (zur Strassen, 2003); in Fallahzedah et al., 2011), Bulgaria (Karadjova & Krumov, 2015), Turkey (Tunc & Hastenpflug-Vesmanis, 2016)..	No	Yes
A0005	***Aeolothrips bournieri*** Lacasa Plasencia, 1983	?	flowers (TripsWiki)	Spanish Mainland (Vierbergen, 2013) Iberian Peninsula (Trdan et al., 2005; zur Strassen, 2003).	No	?
A0006	***Aeolothrips citricintus*** Bagnall, 1933	*Triticum aestivum* (Fallahzedah et al., 2011)	flowers (TripsWiki)	Iran (Fallahzedah et al., 2011), French Mainland, Spanish Mainland (Vierbergen, 2013), Iberian Peninsula (Trdan et al., 2005), Portugal, Ukraine, Tunisia, Algeris, Morocco (zur Strassen, 2003; in Fallahzedah et al., 2011).	No	Yes

A0007	***Aeolothrips collaris*** Priesner, 1919 (= ***A. fasciatus collaris***) **syn. *meridionalis*** ***Aeolothrips collaris syn. meridionalis***	*Hypercium perforatum* (Jenser & Tsanakakis, 1985) *Sinapis arvensis, Anthemis tomentosa, Echium plantagineum, Cistus salvefolius, Sambucus nigra, Parentucellia viscosa, Centauria* sp., *Galium* sp., *Veronica urticifolia, Reseda lutea, Psoralea bituminosa, Malcolmia* sp., *Frankenia hirsuta, Trigonella cf. rechingeri, Chenopodium* sp., *Gastridium ventricosum, Silene vulgatus, Anthyllis hermanniae, Astericus aquaticus* (zur Strassen, 1986) *Bassia scoparia* (Fallahzedah et al., 2011) *Coronilla varia, Fabaceae, Vitis vinifera,* herb, *Amygdalus communis, Euphorbia* sp., *Punica granatum, Zea mays, Althaea* sp., *Chenopodium* sp., *Thymbra spicata, Vitex agnus-castus, Verbascum* sp., *Malva* sp., *Pyrus elaeagnifolia, Cystus* sp., *Nerium oleander, Anthemis* sp., *Quercus* sp., *Cichorium intybus, Echinocloa crusgalli, Carthamus* sp., *Synapis* sp., *Cynodon dactylon, Prunus persica, Avena sativa, Papaver somniferum, Malus communis, Peganum harmala, Vicia sativa, Cardaria draba*. (Tunc et al., 2018) *Brassica, Calendula, Calicotoma, Clinopodium, Eryngium, Rosmarinus* (facultative predator) (Marullo & De Grazia, 2013) Citrus (Belaam-Kort et al., 2020)	flowers (TripsWiki)	Northern Greece (Jenser & Tsanakakis, 1985 - 05), Greece (zur Strassen, 1986-05), Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Iran (Fallahzedah et al., 2011), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012), Cyprus (Srour, 2015), Croatia, Germany, Hungary Iberian Peninsula Italy, Romania Serbia & Montenegro (Trdan et al., 2005), Albania, Azores, Bulgaria, Canary Islands, Corsica, Croatia, Cyprus, Turkey, Germany, Greek mainland, Italian mainland, Macedonia, Madeira, North Aegean Islands, Portuguese mainland, Russia South, Sardinia, Sicily, Spanish mainland, Ukraine (Vierbergen, 2013), East Palaearctic, Near East, North Africa, Oriental region on the most of bushes of flower and vegetables (zur Strassen, 2003; Fauna Europaea Web Service, 2004 in Fallahzedah et al., 2011), France (Pizzol et al., 2014), Egypt (zur Strassen, 2014) Bulgaria (Karadjova & Krumov, 2015) Aegean region, Tunisia (Belaam-Kort et al., 2020), Iran (Bhatti et al., 2009). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003).	No	Yes
A0008	***Aeolothrips cursor*** Priesner, 1939	*Hordeum murinum* (obligatory predator on grasses/cultivated plants; Marullo & De Grazia, 2013, Italy)		Greece (zur Strassen, 1986-05), Italian Islands (Stoch, 2003), Cyprus (Srour, 2015), French Mainland, Greek Manland, Sardinia, Sicily (Vierbergen, 2013), Iberian Peninsula Italy (Trdan et al., 2005; zur Strassen, 2003), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
A0009	***Aeolothrips deserticola*** Priesner, 1929	?		Israel (zur Strassen & Kuslitzky, 2012), Iran (Bhatti et al., 2009), Egypt (zur Strassen, 2003; 2014). Intercepted in US from the Mediterranean and Africa (Nickle,2003).	No	?
A0010	***Aeolothrips eremicola*** Priesner, 1938	*Zilla spinosa* (ThripsWiki)		Egypt (zur Strassen, 2014)	No	?
A0011	***Aeolothrips ericae*** Bagnall, 1920	*Ericaceae and Leguminosae* (Mound et al. 1976) *Anthyllis hermaniae, Psoralea bituminosa, Medicago marina, Genista acanthoclada Spartium junceum, Hypercium perforatum* (zur Strassen, 1986) *Citrus* sp. with *P. kellyanus* (Conti et al., 2001) *Galium verum* (Trdan, 2001) Herb (Tunc et al., 2016) *Brassica, Calendula, Erica, Rosmarinus* spp. (facultative predator) (Marullo & De Grazia, 2013)	flowers	UK, Common and Widespread in Europe (Mound et al., 1976; Mound et al., 2018), Turkey (Tunc et al., 2012), Israel (zur Strassen & Kuslitzky, 2012), Italy and Islands (Conti et al., 2001; Stoch, 2003; Marullo & De Grazia, 2013), Slovenia (Trdan, 2001), Greece (zur Strassen, 1986-05), Cyprus (Srour, 2015), Crete, French Mainland, Spanish Mainland (Vierbergen, 2013) Austria, Germany, Iberian Peninsula, Poland, Romania, Serbia & Montenegro, Slovenia, Netherlands (Trdan et al., 2005), Croatia (Raspudić et al., 2009), France (Pizzol et al., 2014), Scandinavia (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Aegean region (zur Strassen, 2003), Hungary (Jenser, 2011), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe and, Mediterranean (Nickle, 2003).	No	Yes
A0012	***Aeolothrips fasciatus*** (Linnaeus, 1758)	*Trifolium rubens* (Trdan, 2001) (facultative predator; Marullo & De Grazia, 2013) *Convolvulus* sp., *Zea mays, Ficus carica, Chenopodium* sp., *Olea europaea, Raphanus* sp. (Tunc et al., 2012)	flowers (TripsWiki)	Turkey (Tunc et al., 2012; 2016), Italy and Islands (Stoch, 2003), Slovenia (Trdan, 2001), Serbia (Andjus et al., 2001), Nordic countries (Scandinavia + Denmark, Gertsson, 2015) Crete, French Mainland Italian Manland, Sardinia, Sicily, Spanish Mainland (Vierbergen, 2013) Austria, Croatia, Germany Iberian Peninsula Poland Romania Serbia & Montenegro Slovenia, Netherlands (Trdan et al., 2005), Iran (Bhatti et al., 2009), Bulgaria (Karadjova & Krumov, 2015), Aegean region, Turkey (Tunc et al., 2012; zur Strassen, 2003), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Turkey (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe, the Mediterranean and Africa. (Nickle,2003)	No	Yes
A0013	***Aeolothrips fallax*** zur Strassen, 1977	*Echium plantagineum* (ThripsWiki)	flowers (TripsWiki)	Greece (zur Strassen, 1986-05; zur Strassen, 2003; Vierbergen, 2013).	No	Yes

A0014	***Aeolothrips gloriosus*** Bagnall, 1914	*Tilia europea*/ water traps (Mound et al., 1976) *Olea europea (Jenser & Tsanakakis, 1985 – 05)* *Olea europaea, Phyllirea* sp. (zur Strassen, 1986-05) *Olea europea (Trdan et al., 2001)* *Olea europaea, Peganum harmala, Pistacia sp., Quercus sp. (Tunc et al., 2012)* *Pistacea* sp. (facultative predator) (Marullo & De Grazia, 2013)	blossoms	UK, Mediterranean Area (Mound et al., 1976; Mound et al., 2018), Greece (Jenser & Tsanakakis, 1985-05; zur Strassen 1986- 05), Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Slovenia (Trdan, Vidrih, & Vierbergen 2012), Turkey (Tunc et al., 2012: 2016), Cyprus (Srour, 2015), Spanish Mainland (Vierbergen 2013), Croatia, (Trdan et al., 2005), France (Pizzol et al., 2014), Sweden (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Aegean region (zur Strassen, 2003), Iran (Bhatti et al., 2009).	No	Yes
A0015	***Aeolothrips guitiani*** Berzosa & Maroto, 1990	?	flowers (TripsWiki)	Spanish Mainland (Vierbergen, 2013; Trdan et al., 2005).	No	?
A0016	***Aeolothrips heinzi*** zur Strassen, 1990	*Halantium cf. roseum*		Turkey (zur Strassen, 2003, Tunc & Hastenpflug-Vesmanis, 2016).	No	No
A0017	***Aeolothrips intermedius*** Bagnall, 1934 *Banded thrips* (Trdan et al., 2005)	Yellow flowered *Cruciferae*, *Leguminosae*, and *Compoisitae*. (Mound et al., 1976) *Malva silvestris, Spartium juncaeum, Pistacea terebinthus* (Jenser & Tsanakakis, 1985-05) *Spartium juncaeum, Salicornia sp.*(zur Strassen, 1986-05) *Brassica napus* (Kirk, 1996) *Spartium juncaeum* (Trdan, 2001) *Raphanus, Vicia faba* (Fallahzedah et al., 2011) *Rumex sp., Avena sativa, Fabaceae, Triticum sp., Crataegus sp., Asteraceae, Vitis vinifera, Hordeum vulgare, Zea mays, Phragmites sp., herb, Althaea sp., Capsicum annuum, Convolvulus, Typha sp., Carthamus sp., Ligustrum, Pinus sp., Tripleurospermum sp., Sinapis sp., Quercus sp., Salvia sp., Lamium sp., Euphorbia sp., Eucalyptus sp., Vicia sativa, Vicia faba, cereal, Prunus avium, Dianthus sp., Triticum aestivum, Trifolium sp., Raphanus sp., Bromus sp., Amygdalus communis, Papaver somniferum, Medicago sativa, Hordeum sativum.* (Tunc et al., 2012) *Crataegus* sp. (facultative predator) (Marullo & De Grazia, 2013) *Vicia faba* (Razi et al., 2013)	flowers	UK Common and Widespread in Europe (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Greece (Jenser & Tsanakakis, 1985-05; zur Strassen, 1986-05), Slovenia (Trdan, 2001) Italy (Stoch, 2003; Marullo & De Grazia, 2013), Serbia (Trdan et al., 2005) Iran (Fallahzedah et al., 2011), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012), Algeria (Razi et al., 2013), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001) Serbia, Hungary, (Andjus et al., 2001). French Mainland, Greek Mainland Italian Manland, Sardinia Spanish Mainland (Vierbergen, 2013). Austria, Germany Iberian Peninsula Italy Poland Romania Serbia & Montenegro Slovenia, Netherlands (Trdan et al., 2005). Croatia (Raspudić et al., 2009), Asia, Europe, North Africa, Oriental region on the most of bushes of flower and vegetables (zur Strassen, 2003); Fauna Europaea Web Service, 2004 in Fallahzedah et al., 2011). Iran (Bhatti et al., 2009), France (Pizzol et al., 2014). Also on *Medicago* (Baderitakis et al., 2015), Nordic countries (Scandinavia + Denmark, Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015; zur Strassen, 2003), Belgium (Lock, 2006). On *Citrus* sp. in Tunisia (Belaam-Kort et al., 2020) Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003).	Yes	N/A
A0018	***Aeolothrips insularis*** Priesner, 1933 (= ***A.titschaki*** Priesner, 1938)	*Convolvulus floridus, Plocana pendula, Rumex, lunaria, Spartium juncaeum* (zurSrassen,2003)		Canary Islands, Iran (zur Srassen,2003)	No	No
A0019	***Aeolothrips linarius*** Priesner, 1948	*Linum micronatum* (ThripsWiki, 2021) *Cardaria draba* (Tunc *et al*. 2012)	flowers	Turkey (Tunc et al., 2012; 2016), Israel (zur Strassen & Kuslitzky, 2012), Spanish Mainland (Vierbergen,2013), Iberian Peninsula (Trdan et al., 2005; zur Strassen, 2003). Intercepted in US from the Mediterranean (Nickle, 2003).	No	?

A0020	***Aeolothrips manteli*** Titchack, 1962	?	(TripsWiki)	The Netherlands (Trdan et al., 2005), Norway (Gertsson, 2015; zur Strassen (2003)	No	?
A0021	***Aeolothrips masflavus*** Priesner, 1933	*Plocama pendula* (zur Strassen, 2003)		Canary Islands (zur Strassen, 2003)	No	No
A0022	***Aeolothrips melaleucus*** Haliday, 1852	*Quercus*, *Sambuca* flowers, other deciduous trees (predator) (Mound et al., 1976) *Rhamnus alaternus* (zur Strassen, 1986) *Ostria carpinifolia* (Trdan, 2001) obligatory predator on leaves of trees (Marullo & De Grazia, 2013) *Quercus* sp., *Cratageus* sp. (Tunc et al., 2012)	flowers (TripsWiki)	UK Widespread in Europe (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy (Stoch, 2003; Marullo & De Grazia, 2013), Turkey (Tunc et al., 2012; 2016), French Mainland Greek Mainland Italian Manland, Spanish Mainland (Vierbergen, 2013). Austria, Germany, Hungary, Iberian Peninsula Italy Poland Romania Serbia & Montenegro, Slovenia, Netherlands (Trdan et al., 2005). Croatia (Raspudić et al., 2009), France (Pizzol et al., 2014), Nordic countries (Scandinavia, Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015; zur Strassen, 2003), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
A0023	***Aeolothrips melisi*** Priesner, 1936	*Cystisus* sp. (facultative predator) (Marullo & De Grazia, 2013)	flowers (TripsWiki)	Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Spanish Mainland (Vierbergen, 2013), Iberian Peninsula (Trdan et al., 2005; zur Strassen, 2003).	Yes	N/A
A0024	***Aeolothrips modestus*** zur Strassen, 1965	*Zoophagous*, *Bassia scoparia* (Fallahzadeh et al, 2011)	flowers	Canary Islands on flowers (zur Strassen, 2003); Fallahzedah et al., 2011), Iran (Fallahzedah et al., 2011)	No	Yes
A0025	***Aeolothrips montivagus*** Priesner, 1948	Alfalfa (ThripsWiki)	flowers (TripsWiki)	Cyprus (Vierbergen, 2013, zur Strassen, 2003, Srour, 2015)	No	Yes
A0026	***Aeolothrips pelikanus*** Titschack, 1964/***pelikani*** (Trdan *et al.*,.2005)	*Echium vulgare* (ThripsWiki)	flowers (TripsWiki)	Spanish Mainland, Iberian Peninsula (Vierbergen, 2013; zur Strassen, 2003; Trdan et al., 2005)	No	Yes
A0027	***Aeolothrips propinquus*** Bagnall, 1924	*Verbascum nigrum* (Mound et al., 1976) facultative predator (Marullo & De Grazia, 2013)	flowers	UK, recorded across Europe (Mound *et al.* 1976; Mound et al., 2018), South Italy and Sicily (Stoch,2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Spain, France and Germany. French Mainland Italian Mainland, Spanish Mainland (Vierbergen, 2013), Croatia, Germany, Hungary Iberian Peninsula Italy, Netherlands (Trdan et al., 2005). Nordic countries (Sweden + Denmark) (Gertsson, 2015) Bulgaria (Karadjova & Krumov, 2015; zur Strassen, 2003), Slovakia, (Sierka et al., 2008; Zvaríková et al., 2020), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
A0028	***Aeolothrips priesneri*** Knetchel, 1923	*Euphorbia* sp. (Trdan et al., 2005)	flowers (TripsWiki)	Hungary, Romania, Poland (Trdan et al., 2005), Bulgaria (Karadjova & Krumov, 2015; zur Strassen, 2003).	No	No
A0029	***Aeolothrips pulcher*** von Oettingen, 1943	?		Poland, Romania, Serbia & Montenegro (Trdan et al., 2005; zur Strassen, 2003)	No	?
A0030	***Aeolothrips pyrenaicus*** Bagnall, 1934	?		Spanish Mainland, Iberian Peninsula (zur Strassen, 2003; Vierbergen, 2013; Trdan et al., 2005).	No	?
A0031	***Aeolothrips quercicola*** Bournier, 1971	*Quercus coccifera, Q. ilex, Q. pyrenaica*		French Mainland, Spanish Mainland, Iberian Peninsula (zur Strassen, 2003; Vierbergen, 2013; Trdan et al., 2005).	No	Yes
A0032	***Aeolothrips saharae*** zur Strassen, 1968			Egypt (zur Strassen, 2003)	No	?
A0033	***(Aeolothrips scabiosatibia)*** Moulton 1930	?		Intercepted in US from Africa (Nickle, 2003)	No	No

A0034	***Aeolothrips scitus*** (zur Strassen, 1965)	*Ersimium scoparium*		Canary Islands (zur Strassen, 2003)	No	No
A0035	***Aeolothrips tauricus*** Derbeneva, 1959	?		Spanish Mainland, Iberian Peninsula (zur Strassen, 2003; Vierbergen, 2013; Trdan et al., 2005).	No	No
A0036	***Aeolothrips tenuicornis*** Bagnall, 1926	*Yellow flowered Cruciferae*, *Leguminosae*, and Compositae. (Mound et al., 1976) *Taraxacum officinale* (Kirk, 1996) *Triticum aestivum* (Fallahzedah et al., 2011) *Hedysarum coronarium* (zur Strassen & Kuslitzky, 2012) *Cratageus* sp. (Tunc et al., 2012) facultative predator (Marullo & De Grazia, 2013)	flowers	UK, Widespread in Europe (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Italy and Sicily (Stoch, 2003; Marullo & De Grazia 2013), Iran (Fallahzedah et al., 2011; Bhatti et al., 2009), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012), French Mainland Italian Manland, Malta, Sicily, Spanish Mainland (Vierbergen, 2013), Iberian Peninsula Italy netherlands (Trdan et al., 2005), Andorra, Britain Island, Canary Islands, French Mainland, Germany, Italian Mainland, Malta, Portuguese Mainland, Selvagens Islands, Sicily, Spanish Mainland, Switzerland, The Netherlands, Ukraine, Near East, North Africa on *Vitis*, *Citrus* and flower bushes (zur Strassen (2003); Fauna Europaea Web Service, 2004 in Fallahzedah et al., 2011), Aegean region, Turkey (Tunc & Hastenpflug-Vesmanis, 2016), Belgium (Lock, 2006).	Yes	N/A
A0037	***Aeolothrips verbasci*** Knechtel, 1955	*Verbascum* sp.?	flowers (TripsWiki)	Spanish Mainland (Vierbergen, 2013), Romania (zur Strassen, 2003; Trdan et al., 2005; Sierka et al., 2008).	No	Yes
A0038	***Aeolothrips versicolor*** Uzel, 1895	*Fraxinus* and other deciduous trees (predatory) (Mound et al., 1976) *Pistacea terebinthus* (Jenser & Tsanakakis, 1985-05) *Carpinus betulus (Trdan, 2001)* *Pistacia* sp., *Morus alba (Tunc et al., 2012)* obligate predator on leaves of trees (Marullo & De Grazia, 2013)	flowers (TripsWiki)	UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), Northern Greece (Jenser & Tsanakakis, 1985-05), Slovenia (Trdan, 2001), Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Turkey (Tunc et al., 2012; 2016), Iran (Bhatti et al., 2009), French Mainland Greek Mainland Italian Manland, Spanish Mainland (Vierbergen, 2013) Austria, Croatia, Hungary Iberian Peninsula Italy Poland Romania Serbia & Montenegro, Slovenia netherlands (Trdan et al., 2005), Nordic countries (Scandinavia + Denmark) (Gertsson, 2015) Bulgaria (Karadjova & Krumov, 2015,) Aegean region, Turkey (Tunc et al., 2012;. zur Strassen, 2003), Hungary (Jenser, 2011), Poland, Slovakia, (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
A0039	***Aeolothrips vittatus*** Haliday, 1836	*Pinus* (probably predaceous) (Mound et al., 1976)	flowers (TripsWiki)	UK, Widespread in Europe but not common (Mound et al., 1976), French Mainland Italian Manland, Spanish Mainland (Vierbergen, 2013) Austria, Hungary Iberian Peninsula Italy Poland Romania Serbia & Montenegro netherlnds (Trdan et al., 2005) Nordic countries (Scandinavia + Denmark) (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015; zur Strassen, 2003). Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
A0040	***Aeolothrips wittmeri*** Priesner, 1935	*Zilla spinosa, Zygophyllum, Retama raetam* (zur Strassen & Kuslitzky, 2012)	flowers (TripsWiki)	Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2003; 2014).	No	No
A0041	***Franklinothrips megalops*** (Trybom, 1912)	Trees (ThripsWiki) Citrus (Belaam-Kort et al., 2020)	trees (TripsWiki)	Israel (zur Strassen & Kuslitzky, 2012), Libya, Tunisia, Spain, India, Indonesia, Yemen, Kenya, S. Africa (zur Strassen, 2003), Tunisia (Belaam-Kort et al., 2020).	Yes	N/A
A0042	***Franklinothrips vespiformis*** (Crawford DL, 1909)	Ant mimic obligate predator (ThripsWiki) Citrus (Belaam-Kort et al., 2020)	flowers (TripsWiki)	On *Citrus* sp. in Tunisia (Belaam-Kort et al., 2020), Madeira, USA, Brazil, Peru, Pacific islands, Thailand, Taiwan (zur Strassen, 2003). Intercepted in US from Europe (Nickle, 2003)	No	Yes
A0043	***Orothrips priesneri*** (Titschack, 1958)	*Crataegus* sp. (Tunc et al., 2012, Marullo & De Grazia, 2013)	flowers (TripsWiki)	South Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Turkey (Tunc et al., 2012; 2016), French Mainland Italian Manland, Sicily Spanish Mainland (Vierbergen, 2013), Hungary (Jenser, 2011).	No	Yes

A0044	***Rhipidothrips brunneus*** (may be = *R. cahirensis*) Williams, 1913	*Bromus sterilis* (Mound et al., 1976) Grasses? (zur Strassen, 1986) *Avena sativa* (Tunc et al, 2012)	flowers (TripsWiki)	UK (Mound et al., 1976; Mound et al., 2018), Italy (Stoch, 2003; Marullo & De Grazia, 2013), Turkey (Tunc et al., 2012; 2016), Israel, (zur Strassen & Kuslitzky, 2012), Greece (zur Strassen, 1986-05), French, Greek Mainland and Spanish Mainland, (Vierbergen, 2013), Nederlands, Finland, Russia (zur Strassen, 2003), Iran (Bhatti et al., 2009), Egypt (zur Strassen, 2014), Finland (Gertsson, 2015).	Yes	N/A
A0045	***Rhipidothrips elegans*** Pelikan, 1961	?		Kazakistan, Ukraina, Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	No
A0046	***Rhipidothrips flavus*** Tunc, 1991	*Triticum aestivum*		Turkey (zur Strassen 2003; Tunc & Hastenpflug-Vesmanis, 2016)	No	Yes
A0047	***Rhipidothrips gratiosus*** Uzel, 1895	*Avena sativa* (Mound et al., 1976) *Avena sativa, Triticum aestivum* (Tunc et al, 2012) *Vicia faba (Razi et al, 2013)*	flowers (TripsWiki)	UK Widespread in Europe (Mound et al., 1976; Mound et al., 2018), Italy and Sicily (Stoch,2003), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 201), Algeria (Razi *et al.,*2013), Iran (Bhatti et al., 2009), Cyprus, French Mainland, Italian Manland, Sicily, Spanish Mainland (Vierbergen. 2013). France (Pizzol et al., 2014) Also in Egypt (zur Strassen, 2014), Bulgaria (Karadjova & Krumov, 2015; zur Strassen (2003), Hungary (Jenser, 2011), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Romania (Sierka et al., 2008).	Yes	N/A
A0048	***Rhipidothrips niveipennis*** O. M. Reuter, 1899	*Avena, Allopercurus pratensis*	flowers (TripsWiki)	Spanish Mainland (Vierbergen, 2013), Norway & Finland (Gertsson, 2015; zur Strassen, 2003).	Yes	N/A
A0049	***Rhipidothrips unicolor*** zur Strassen, 1965	*Stipa capensis* (zur Strassen, 1986)	flowers (TripsWiki)	Sicily (Stoch, 2003), Greece (zur Strassen, 1986-05), Iran (Bhatti et al., 2009), Greek Mainland Italian Manland, Spanish Mainland (Vierbergen, 2013; zur Strassen, 2003).	Yes	N/A

Suborder Terebrantia: Family Melanthripidae						
Species nº	**Species name**	**Recorded on**	**Plant region**	**Distribution**	**Records from Malta**	**Likely in Malta**
MI0001	***Ankothrips flavidus*** Pelikan, 1958	?		Slovakia (zur Strassen, 2003; Zvaríková et al., 2020).	No	?
MI0002	***Ankothrips mavromoustakisi*** Priesner, 1939	*Arundo* sp. *Juniperus, Cupressus*	flowers (TripsWiki)	Italy (Marullo & De Grazia, 2013), Cyprus (Srour, 2015), French Mainland, Sicily, Spanish Mainland (Vierbergen, 2013; zur Strassen (2003), Turkey (Tunc & Hastenpflug-Vesmanis, 2016)	No	Yes
MI0003	***Ankothrips niezabitowskii*** Schille, 1910	*Juniperus* sp. (Trdan, 2001)		Italy (Marullo & De Grazia, 2013), Slovenia (Trdan, 2001), Spanish Mainland (Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015; zur Strassen (2003), Hungary (Jenser, 2011), Poland, Slovakia, (Sierka et al., 2008; Zvaríková et al., 2020). On *Citrus* sp. in Tunisia (Belaam-Kort et al., 2020).	No	No
MI0004	***Ankotrhrips thuriferae*** Berzosa & Maroto, 1983	*Juniperus thurifera* (ThripsWiki)		Spanish Mainland (zur Strassen, 2003, Vierbergen, 2013)	No	No
MI0005	***Melanthrips acetosellae*** John, 1927	*Rumex acetosella* (zur Strassen, 1986) *Rumex* sp. (Marullo & De Grazia, 2013)	flowers (TripsWiki)	Italy (Marullo & De Grazia, 2013), Greece (zur Strassen, 1986-05), French Mainland, Spanish Mainland (Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015; zur Strassen, 2003), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
MI0006	***Melanthrips arabs*** Preisner, 1936	*Stachys aegyptica* (ThripsWiki)	flowers	Egypt (zur Strassen, 2014)	No	No
MI0006	***Melanthrips areolatus*** Priesner, 1936	Chenopodiaceae (ThripsWiki)	flowers	Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2013; 2014).	No	Yes
MI0008	***Melanthrips bagnalli*** Priesner, 1936	?	flowers (TripsWiki)	Egypt (zur Strassen, 2014)	No	?
MI0009	***Melanthrips concinnus*** Zur Strassen, 1968	Caryophylliaceae		Morocco (zur Strassen, 2003)	No	Yes
MI0010	***Melanthrips desertorum*** Priesner, 1965	Cruciferae (ThripsWiki)	flowers	Egypt (zur Strassen, 2014)	No	Yes
MI0011	***Melanthrips ficalbii*** Buffa, 1907	*Galium aparine, G. mollugo, Reseda lutea* (Mound et al., 1976) *Reseda* sp. (Marullo & De Grazia (2013)	flowers	UK, Widespread in Europe (Mound et al., 1976; Mound et al., 2018), South Italy (zur Strassen, 2003; Stoch, 2003; Vierbergen, 2013; Marullo & De Grazia, 2013), Belgium (Lock, 2006).	Yes	N/A

MI0012	***Melanthrips fuscus*** Sulzer 1776 zur Strassen & Kuslitzky (2012) quote as *= M. gracilicornis*	*Sinapsis arvensis, Brassica* spp. *Poterium sanguisorba (Mound et al., 1976)* *Sinapis arvensis, Oenanthe fistulosa, Hirschfeldia incana, Brassicaceae, Galium* sp. (zur Strassen, 1986) *Cardaria draba* (Trdan, 2001) *Hirschfeldia incana,* Cruciferae and the other families of plants (Priesner, 1964b) *Verbascum* sp., *Sinapis* sp., *Vicia sativa, Raphanus* sp., cereal. (Tunc et al., 2012) *Crataegus* sp. (Marullo & De Grazia, 2013) *Vicia faba* (Razi et al., 2013)	flowers	UK, Widespread in Europe and North Africa (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy and Islands (Stoch, 2003; Marullo & De Grazia,2013), Iran (Fallahzedah et al., 2011), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016) Algeria (Razi et al., 2013), Serbia (Andjus et al., 2001). Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Cyprus (Srour, 2015), Crete, Greek Mainland Italian Manland, Malta, Sardinia, Sicily (Vierbergen, 2013). Iran (Bhatti et al., 2009), Europe, East Palaearctic, Near East, Nearctic region, North Africa (Priesner, 1964b; in Fallahzedah et al., 2011), Sweden + Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015; zur Strassen, 2003), Belgium (Lock 2016), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020). On *Citrus* sp. in Tunisia (Belaam-Kort et al., 2020. Also in Egypt (zur Strassen, 2014) Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003).	Yes	N/A
MI0013	***Melanthrips gratiosus*** zur Strassen, 1968	*Genista*		Morocco (zur Strassen, 2003)	No	No
MI0014	***Melanthrips hispanicus*** Pelikan, 1977	*Reseda* sp., *Sesamoides* sp. (ThripsWiki)	flowers (TripsWiki)	Spanish Mainland (zur Strassen, 2003; Vierbergen 2013)	No	Yes
MI0015	***Melanthrips knechteli*** Priesner, 1936	*Cerinthe* (zur Strassen, 2003)	flowers (TripsWiki)	Spanish Mainland (Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015; zur Strassen (2003), Romania (Sierka et al., 2008), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	Yes	N/A
MI0016	***Melanthrips libycus*** Priesner, 1936	*Cruciferae* (ThripsWiki) *Erucaria hispanica,* Citrus x paradise (zur Strassen & Kuslitzky, 2012)		Israel (zur Strassen & Kuslitzky, 2012), Sicily (Stoch, 2003), Spanish Mainland (Vierbergen, 2013). Authors list Malta as distribution for this species together with S. Spain, S. Italy, Malta, Libya and Egypt (zur Strassen, 2003; 2014).	Yes	N/A
MI0017	***Melanthrips longisetis*** Priesner, 1965	?	flowers (TripsWiki)	Egypt (zur Strassen, 2014)	No	?
MI0018	***Melanthrips maculipennis*** Zur Strassen, 1968	*Withania frutescens*		Morocco (zur Strassen, 2003)	No	No
MI0019	***Melanthrips matthiolae*** Priesner, 1936	*Matthiola livida* (ThripsWiki)	flowers	Spanish Mainland (Vierbergen, 2013), Egypt (zur Strassen, 2003; 2014).	No	Yes
MI0020	***Melanthrips morulus*** Zur Strassen, 1968	*Matthiola maroccana*	flowers	Morocco (zur Strassen, 2003)	No	No
MI0021	***Melanthrips*** cf. ***nigricornis*** Bagnall, 1913	*Pyrus* sp., *Citrus* sp. zur Strassen & Kuslitzky 2012	flowers (TripsWiki)	Israel (zur Strassen & Kuslitzky, 2012), Sicily (zur Strassen, 2003; Stoch, 2003), France, Spain, Italy, Tunisia, Sicily, Spanish Mainland (Vierbergen, 2013)	No	Yes
MI0022	***Melanthrips pallidior*** Priesner, 1919	various plants, but particularly in *Euphorbia cyparissias* (ThripsWiki) *Vicia sativa, herb, Myrtus communis, Satureja thymbra, Trifolium sp., Asteraceae* (Tunc et al., 2012)	flowers (TripsWiki)	Italy (Stoch, 2003), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012;2016), Cyprus, Greek Mainland Italian Manland, Sicily, Spanish Mainland (Vierbergen, 2013), Iran (Bhatti et al., 2009), Croatia (Raspudić et al., 2009) Bulgaria (Karadjova & Krumov, 2015; zur Strassen (2003). On *Citrus* sp. in Tunisia (Belaam-Kort et al., 2020), Hungary (Jenser, 2011), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003)	No	Yes
MI0023	***Melanthrips paspalevi*** Pelikan, 1960	*Alyssium, Orlaya, Haplophyllum, Spartium* (zur Strassen, 2003)		Tajikistan, Georgia, Turkey, Bulgaria,Rumania Turkey (zur Strassen, 2003; Tunc & Hastenpflug-Vesmanis, 2016).	No	No
MI0024	***Melanthrips pelikani*** Jenser, 1993	?		Algeria (zur Strassen, 2003)	No	?

MI0025	***Melanthrips rivnayi*** Priesner, 1936	Woody Rosaceae (ThripsWiki) *Cercis silquastrum* (Tunc et al., 2012)		Italian Islands (Stoch, 2003), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012;2016), French Mainland Italian Mainland, Sicily Spanish Mainland (Vierbergen, 2013; zur Strassen, 2003).	No	Yes
MI0026	***Melanthrips separandus*** Priesner, 1936	?		Israel (zur Strassen & Kuslitzky, 2012), Crete (Vierbergen, 2013), zur Strassen (2003), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	?
MI0027	***Melanthrips sinaiticus*** Priesner, 1964	?		Spanish Mainland (Vierbergen, 2013), Egypt (zur Strassen, 2003;2014)	No	?
MI0028	***Melanthrips sudanensis*** Priesner, 1936	*Panicum turgidum* (ThripsWiki), *Launatea, Emex, Chenopodium, Suaeda* (zur Strassen, 2003)		Egypt (zur Strassen, 2003, Vierbergen, 2013).	No	Yes
MI0029	***Melanthrips titchaki*** Pelikan, 1960	*Asteraceae* (zur Strassen, 2003)	flowers (TripsWiki)	Bulgaria, Czech Republic, Turkey (zur Strassen, 2003; Tunc & Hastenpflug-Vesmanis, 2016).	No	?
MI0030	***Melanthrips tortus*** Zur Strassen, 1968	*Melilotus* sp. (zur Strassen, 2003)		Morocco (zur Strassen, 2003)	No	Yes
MI0031	***Melanthrips trifasciatus*** Priesner, 1961	*Phyllirea latifolia* (zur Strassen, 1986) *Quercus* sp., herb, *Cratageegus* sp., *Pinus* sp. (Tunc et al., 2012)		Greece (zur Strassen,1986-05), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Crete, Greek Mainland (zur Strassen, 2003; Vierbergen, 2013).	No	Yes
MI0032	***Melanthrips tristis*** Priesner, 1936	*Parentucellia viscosa, Veronica urticifolia, Satureja thimbra* zur Strassen1986		Greece (zur Strassen, 1986-05), Israel (zur Strassen & Kuslitzky, 2012), Crete, Greek Mainland, Spanish Mainland (Vierbergen, 2013; zur Strassen, 2003), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	No

Suborder Terebrantia: Family Faurieliidae						
Species nº	Species name	Recorded on	Plant region	Distribution	Records from Malta	Likely in Malta
F0001	***Ropotamothrips buresi*** Pelikan, 1958	*Artemisia* sp. (ThripsWiki)	?	French Mainland (Vierbergen, 2013). Genus found in North Italy (Marullo & De Grazia, 2013), Spanish Mainland (Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015; zur Strassen (2003)	No	No
F0002	***Ropotampothrips ressli*** (Priesner, 1961)	?		Georgia, Turkey, (Tunc & Hastenpflug-Vesmanis, 2016) Romania (zur Strassen, 2003).	No	?

Suborder Terebrantia: Family Merothripidae						
Species nº	Species name	Recorded on	Plant region	Distribution	Records from Malta	Likely in Malta
Mr0001	***Merothrips floridensis*** Watson, 1927	Fungophyte on dead branches and leaf litter (ThripsWiki, 2021)	?	French Mainland, Spanish Mainland, Azores (zur Strassen, 2003, Vierbergen, 2013)	No	No

Suborder Terebrantia: Family Adiheterothripidae (=Stenurothripidae)						
Species nº	Species name	Recorded on	Plant region	Distribution	Records from Malta	Likely in Malta
S0001	***Holarthrothrips josephi*** Bhatti, 1986	*Phoenix dactylifera* (ThripsWiki, 2021)	male flowers (ThripsWiki)	Israel (zur Strassen & Kuslitzky, 2012	No	No
S0002	***Holarthrothrips tenuicornis*** Bagnall, 1927	*Phoenix* particularly *P. canariensis* (ThripsWiki) *Vitis, Citrus, Rubia* (Marullo & De Grazia, 2013)		Sicily (Stoch, 2003; Marullo & De Grazia 2013), Israel (zur Strassen & Kuslitzky, 2012), French Mainland, Greek Manland, Spanish Mainland, Corsica, Sicily (Vierbergen, 2013; zur Strassen (2003).	Yes	N/A

Suborder Terebrantia: Family Thripidae: Subfamily Dendrothripinae						
Species nº	**Species name**	**Recorded on**	**Plant region**	**Distribution**	**Records from Malta**	**Likely in Malta**
Td0001	***Dendrothrips decoris*** (Bagnall, 1927)	*Quercus coccifera* and *Phyllirea* sp. (ThripsWiki)		French Mainland, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	Yes
Td0002	***Dendrothrips degeeri*** Uzel, 1895	*Fraxinus* and *Ulmus* (on *Tilia*, *Alnus* and *Corylus* in Europe) (Mound et al., 1976) *Fraxinus ornus* (Trdan, 2001) *Fraxinus, Quercus* (Marullo & De Grazia, 2013)		UK Widespread in Europe (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001), Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Close to greenhouses in Netherlands (Vierbergen, 2001), Iran (Bhatti et al., 2009), French Mainland, Italian Mainland, Spanish Mainland (Vierbergen, 2013), Scandinavia (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015; zur Strassen (2003), Hungary (Jenser, 2011), Slovakia, Romania (Sierka et al., 2008), Turkey (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003)	No	Yes
Td0003	***Dendrothrips eastopi*** Pitkin & Palmer, 1974	*Hedera helix* (Mound et al. 1976)		UK (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018)	No	No
Td0004	***Dendrothrips karnyi*** Priesner, 1921	*Vitex trifolia*		Israel (zur Strassen & Kuslitzky, 2012), Poland, Moldova, Crimea, Italy, Croatia, Turkey, Italian Mainland (Vierbergen, 2013; zur Strassen (2003), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Td0005	***Dendrothrips ornatus*** (Jablonowski, 1894)	*Ligustrum* and *Syringia* (on *Tilia* and *Alnus* in Europe) (Mound et al., 1976) *Ligustrum ovalifolium* larva found (Kirk, 1996) *Tilia cordata* (Trdan, 2001)	leaves	UK, Widespread in Europe (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Slovenia (Trdan, 2001) North Italy (Stoch, 2003), French Mainland, Italian Mainland Spanish Mainland (Vierbergen, 2013), Scandinavia (Gertsson, 2015) Bulgaria (Karadjova & Krumov, 2015). zur Strassen (2003). Hungary (Jenser, 2011), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003).	No	No
Td0006	***Dendrothrips phyllirae*** Bagnall, 1927	*Phyllirea* sp. *Phyllirea latifolia, Ligustrum vulgare* (zur Strassen, 1986) *Phylliraea, Ligustrum* (Marullo & De Grazia, 2013)		Greece (zur Strassen, 1986-05), Israel (zur Strassen & Kuslitzky, 2012), Italy (Marullo & De Grazia, 2013), Iran (Bhatti et al., 2009), French Mainland Greek Mainland Italian Mainland Spanish Mainland (Vierbergen, 2013), France (Pizzol et al., 2014), Bulgaria (Karadjova & Krumov, 2015; zur Strassen (2003), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Td0007	***Dendrothrips priesneri*** zur Strassen, 1965	*Rumex lunaria, Euphorbia regisjubae* (zur Strassen, 2003)		Canary Islands (zur Strassen, 2003)	No	No

Td0008	***Dendrothrips saltator*** Uzel, 1895 *(= D. saltatrix*, Bhatti et al., 2009)	*Peucedanum officinale* (on *Tilia*, *Alnus, Corylus* and *Eupatorum cannabinum* in Europe) (Mound et al., 1976) *Pallenis spinose,* Umbellifera, Compostiae (zur Strassen, 1986) *Pyrus communis* (Trdan, 2001) *Triticum aestivum, Fabaceae, Olea europaea, Umbellifereae*. (Tunc et al., 2012) *Ferula melitensis* Mifsud (unpublished)		UK, Widespread in Europe. (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy and Sicily (Stoch, 2003), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012, 2016) Iran (Bhatti et al., 2009) French Mainland, Greek Mainland, Spanish Mainland (Vierbergen, 2013), Scandinavia (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015; zur Strassen, 2003), Hungary (Jenser, 2011), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003)	Yes	N/A
Td0009	***Leucothrips nigripennis*** O. M. Reuter, 1904	Fern in greenhouse (Mound et al., 1976)		UK, mainly in tropics. (Mound et al., 1976), French Mainland (zur Strassen, 2003; Vierbergen 2013).	No	No
Td00010	***Pseudodendrothrips aegyptiacus*** (Priesner, 1965)	*Convolvulus arvensis, Euphorbia cuneata, Lycium arabicum, Plocama pendula* (ThripsWiki)		Israel (zur Strassen & Kuslitzky, 2012), genus found in N Italy (Marullo & De Grazia, 2013). Also in Egypt (zur Strassen, 2014; zur Strassen, 2003)	No	No
Td0011	***Pseudodendrothrips mori*** (Niwa, 1908)	*Ficus carica, Morus alba* (ThripsWiki) *Medicago sativa* (Baderitakis et al., 2015)		North Italy (Stoch, 2003), Spanish Mainland (Vierbergen, 2013), Greece (Baderitakis et al., 2015), Bulgaria (zur Strassen, 2003; Karadjova & Krumov, 2015), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes

Suborter Terebrantia: Family Thripidae: Subfamily Panchaetothripinae						
Species nº	**Species name**	**Recorded on**	**Plant region**	**Distribution**	**Records from Malta**	**Likely in Malta**
Tp0001	***Anisopilothrips venustulus*** Stannard & Mitri 1962	Cacao leaves (Thripswiki)		Azores (zur Strassen, 2003)	No	No
Tp0002	***Caliothrips fasciatus*** (Pergande, 1915)	Fabaceae		UK (zur Strassen, 2003)	No	No
Tp0003	***Caliothrips graminicola (=quadrifasciatus)*** (Girault, 1927)	Naal Grass (ThripsWiki)		Egypt (zur Strassen, 2014), Delhi, India (Kumar et al., 2008)	No	No
Tp0004	***Caliothrips impurus*** (Priesner, 1927)	grasses, ground nuts, *Tephrosia uniflora*, onion, cotton, berseem, *Heliotrophium* sp., lucerne, garden beans and legumes. (ThripsWiki)		Egypt (zur Strassen, 2014)	No	Yes
Tp0005	***Caliothrips sudanensis*** (Bagnall & Cameron, 1932)	Cotton? (ThripsWiki)		Egypt (zur Strassen, 2014)	No	Yes
Tp0006	***Helionothrips errans*** (Williams, 1916)	Greenhouse orchids (Mound et al., 1976)		UK (Mound et al., 1976; Mound et al., 2018), Old World (zur Strassen, 2003).	No	No
Tp0007	***Heliothrips hemorrhoidalis*** (Bouché, 1833) (Greenhouse thrips)	Polyphagous in greenhouses (Mound et al. ,1976) Polyphagous leaves of plants with low levels of nitrogen, *Viburnum* (Mifsud & Watson, 1999) Occasionally on *Citrus* (Conti et al., 2001) *Viburnum tinus* (Trdan, 2001)	flowers	UK, South Africa. Throughout tropics and subtropics and greenhouses (Mound et al., 1976; Mound et al., 2018), Malta (Mifsud & Watson, 1999), Sicily (Conti et al., 2001), Slovenia (Trdan, 2001), Italy and Islands (Stoch, 2003), Libya (Mohammed & Saurub, 2010), Israel (zur Strassen & Kuslitzky, 2012), Iran (Bhatti et al., 2009), found in Italy (Marullo & De Grazia, 2013), French Mainland, Greek Mainland, Italian Mainland, Sardinia, Sicily, Spanish Mainland (Vierbergen, 2013), France (Pizzol et al., 2014). Also in Egypt (zur Strassen, 2014), Scandinavia, Denmark (Gertsson, 2015) Bulgaria (Karadjova & Krumov, 2015). zur Strassen (2003), Belgium (Lock, 2006), Hungary (Jenser, 2011), Turkey (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe, and the Mediterranean and Africa (Nickle, 2003)	Yes	N/A
Tp0008	***Hercinothrips bicinctus*** (Bagnall, 1919) **[ ]**	Polyphagous in greenhouses (pest on Bananas in tropics) (Mound et al., 1976)		UK. Common in tropics/ subtropics (Mound et al., 1976; Mound et al., 2018), Israel (zur Strassen & Kuslitzky, 2012), French Mainland, Spanish Mainland (Vierbergen, 2013, zur Strassen, 2003), Norway, Denmark (Gertsson, 2015), Belgium (Lock, 2006), Hungary (Jenser, 2011). Intercepted in US from Africa (Nickle 2003).	No	Yes
Tp0009	***Hercinothrips dimidiatus*** Hood, 1937	Liliaceous plants (ThripsWiki)		Intercepted in US from Africa (Nickle, 2003)	No	No
Tp0010	***Hercinothrips femoralis*** (O. M. Reuter, 1891)	Polyphagous in greenhouses (Mound *et al.* 1976)		UK Common in tropics/ subtropics (Mound et al., 1976; Mound et al., 2018), South Italy (Stoch, 2003), Israel (zur Strassen & Kuslitzky, 2012), French Mainland, Italian Mainland, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Scandinavia, Denmark (Gertsson, 2015)., Belgium (Lock, 2006), Hungary (Jenser, 2011), Turkey (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020).	Yes	N/A

Tp0011	***Parthenothrips dracenae*** (Heeger, 1854)	Greenhouses? (Mound et al., 1976) *Dracaena* sp. (Trdan, 2001)		UK on imported plants? (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001), Northern Italy (Stoch, 2003), Close to greenhouses in Netherlands (Vierbergen, 2001; zur Strassen, 2003). Iran (Bhatti et al., 2009), Genus found in N Italy (Marullo *et al*.), French Mainland, Greek Mainland, Italian Mainland, Spanish Mainland (Vierbergen, 2013) Scandinavia, Denmark, Iceland (Gertsson, 2015), Belgium (Lock, 2006), Hungary (Jenser, 2011), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe, and the Mediterranean and Africa (Nickle, 2003)	No	Yes
Tp0012	***Phibalothrips peringuey*** (Faure, 1925)	?		Italy and Sicily (zur Strassen, 2003; Stoch, 2003; Vierbergen, 2013; Marullo & De Grazia, 2013), Delhi, India (Kumar et al., 2008).	No	?
Tp0013	***Phibalothrips dispar*** zur Strassen, 1974	*Brachypodium sylvaticum*		Canary Islands (zur Strassen, 2003)	No	No
Tp0014	***(Retithrips aegypticus)*** Marchal, 1910	?		Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004)	No	?
Tp0015	***(Retithrips javanicus)*** Karny, 1923	*Quisqualis indica*		Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004)	No	No
Tp0016	***Retithrips syriacus*** (Mayet, 1890)	Cultured plants e,g. *Ficus carica, Gossypium, Hibiscus, Jatropha curcas, Melia azerdarach, Pistacia* sp., *Vitis vinifera* (zur Strassen, 2003)		Turkey, (zur Strassen, 2003; Tunc & Hastenpflug-Vesmanis, 2016), Cyprus (Srour, 2015), Israel (zur Strassen & Kuslitzky, 2012), Iran (Bhatti et al., 2009), Iraq Abdul-fatah Hamodi & Abdul-Rassoul. 2004), Egypt (zur Strassen, 2014). Intercepted in US from the Mediterranean and Africa (Nickle, 2003).	No	Yes
Tp0017	***(Rhipiphorothrips miemsae)*** Jacot-Guillarmod, 1937	*Brachystegia filiformis*		Intercepted in US from Africa (Nickle, 2003)	No	No
Tp0018	***(Selenothrips rubrocinctus)*** (Giard, 1901)	?		Intercepted in US from Africa (Nickle, 2003)	No	?

Suborder Terebrantia: Family Thripidae: Subfamily Sericothripinae						
Species nº	**Species name**	**Recorded on**	**Plant region**	**Distribution**	**Records from Malta**	**Likely in Malta**
Ts0001	***Hydatothrips boerhaaviae*** (Seshadri & Ananthakrishnan, 1954)	?		Israel (zur Strassen, 2003, zur Strassen & Kuslitzky, 2012)	No	?
Ts0002	***Hydatorthrips kassimianus*** (Priesner, 1950)	?		Egypt (zur Strassen, 2014)	No	?
Ts0003	***Neohydatothrips abnormis*** (Karny, 1910)	*Prosopis farcta* (zur Strassen & Kuslitzky, 2012)		North Italy (Stoch, 2003), Israel (zur Strassen & Kuslitzky, 2012), Europe, French Mainland, Italian Mainland (Vierbergen, 2013), Norway, Finland (Gertsson, 2015) Bulgaria (Karadjova & Krumov, 2015) zur Strassen (2003), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	No
Ts0004	***Neohydatothrips gracilicornis*** (Williams, 1916)	*Vicia sativa, Lathyrus sativus,* herb, *Vitis vinifera,* grass, *Verbascum sp., Olea europaea, Melilotus sp., Citrus aurantium, Vicia sativa, Medicago sativa, Malus communis, Hordeum vulgare* (Tunc et al., 2012). *Vicia* sp. (Marullo & De Grazia, 2013)		UK (Mound et al., 2018), Italy and Sardinia (Stoch, 2003; Marullo & De Grazia, 2013), Turkey (Tunc et al., 2012; 2016) Balearic Islands, Greek and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013) Scandinavia (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Ts0005	***Neohydatothrips hispanicus*** Berzosa, 1983	*Cistus laurifolius, Juniperus thuriferae,* (zur Strassen, 2003)		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Ts0006	***Neohydatothrips masrensis*** (Priesner, 1965)	?		Egypt (zur Strassen, 2014)	No	?
Ts0007	***Neohydatothrips necopinatus*** zur Strassen, 1995	*Ulex* sp. (ThripsWiki)		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Ts0008	***Neohydatothrips samayunkur*** (Kudo, 1995)	*Tagetes* sp., *Tagetes eretica* (Abd el Wahab, 2015)		Egypt (Abd el Wahab, 2015), Delhi, India (Kumar et al., 2008). Intercepted in US from the Mediterranean and Africa (Nickle, 2003)	No	Yes
Ts0009	***Neohydatothrips zur Strasseni*** Berzosa, 1983	*Cistus ladanifer* (zur Strassen, 2003)		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Ts0010	***Sericothrips abnormis*** *(=Neohydatothrips abnormis)*	*Lotus corniculatus* (Mound et al., 1976)		UK, Widespread in Europe (Mound et al., 1976)	No	Yes
Ts0011	***Sericothrips bicornis*** (Karny, 1910)	*Lotus corniculatus* (Trdan, 2001). *Lotus, Trifolium* (Marullo & De Grazia, 2013) *Medicago sativa, M. lupulina* (Baderitakis *et.al* 2015)		UK (Mound et al., 2018), Slovenia (Trdan, 2001), Italy (Stoch, 2003; Marullo & De Grazia, 2013), Greece (Baderitakis *et.al.,*2015), French Mainland, Italian Mainland, Sardini, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013) Sweden, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Croatia (Raspudić et al., 2009), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Ts0012	***Sericothrips gracilicornis*** *(=Neohydatothrips gracilicornis)*	*Vicia cracca* (Mound et al., 1976) *Anthyllis hermanniae, Psoralea bituminiosa, Medicago marina, Astralagus* sp., *Medicago* sp., *Vicia cretica* (zur Strassen, 1986)		UK, Widespread in Europe (Mound et al., 1976), Greece (zur Strassen, 1986-05)	No	Yes
Ts0013	***Sericothrips staphylinus*** Haliday, 1836	*Ulex* sp. (Mound et al., 1976), *Ulex europaeus.* larva found (Kirk , 1996)	flowers/ leaves	UK (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Denmark French Mainland, Italian Mainland, Spanish Mainland (Vierbergen, 2013), Sweden + Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015). zur Strassen (2003), Hungary (Jenser, 2011), Romania (Sierka et al., 2008)	No	No

Suborder Terebrantia: Family Thripidae: Subfamily Thripinae						
Species nº	**Species name**	**Recorded on**	**Plant region**	**Distribution**	**Records from Malta**	**Likely in Malta**
Tt0001	***Agrostothrips meridionalis*** Bagnall, 1927	*Andropogon halepanse, Brachypodium ramosum, Cenchrus, Heteropogon contortus, Hyparrhenia hirta, Sorghum halpense* (zur Strassen, 2003)		Madeira, Canary Islands, India, Pakistan, Yemen, Iran, Nigeria, S. Africa (zur Strassen, 2003), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0002	***Anaphotrhips (Hemianaphothrips) articulosus*** Priesner, 1925	*Glyceria sp.* (Mound et al., 1976)		UK, Widespread in Europe (Mound et al., 1976), Hungary (Jenser, 2011). Intercepted in US from Europe and Africa (Nickle, 2009).	No	No
Tt0003	***Anaphothrips atroapterus*** Priesner, 1921	*Euphoria (Ephedra?)* sp. (ThripsWiki, 2021)		French Mainland (Vierbergen, 2013; zur Strassen,2003), Hungary (Jenser, 2011), Romania (Sierka et al., 2008).	No	No
Tt0004	***Anaphothrips badius*** (Williams, 1913)	*Carex* and *Phragmites* (Mound et al., 1976), *Phragmites australis* (Kucharzyk *et al.,* 2011).		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), Poland (Kucharczyk & Zawirska, 2001), Spanish Mainland (Vierbergen, 2013), Sweden, Norway and Denmark (Gertsson, 2015; zur Strassen, 2003) Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
Tt0005	***Anaphothrips euphorbiae*** Uzel, 1895	*Euphorbia, amygdaloides, E. Cyparissias, E. esula* (zur Strassen, 2003)		South Russia, Georgia, Germany, Austria, Netherlands, Central Europe (zur Strassen, 2003), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	No
Tt0006	***Anaphotrhtips gracilissimus*** Priesner, 1923	High grass (Trdan, 2001)		Slovenia (Trdan, 2001), North Italy (Stoch, 2003), French, Italian and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Finland (Gertsson, 2015), Hungary (Jenser, 2011). Slovakia (Zvaríková et al., 2020).	No	Yes
Tt0007	***Anaphothrips graminum*** Priesner, 1935	*Hyparrhenia hirta* (zur Strassen, 1986)		Greece (zur Strassen, 1986-05), Israel (zur Strassen & Kuslitzky, 2012), Cyprus (Srour, 2015), Greek Mainland (zur Strassen, 2003; Vierbergen, 2013), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0008	***Anaphothrips obscurus*** (Muller, 1776)	Grasses and cereals (Mound et al., 1976) *Carex pendula, Avena sativa* (zur Strassen, 1986) High grass (Trdan, 2001) *Triticum aestivum* (Fallahzedah et al., 2011) *Zea mays, Citrus reticulata, Olea europaea, Hordeum vulgare, Avena sativa, Juncus sp., Asteraceae, Vicia faba, cereal, Fragaria ananasa, Dianthus sp., Triticum aestivum, Hordeum sativum* (Tunc et al., 2012) *Arundo* sp. (Marullo & De Grazia, 2013)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Iran (Fallazadeh *et al.,* 2011), Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Cyprus (Srour, 2015), French Mainland, and Spanish Mainlands (Vierbergen, 2013), Europe, Australian region, East Palaearctic, Near East, Nearctic region, Neotropical region, North Africa, Oriental region on the Weeds and different kinds of bushes (zur Strassen (2003); Fauna Europaea Web Service, 2004 in Fallahzedah et al., 2011). France (Pizzol et al., 2014), Egypt (zur Strassen, 2014), Scandinavia, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Iran (Mirab-balou et al., 2013; zur Strassen, 2003), Belgium (Lock, 2006), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Croatiia (Raspudić et al., 2009, Slovakia (Zvaríková et al., 2020), Iran (Bhatti et al., 2009). Intercepted in US from Europe and Africa (Nickle, 2003).	No	Yes
Tt0009	***Anaphothrips sudanensis*** Trybom, 1911	*Allium cepa* (Fallahzedah et al., 2011) *Urochloa maxima* (Jacq.) R. Webster (Poaceae), *Pennisetum* sp. (Poaceae), *Sorghum halepense* (L.) Pers. (Poaceae), *Zea mays* L. (Poaceae) (zur Strassen (2003);		Europe, Australian region, Oriental region, East Palaearctic, Near East, Neotropical region, North Africa, Spanish Mainland, Afro-tropical region (Vierbergen, 2013), Cyprus (Srour, 2015), Egypt (zur Strassen, 2014), Iran (Mirab-balou et al., 2013), Turkey (Tunc & Hastenpflug-Vesmanis, 2016), Iran (Bhatti et al., 2009 Fallahzedah et al., 2011). Intercepted in US from the Mediterranean and Africa (Nickle, 2003).	Yes	N/A

Tt0010	***Anascirtothrips arorai*** Bhatti, 1961	*Ficus* sp. (ThripsWiki, 2021)	young leaves	Israel (zur Strassen & Kuslitzky, 2012)	No	No
Tt0011	***Apterothrips apteris*** (Daniel, 1904)	?		UK (Mound et al., 2018), N. Italy (Marullo & De Grazia, 2013). Intercepted in US from Europe (Nickle, 2009)	No	?
Tt0012	***Apterothrips secticornis*** (Trybom, 1896)	Grasses (Mound et al., 1976)		UK, found in cold temperate habitats (Mound et al., 1976), North Italy (Stoch, 2003), Italian Mainland (Vierbergen, 2013), Scandinavia, Iceland (Gertsson, 2015; zur Strassen, 2003), Romania (Sierka et al., 2008). Intercepted in US from Europe (Nickle, 2003).	No	No
Tt0013	***Aptinothrips elegans*** Priesner, 1924 (= ***Aptinothrips mediterraneus***) Priesner, 1926	Grasses (Mound et al., 1976) Grasses with dead leaves (Trdan, 2001) Lawn, *Lathyrus tuberosus* in Hungary (ThripsWiki, 2021) *Agropyron* sp. (Marullo & De Grazia, 2013)		UK, widespread in Europe (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), Tunisia (Jenser, 1982), Iran (Bhatti et al., 2009), Slovenia (Trdan, 2001), South Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), French Mainland, Italian Mainland Spanish Mainland (Vierbergen, 2013), Scandinavia + Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Iran (Mirab-balou et al., 2013), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0014	***Aptinothrips karnyi*** John, 1927	Grasses (Mound et al., 1976)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), South Italy (Stoch, 2003), Poland (Kucharczyk & Sałapa, 2001), French Mainland, Italian Mainland, Spanish Mainland (Vierbergen, 2013; zur Strassen, 2003), Hungary (Jenser, 2011), Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
Tt0015	***Aptinothrips rufus*** (Haliday, 1836) (dark form *nitilus* in salt marshes)	Grasses (Mound et al., 1976) *Thymus* sp., *Calycotome* sp., *Othonopsis* sp. (Jenser, 1982) *Ammophila littoralis, Brachypodium retusium, Dasypyrum villosum, Hordeum murinum, Limonium vulgare, Polypogon monspeliensis, P. maritimus, Hyparrhenia hirta, Stipa capensis, Gastridium venticosum, Dactylis hispanica, Avena barbata, Pipatherium miliaceum, Malcolmia microcalyx scyria* (zur Strassen, 1986) *Hyparrhenia hirta* (zur Strassen & Kuslitzky, 2012) *Rumex* sp., *Fabaceae, Triticum* sp., *Trifolium* sp. (Tunc et al., 2012) *Ampelodesma* sp. (Marullo & De Grazia, 2013)		UK, common in temperate regions (Mound et al., 1976; Mound et al., 2018), Tunisia (Jenser 1982), Greece (zur Strassen, 1986-05), Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc *et al*. 2012; 2016), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Cyprus (Srour, 2015), French Mainland, Greek Mainland, Italian Mainland, Sardinia, Sicily Spanish Mainland (Vierbergen, 2013), France (Pizzol et al., 2014), Egypt (zur Strassen, 2014), Scandinavia + Denmark + Iceland (Gertsson, 2015), Croatiia (Raspudić et al., 2009), Bulgaria (Karadjova & Krumov, 2015) Iran (Mirab-balou et al., 2013). zur Strassen (2003), Belgium (Lock, 2006). Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Iran (Bhatti et al., 2009). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003).	Yes	N/A
Tt0016	***Aptinothrips stylifer*** Trybom, 1894	Grasses esp. *Deschampsia* and *Dactylis* spp. (Mound et al., 1976) Grasses of medium height (Trdan, 2001) *Phragmites australis* (Kucharzyk *et al.,* 2011)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001), Italy (Stoch, 2003), Poland (Kucharzyk *et al.,* 2011), Iran (Bhatti et al., 2009), French Mainland, Italian Mainland, Spanish Mainland (Vierbergen, 2013) Scandinavia, Denmark, Iceland (Gertsson, 2015), Croatiia (Raspudić et al., 2009), Bulgaria (Karadjova & Krumov, 2015), Iran (Mirab-balou et al., 2013; zur Strassen, 2003) Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003),	No	Yes
Tt0017	***Asphodelothrips croceicollis*** (=***Ceratothrips croceicollis***) (Karny, 1914)	*Asphodelus* sp. (zur Strassen, 1986-05), *Asphodelus* spp. (Marullo & De Grazia, 2013)	flowers (ThripsWiki, 2021)	Greece (zur Strassen, 1986-05), South Italy and Islands (Stoch, 2003; Marullo & De Grazia,2013), Israel (zur Strassen & Kuslitzky, 2012), Cyprus (Srour, 2015), French Mainland, Greek Mainland, Italian Mainland, Sardinia, Sicily, Spanish Mainland (Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015). zur Strassen (2003), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	Yes	N/A

Tt0018	***Aurantothrips orchidaceus*** (=***Anaphothrips orchidaceous***) (Bagnall, 1909)	cultivated orchids (Mound *et al.*1976; ThripsWiki, 2021)	flowers	UK in greenhouses (Mound et al., 1976; Mound et al., 2018), French Mainland (Vierbergen, 2013), Neotropical (ThripsWiki, 2021), Sweden, Norway, Denmark (Gertsson, 2015; zur Strassen, 2003), Belgium (Lock, 2016).	No	Yes
Tt0019	***Baliothrips dispar*** (Haliday, 1836)	Gramineae, particularly *Glyceria*, *Phalaris* and *Holcus* (Mound et al., 1976) *Cyperaceae* (zur Strassen, 2003)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), Close to greenhouses in Netherlands (Vierbergen, 2001). French Mainland, Italian Mainland (Vierbergen, 2013) Scandinavia, Denmark (Gertsson, 2015; zur Strassen, 2003), Belgium (Lock 2006) Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
Tt0020	***Baliothrips kroli*** (=***Euchaetothrips kroli*** - ThripsWiki) (Schille, 1912)	*Glyceria maxima* (Mound *et al.* 1976)		UK, (Mound et al., 1976; Mound et al., 2018), French Mainland (Vierbergen, 2013), Close to greenhouses in Netherlands (Vierbergen, 2001), Widespread in Europe. Scandinavia, Denmark (Gertsson, 2015), Hungary (Jenser, 2011).	No	No
Tt0021	***Belothrips acuminatus*** Haliday, 1836	*Galium verum* (Mound et al., 1976)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), French Mainland (Vierbergen, 2013) Scandinavia, Denmark (Gertsson, 2015; zur Strassen, 2003). Hungary (Jenser, 2011), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
TT0022	***Belothrips morio*** O.M. Reuter, 1899	*Galium boreale*		Russia, Scandinavia, Central Europe. Slovakia (zur Strassen, 2003; Sierka et al., 2008), Slovakia (Zvaríková et al., 2020),	No	No
Tt0023	***Blascothrips zumetai*** zur Strassen, 1997	*Krascheninnikovia ceratoides* (zur Strassen, 2003)		Spanish Mainland (zur Strassen, 2003; Vierbergen 2013)	No	No
Tt0024	***Bolacothrips graminis*** (Priesner, 1930)	Poaceae (ThripsWiki)		Egypt (zur Strassen, 2014)	No	Yes
Tt0025	***Bolacothrips jordani*** Uzel, 1895	*Alopercurus* sp., *Calmagrostis, Dactylis glomerata* (zur Strassen, 2003)		UK, widespread in Europe (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), Cyprus (Srour, 2015), French and Spanish Mainlands (Vierbergen, 2013) Finland, Denmark (Gertsson, 2015), Hungary (Jenser, 2011), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Tt0026	***Bradinothrips musae*** (Hood, 1956)	*Spathyphyllum, Musa* (zur Strassen, 2003)		Italy (zur Strassen, 2003; Marullo & De Grazia, 2013; Vierbergen, 2013), Sweden (Gertsson, 2015).	No	Yes
Tt0027	***Bregmatothrips dimorphus*** (Priesner, 1919)	Described in Croatia from grass (ThripsWiki, 2021) *Grass, Cynodon dactylon* (Tunc et al., 2012)		South Italy and Sicily (zur Strassen, 2003; Stoch, 2003; Marullo & De Grazia, 2013; Vierbergen, 2013), Spanish Mainland (Vierbergen, 2013), Turkey (Tunc et al., 2012;2016), France (Vierbergen, 2013; Pizzol et al., 2014), Bulgaria (Karadjova & Krumov, 2015)	Yes	N/A
Tt0028	***Bregmatothrips wilcocksi*** (Priesner, 1939)	*Graminea* sp. (ThripsWik, 2021i)		Egypt (zur Strassen, 2014), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0029	***Caprithrips*** (=*Aptinothrips*) ***melanophthalmus*** (Bagnall, 1927)	*Hyparrhenia hirta* (zur Strassen, 1986) *Cymbopogon hirtus* (De Marzo & Ravazzi, 2005) *Cymbopogon* sp. (Marullo & De Grazia, 2013)		Greece (zur Strassen, 1986-05), South Italy (De Marzo & Ravazzi, 2005-05/06; Marullo & De Grazia, 2013), France, India, Canary Islands (De Marzo & Ravazzi, 2005), French Mainland, Greek Mainland Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	Yes
Tt0030	***Ceratothripoides brunneus*** Bagnall, 1918	Solanacedae (Skarlinsky *et al.*, 2017), *Rosa* (Sartiami & Mound, 2013)	flowers (ThripsWiki, 2021)	Intercepted in US from the Mediterranean and Africa (Nickle, 2003)	No	Yes
Tt0031	***Ceratothrips ericae*** (Haliday, 1836)	*Erica* sp. (Mound et al., 1976) *Erica arborea Calluna* sp. (zur Strassen, 1986) *Calluna vulgaris, Erica cinerea* larva found (Kirk 1996) *Erica carnea* (Trdan, 2001) *Erica* sp. (Marullo & De Grazia, 2013)	flowers	UK, Northern Europe (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Greece (zur Strassen, 1986-05), Italy (Stoch, 2003; Marullo & De Grazia,2013), Slovenia (Trdan, 2001), close to greenhouses in Netherlands (Vierbergen, 2001). French and Spanish Mainlands (Vierbergen, 2013), Scandinavia, Denmark, Iceland (Gertsson, 2015). zur Strassen (2003), Belgium (Lock, 2006), Hungary (Jenser, 2011), Poland (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Croatiia (Raspudić et al., 2009), Turkey (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe (Nickle, 2003)	Yes	N/A

Tt0032	***Cestrothrips karnyi*** (Bagnall, 1927)	Erica (ThripsWiki, 2021)		South Italy (Stoch, 2003; zur Strassen, 2003; Marullo & De Grazia, 2013; Vierbergen, 2013), French Mainland (Vierbergen, 2013).	No	Yes
Tt0033	***Chaetanaphothrips orchidii*** (Moulton, 1907)	polyphagous in greenhouses (Mound et al., 1976)	leaves?	UK possibly in flower nurseries (Mound et al., 1976; Mound et al., 2018), Israel (zur Strassen & Kuslitzky, 2012), French Mainland (zur Strassen, 2003; Vierbergen, 2013), Iran (Mirab-balou et al., 2013), Belgium (Lock, 2006).	No	Yes
Tt0034	***Chirothrips aculeatus*** (Bagnall, 1927)	Grass (Mound et al., 1976) *Juncus acutus* (zur Strassen, 1986) High grass (Trdan, 2001) *Echinochloa crus-galli, Phragmites* sp., *Echinocloa crusgalli, Zea mays* (Tunc et al., 2012) *Dactylis* sp. (Marullo & De Grazia, 2013)	florets (ThripsWiki, 2021)	UK, found in temperate countries worldwide (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Turkey (Tunc et al., 2012; 2016), French Mainland, Greek Mainland, Italian Mainland, Spanish Mainland (Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Aegean region, Turkey (Tunc et al., 2012; zur Strassen, 2003), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Croatia (Raspudić et al., 2009). Intercepted in US from Europe (Nickle, 2003).	No	Yes
Tt0035	***Chirothrips africanus*** Priesner, 1932	*Grape, wheat* (zur Strassen & Kuslitzky, 2012) *Arundo* (Marullo & De Grazia, 2013) *Cynodon dactylon, Eragrostis bipinnata, Panicum turgidum, Sorghum sp.* (zur Strassen (2003)		Israel (zur Strassen & Kuslitzky, 2012), S. Italy (Marullo & De Grazia, 2013), Cyprus (Srour, 2015), Ethiopia, Sudan, Yemen, Uzbekistan, Taiwan (zur Strassen, 2003, Vierbergen, 2013), Egypt (zur Strassen, 2014), Delhi, India (Kumar et al., 2008).	No	Yes
Tt0036	***Chirothrips ambulans*** Bagnall, 1932	*Poa praternis* (zur Strassen, 2003)		Czech Republic, Austria, Germany, Nederlands. Poland, Slovakia (zur Strassen, 2003; Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	No
Tt0037	***Chirothrips ammophilae*** Bagnall, 1927	*Ammophila arenaria* (zur Strassen, 2003)		France, Spain (zur Strassen, 2003)	No	No
Tt0038	***Chirothrips azoricus*** zur Strassen, 1981	*Festuca petraea* (zur Strassen, 2003)		Azores (zur Strassen, 2003)	No	No
Tt0039	***Chirothrips cypriotes*** Hood, 1938	*Prunus sp., Hiparrhenia hirta* (zur Strassen & Kuslitzky, 2012)		Cyprus (Srour, 2015), Yemen (zur Strassen, 2003; Vierbergen, 2013), Israel (zur Strassen & Kuslitzky, 2012)	No	Yes
Tt0040	***Chirothrips hamatus*** Trybom, 1895	*Alopecurus pratensis* (Mound et al., 1976)		UK, Widespread in Europe (Mound et al., 1976; Mound et al., 2018), French Mainland (Vierbergen, 2013), Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004) Scandinavia, Denmark (Gertsson, 2015; zur Strassen, 2003), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
Tt0041	***Chirothrips insularis*** Hood, 1938	?		Cyprus (zur Strassen, 2003; Vierbergen, 2013; Srour, 2015).	No	?
Tt0042	***(Chirothrips imperatus)*** Fattah-Hammoodi, 2004	?		Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004)	No	?
Tt0043	***Chirothrips kurdistanus*** zur Strassen, 1967	*Digitaria* sp. (ThripsWiki, 2021). *Cynodon dactylon, Panicum* sp. *Sorghum halepense* (zur Strassen, 2003)	seeds (ThripsWiki, 2021)	Israel (zur Strassen & Kuslitzky, 2012), Aegean region, Turkey (zur Strassen, 2003; Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016).	No	No

Tt0044	***Chirothrips manicatus*** Haliday, 1836	*Graminae* (Mound et al., 1976) *Triticum aestivum,* larva found (Kirk, 1996) *Juncus* sp. (Jenser, 1977) netted (Jenser & Tsanakakis, 1985) *Cyperius badus, Polypogon monspeliensis, half dried grass* (Trdan, 2001) *Asparagus officinalis, Zea mays* (Trdan et al., 2005) *Zea mays* (zur Strassen & Kuslitzky, 2012) *Chenopodium* sp., *Echinochloa crus-galli, Olea europaea, Pinus* sp., *Crataegus sp., Pyrus elaeagnifolia, Agrostis palustris, Spartium junceum, Solanum melongena, Malva* sp., *herb, Amygdalus communis, Triticum aestivum* (Tunc et al., 2012) *Zea mays* (Marullo & De Grazia, 2013) *Medicago* (Baderitakis et al., 2015) *Citrus* sp.(Belaam-Kort et al., 2020).	flowers/ leaves Prey to *A. intermedius* (Trdan et al., 2005)	UK, found in most temperate parts of the world (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Tunisia (Jenser, 1982), Greece (Jenser & Tsanakakis, 1985-05; zur Strassen, 1986-05), Slovenia, Croatia, Serbia & Montenegro (Trdan, 2001; Trdan et al., 2005), Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001). Serbia (Andjus et al., 2001). French and Spanish Mainlands (Vierbergen, 2013), Scandinavia + Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015; zur Strassen, 2003), Belgium (Lock, 2006), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Croatia (Raspudić et al., 2009), Tunisia (Belaam-Kort et al., 2020). Intercepted in US from Europe and the Mediterranean? (Nickle, 2003),	Yes	N/A
	(= ***C. ammophilae***) Bagnall, 1927	*Agropyron, Arundo*		French and Spanish Mainland (Vierbergen, 2013)	No	Yes
Tt0045	***Chirothrips medius*** zur Strassen, 1965	*Andropogon, Hyparrhenia hirta*, *Melica*, *Stipa retorta* (zur Strassen, 2003).	florets (ThripsWiki, 2021)	Spanish Maniland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Tt0046	***Chirothrips meridionalis*** (Bagnall, 1927) (= ***Agrostothrips meridionalis)***	*Brachypodium ramosum* (ThripsWiki, 2021)	florets (ThripsWiki, 2021)	Israel (zur Strassen & Kuslitzky, 2012), S. Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Cyprus (Srour, 2015), French and Spanish Mainland. (Vierbergen, 2013), Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004), Egypt (zur Strassen, 2014). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003)	Yes	N/A
Tt0047	***Chirothrips molestus*** Priesner, 1926	*Agropyron (*zur Strassen, 2003)	florets ((ThripsWiki, 2021)	UK, Uncommon (Mound et al., 1976; Mound et al., 2018), Austria, Czechoslovakia, France, Italian Mainland (zur Strassen, 2003; Vierbergen, 2013), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0048	***Chirothrips pallidicornis*** Priesner, 1925	*Dactylis* sp. (Marullo & De Grazia, 2013)		South Italy and Sicily (Stoch, 2003; zur Strassen, 2003; Marullo & De Grazia, 2013; Vierbergen, 2013), Finland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Poland, Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	Yes?	N/A
Tt0049	***Chirothrips ruptipennis*** Priesner, 1938	*Koeleria cristata* (Mound et al., 1976) *Poa nemoralis* (zur Strassen, 2003)		UK, Uncommon in Central and southern Europe (Mound et al., 1976; Mound et al., 2018), South Italy and Sicily, (Stoch, 2003), Spanish Mainland (zur Strassen 2003, Vierbergen, 2013), Hungary (Jenser, 2011), Romania (Sierka et al., 2008). Intercepted in US from Africa (Nickle, 2003).	No	Yes
Tt0050	***Chirothrips spinulosus*** Andre, 1941	*Melica, Phragmites australis* (zur Strassen, 2003)		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Tt0051	***Collembolothrips mediterraneus*** Priesner, 1935	herb, *Medicago sativa*, cereal (Tunc et al., 2012)		Cyprus (zur Strassen, 2003; Vierbergen, 2013; Srour, 2015), Turkey (Tunc et al., 2012; 2016) South Italy (Marullo & De Grazia, 2013), Iran (Mirab-balou et al., 2013).	No	Yes

Tt0052	***Collembolothrips atlanticus*** zur Strassen, 1965	Damp rocks and plants (zur Strassen, 2003)		Canary Islands (zur Strassen, 2003)	No	No
Tt0053	***Ctenothrips distinctus*** Uzel, 1895	*Convallaria majus* (zur Strassen, 2003)		Mediterranean and Mongolia (zur Strassen, 2003), Hungary (Jenser, 2011).	No	No
Tt0054	***(Dendrothripoides innoxius)*** (Karny, 1914)	?		Delhi, India (Kumar et al., 2008). Intercepted in the US from Africa (Nickle, 2003)	No	?
Tt0055	***(Dendrothripoides venustus)*** Faure, 1941	?		Intercepted in US from Africa (Nickle, 2003)	No	?
Tt0056	***Dichromothrips corbetti*** (Priesner, 1936)	*Vanda joaquim* (ThripsWiki, 2021)		UK (Mound et al., 2018), Hungary (zur Strassen, 2003; Jenser, 2011), Slovakia (Zvaríková et al., 2020), Delhi, India (Kumar et al., 2008). Intercepted in US from Europe (Nickle, 2003)	No	No
Tt0057	***Dichromothrips orchidis*** Priesner, 1932	*Cymbidium* sp. (Mound et al., 1976)	flower stalks	UK, Old World Orchids (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018)	No	No
Tt0058	***Dictyothrips betae*** Uzel, 1895	Vector of Polygonum ringspot tospovirus on *Polygonum convolvulus* and *Polygonum dumetorum* (Ciuffo *et al.* 2010). (ThripsWiki, 2021)		South Italy (Stoch, 2003; Vierbergen, 2013), Close to greenhouses in Netherlands (Vierbergen, 2001). Genus found in North Italy (Marullo & De Grazia, 2013) Sweden, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015; zur Strassen, 2003), Hungary (Jenser, 2011), Slovakia (Zvaríková et al., 2020).	No	No
Tt0059	***Dorcadothrips billeni*** Zur Strassen, 1995	*Microsorum pteropus* (zur Strassen, 2003)		Imported from indonesia to Germany (zur Strassen, 2003)	No	No
Tt0060	***Drepanothrips reuteri*** Uzel, 1895	*Quercus robur*, *Betula*, *Corylus*. *Vitis vinifera* pest (Mound et al., 1976) *Phyllirea latifolia*, *Quercus macrolepis* (zur Strassen, 1986) *Fraxinus ornus* (Trdan, 2001) *Vitis vinifera, Quercus* sp. (Tunc et al., 2012) *Vitis, Quercus* (Marullo & De Grazia, 2013)		UK Widespread in Europe (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Turkey (Tunc et al., 2012), French Mainland, Greek Mainland, Italian Mainland, Sicily, Spanish Mainland (Vierbergen, 2013), Scandinavia + Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Iran (Mirab-balou, M., Tong, X., & Chen, X. 2013), Aegean region, zur Strassen, 2003), Hungary (Jenser, 2011), Croatia (Raspudić et al., 2009), Turkey (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003),	No	Yes
Tt0061	***Echinothrips americanus*** Morgan, 1913	vegetables (ThripsWiki, 2021)	leaf feeding species (ThripsWiki 2021)	UK (Mound et al., 2018), Israel (zur Strassen & Kuslitzky, 2012), Close to greenhouses in Netherlands (Vierbergen, 2001), Europe (occasional introduction), N. America, French Mainland, Italian Mainland (zur Strassen, 2003; Vierbergen, 2013), Scandinavia (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium, (Lock, 2006), Hungary (Jenser, 2011), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003).	Yes	N/A
Tt0062	***Ephedrothrips maroccanus*** zur Strassen, 1968	*Ephedra alata* (zur Strassen, 2003)		Morocco (zur Strassen, 2003)	No	No
Tt0063	***Ereiketohrips calcaratus*** Knetchel 1960	*Xeranthemum annuum* (zur Strassen, 2003)		Romania (zur Strassen, 2003)	No	No
Tt0064	***Eremiothrips antilope*** (Priesner, 1923)	Compositae in Egypt (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	Israel (zur Strassen & Kuslitzky, 2012), Cyprus (zur Strassen, 2003; Vierbergen, 2013; Srour, 2015), Egypt (zur Strassen, 2014)	No	No
Tt0065	***Eremiothrips brunneus*** (zur Strassen, 1975)	*Nitraria retusa* (ThripsWiki, 2021)		Israel (zur Strassen & Kuslitzky, 2012), Morocco (zur Strassen 2003)	No	No

Tt0066	***Eremiothrips dorcas*** zur Strassen, 1975	*Umbellifera*, *Pituranthus chloranthus* (zur Strassen 2003)		Algeria, Morocco (zur Strassen 2003)	No	Yes
Tt0067	***Eremiothrips dubius*** (Priesner, 1933)	*Launaeae spinose* (ThripsWiki, 2021)		Spanish Mainland (Vierbergen, 2013), Canary Islands, Morocco (zur Strassen, 2003), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0068	***Eremiothrips efflatouni*** (Priesner, 1965)	*Halocnemon strobilaceum* (ThripsWiki, 2021)		Israel (zur Strassen & Kuslitzky, 2012), Canary Islands (zur Strassen 2003), Egypt (zur Strassen, 2014).	No	No
Tt0069	***Eremiothrips imitator*** Priesner, 1950	?		Egypt (zur Strassen, 2014)	No	?
Tt0070	***Eremiothrips manolachei*** (Knechtel, 1955)	?		French and Spanish Mainland (Vierbergen, 2013), Rumania (zur Strassen 2003).	No	?
Tt0071	***(Eremiothrips ?similis)*** Bhatti, 1988	*Prosopis farcta* (zur Strassen & Kuslitzky, 2012)		Israel, Iran, Iraq (zur Strassen & Kuslitzky, 2012)	No	No
Tt0072	***Eremiothrips tamaricis*** zur Strassen 1975	*Tamarix sp.* (zur Strassen, 2003)		Morocco (zur Strassen, 2003)	No	Yes
Tt0073	***Eremiothrips taghizadehi*** (zur Strassen, 1975)	*Prosopis farcta*, *Citrus* sp., *Parkinsonia* sp., *Amaranthus* sp., *orange*, Yellow trap, *Gypsophila* sp, grape (zur Strassen & Kuslitzky, 2012) *Chenopodium* sp. (Tunc et al., 2012)		Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Iraq (zur Strassen, 2003)	No	Yes
Tt0074	***Eryngyothrips discolor*** Bhatti,1979	?		Turkey (zur Strassen, 2003; Tunc & Hastenpflug-Vesmanis, 2016).	No	?
Tt0075	***Eryngyothrips eryngii (Priesner, 1940)***	*Eryngium creticum* (ThripsWiki, 2021)		Israel (zur Strassen, 2003; zur Strassen & Kuslitzky, 2012), Cyprus (Srour, 2015).	No	?
Tt0076	***Eryngyothrips nickelae*** zur Strassen (1968)	*Anthemis stiparum*, *Matricaria pubvescens*, *Urospermum picroides* (zur Strassen, 2003)		Morocco (zur Strassen, 2003)	No	No
Tt0077	***Eryngiothrips ferulae*** (Priesner, 1933)	*Ferula* sp. (Marullo & De Grazia, 2013)		South Italy and Sicily (zur Strassen, 2003; Stoch, 2003; Marullo & De Grazia, 2013; Vierbergen, 2013) Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013).	No	Yes
Tt0078	***Euchaetothrips kroli*** Schille, 1910	*Glyceria*, *Phragmitres*, *Carex*, *Scirpus* spp.(zur Strassen, 2003)		North and mid Europe, Romania, Nederlands, UK. (zur Strassen, 2003), Hungary (Jenser, 2011).	No	No
Tt0079	***Euphysothrips minozzii*** Bagnall, 1926	*Prosopis farcta*, plum (zur Strassen & Kuslitzky, 2012).		Israel (zur Strassen & Kuslitzky, 2012), S. France, Austria, Turkey, Iran, India, S. Africa, Canary Islands, Yemen, Mozambique French Mainland (Vierbergen 2013), Egypt (zur Strassen, 2014), Iran (Mirab-balou et al., 2013). zur Strassen (2003), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0080	***Exothrips pannonicus*** Priesner, 1924	*Bromus mollis* (zur Strassen, 2003)		Hungary, Serbia (zur Strassen, 2003)	No	No
Tt0081	***Firmothrips firmus*** (Uzel, 1895)	*Vicia cracca* (Ravazzi, 2001) *Ajuga reptans* (Trdan, 2001)		N. Italy (Ravazzi, 2001), Slovenia (Trdan, 2001), Northern and Central Europe (zur Strassen, 2003), Scandinavia (Gertsson, 2015), Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008).	No	?
Tt0082	***Florithrips dilutus*** (Hood, 1925)	*Ochradenus baccatus*, *Reseda* sp.		Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2003; 2014).	No	No
Tt0083	***Florithrips traegardhi*** (Trybom, 1911)	*Oryza*, *Pennisetum*, *Saccarum*, *Sorghum*, *Zea mays*, *Acacia*, *Caesalpina*, *Punica granatum*, *Zizyphus*	Flowers (ThripsWiki, 2021)	Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen; 2003; zur Strassen, 2014), Delhi, India (Kumar et al., 2008), Iran (Mirab-balou et al., 2013).	No	Yes

Tt0084	***[Frankliniella bondari]*** Hood, 1942	*Asclepias tuberosa, Gladiolus communis* (zur Strassen, 2003)		Israel (zur Strassen & Kuslitzky, 2012), USA, Cuba, Mexico, Brazil, Israel, Nederlands (zur Strassen, 2003)	No	No
Tt0085	***Frankliniella fusca*** (Hinds, 1902)	?		Nederlands (zur Strassen, 2003). Intercepted in US from Europe (Nickle, 2003).	No	?
Tt0086	***Frankliniella intonsa*** (Trybom, 1895)	*Erica* sp. (Mound et al., 1976) *Aster spp., Helianthus annuus, Brassica spp., Medicago sativa, Phacelia tanacetifolia, Trifolium pratense, Gladiolus* spp.*, Triticum aestivum, Rosa spp.* (Trdan *et al.* 2005) *Beta vulgaris, Glycene max, Phaseolus vulgaris* (Trdan et al., 2005) *Pisum sativum, Trifolium campestre, Trifolium pratense, Gladiolus spp., Rosa spp., Nicotiana tabacum* (Trdan et al., 2005) *Aster spp, Helianthuus annuus, Medicago sativa, Trifolium pratense, Triticum aestivum* (zur Strassen & Kuslitzky, 2011) *Punica granatum, grass, herb, Styrax* sp.*, Citrus sinensis, Rosa* sp. (Tunc et al., 2012) *Vicia* sp. (Marullo & De Grazia, 2013)	flowers Prey to *A. intermedius* (Trdan *et al.* 2005)	UK, very common throughout Europe (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Slovenia, Croatia, Serbia & Montenegro (Trdan, 2001; Trdan et al., 2005), Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Northern Greece (Jenser & Tsanakakis, 1985-05), Israel (Italy zur Strassen & Kuslitzky, 2011), Turkey (Tunc et al., 2012; 2016), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001)., Iran (Bhatti et al., 2009), Serbia (Andjus et al., 2001), Crete, French Mainland, Greek Mainland, Italian Mainland, Sardinia, Spanish Mainland (Vierbergen, 2013), Scandinavia, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015) Aegean region, Turkey (Tunc et al., 2012). zur Strassen (2003). Belgium (Lock, 2006), Hungary (Jenser, 2011). Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Croatia (Raspudić et al., 2009). Intercepted in US from Europe and the Mediterranean (Nickle, 2003).	No	Yes
Tt0087	***(Frankliniella megacephala)*** Fattah-Hamoodi, 2004	?		Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2011)	No	?
Tt0088	***Frankliniella nigriventris*** (Uzel, 1895)	*Hierarcium pilosella, Crepis aurea* (zur Strassen, 2003)		French and Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Finland (Gertsson, 2015), Hungary (Jenser, 2011).	No	No
Tt0089	***Frankliniella occidentalis*** (Pergande, 1895)	*Chrysanthemum hybrids (glasshouses) larva found* (Kirk, 1996) *Seed crops, cut flowers, nursery stock, peaches plums, nectarines, strawberries, sweet peppers, grapes, cotton and other crops. Carnations and tomatoes. Grown Dahlia and Gerbera with TSWSV* (Mifsud & Watson, 1999). *Dianthus caryophyllus* (Trdan, 2001) *Vicia faba* (Razi et al., 2013) *Medicago sativa, M. marina, M. arborea* (Baderitakis et al., 2015) Citrus (Belaam-Kort et al., 2020)	flowers	GB (Kirk, 1996; Mound et al., 2018), Malta (Mifsud & Watson, 1999), Slovenia (Trdan, 2001), Italy and Islands (Stoch, 2003; Rapisarda et al., 2004), Israel (zur Strassen & Kuslitzky, 2012), Algeria (Razi et al., 2013), Greece (Baderitakis et al., 2015), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Iran (Bhatti et al., 2009), Cyprus (Srour, 2015), Crete, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), France also in greenhouses (Pizzol et al., 2014). Scandinavia, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Tunisia (Belaam-Kort et al., 2020), Hungary (Jenser, 2011), Croatia (Raspudić et al., 2009), Turkey (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe, the Mediterranean and Africa (Nickle2003).	Yes	N/A
Tt0090	***Frankliniella pallida*** (Uzel, 1895)	*Trifolium rubens* (Trdan, 2001) *Salvia sp.* (Tunc et al., 2012) *Vicia sp.* (Marullo & De Grazia, 2013)		UK (Mound et al., 2018), Slovenia (Trdan, 2001), Turkey (Tunc et al., 2012; 2016), Italy (Stoch, 2003; Marullo & De Grazia, 2013), Close to greenhouses in Netherlands (Vierbergen, 2001), Iran (Bhatti et al., 2009), Serbia (Andjus et al., 2001), French Mainland, Italian Mainland, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Scandinavia, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011). Poland, Slovakia, Romania (Sierka et al., 2008), Croatia (Raspudić et al., 2009), Turkey (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe (Nickle, 2003).	No	Yes

Tt0091	***Frankliniella schultzei*** (Trybom, 1910) (Tomato Thrips - Thrips of California)	Bulb stores, *Pinus* sp. (Mound et al., 1976)		UK Common pest in tropics (Mound et al., 1976; Mound et al., 2018), Israel (zur Strassen & Kuslitzky, 2012), Iran (Bhatti et al., 2009), Iraq (Fattah Hammoodi et *al.* 2004), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Egypt (zur Strassen, 2014), Denmark (Gertsson, 2015), Delhi, India (Kumar et al., 2008), Romania (Sierka et al., 2008). Intercepted in US from Europe, and the Mediterranean and Africa (Nickle, 2003)	Yes	N/A
Tt0092	***Frankliniella tenuicornis*** (Uzel, 1895)	*Graminae* particularly *Avena* (Mound et al., 1976) *Iris pseudacorus* (Trdan, 2001) *Avena sativa, Triticum aestuvum, Nicotiana tabacum, Triticum aestivum* (Trdan et al., 2005) *Triticum aestivum* (Fallahzedah et al., 2011) grass, *Avena sativa*, *Convolvulus* sp., *Zea mays*, *Eucalyptus* sp., *Vitis vinifera*, *Echinochloa crus-galli*, *Olea europaea*, *Juncus* sp., *Carthamus* sp., *Typha* sp., *Prunus domestica*, *Ligustrum* sp., *Tripleurospermum* sp. (Tunc et al., 2012)	Prey to *A. intermedius* (Trdan et al., 2005)	UK, Widespread in Europe (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001; Trdan *et al,*2005), Croatia, Serbia and Montenegro (Trdan et al., 2005), Italy (Stoch, 2003), Iran Fallahzedah et al., 2011), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Serbia (Andjus et al., 2001). Iran (Bhatti et al., 2009), French Mainland, Italian Mainland, Spanish Mainland (Vierbergen, 2013) Europe, East Palaearctic, Near East, Nearctic region, North Africa (Palmer, 1992; zur Strassen, 2003; Fauna Europaea Web Service, 2004 in Fallahzedah et al., 2011), Scandinavia and Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Aegean region, Turkey (Tunc et al., 2012) Zur Strassen (2003), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Croatia (Raspudić et al., 2009). Intercepted in US from Europe and the Mediterranean (Nickle, 2003).	No	Yes
Tt0093	***Frankliniella tristis*** Priesner, 1920	Cyperaceae (zur Strassen, 2003)		Spain (Vierbergen, 2013), Ukraine, Poland, Austria (zur Strassen, 2003)	No	No
Tt0094	***(Frankliniella tritici)*** (Fitch, 1855)	?		Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004), Iran (Mirab-balou et al., 2013)	No	?
Tt0095	***(Frankliniella unicolor)*** Morgan, 1925	*Andropogon* sp. (ThripsWiki, 2021)		Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004)	No	No
Tt0096	***(Glaucothrips glaucus)*** (Bagnall, 1914)	*Sebaea* sp.		Intercepted in US from Africa (Nickle, 2003)	No	No
Tt0097	***Hemianaphothrips articulosus*** Priesner 1925	*Calmagrostis, Glyceria, Phalaris*		UK (Mound et al., 2018), Denmark, South Italy, Hungary (zur Strassen, 2003; Jenser, 2011), Romania (Sierka et al., 2008).	No	Yes
Tt0098	***Idolimothrips paradoxus*** Priesner, 1920	?		Poland, Czech Republic, Austria, Croatia. Romania (zur Strassen, 2003; Sierka et al., 2008).	No	?
Tt0099	***Iridothrips iridis*** (=***Frankliniella iridis; Bregmatothrips iridis***) (Watson, 1924)	*Iris pseudaccorus* (Mound et al., 1976) *Iris* sp. (Marullo & De Grazia, 2013)	leaf funnels	UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), N Italy (zur Strassen 2003; Marullo & De Grazia, 2013), French Mainland, (zur Strassen 2003; Vierbergen, 2013), Scandinavia, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Poland, Slovakia (Sierka et al., 2008). Slovakia (Zvaríková et al., 2020), Turkey (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe (Nickle, 2003).	No	Yes
Tt0100	***Iridothrips mariae*** Pelikan, 1961	*Typha latifolia* (Ravazzi, 2001)		Italy (Ravazzi, 2001), Czechoslovakia, Holland, Rumania, Ukraine, Bulgaria (zur Strassen, 2003; Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Romania (Sierka et al., 2008). Intercepted in US from Europe (Nickle, 2003).	No	No
Tt0101	***Isoneurothrips australis*** Bagnall, 1915	*Various plants*		Cyprus (Srour, 2015), Turkey (zur Strassen, 2003; Tunc & Hastenpflug-Vesmanis, 2016).	No	?
Tt0102	***Kakothrips acanthus*** Berzosa, 1994	herbs (ThripsWiki, 2021)		Italy and Islands (Stoch, 2003), Spanish Mainland (Vierbergen, 2013)	No	Yes
Tt0103	***Kakothrips dentatus*** Knechtel, 1939	*Cardus nutans* (Jenser & Tsanakakis, 1985)		Northern Greece (Jenser & Tsanakakis, 1985-05), Greek Mainland (zur Strassen, 2003; Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	No
Tt104	***Kakothrips dolosus*** Berzosa, 1994	*Asteraceae*		Morocco (zur Strassen, 2003)	No	Yes

Tt0105	***Kakothrips firmoides*** Priesner, 1932	*Ulex europaeus* (ThripsWiki, 2021)		Italy and Islands (Stoch, 2003), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013)	No	No
Tt0106	***Kakothrips pisivorus*** *(=robustus)* (Uzel, 1895) (Bean Thrips)	*Phaseolus vulgaris* (Williams, 1915) *Pisum, Lathyrus* and *Vicia* (Mound et al., 1976) *Vicia faba* larva found (Kirk, 1996) *Trifolium aureus. Vicia* sp. (Jenser & Tsanakakis, 1985) *Melilotus officinalis* (Trdan, 2001) *Pisum sativum* (Trdan et al., 2005) *Melilotus, Ononis* (Marullo & De Grazia, 2013)	flowers (Mound *et al.,* 1976) Prey to *A. intermedius* (Trdan *et al.,* 2005)	UK Widespread in Europe (Williams, 1915; Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Northern Greece (Jenser & Tsanakakis, 1985-05), Slovenia (Trdan, 2001), Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Croatia (Trdan et al., 2005), Israel (zur Strassen & Kuslitzky, 2012), Iran (Bhatti et al., 2009), Serbia (Andjus et al., 2001), French Mainland, Greek Mainland, Italian Mainland, Sicily, Spanish Mainland (Vierbergen, 2013), Scandinavia + Denmark (Gertsson, 2015) Bulgaria (Karadjova & Krumov, 2015), Aegean region, Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016; zur Strassen, 2003), Belgium (Lock, 2006), Hungary (Jenser, 2011). Poland, Slovakia, Romania (Sierka et al., 2008), Croatia (Raspudić et al., 2009), Slovakia (Zvaríková et al., 2020).	No	Yes
Tt0107	***Kakothrips priesneri*** Pelikan, 1965	*Anthemis, Colutea, Daphne, Lens, Prunus, Trifolium, Vicia* (zur Strassen & Kuslitzky, 2012)		Israel (zur Strassen & Kuslitzky,2012), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Afghanistan, Iran (zur Strassen. 2003)	No	No
Tt0108	***Kakothrips priesniorum*** Bournier, 1971	*Cornus mas* (zur Strassen, 2003)		French Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Tt109	***Krokeothrips innocens*** (Priesner, 1922)	*lawns* (zur Strassen, 2003)		Ukraina, Bulgaria, Czech Republic, Austria (zur Strassen, 2003).	No	No
Tt 110	***Leucothrips nigripennis*** O.M. Reuter 1904	?		UK (Mound et al., 2018), Belgium (Lock, 2006).	No	?
Tt0111	***Limothrips angulicornis*** Jablonowski, 1894	*Hordeum murinum* (zur Strassen, 1986) *Triticum aestivum* (Fallahzedah et al., 2011) *Bromus* sp., *Populus* sp., grass, *Pinus* sp., *Avena sativa, Triticum aestivum* (Tunc et al., 2012) *Hordeum* sp. (Marullo & De Grazia, 2013)		Greece (zur Strassen, 1986-05), South Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Iran (Bhatti et al., 2009; Fallahzedah et al., 2011), Turkey (Tunc et al., 2012:2016), Cyprus (Srour, 2015), French Mainland, Sardinia, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Europe, Australian region, East Palaearctic, Near East, Nearctic region, Neotropical region, North Africa on Hordeum sp. and various species of Poaceae (Priesner, 1964a, zur Strassen (2003); Fauna Europaea Web Service, 2004 in Fallahzedah et al., 2011), Egypt (zur Strassen, 2014) Sweden, Finland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Slovakia (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	Yes	N/A
Tt0112	***Limothrips cerealium*** (Haliday, 1836) (Grain or Corn Thrips)	Gramineae (Mound et al., 1976) *Avena sativa, Secale cereale, Triiticum vulgare* (Jenser & Tsanakakis, 1985) *Triticum aestivum* larva found (Kirk, 1996) *Triticum vulgare* (Trdan, 2001) *Salix* sp., *Zea mays*, *Triticum aestivum*, *Avena sativa* (Tunc et al., 2012) *Triticum* sp. (Marullo & De Grazia, 2013) *Citrus* sp. (Belaam-Kort et al., 2020)	flowers/ leaves Mound *et al.* 1976	UK, widespread in Europe - pandemic (Mound et al., 1976; Kirk,1996; zur Strassen, 2003; Mound et al., 2018), Northern Greece (Jenser & Tsanakakis, 1985-05), Slovenia (Trdan, 2001), All Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016); Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Cyprus (Srour, 2015), Spanish Mainland (Vierbergen, 2013), France (Pizzol *et al.*, 2014), Egypt (zur Strassen, 2014), Scandinavia, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Iran (Mirab-balou et al., 2013), Aegean region, Turkey (Tunc et al., 2012), Belgium (Lock, 2006), Tunisia (Belaam-Kort et al., 2020), Hungary (Jenser, 2011), Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe, and the Mediterranean and Africa (Nickle, 2006).	Yes	N/A
Tt0113	***Limothrips consimilis*** Priesner, 1926	High grass (Trdan, 2001) *Dactylis* sp. (Marullo & De Grazia, 2013)		Slovenia (Trdan, 2001), Italy and Sicily (zur Strassen, 2003; Stoch, 2003; Marullo & De Grazia, 2013; Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes

Tt0114	***Limothrips denticornis*** (Haliday, 1836)	Gramineae particularly *Avena* sp. (Mound et al., 1976) *Triticum aestivum,* larva found (Kirk, 1996) *Phleum pratense* (Trdan, 2001) *Avena sativa, Hordeum vulgare, Triticum aestivum* (Trdan et al., 2005) *Hordeum vulgare* (Trdan et al., 2005) *Phragmites australis (*Kucharczyk, & Sałapa, 2011) *Hordeum vulgare, Pinus* sp.*, Malus communis, Avena sativa, Salvia* sp.*, Triticum aestivum, cereal.* (Tunc et al., 2012) *Triticum* sp. (Marullo & De Grazia, 2013)	florets (Mound *et al.* 1976) Prey to *A. intermedius* (Trdan *et al.* 2005) Galls associated with Diptera (Kucharzyk *et al.* 2011)	UK, (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Slovenia (Trdan, 2001), Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Slovenia (Trdan et al., 2005), Croatia (Kucharczyk, & Sałapa, 2011, 2011), Poland (Tunc et al., 2012), Turkey (Tunc, & Hastenpflug-Vesmanis, 2016), Close to greenhouses in Netherlands (Vierbergen, 2001)., Iran (Bhatti et al., 2009), Serbia (Andjus et al., 2001), French Mainland, Italian Mainland, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Scandinavia, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Croatia (Raspudić et al., 2009). Widespread in Europe, Intercepted in US from Europe, (Nickle, 2003)	No	Yes
Tt0115	***Limothrips schmutzi*** Priesner, 1919	*Zerna ramosa* (Mound et al., 1976)		UK, Uncommon in Europe (Mound et al., 1976; Mound et al., 2018), North Italy (zur Strassen, 2003; Stoch, 2003; Vierbergen, 2013), Iran (Bhatti et al., 2009), Bulgaria (Karadjova & Krumov, 2015), Romania (Sierka et al., 2008).	No	?
Tt0116	***Limothrips transcaucasicus*** Sawenko, 1944	*Hordeum* sp.		Turkey (Tunc & Hastenpflug-Vesmanis, 2016), Uzbekistan, Iran (zur Strassen, 2003).	No	No
Tt0117	***Macrurothrips normandi*** Vuillet, 1914	?		Tunisia (zur Strassen, 2003)	No	?
Tt0118	***(Megalurothrips sjöstedti)*** (Trybom, 1908)	*Cajanus cajan, Medicago sativa, Vigna ungiculata* (zur Strassen, 2003). *Citrus* sp. (Belaam-Kort et al., 2020).		Sahara region. Introduced in Europe through plant trade (zur Strassen, 2003), Tunisia (Belaam-Kort et al., 2020). Intercepted in US from Africa (Nickle, 2003)	No	No
Tt0119	***Microcephalothrips abdominalis*** (Crawford DL, 1910)	*Dahlia pinnata* (Trdan et al., 2005) *Tagetes lucida* (Fallahzedah et al., 2011)	Prey to *A. intermedius* (Trdan et al., 2005)	Slovenia (Trdan et al., 2005), Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004; Fallahzedah et al., 2011), Iran (Bhatti et al., 2009), Israel (zur Strassen & Kuslitzky, 2012), Italian Mainland (zur Strassen, 2003;Vierbergen, 2013), Genus found in N Italy (Marullo & De Grazia, 2013), Europe (Canary Islands, Italian mainland, Slovenia), Afro-tropical region, Australian region, Near East, Nearctic region, Neotropical region, North Africa, Oriental region on Astereceae and Chenopodiaceae plants (Priesner, 1964a; Mound & Kibby, 1998; Fauna Europaea Web Service, 2004 in Fallahzadeh *et al.*, 2001), France (Pizzol et al., 2012, 2014), Egypt (zur Strassen, 2014), Delhi, India (Kumar et al., 2008), Iran (Mirab-balou et al., 2013), Hungary (Jenser, 2011), Turkey (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020). Intercepted in US from Africa (Nickle, 2003)	No	Yes
Tt0120	***Mycterothrips acaciae*** Priesner, 1932	*Acacia* sp. (ThripsWiki)		Israel (zur Strassen & Kuslitzky, 2012), Italy (zur Strassen, 2003; Marullo & De Grazia, 2013), Egypt (zur Strassen, 2014)	No	Yes
Tt0121	***Mycterothrips albidicornis*** (=***Physothrips albidicornis***) (Knechtel, 1923)	*Arbutus unedo* (zur Strassen, 1986) Wood trees (Trdan, 2001) *Amygdalus communis*, *Vitis vinifera*, *Pyrus elaeagnifolia*, *Convolvulus* sp., woody plant (Tunc et al., 2012)		Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy and SIcily (Stoch, 2003; Vierbergen, 2013 Marullo & De Grazia, 2013), French, Greek, Italian and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Turkey (Tunc *et al,* 2012; 2016), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Slovakia, Romania (Sierka et al., 2008).	No	Yes

Tt0122	***Mycterothrips annulicornis*** (Uzel, 1895)	*Trinia glauca* (zur Strassen, 2003)		North Italy (Stoch, 2003; zur Strassen 2003; Vierbergen, 2013), France (Pizzol et al., 2014), Finland (Gertsson, 2015), Hungary (Jenser, 2011), Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	No
Tt0123	***Mycterothrips consociatus*** (Targioni-Tozzetti, 1886)	*Betula* sp. (Mound et al., 1976)	leaves	UK, widespread in Europe, uncommon (Mound et al., 1976; Mound et al., 2018), Italy and Sicily (Stoch, 2003), French Mainland, Italian Mainland, Sicily, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Iran (Bhatti et al., 2009), Sweden, Finland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Slovakia, (Sierka et al., 2008). Intercepted in US from Europe (Nickle, 2003)	No	No
Tt0124	***Mycterothrips latus*** (Bagnall, 1912)	*Betula* sp. (Mound et al., 1976)		UK, possibly widespread in Europe (Mound et al., 1976; Mound et al., 2018), Iran (Bhatti et al., 2009) French Mainland, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Scandinavia, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003),	No	No
Tt0125	***Mycterothrips salicis*** (=***Physothrips salicis***) (O. M. Reuter, 1879) ***Physothrips ulmifoliorum*** (Uzel, 1895) ?	*Salix* sp. (Mound et al., 1976) *Populus* sp. (Tunc et al., 2012)		UK, widespread in Europe, Uncommon (Mound et al., 1976; Mound et al., 2018), South Italy and Sicily (Stoch, 2003), Turkey (Tunc et al., 2012: 2016), French Mainland, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013) Scandinavia, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Iran (Bhatti et al., 2009).	No	Yes
Tt0126	***Mycterothrips tschirkunae*** (Yakhontov, 1961)	*Rosa sp.* (zur Strassen & Kuslitzky, 2012)		Israel (zur Strassen & Kuslitzky, 2012), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Iran, Uzbekistan. zur Strassen (2003)	No	No
Tt0127	***Nigritothrips longistylosus*** (Priesner, 1920)	Bank vegetation (zur Strassen, 2003)		Western Russia, Poland, Austria (zur Strassen, 2003), Hungary (Jenser, 2011).	No	No
Tt0128	***Nigritothrips zur Strasseni*** Bhatti, 1978	Grassy terrain (zur Strassen, 2003)		Austria (zur Strassen, 2003)	No	No
Tt0129	***Odontothrips aemulans*** Priesner, 1924	*Vicia cracca* (zur Strassen, 2003)		South Italy (Stoch, 2003; zur Strassen, 2003; Marullo & De Grazia, 2013; Vierbergen 2013), Hungary (Jenser, 2011), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0130	***Odontothrips biuncus*** John, 1921	*Vicia* sp. (Mound et al., 1976)		UK, Widespread in Europe. (Mound et al., 1976; Mound et al., 2018), Close to greenhouses in Netherlands (Vierbergen, 2001). French Mainland, Italian Mainland (Vierbergen, 2013) Scandinavia + Denmark (Gertsson, 2015; zur Strassen, 2003), Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008).	No	Yes
Tt0131	***Odontothrips confusus*** Priesner, 1926	*Spartium juncaeum* (Trdan, 2001) *Medicago sativa* (Trdan et al., 2005) *Glyssyrhiza glabra, Sophora alopecuroides, Astralagus sp., Sisymbrium irio* (Fallahzadeh et al., 2012)	Prey to *A. intermedius* Trdan *et al.* 2005 flowers zur Strassen & Kuslitzky 2012	UK (Mound et al., 2018), Slovenia (Trdan, 2001, Trdan et al., 2005) Serbia & Montenegro (Trdan et al., 2005), South Italy (Stoch, 2003), Iran (Fallahzadeh et *al*., 2012), Israel (zur Strassen & Kuslitzky, 2012), Cycladic Islands, French Mainland, Greek Mainland, Italian Mainland, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Europe, East Palaearctic, Near East (Fauna Europaea Web Service, 2004 in Fallahzedah et al., 2011), Sweden (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Iran (Mirab-balou et al., 2013), Hungary (Jenser, 2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 200; Zvaríková et al., 2020), Croatia (Raspudić et al., 2009), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0132	***Odontothrips cytisi*** Morison, 1928	*Cystisus* (*Sarothamnus*) *scoparius.* larvae found (Kirk, 1996) *Chamaecystius albus* (Kucharczyk & Zawirska, 2001)	flowers Mound *et al.* 1976	UK (Mound et al., 1976; Kirk,1996; Mound et al., 2018), Poland (Kucharzyk *et al,* 2001), South Italy (Stoch, 2003), French Mainland, Italian Mainland, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015) .	No	No

Tt0133	***Odontothrips dorycnii*** Priesner, 1951 (=***Odontothrips paraconfusus***) (Pelikan, 1958)	*Dorycinum herbaceum* (Trdan, 2001)		France (zur Strassen, 2003; Pizzol et al., 2014), Slovenia (Trdan, 2001), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Romania (Sierka et al., 2008), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0134	***Odontothrips edentulus*** Priesner, 1926	?		Czech Republic (zur Strassen, 2003), Hungary (zur Strassen, 2003; Jenser, 2011).	No	?
Tt0135	***Odontothrips ignobilis*** Bagnall, 1919	*Ulex minor* (Mound et al., 1976)		UK (Mound et al., 1976; Mound et al., 2018), South Italy (Stoch, 2003), France, Spain, Portugal, Balearic Islands, Italian Mainland, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013).	No	No
Tt136	***Odontothrips intermedius*** (Uzel, 1895)	*Lathyrus* (zur Strassen, 2003)		Russia, Finland, Sweden, Czech Republic, Austria, Bulgaria, England, Scotland (zur Strassen, 2003), Hungary (zur Strassen, 2003; Jenser, 2011), Romania (zur Strassen, 2003; Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	No
Tt0137	***Odontothrips insignicornis*** zur Strassen, 1996	*Phlomis lychnitis* (ThripsWiki, 2021) *P. purpurea* (zur Strassen, 2003)		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013).	No	No
Tt0138	***Odontothrips karnyi*** Priesner, 1924	*Tamarix africanus* (Mifsud, unpublished) Fabaceae (zur Strassen, 2003)		Malta (Mifsud, unpublished), Israel (zur Strassen & Kuslitzky, 2012), South Italy and Sicily (Stoch, 2003), Cyprus (Srour, 2015), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol et al., 2014), Egypt (zur Strassen, 2014), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe, and the Mediterranean and Africa (Nickle, 2003)	Yes?	N/A
Tt0139	***Odontothrips loti*** (Haliday, 1852)	*Lotus* sp., *Anthyllis*, sp., *Allium cepa* (Mound et al. 1976) *Trifolium repens* (Trdan, 2001) *Vicia faba* (Razi, Laamari, Ouamen, & Bernar, 2013)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001), Italy (Stoch, 2003), Algeria (Razi et al., 2013), Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), France (zur Strassen, 2003; Pizzol *et al.*, 2014), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Croatia (Raspudić et al., 2009), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	Yes?	N/A
Tt0140	***Odontothrips meliloti*** Priesner, 1951	*Melilotus* sp. (Mound et al., 1976)		UK, widespread in central and southern Europe (Mound et al., 1976; Mound et al., 2018), South Italy (zur Strassen, 2003; Vierbergen, 2013; Stoch, 2003), French Mainland (zur Strassen, 2003; Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Iran (Bhatti et al., 2009).	Yes	N/A
Tt0141	***Odontothrips meridionalis*** Priesner, 1919	*Spartium juncaeum* (Jenser & Tsanakakis, 1985) *Spartium juncaeum, Anthyllis hermanniae, Psoralea bituminosa, Genista acanthoclada, Astralagus* sp. (zur Strassen, 1986) *Spartium juncaeum* (Trdan, 2001) *Spartium junceum, Althaea* sp., *Zea mays, Genista* sp., *Salix* sp., *Myrtus communis, Cercis siliquastrum* (Tunc et al., 2012)		Northern Greece (Jenser & Tsanakakis, 1985-05), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy (Stoch, 2003), Turkey (Tunc et al., 2012; 2016), Israel (zur Strassen & Kuslitzky, 2012), Cyprus (Srour, 2015), French, Greek and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Slovakia (Sierka et al., 2008).	No	Yes
Tt0142	***Odontothrips ononidis*** Bagnall, 1934	*Astralagus monspeliensis, Ononis* sp. (zur Strassen, 2003)		French and Spanish Mainlands, Canary Islands (zur Strassen, 2003; Vierbergen, 2013).	No	No
Tt0143	***Odontothrips pelikani*** zur Strassen, 1996	*Moricanda arvensis* (ThripsWiki, 2021)	flowers	Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No

Tt0144	***Odontothrips phaleratus*** (Haliday, 1836)	*Lathyrus* sp., *Vicia* sp. (Mound et al., 1976) *Low pasture plants* (Trdan, 2001)		UK, widespread in central Europe (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001), Italy (Stoch, 2003), French and Spanish Mainlands (zur Strassen, 2003, Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Tt0145	***Odontothrips ramadei*** Bournier, 1990	*Cistus salviaefolius, Genista cinereal, Ormenis scariosa* (zur Strassen. 2003)		Sicily, Spanish Mainland, Morocco (zur Strassen, 2003; Vierbergen, 2013)	No	Yes
Tt0146	***Odontothrips retamae*** Priesner, 1933	*Adenocarpus foliosus* var. *villosus*, *Cistus monspeliensis*, C. *symphytifolius*, *Greenovia aurea*, *Lotus lancerotensis*, *Lupinus albus*, *Orithopus compressus*, *Salvia verbenacea*, *Spartium junceum* (ThripsWiki, 2021)		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	Yes
Tt0147	***Odontothrips ulicis*** (Haliday, 1836)	*Ulex europaeus* larva found (Kirk, 1996)	flowers	UK (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), France (zur Strassen, 2003; Mound et al., 1976; Vierbergen, 2013), Sardinia, Italian and Spanish Mainlands (Vierbergen, 2013), Sweden (Gertsson, 2015), Belgium (Lock, 2006).	No	No
Tt0148	***Odontothrips viciae*** Priesner, 1951	*Vicia* sp. (ThripsWiki)	flowers	Israel (zur Strassen, 2003; zur Strassen & Kuslitzky, 2012)	No	Yes
Tt0149	***Organothrips indicus*** Bhatti, 1974	*Cryprocoryne* (zur Strassen, 2003)		Imported in Germany from Bangladesh and India with aquatic plants (zur Strassen, 2003).	No	No
Tt0150	***Oxythrips ajugae*** Uzel, 1895	*Pinus* sp. (Mound et al., 1976) *Pinus* sp., *Vitis vinifera, Pinus brutia, Euphorbia* sp., *Bellis perennis, Cupressus* sp., *Crataegus* sp., *Citrus sinensis, Spartium junceum, Pinus* sp. (Tunc et al., 2012) *Cupressus* sp. Marullo & De Grazia, 2013)	Male cones	UK Widespread in Europe to Turkey (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Italy and Sicily (Stoch, 2003; Marullo & De Grazia,2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Greek and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol *et al.*, 2014), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Poland (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	Yes	N/A
Tt0151	***Oxythrips bicolor*** (O. M. Reuter, 1879)	*Pinus* sp. (Mound et al., 1976) *Picea abies* (Trdan, 2001),	Male cones	UK, widespread from Britain to Romania (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001), North Italy (Stoch, 2003), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser, 2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Croatia (Raspudić et al., 2009).	No	Yes
Tt0152	***Oxythrips cannabensis*** Knetchel, 1923	*Cannabis sativa* (zur Strassen, 2003)		Siberia, Russia, Poland, Romania (zur Strassen, 2003), Hungary (zur Strassen, 2003; Jenser, 2011).	No	No
Tt0153	***Oxythrips claripennis*** Priesner, 1940	*Lycium, WIthania frutescens* (zur Strassen, 2003)		Israel (zur Strassen & Kuslitzky, 2012), Cyprus (Srour, 2015), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013).	No	No
Tt0154	***Oxythrips euxinus*** Knetchel, 1932	*Euphorbia gerardiana*		Romania (zur Strassen, 2003)	No	No
Tt0155	***Oxythrips halidayi*** Bagnall, 1924	*Fraxinus* sp. (Mound et al., 1976) *Fraxinus excelsior* (De Marzo & Ravazzi, 2005) *Quercus* sp. (Tunc et al., 2012)		UK, recorded in Germany and France. (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), North Italy (De Marzo & Ravazzi, 2005-08), Turkey (Tunc et al., 2012; 2016), Iran (Bhatti et al., 2009), Russia (De Marzo & Ravazzi, 2005).	No	No
Tt0156	***Oxythrips illitus*** zur Strassen, 1968	*Juniperus oxycedrus* (zur Strassen, 2003)		Morocco (zur Strassen, 2003)	No	No

Tt0157	***Oxythrips inopinatus*** Priesner, 1923	*Alpine highlands* (zur Strassen, 2003)		Austria (zur Strassen, 2003)	No	No
Tt0158	***Oxythrips nobilis*** Bagnall, 1927	*Pinus halepensis* (zur Strassen, 2003)		Italy (Stoch, 2003), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol *et al.*, 2014), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003)	No	No
Tt0159	***Oxythrips perisi*** Berzosa, 1980	*Pinus halepensis, Quercus rotundifolia, Cistus, Cystisus* (zur Strassen, 2003)		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	Yes
Tt0160	***Oxythrips priesneri*** Pelikan, 1957	*Pinus* sp. (Tunc et al., 2012)		Greek Mainland (zur Strassen, 2003; Vierbergen, 2013), Turkey (Tunc et al., 2012; 2016), Hungary (Jenser, 2011), Slovakia, (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Tt0161	***Oxythrips quercicola*** Bagnall, 1926	*Quercus robur* (Mound *et al.* 1976)		UK (Mound et al., 1976; Mound et al., 2018), Sicily (Stoch, 2003), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	Yes
Tt0162	***Oxythrips retamae*** (=***Retamothrips retamae***) (Priesner, 1934)	*Retama forosperma* (ThripsWiki, 2021)		Israel (zur Strassen & Kuslitzky, 2012), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Egypt (zur Strassen, 2014)	No	No
Tt0163	***Oxythrips sabinae*** Berzosa, 1985	*Juniperus thuriferae* (ThripsWiki, 2021)		Spanish Mainland (Vierbergen, 2013)	No	No
Tt0164	***Oxythrips tatricus*** Pelikan, 1955	*Pinus cembra, P. mungo* (zur Strassen, 2003)		Austrian Alps (zur Strassen, 2003), Poland, Slovakia, (zur Strassen, 2003; Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0165	***Oxythrips tristis*** Bagnall, 1927	*Eryngium maritimum, Quercus ruber, Juniperus thuriferae* (zur Strassen, 2003)		Italian Mainland (Stoch, 2003), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0166	***Oxythrips ulmifoliorum*** (Haliday, 1836)	*Ulmus* sp. (Mound et al., 1976) *Rosa glauca* (Trdan, 2001) *Eryngium, Ulmus* (Marullo & De Grazia, 2013)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001), North Italy and Sicily (Stoch, 2003; Marullo & De Grazia,2013), French and Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser, 2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008, Zvaríková et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0167	***Oxythrips uncinatus*** Priesner, 1940	*Quercus* sp. (Marullo & De Grazia, 2013)		Italy (Marullo & De Grazia, 2013; Vierbergen, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0168	***Palmiothrips palmae*** (Ramakrishna, 1934)	*Phoenix* sp. (ThripsWiki, 2021)	Male flowers ThripsWiki, 2021)	Israel (zur Strassen & Kuslitzky, 2012)	No	Yes
	as ***Palmiothrips annulicornis*** zur Strassen, 1965			Canary Islands (zur Strassen, 2003). Intercepted in US from Europe (Nickle, 2003)		
Tt0169	***Parascolothrips priesneri*** Mound, 1967	Apple trees; Mite predator? (ThripsWiki, 2021)		Israel (zur Strassen & Kuslitzky, 2012), Iran (Mirab-balou et al., 2013), Turkey (zur Strassen 2003; Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0170	***Parexothrips tenellus*** (Priesner, 1950)	Poaceae (ThripsWiki, 2021)		Egypt (zur Strassen, 2014), Delhi, India (Kumar et al., 2008)	No	No
Tt0172	***Peladothrips biunculatus*** *Priesner, 1940*	*Silene* sp. (zur Strassen, 2003)		Turkey, (zur Strassen, 2003; Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0173	***Pelikanothrips kratochvili*** Pelikan, 1947	*Carex* sp. (zur Strassen, 2003)		Czech Republic, Germany, Nederlands (zur Strassen, 2003), Hungary (Jenser, 2011).	No	No
Tt0175	***Pezothrips bactrianus*** (Pelikán, 1968)	*Gypsophila* (zur Strassen, 2003)		Turkey, Tadzikistan, Iran, Turkey, (zur Strassen, 2003; Tunc & Hastenpflug-Vesmanis, 2016).	No	No

Tt0176	***Pezothrips dianthii*** (=***Ceratothripoides dianthi***) (Priesner, 1921)	*Dianthus caryophyllus* (Trdan, 2001) *Dianthus* sp. (Marullo & De Grazia, 2013)		Italy (Marullo & De Grazia, 2013), Slovenia (Trdan, 2001), South Italy (Stoch, 2003), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Egypt (zur Strassen, 2014), Hungary (Jenser, 2011), Romania (). Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Tt0177	***Pezothrips frontalis*** (Uzel, 1895)	Short growing herbs (zur Strassen, 2003)		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Norway, Finland (Gertsson, 2015), Hungary (Jenser, 2011), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020),	No	No
Tt0178	***Pezothrips kellyanus*** (Bagnall, 1916)	*Citrus* (Conti et al., 2001) *Olea europea* (Tunc et al., 2012) *Jasminus*, *Pittosporum* (Marullo & De Grazia, 2013) *Citrus* sp. (Marullo & De Grazia, 2013; Belaam-Kort et al., 2020).	flowers	Italy and Sicily (Conti *et al*., 2001; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012), Greek and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol *et al.*, 2014), Aegean region, Turkey (Tunc et al., 2012), Tunisia (Belaam-Kort et al., 2020).	Yes	N/A
Tt0179	***Pezothtrips moravicus*** (Pelikán, 1951)	Xerothermic plants (zur Strassen, 2003)		Czech Republic (zur Strassen, 2003)	No	No
Tt0180	***Pezothrips nigriventris*** (Pelikán, 1956)	Fabaceae (zur Strassen, 2003)		Czech Republic, Austria (zur Strassen, 2003), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (zur Strassen, 2003; Zvaríková et al., 2020).	No	No
Tt0181	***Pezothrips pilosus*** (=***Theilopedothrips pilosus***) (Uzel, 1895)	?		North Italy (Stoch, 2003)	No	?
Tt0182	***Platythrips tunicatus*** (Haliday, 1852)	*Galium* sp. (Mound et al., 1976)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), North Italy (Stoch, 2003; Marullo et al., 2013) French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Sweden, Finland, Denmark (Gertsson, 2015), Belgium (Lock, 2006), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Tt0183	***Plesiothrips perplexus*** (Beach, 1896)	*Saccharum officinarium* (ThripsWiki, 2021)		Italian Mainland (zur Strassen, 2003; Vierbergen, 2013), Israel (zur Strassen & Kuslitzky, 2012)	No	No
Tt0184	***Prosopithrips alpicola*** Priesner, 1937	?		Specimen in museum, Hamburg (zur Strassen, 2003)	No	?
Tt0185	***Prosopothrips capitatus*** zur Strassen, 1968	Short vegetation (ThripsWiki, 2021) *Briza maxima, Juncus acutus, Plantago coronopus* (zur Strassen, 2003)		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	Yes
Tt0186	***Prosopothrips nigriceps*** Bagnall, 1927	Poaceae (ThripsWiki, 2021) *Olea europea* (Tunc et al., 2012)		Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012), Cyprus (Srour, 2015), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Egypt (zur Strassen, 2014), Aegean region, Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe and the Mediterranean. (Nickle, 2003).	Yes	N/A
Tt0187	***Prosopothrips titchaki*** Priesner, 1933	grasses (zur Strassen, 2003)		Madeira, Canary Islands (zur Strassen, 2003)	No	No
Tt0188	***Prosopothrips vejdowski*** Uzel, 1895	Low alpine plants (Trdan, 2001)		Slovenia (Trdan, 2001), North Italy (Stoch, 2003), Spanish Mainland (Vierbergen, 2013), Poland (Kucharzyk & Salapa, 2001; Sierka et al., 2008), Norway, Finland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011). Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020),	No	No
Tt0189	***Pseudoxythrips dentatus*** Knechtel, 1923	?		Hungary (Jenser, 2011), Slovakia (Zvaríková et al., 2020),	No	?

Tt0190	***Pseudoxythrips umbriaticornis*** (Priesner, 1940)	*Allium Anthemis, Matricaria, Trifolium* (zur Strassen, 2003)		Israel (zur Strassen, 2003; zur Strassen & Kuslitzky, 2012)	No	No
Tt0191	***Psilothrips bimaculatus*** (Priesner, 1932)	*Albizia sp., Ipomoea carnea, Lycium halimifolium,* (Minaei & Mound, 2015)		Israel (zur Strassen, 2003; zur Strassen & Kuslitzky, 2012), S. Mediterranean from Morocco to Yemen. (Minaei & Mound, 2015), Egypt (zur Strassen, 2014), Iran (Mirab-balou et al., 2013; Minaei & Mound, 2015)	No	Yes
Tt0192	***Psilothrips minutus*** zur Strassen, 1965	*Suaeda fructicosa* (zur Strassen, 2003)		Canary Islands (zur Strassen, 2003; Minaei & Mound, 2015)	No	No
Tt0193	***Psydrothrips kewi*** Palmer & Mound, 1985	*Philodendron* (zur Strassen, 2003)		UK (zur Strassen, 2003)	No	No
Tt0194	***Pteridothrips pteridicola*** (Karny, 1914)	*Mikrosorum pteropus* (zur Strassen, 2003)		Sweden, Germany, imported from Java (zur Strassen, 2003).	No	No
Tt0195	***Rhaphidothrips longistylosus*** Uzel, 1895	Gramineae (Mound et al., 1976)		UK, Central Europe (zur Strassen, 2003, Mound et al., 1976; Mound et al., 2018), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015). Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0196	***Rhinothripiella ctenifera*** Zur Strassen, 1977	*Artemisia argentea*		Madeira (zur Strassen, 2003)	No	No
Tt0197	***Rubiothrips ferrugineus*** (Uzel, 1895)	*Vicia cracca* (Ravazzi, 2001) *Stellaria holostea* (Trdan, 2001) associated with *Galium* sp. (zur Strassen, 2003)	flowers	Italy (Ravazzi, 2001), Slovenia (Trdan, 2001), Spanish Mainland (Vierbergen, 2013), Central-Southern Europe (zur Strassen, 2003), Sweden, Finland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008). Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0198	***Rubiothrips pillichi*** (Priesner, 1938)	*Galium odoratum, G. sylvaticum* (zur Strassen, 2003)		Czech Republic, Germany (zur Strassen, 2003), Hungary (zur Strassen, 2003; Jenser, 2011).	No	No
Tt0199	***Rubiothrips silvarum*** (=***Anaphothrips sylvarum***) (Priesner, 1920)	*Galium verum* (Mound et al., 1976; Trdan, 2001)		UK, widespread in Europe (Mound et al., 1976), Slovenia (Trdan, 2001), North Italy (Stoch, 2003), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0200	***Rubiothrips sordidus*** (Uzel, 1895)	*Galium sp.* (zur Strassen, 1986)		Greece (zur Strassen, 1986-05), North Italy (Stoch, 2003), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Hungary (Jenser, 2011), Poland (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0201	***Rubiothrips validus*** (=***Anaphothrips validus***) (Karny, 1910)	*Galium palustre* (Mound et al., 1976) *Galium* sp.*, Asperula* sp. (zur Strassen, 1986) Herb (Tunc et al., 2012)		UK, from Germany and Romania (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Turkey (Tunc et al., 2012), Sweden (Gertsson, 2015), Greek Mainland, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Aegean region, Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016), Hungary (Jenser, 2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0202	***Rubiothrips vitalbae*** (Bagnall, 1926)	*Clematis* sp. (Marullo & De Grazia, 2013)		Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), France (zur Strassen, 2003; Pizzol *et al.*, 2014), Bulgaria (Karadjova & Krumov, 2015). Hungary (Jenser, 2011), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0203	***Rubiothrips vitis*** (Priesner, 1933)	*Vitis vinifera* (Tunc et al., 2012)	leaves (ThripsWiki, 2021)	Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Greek Mainland (zur Strassen, 2003; Vierbergen, 2013), Hungary (Jenser, 2011).	No	Yes

Tt0204	***(Scirtothrips aurantii) Faure, 1929***	Mainly citrus and mango but polyphagous on *Arachis*, *Asparagus*, *Gossypium*, *Musa*, *Ricinus* and *Vitis* (Vierbergen, 2005)		Africa and Yemen and introduced to Australia (Vierbergen, 2013; 2005), Egypt (zur Strassen, 2014). Intercepted in US from Africa (Nickle, 2003).	No	No
Tt0205	***Scirtothrips bournieri*** Berzosa & Cano, 1990	*Cistus laurifolius* (ThripsWiki, 2021)		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Tt0206	***Scirtothrips canizoi*** Titschack, 1964	?		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	?
Tt0207	***[Scirtothrips citri]*** (Moulton, 1909)	*Polyphagous but mostly citrus pest* (Vierbergen, 2005)		America (Vierbergen, 2005), Iran (Mirab-balou et al., 2013)	No	No
Tt0208	***Scirtothrips dignus*** zur Strassen, 1986	*Juniperus phoenicaea* (zur Strassen, 1986)		Greece (zur Strassen, 1986-05), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0209	***Scirtothrips dorsalis*** Hood, 1919	*Persea americana*, mango, persimmon, *Citrus* spp., grape, litchi, cotton, rose, *Carissa* sp., *Ricinus communis, Calliandra* sp., *Ctenopodium* sp., *Ambrosia* sp., *Acacia* spp., *Myrtus communis, Lisianthus* sp. (zur Strassen & Kuslitzky, 2012)		UK (Mound et al., 2018), Israel, Cosmopolitan (zur Strassen & Kuslitzky, 2012), S. Italy (Marullo & De Grazia, 2013), Tropical Asia and S Africa (Vierbergen, 2013), Delhi, India (Kumar et al., 2008). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2009).	No	Yes
Tt0210	***Scirtothrips inermis*** Priesner, 1933	Avocado, mango, persimmon, *Citrus* spp., grape, kiwi, Viburnum tinus, *Carissa grandiflora*, *Melia azerdarach*, *Rosmarinus officialis* (sic). (zur Strassen & Kuslitzky, 2012)		UK (Mound et al., 2018), Israel, Cosmopolitan (zur Strassen & Kuslitzky, 2012), Sicily (Stoch, 2003), Balearic Islands, Corsica, Crete, Italian Mainland, Sicily, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), France, also in greenhouses (Pizzol *et al.*, 2014). Intercepted in US from Europe (Nickle, 2003)	No	Yes
Tt0211	***Scirtothrips longipennis*** (Bagnall, 1909)	polyphagous in greenhouses (Mound et al., 1976)		UK Recorded in Europe. (Mound et al., 1976; Mound et al., 2018), Sicily (Stoch, 2003), French and Italian Mainlands (zur Strassen, 2003; Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Belgium (Lock, 2006).	No	Yes
Tt0212	***Scirtothrips mangiferae*** Priesner, 1932	*Arbutus unedo* (zur Strassen, 1986)		Greece (zur Strassen, 1986-05), Israel (zur Strassen & Kuslitzky, 2012), Greek Mainland (zur Strassen, 2003; Vierbergen, 2013), Egypt (zur Strassen, 2014), Delhi, India (Kumar et al., 2008), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0213	***(Scirtothrips nubicus)*** Priesner, 1936	*Acacia* sp. (zur Strassen & Kuslitzky, 2012)		Israel (zur Strassen & Kuslitzky, 2012), Egypt, Sudan Egypt (zur Strassen, 2014)	No	Yes
Tt0214	***Scolothrips lanzarotensis*** Priesner, 1933	*Atriplex glauca, Pennisetum ciliarre* (zur Strassen, 2003)		Canary Islands (zur Strassen, 2003)	No	No
Tt0215	***Scolothrips latipennis*** Priesner, 1950	*Pomello (Citrus grandis)* (zur Strassen & Kuslitzky, 2012)		Israel (zur Strassen & Kuslitzky, 2012), Iran, Crimea, Egypt, Spain, Morocco, Canary Islands Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol *et al.*, 2014), Egypt (zur Strassen, 2014), New South Wales, Australia (Mound, 2011), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0216	***Scolothrips longicornis*** Priesner, 1926	Predatory on *Eotetranychus* (red spider mites) (Mound et al., 1976) *Solanum melanogena* (Tunc et al., 2012) *Citrus* sp. (Belaam-Kort et al., 2020)		UK Widespread in Europe (Mound et al., 1976), South Italy (Stoch, 2003), Iran (Bhatti et al., 2009), French Mainland (zur Strassen, 2003; Vierbergen, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012: 2016), S. Italy (Marullo & De Grazia, 2013), Spanish Mainland (Vierbergen, 2013), Egypt (zur Strassen, 2014), Finland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), California (Mound, 2011), Tunisia (Belaam-Kort et al., 2020), Hungary (Jenser, 2011), Slovakia (Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003).	No	Yes

Tt0217	***(Scolothtips pallidus)*** (Beach, 1896)	bean, elm blueberry and hop (ThripsWiki, 2021)		Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004), Iowa US (Mound, 2011).	No	No
Tt0218	***Scolothrips rhagebianus*** Priesner, 1950	*Punica granatum* (ThripsWiki, 2021)		Egypt (zur Strassen, 2014), Delhi, India (Kumar et al., 2008) Australia (Mound, 2011).	No	No
Tt0219	***Scolothrips quadrimaculatus*** Priesner 1933	*Pennisetum ciliare* (zur Strassen, 2003)		Canary Islands (zur Strassen, 2003)	No	No
Tt0220	***(Scolothrips sexamculatus)*** (Pergande, 1891)	?		Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004), Iran (Mirab-balou et al., 2013), Australia (Mound, 2011).	No	?
Tt0221	***Scolothrips tenuipennis*** zur Strassen 1965	*Hyparrhenia hirta* (zur Strassen, 2003)		Canary Islands (zur Strassen, 2003)	No	No
Tt0222	***Scolothrips uzeli*** (Schille, 1911)	Predatory on red spider mites (Marullo & De Grazia, 2013)	leaves	Italy (Marullo & De Grazia, 2013), Poland (Kucharczyk & Zawirska, 2001), Sweden, Norway (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Netherlands (Mound, 2011; zur Strassen, 2003), Hungary (Jenser, 2011), Poland (Sierka et al., 2008).	No	Yes
Tt0223	***(Selenothrips rubrocinctus)*** (Giard, 1901)	?		Norway (Gertsson, 2015). Intercepted in US from Africa (Nickle, 2003).	No	?
Tt0224	***Sitothrips almargeniensis*** Titschack, 1964	*Avena, Stipa, Triticum* (zur Strassen, 2003)		Spain and Portugal (zur Strassen, 2003; Vierbergen, 2013)	No	Yes
Tt0225	***Sitothrips arabicus*** Priesner, 1931	*Triticum aestivum*, *Avena sativa*, *Bromus* sp., *Crataegus* sp., grass, *Euphorbia* sp., *Hordeum vulgare* (Tunc et al., 2012) *Hordeum* sp. (Marullo & De Grazia, 2013)		S Italy, Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Cyprus (Srour, 2015), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Egypt (zur Strassen, 2014), Iran (Mirab-balou et al., 2013).	No	Yes
Tt0226	***Sitothrips lindbergi*** zur Strassen, 1965	*Stipa retorta,* other Graminaceae (zur Strassen, 2003)		Morocco, Canary Islands (zur Strassen, 2003).	No	No
Tt0227	***Sminyothrips biuncatus*** Uzel, 1895	*Valeriana officinalis* (zur Strassen, 2003)		Ukraine, Czech Republic, Austria, Nederlands. (zur Strassen, 2003), Hungary (Jenser, 2011), Romania (zur Strassen, 2003; Sierka et al., 2008).	No	No
Tt0228	***Sminyothrips biuncinatus Uzel, 1895***	*Euphorbia sp.* (zur Strassen, 2003)		Poland, Romania, Czech Republic, Hungary, Austria, Nederlands (zur Strassen, 2003), Hungary (Jenser, 2011).	No	No
Tt0229	***Sphaeropothrips vittipennis*** (Bagnall, 1927)	Cyperaceae (ThripsWiki, 2021)		French Mainland (zur Strassen, 2003; Vierbergen, 2013), North Italy (Marullo & De Grazia, 2013), Hungary (Jenser, 2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Egypt (zur Strassen, 2014).	No	No
Tt0230	***Stenchaeothrips biformis*** (=***Baliothrips biformis***) (Bagnall, 1913)	*Phalaris* and *Phragmites* (Mound et al., 1976) *Phragmites australis – monophagous* A pest on rice in Oriental region (as *oryzae*) (Kucharzyk et al., 2011) *Phalaris, Carex, Oryza sativa* (zur Strassen, 2003)		UK, found in Rumania (Mound et al., 1976; Mound et al., 2018), Italian Mainland (Stoch, 2003; Vierbergen, 2013; Marullo & De Grazia, 2013), Oriental region (as *oryzae*) Poland (Kucharczyk & Sałapa, 2011), Delhi, India (Kumar et al., 2008), Iran (Mirab-balou et al., 2013).	No	Yes

Tt0231	***Stenothrips graminum*** (=***Baliothrips graminum***) Uzel, 1895	*Graminaceae* and cereals (Mound et al., 1976) *Triticum aestivum larva found* (Kirk, 1996) *Avena sativa* (Jenser & Tsanakakis, 1985) *Triticum aestivum*, *Quercus* sp., herb, *Avena sativa* (Tunc et al., 2012) *Avena, Triticum* (Marullo & De Grazia, 2013) *Citrus* sp. (Belaam-Kort et al., 2020)	flowers and leaves (Mound *et al.,* 1976)	UK, throughout Europe. (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Northern Greece (Jenser & Tsanakakis, 1985-05), Italian Mainland and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Aegean region, Turkey (Tunc et al., 2012; 2016), Serbia (Andjus et al., 2001), Cyprus (Srour, 2015), Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol *et al.*, 2014), Egypt (zur Strassen, 2014), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Iran (Mirab-balou et al., 2013), Tunisia (Belaam-Kort et al., 2020), Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Croatia (Raspudić et al., 2009).	No	Yes
Tt0232	***(Synaptothrips africanus)*** (Moulton, 1936)	?	flowers (ThripsWiki, 2021)	Intercepted in US from Africa (Nickle, 2003)	No	?
Tt0233	***(Synaptothrips distinctus)*** (Bagnall, 1915)	Sugar bush flower (ThripsWIki,2021)		Intercepted in US from Africa (Nickle, 2003)	No	No
Tt0234	***(Synaptothrips gezinae)*** Faure, 1938	?		Intercepted in US from Africa (Nickle, 2003)	No	?
Tt0235	***Taeniothrips arbuti*** Bournier, 1983	*Arbutus unedo* (zur Strassen, 2003)	flowers and young leaves (ThripsWiki 2021)	French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013)	No	Yes
Tt0236	***Taeniothrips inconsequens*** (Uzel, 1895) (Pear Thrips)	*Malus, Prunus, Acer spp.* (Mound et al., 1976) *Prunus dulcis, Olea europea* (zur Strassen, 1986) *Anemone nemorosa* (Trdan, 2001) *Arbutus* sp., *Prunus avium, Crataegus* sp. (Tunc et al., 2012) *Prunus* (Marullo & De Grazia, 2013)		UK Widespread in Europe (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy and Islands (Stoch, 2003), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Italy and Islands (Marullo & De Grazia, 2013), Iran (Bhatti et al., 2009), Cyprus (Srour, 2015), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol *et al.*, 2014), Sweden, Norway, Finland, Denmark, Iceland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Iran (Mirab-balou et al., 2013), Belgium (Lock, 2006), Poland, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Croatia (Raspudić et al., 2009). Intercepted in US from Europe (Nickle, 2003).	No	Yes
Tt0237	***Taeniothrips picipes*** (Zetterstedt, 1828)	herbs, *Teuchrium, Primula, Cochlearia, Anemone spp.* (Mound et al., 1976) *Primula vulgaris* larva found (Kirk, 1996) *Urtica dioica* (Trdan2001)	flowers	UK, widespread in northern Europe (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Slovenia (Trdan, 2001), Italy (Stoch, 2003), Close to greenhouses in Netherlands (Vierbergen, 2001), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser, 2011), Poland, (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	Yes	N/A
Tt0238	**(*Taeniothrips tigris*)** Bhatti, 1995	?		Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004)	No	?
Tt0239	***Tamaricothrips tamaricis*** (Bagnall, 1926)	*Tamarix* sp. (Marullo & De Grazia, 2013)		Israel (zur Strassen & Kuslitzky, 2012), Italy (Marullo & De Grazia, 2013), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Egypt (zur Strassen, 2014), Iran (Mirab-balou et al., 2013), Bulgaria (Karadjova & Krumov, 2015).	No	Yes
Tt0240	***Tameothrips tamicola*** (=***Anaphothrips tamicola***) (= ***Euthrips tamicola***?) (Bagnall, 1914)	*Tamus (=Dioscorea) communis* (Mound et al., 1976; Ravazzi, 2001)	flowers (Mound et al., 1976)	UK, recorded in France and Spain (Mound et al., 1976; zur Strassen, 2003; Vierbergen, 2013; Mound et al., 2018), Italy (Ravazzi, 2001), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe (Nickle, 2003)	No	Yes

Tt0241	***Tenothrips anatolicus*** (= ***Ceratothrips anatolicus***) (Priesner, 1961)	*Malcolmia microcalyx scyria, Campanula rechingeri, Satureja thymbra, Hypercium perforatum, Salvia trilobata, Origanum onites, Olea europea, Centauria raphanina mixta* (zur Strassen, 1986)	flowers (ThripsWiki 2021)	Greece (zur Strassen, 1986-05), Israel (zur Strassen & Kuslitzky, 2012), Aegean region, Turkey (Tunc et al., 2012; 2016), Cyprus (Srour, 2015).	No	Yes
Tt0242	***Tenothrips brevis*** (Bournier, 1969)	*Ononis viscosa* (zur Strassen, 2003)		French Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Tt0243	***Tenothrips croceicollis*** (=***T. hispanicus*** – ThripsWiki) (Priesner, 1919)	*Solidago* sp, *Parkinsonia* sp. (zur Strassen & Kuslitzky, 2012) *Centaurea* (Marullo & De Grazia, 2013) *Chicorium intybus* (zur Strassen,2003)		Israel Ponto-Mediterranean (zur Strassen & Kuslitzky, 2012), Italy (Marullo & De Grazia, 2013), Greek and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol et al., 2014), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Romania (Sierka et al., 2008).	No	Yes
Tt0244	***Tenothrips discolor*** (=***Ceratothrips discolor***) (=***Taeniothrips discolor***) (Karny, 1907)	*Anthyllis hermanniae, Galactites tomentosa, Echium plantagineum, Reseda lutea, Daucus carota, Salvia trilobata, Carthamus lanatus, Cistus monspeliensis, Coridothymus* sp., *Origanum onites Centaurea raphanina mixta, Scolymus hispanicus* (zur Strassen, 1986) Floweing plants and turf., *Citrus* sp. (in Israel – Integrated Pest Control in Citrus Groves by R. Cavalloro) (Jenser,1982) *Centaurea jacea* (Trdan, 2001) *Chenopodium* sp., *Olea europaea,* herb, *Pinus* sp., *Solidago* sp., Anthemis sp., *Tripleurospermum* sp. (Tunc et al., 2012) *Helychrysium* sp. (Marullo & De Grazia, 2013)	flowers (ThripsWiki, 2021)	Greece (zur Strassen, 1986-05), Tunisia (Jenser, 1982), Slovenia (Trdan, 2001), Italian Mainland and Sicily (Stoch, 2003, Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012), Cyprus (Srour, 2015), Corsica, Crete, French Mainland Greek Mainland, Italian Mainland, Sicily, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Malta (Vierbergen, 2013), France (Pizzol et al., 2014), Bulgaria (Karadjova & Krumov, 2015), Hungary (2011), Romania (Sierka et al., 2008), Egypt (zur Strassen, 2014), Iran (Bhatti et al., 2009). Intercepted in US from Europe? and the Mediterranean (Nickle, 2003)	Yes?	N/A
Tt0245	***Tenothrips echii*** (Priesner, 1931)	?		Egypt (zur Strassen, 2014)	No	?
Tt0246	***Tenothrips frici*** (=***Taeniothrips frici***) (=***Ceratothrips frici***) (=***Ceratothrips pallidivestis***) (=***Tenothrips pallidivestis***) (Uzel, 1895)	Compositae (Mound et al., 1976) *Hypercium perforatum*, *Tragopogon* sp., (Jenser & Tsanakakis, 1985) *Carex pendula* (Marullo & De Grazia, 2013) *Hippocrepis comosa* (Trdan, 2001) *Triticum aestivum* (Fallahzedah et al., 2011) *Centaurea*, *Rosmarinus*, *Alyssum* (zur Strassen & Kuslitzky, 2012) *Verbascum* sp., *Glaucium flavum, Cynodon dactylon, Echinochloa crus-galli,* herb, *Spartium junceum, Amygdalus communis, Carthamus* sp., *Olea europaea, Vitex agnus-castus, Cichorium intybus, Convolvulus sp., Carthamus sp., Sinapis* sp., *Althaea* sp., *Prunus persica, Pyrus elaeagnifoli, Scorzonera sp., Euphorbia sp.* (Tunc et al., 2012) *Cnicus benedictus, Carthamus lanatus* (zur Strassen, 1986) *Medicago* (Baderitakis et al., 2015)	flowers (ThripsWiki2021)	UK Mediterranean and southern Europe (Mound et al., 1976; Mound et al., 2018), Greece (Jenser & Tsanakakis, 1985-05; zur Strassen, 1986-05; Baderitakis et al., 2015), Slovenia (Trdan, 2001), Italy including islands (Stoch, 2003; Marullo & De Grazia, 2013), Iran (Bhatti et al., 2009; Fallahzedah et al., 2011), France (Pizzol et al., 2014), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Cyprus (Srour, 2015), Corsica, Crete, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Semi-cosmopolitan: Europe, Australian region, East Palaearctic, Near East, Nearctic region, Neotropical region, North Africa, Oriental region (Fauna Europaea Web Service, 2004 in Fallahzadeh et al. 2011). Delhi, India (Kumar et al., 2008), Iran (Mirab-balou et al., 2013), Poland, Romania (Sierka et al., 2008). Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011). Intercepted in US from the Mediterranean (Nickle, 2003)	No	Yes

Tt0247	***Tenothrips garriguae*** (Bournier, 1962)	*Teucrum aureum* (zur Strassen, 2003)		France (zur Strassen, 2003; Vierbergen, 2013)	No	Yes
Tt0248	***Tenothrips hilarus*** (zur Strassen, 1977)	*Parietaria ?officinalis* (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	South Italy (zur Strassen, 2003; Stoch, 2003; Vierbergen, 2013)	No	Yes
Tt0249	***Tenothrips hispanicus*** (Bagnall, 1921)	?		Italian Mainland (Stoch, 2003)	No	?
Tt0250	***Tenothrips onondis*** (Bournier, 1962)	*Ononis minutissima, O. natrix* (zur Strassen, 2003)		Balearic islands (zur Strassen, 2003; Vierbergen, 2013), France (zur Strassen, 2003; Vierbergen, 2013; Pizzol et al., 2014)	No	No
Tt0251	***Tenothrips reichardti*** (Priesner, 1926)	*Hieracium pilosella, Mulgedium* (zur Strassen, 2003)		Russia, Poland, Mongolia, Iran, Western Siberia (zur Strassen, 2003), Poland (Sierka et al., 2008).	No	No
Tt0252	***Theilopedothrips pilosus*** (Uzel, 1895)	*Trifolium arvense* (zur Strassen, 2003)		French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), North Italy (Marullo & De Grazia, 2013), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Slovakia, (Sierka et al., 2008; Zvaríková et al., 2020),	No	No
Tt0253	***Thermothrips mohelensis*** Pelikán, 1949	*Galium verum* (zur Strassen, 2003)		West Russia, Poland, Turkey, Czech republic (zur Strassen, 2003), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0254	***(Thrips acaciae)*** Trybom, 1910	?		Intercepted in US from Africa (Nickle, 2003)	No	?
Tt0255	***Thrips albopilosus*** Uzel, 1895 (Hop thrips)	*Humulus lupulus* (Mound et al., 1976)	flowers (Mound et al., 1976)	UK, Widespread in Europe (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001), Iran (Bhatti et al., 2009), French Mainland (zur Strassen, 2003; Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0256	***Thrips alni*** Uzel, 1895	*Alnus glutinosus* (Mound et al., 1976) *Alnus* sp. (Marullo & De Grazia, 2013)		UK, found in Central Europe (zur Strassen, 2003; Mound et al., 1976), North Italy (Stoch, 2003; Marullo & De Grazia, 2013), France (Pizzol et al., 2014), Sweden, Finland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008, Zvaríková et al., 2020).	No	No

Tt0257	***Thrips angusticeps*** Uzel, 1895 (= ***Thrips ebneri***)	*Linum* and various *Cruciferae* (Mound et al., 1976) Weedy vegetation along tracks and ditch borders (Jenser, 1982) *Coronilla emerus, Trifolium aureum, Vicia* sp., *Avena sativa, Silybum marianum* Tunisia (Jenser & Tsanakakis, 1985) *Parentucelia viscosa, Galium sp. Pallenis spinosa Veronica urticifolia, Echium plantagineum* (zur Strassen, 1986) *Linum usitalissimum larvae found* (Kirk, 1996) *Solanum dulcamara* (Trdan, 2001) *Triticum aestivum, Verbascum* sp., *Vitis vinifera, Convolvulus* sp., *Avena sativa, Pisum sativum, Bromus* sp., herb, *Quercus* sp., *Citrus aurantium, Citrus sinensis, Vicia sativa, Solanum melongena, Olea europaea, Typha* sp., *grass, Asteraceae, Vicia faba,* cereal, *Prunus avium, Fragaria ananasa, Dianthus sp., Brassica oleraceae, Trifolium sp., Morus alba, Sinapis sp., Raphanus sp., Taraxacum* sp., *Prunus domestica , Citrus reticulata,* cereal, Raphanus *sp., Carthamus* sp., *Malus communis, Medicago sativa, Euphorbia* sp. (Tunc et al., 2012) *Vicia faba* (Razi et al., 2013) *Citrus* sp. (Belaam-Kort et al., 2020).	flowers leaves (Mound et al., 1976)	UK, widespread in Europe, (Mound et al., 1976; Kirk, 1996), Tunisia (Jenser, 1982), Greece (Jenser & Tsanakakis, 1985-05; zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy and Islands (Stoch, 2003), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Algeria (Razi et al., 2013), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Iran (Bhatti et al., 2009), Cyprus (Srour, 2015), Corsica, Crete, Greek and Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol *et al.*, 2014), Egypt (zur Strassen, 2014), Sweden, Finland, Denmark (Gertsson, 2015), Iran (Mirab-balou et al., 2013), Belgium (Lock, 2006), Tunisia (Belaam-Kort et al., 2020), Hungary (Jenser (2011), Poland, (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003)	No	Yes
Tt0258	***Thrips annulatus (=Taeniothrips annulatus) Menge, 1856***	*Spartium juncaeum, Galactites tomentosa, Sinapis arvensis, Oenanthe* cf. *fistulosa* (zur Strassen, 1986)		Greece (zur Strassen, 1986-05), Italian Mainland and Sicily (Stoch, 2003)	No	Yes
Tt0259	***Thrips asparagi*** zur Strassen, 1968	*Plantago major, Asparagus latissimus* (zur Strassen, 2003)		Spain, Morocco (zur Strassen, 2003; Vierbergen, 2013), Israel (zur Strassen & Kuslitzky, 2012)	No	Yes
Tt0260	***Thrips atratus*** (=***Taeniothrips atratus***) Haliday, 1836	many plants, particularly Caryophyllaceae (Mound et al., 1976) *Parentucelia viscosa, Echium plantagineum* (zur Strassen, 1986) *Convolvulus arvensis* (Kirk, 1996) *Stellaria holostea* (Trdan, 2001) *Dianthus spp., Pisum sativum* (Trdan et al., 2005) *Quercus* sp., *Lamium* sp., *Triticum aestivum.* (Tunc et al., 2012) *Rosmarinus*, *Teucrium*, *Stachys* (Marullo & De Grazia, 2013)	flowers (Mound et al., 1976) Prey to *A. intermedius* (Trdan *et al.*, 2005)	UK, widespread in Europe. (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001, Trdan et al., 2005), Italian Mainland and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Croatia (Trdan et al., 2005), Turkey (Tunc et al., 2012; 2016), Serbia (Andjus et al., 2001), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Cyprus (Srour, 2015), French, and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013) Sweden, Norway, Finland, Denmark, Iceland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser, 2011),S Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Croatia (Raspudić et al., 2009), Iran (Bhatti et al., 2009). Intercepted in US from Europe, and the Mediterranean (Nickle, 2003)	No	Yes
Tt0261	***Thrips australis*** (=***Isoneurothrips australis***) Bagnall, 1915 (Gum tree thrips)	*Juncus* sp. (Jenser, 1982) *Acacia* and *Eucalyptus* (ThripsWiki, 2021)		Tunisia (Jenser, 1982), Israel (zur Strassen & Kuslitzky, 2012), South Italy and Sicily (Stoch, 2003), France (Pizzol et al., 2014), Greek and Spanish Mainlands, Sicily, Cyprus (Vierbergen, 2013), Egypt (zur Strassen, 2014). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003)	Yes	N/A

Tt0262	***Thrips biunculatus*** (Priesner, 1940)	*Silene atocion* (zur Strassen & Kuslitzky, 2012)		Israel (zur Strassen & Kuslitzky, 2012)	No	No
Tt0263	***Thrips brevicornis*** Priesner, 1920 (Honeysuckle thrips)	*Lonicera* sp. (Mound et al., 1976) *Lobularia* sp. (Marullo & De Grazia, 2013)		UK, common in Europe (Mound et al., 1976; Mound et al., 2018), Italy (Stoch, 2003; Marullo & De Grazia, 2013), Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol *et al.*, 2014), Sweden, Norway, Finland (Gertsson, 2015), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003).	No	Yes
Tt0264	***(Thrips spadix)*** (= ***T. brevisetosus***) Hood, 1932	?		Intercepted in US from Africa (Nickle, 2003)	No	?
Tt0265	***Thrips buxi*** Berzosa, 1987	*Buxus sempervirens* (zur Strassen, 2003)		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Tt0266	***Thrips calcaratus*** Uzel, 1895	*Tilia* sp. (Mound et al., 1976) *Tilia cordata* (Trdan, 2001)	buds (Mound *et al.,* 1976)	UK, Throughout Europe (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001), South Italy (Stoch, 2003), French Mainland (zur Strassen, 2003; Vierbergen, 2013), Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	No
Tt0267	***Thrips crassicornis*** (= ***T. euphorbiae***?) Bagnall, 1923	*Euphorbia amygdaloides* (Mound et al., 1976)		Britain (Mound et al., 1976; zur Strassen, 2003; Vierbergen, 2013; Mound et al., 2018), French Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Tt0268	***Thrips conferticornis*** Priesner, 1922	*Pimpinella saxifraga* (zur Strassen, 2003)		North Italy (Stoch, 2003; zur Strassen 2003; Vierbergen, 2013), Norway, Finland (Gertsson, 2015), Hungary (Jenser (2011).	No	No
Tt0269	***Thrips difficilis*** Priesner, 1920	*Salix repens* (Mound et al., 1976)		UK (Mound et al., 1976; Mound et al., 2018), South Italy (Stoch, 2003), Germany, Austria and France. French Mainland, (zur Strassen, 2003; Vierbergen, 2013), Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Romania (Sierka et al., 2008).	No	No
Tt0270	***Thrips dilatatus*** Uzel, 1895	*Euphrasia* sp. (Mound et al., 1976) *Pedicularis, Rhinanthus* (zur Strassen, 2003)	flowers (Mound et al., 1976)	UK, throughout Europe (Mound et al., 1976; Mound et al., 2018), North Italy (Stoch, 2003), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020),	No	No
Tt0271	***Thrips discolor*** Haliday, 1836	*Ranunculus repens* (Mound et al., 1976)	leaves (Mound et al., 1976)	UK, throughout Europe (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), close to greenhouses in Netherlands (Vierbergen, 2001). Sweden, Norway, Finland, Denmark (Gertsson, 2015), Belgium (Lock, 2006). Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
Tt0272	***Thrips dubius*** Priesner, 1927	*Erucaria hispanica* (zur Strassen & Kuslitzky, 2012) *Euphorbia sp.* (Tunc et al., 2012)		Cyprus (Srour, 2015), Germany, Poland, Czech Republic, Austria, Hungary, France, Ukraine, Georgia, Turkey, French Manland (zur Strassen, 2003; Vierbergen, 2013), Hungary (Jenser (2011), Slovakia (Zvaríková et al., 2020), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016)	No	?
Tt0273	***Thrips euphorbiae*** Knechtel, 1923	*Urtica dioica* (Trdan, 2001) *Euphorbia* sp. (zur Strassen, 2003)		Slovenia (Trdan, 2001), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Romania (Sierka et al., 2008), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0274	***Thrips euphorbiicola*** Bagnall, 1924	*Euphorbia amygdaloides, Euphorbia dendroides, E. paralias,* (zur Strassen, 2003)		UK Recorded in France. (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), Sicily (Stoch, 2003).	No	Yes
Tt0275	***Thrips fedorovi*** Priesner, 1933	*Salvia sclerea* (zur Strassen, 2003)		Ukraine, Romania, Bulgaria (zur Strassen, 2003), Hungary (Jenser, 2011), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	No

Tt0276	***Thrips flavus*** Schrank, 1776 (Yellow flower thrips)	Many particularly *Ulex* sp. (Mound et al., 1976) *Ranunculus acris, Ulex europeus* larva found (Kirk, 1996) *Citrus* with *P. kellyanus* (Conti *et al.,* 2001) *Dianthus caryophillus* (Trdan, 2001) *Rosmarinus, Viburnum* (Marullo & De Grazia, 2013)	flowers Mound *et al.* 1976	UK, common throughout Europe (Mound et al., 1976; Kirk, 1996; zur Strassen 2003; Mound et al., 2018), Sicily (Conti et al.,2001), Slovenia (Trdan, 2001), Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Iran (Bhatti et al., 2009) Spanish Mainland (Vierbergen, 2013), France also in greenhouses (Pizzol et al., 2014) Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Delhi, India (Kumar et al., 2008) Iran (Mirab-balou et al., 2013), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Croatia (Raspudić et al., 2009), Turkey (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe (Nickle, 2003).	No	Yes
Tt0277	***Thrips floricola Zur Strassen, 1995***	?		Canary Islands (zur Strassen, 2003)	No	?
Tt0278	***Thrips florum*** Schmutz, 1913	?		India (Kumar et.al., 2008)	No	?
Tt0279	***Thrips fulvipes*** Bagnall, 1923	*Mercurialis perennis* (Mound et al., 1976)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), Poland (Kucharzyk et al, 2001). French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Sweden, Norway, Denmark (Gertsson, 2015), Hungary (Jenser (2011), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003).	No	Yes
Tt0280	***Thrips fuscipennis*** Haliday, 1836	Many species particularly Rosaceae (Mound et al., 1976) *Callistegia sepium* (Kirk, 1996) *Trifolium repens* (Jenser & Tsanakakis, 1985) *Achillea millefolium* (Trdan, 2001) *Gladiolus spp, Fagopyrum esculentum, Pisum sativum, Rosa spp.* (Trdan et al., 2005) Fabaceae (Tunc et al., 2012)	flowers, young leaves of trees (Mound et al., 1976) Prey to *A. intermedius* (Trdan *et al.* 2005)	UK, widespread in Europe (Mound et al., 1976; zur Strassen, 2003; Kirk, 1996; Mound et al., 2018), Northern Greece (Jenser & Tsanakakis, 1985), Slovenia (Trdan, 2001), Italy and Islands (Stoch, 2003), Slovenia, Croatia (Trdan et al., 2005), (Tunc et al., 2012; 2016), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Greek and Spanish Mainlands (Vierbergen, 2013), France (Pizzol et al., 2014), Sweden, Norway, Finland, Denmark, Iceland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008, Zvaríková et al., 2020), Iran (Bhatti et al., 2009). Intercepted in US from Europe (Nickle, 2003).	No	Yes
Tt0281	***Thrips funebris*** Bagnall, 1924	*Triglochin maritimum* (Mound et al., 1976) *Carex, Salicornia* (zur Strassen, 2003)		UK, found in Germany (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), Norway (Gertsson, 2015).	No	No
Tt0282	***Thrips gentluteae*** Bournier, 1983	*Gentiana lutea* (zur Strassen, 2003)		French Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Tt0283	***Thrips georgicus*** Pelikan, 1973	?		Georgia (zur Strassen, 2003)	No	?
Tt0284	***(Taeniothrips gowdeyi)*** Bagnall, 1919	?		Iraq (Abdul-fatah Hamodi, & Abdul-Rassoul, 2004)	No	?
Tt0285	***Thrips hawaiiensis*** (Morgan, 1913)	fruit trees e.g. lemons, nectarines, cotton sunflower, maize sesame (causes silvering) (Atakan et al.2015)		France also in greenhouses (Pizzol et al., 2014),Turkey (Atakan et al.2015; Tunc & Hastenpflug-Vesmanis, 2016), Spain (zur Strassen, 2003; Goldarazena, 2017) Delhi, India (Kumar et al., 2008), Italy (zur Strassen, 2003; Marullo & De Grazia, 2017), Iran (Mirab-balou et al., 2013).	No	Yes
Tt0286	***Thrips herricki*** Bagnall, 1926	*Veratrum viride, Veratum album* (zur Strassen, 2003)		French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Slovakia, (Sierka et al., 2008; Zvaríková et al., 2020),	No	No
Tt0287	***Thrips imaginis*** Bagnall, 1926	*Polyphagous* (zur Strassen, 2003)		England and Nederlands (imported) New Zealand, Fiji (zur Strassen, 2003)	No	No
Tt0288	***Thrips incognitus*** Priesner, 1914	*Galium sp.* (Kucharczyk & Zawirska, 2001) *Galium cruciatum* (Ravazzi, 2001) *Crucuata laevipes* (zur Strassen, 2003)	flowers (Kucharzyk *et al.*, 2001)	Poland (zur Strassen, 2003; Kucharczyk & Zawirska, 2001), N Italy (Ravazzi, 2001), Spanish Mainland, Germany, Czechoslovakia, Romania (zur Strassen, 2003; Vierbergen, 2013), Hungary (Jenser (2011), Romania (Sierka et al., 2008).	No	No

Tt0289	***Thrips inopinatus*** Zur Strassen, 1963	*Solanum dulcamara* (zur Strassen, 2003)		Czech Republic, Germany, Nederlands, Scotland (zur Strassen, 2003)	No	Yes
Tt0290	***Thrips italicus*** (Bagnall, 1926)	*Spartium junceum, Althaea* sp., *Verbascum* sp., *Olea europaea, Prunus avium,* shrub, *Euphorbia* sp., *Daphne* sp., *Pyrus elaeagnifolia, Styrax* sp., *Eucalyptus sp., Citrus reticulata, Platanus orientalis, Acacia cynophylla, Styrax* sp., *Citrus sinensis,* herb, *Crataegus* sp., *Asphodelus* sp., *Umbellifereae, Acacia* sp., *Crataegus* sp., *Crataegus* sp., *Genista* sp., *Cardaria draba, Pyrus elaeagnifolia, Medicago sativa, Euphorbia* sp., *Raphanus* sp. (Tunc et al., 2012) *Dianthus* sp. (Marullo & De Grazia, 2013)		Turkey (Tunc et al., 2012; 2016), Italy and Sicily (Marullo & De Grazia, 2013), Crete, French and Greek Mainlands (zur Strassen, 2003; Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015). Intercepted in US from Europe (Nickle, 2003)	No	Yes
Tt0291	***Thrips juniperinus*** Linnaeus, 1758 *(prob =carpathicus)*	*Juniperus communis* (Mound et al., 1976)		UK (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001), Spanish Mainland (zur Strassen 2003; Vierbergen, 2013), Sweden, Norway (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0292	***Thrips klapaleki*** Uzel, 1895	*Gymnadenia* and *Dactylochloris* spp. (Mound et al., 1976)	flowers (Mound Morrison, Pitkin, & Palmer, 1976)	UK, probably widespread in Europe (Mound et al., 1976; Mound et al., 2018), Italian Mainland (Stoch, 2003), French Mainland, Italian Mainland (zur Strassen, 2003; Vierbergen, 2013), Finland, (Gertsson, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Romania (Sierka et al., 2008).	No	Yes
Tt0293	***Thrips linarius*** Uzel, 1895	*Linum, Isatis Marrubium,* Asteraceae (zur Strassen, 2003)		North Italy (Stoch, 2003), French Mainland (zur Strassen 2003; Vierbergen, 2013), Sweden, Norway (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0294	***Thrips linariae*** Priesner, 1928	*Linaria vulgaris* (zur Strassen, 2003)		Sweden, Norway, Germany, Czech Republic, Hungary, Rumania, Bulgaria, Nederlands. (zur Strassen, 2003), Hungary (Jenser (2011).	No	No
Tt0295	***Thrips major*** Uzel, 1895	Many species particularly Rosaceae (Mound et al., 1976) *Pyracantha* sp., *Salyx babylonica* (Jenser & Tsanakakis, 1985) *Olea europea, Anthyllis hermannae* (zur Strassen, 1986) *Calystegia sepium, Ranunculus acris* (Kirk, 1996) *Clematis vitalba* (Trdan, 2001) *Coronilla varia*, *Elaeagnus* sp., *Pyrus elaeagnifolia*, *Euucalyptus* sp., *Nerium oleander*, *Citrus reticulata*, *Prunus armeniaca*, *Crataegus* sp., *Berberis* sp., *Spartium junceum*, *Quercus* sp., *Styrax* sp., *Citrus sinensis*, *Citrus reticulata,* herb, *Prunus avium*, *Acacia cyanophylla*, *Citrus aurantium*, *Olea europaea*, *Rosa* sp., *Spartium junceum*, *Avena sativa*. (Tunc et al., 2012) *Eucalyptus, Arbutus, Lobularia* (Marullo & De Grazia, 2013) *Citrus* sp. (Belaam-Kort et al., 2020)	flowers (Mound et al. 1976)	UK, throughout Europe (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Greece (Jenser & Tsanakakis, 1985-05; zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Cyprus (Srour, 2015), Balearic Islands, Crete, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), France also in greenhouses (Pizzol et al., 2014), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015). Belgium (Lock, 2006), Tunisia (Belaam-Kort et al., 2020), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Croatia (Raspudić et al., 2009), Iran (Bhatti et al., 2009). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003).	Yes	N/A

Tt0296	***Thrips mancosetosus* Priesner, 1964**	*Cirsum oleraceum, Centaurera montana* (Zur Strassen, 2003)		Italy (Stoch, 2003; Vierbergen, 2013), Denmark (Gertsson, 2015), Poland, Czech republic, Austria, (zur Strassen, 2003), Poland, (Sierka et al., 2008).	No	No
Tt0297	***Thrips mareoticus*** (Priesner, 1932)	*Anthemis, Calendula, Chrysanthemum, Ferula* (zur Strassen, 2003)		Israel (zur Strassen & Kuslitzky, 2012), Sicily (Stoch, 2003), Cyprus (Srour, 2015), Balearic Islands, Corsica, French, Greek and Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), Egypt (zur Strassen, 2014), Bulgaria (Karadjova & Krumov, 2015), Turkey (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe (Nickle, 2003).	Yes	N/A
Tt0298	***Thrips mediterraneus*** Priesner, 1934	*Chrysanthemum coronarium* (zur Strassen, 1986) *Cistus, Olea europaea, Retama retam, Rhamnus lycoides, Sambucus nigra, Tamarix* (zur Strassen, 2003)		Greece (zur Strassen, 1986-05), Italy and Sicily (Stoch, 2003), Greek and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Egypt (zur Strassen, 2014)	No	Yes
Tt299	***Thrips menyanthidis*** Bagnall, 1923	*Meyanthes trifoliata* (ThripsWiki, 2021)		UK (Mound et al., 2018), French Mainland (zur Strassen, 2003; Vierbergen, 2013) Sweden, Norway, Finland, (Gertsson, 2015), Slovakia (Zvaríková et al., 2020),	No	No
Tt0300	***Thrips meridionalis*** (=***Taeniothrips meridionalis***) (Priesner, 1926)	*Pistacea terebinthus, Spartium juncaeum, Isatis tinctoria, Helianthemum lavandiifolium, Medicago sativa* (Jenser & Tsanakakis, 1985) *Spartium juncaeum, Trifolium uniflorum, Malcolmia microcalyx syriaca, Cakile maritima aegyptica, Campanula rechingeri, Malcolmia sp, Trigonella cf. rechingeri, Scabiosa sp., Anthyllis hermanniae, Silene vulgaris, Lactuca sp., Vitex agnus-castus, Convolvulus sp., Cardus nutans, Hirchfeldia incana, Scolymus hispanicus* (zur Strassen, 1986) *Rosa glauca* (Trdan, 2001) *Raphanus sp., Lepidium draba, Ligustrum vulgaris, Sisymbrium irio, Vaccaria hispanica, Malcolmia Africana, Hirchfeldia incana, Brassica napus, Glyssyrhiza glabra* (Fallahzedah et al., 2011) *Coronilla varia*, *Elaeagnus* sp., *Vicia sativa*, *Prunus domestica*, *Rosa canina*, herb, *Amygdalus communis*, *Vitis vinifera*, *Avena sativa*, *Euphorbia* sp., *Quercus*, *Pinus* sp., *Verbascum* sp., *Citrus reticulata*, *Salix* sp., *Cystus* sp., *Olea europaea*, *Nerium oleander*, *Althaea* sp., *Convolvulus* sp., shrub, *Onobrychis* sp., *Spirea* sp., *Tagetes* sp., *Salvia* sp., *Papaver somniferum*, *Spartium junceum*, *Bellis perennis*, *Citrus sinensis*, *Juncus* sp., *Styrax* sp., *Citrus aurantium*, *Asphodelus* sp., *Sinapis* sp., *Cercis siliquastrum*, *Crataegus* sp., *Vicia sativa*, *Acacia* sp., *Genista* sp., *Raphanus* sp., *Malus communis*, *Morus alba*, *Cardaria draba*, *Prunus avium*, *Prunus armeniaca*, *Cydonia vulgaris*, *Boreava orientalis*, *Berberis* sp., *Peganum harmala*, *Pyrus elaeagnifolia*. (Tunc et al., 2012) *Prunus, Cystisus* (Marullo & De Grazia, 2013)		Greece (Jenser & Tsanakakis, 1985-05; zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy and Sardegna (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc *et al.* 2012), Cyprus (Srour, 2015), Europe, East Palaearctic, French Mainland, Greek Mainland, Italian Mainland, Sardinia, Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol et al., 2014), Bulgaria (Karadjova & Krumov, 2015) Iran (Bhatti et al., 2009; Fallahzedah et al., 2011; Mirab-balou et al., 2013), Iraq (Fattah Hammoodi et al. 2004), Tunisia (Belaam-Kort et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003)	No	Yes
Tt0301	***(Thrips microchaetus)*** Karny, 1920	*Gymnocarpos decander* (zur Strassen, 2003)		Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014), Morocco, Yemen, Sudan, Kenya (zur Strassen, 2003). Intercepted in US from Africa (Nickle, 2003).	No	No

Tt0302	***Thrips minutissimus*** Linnaeus, 1758	*Quercus robur* (Mound et al., 1976) *Olea europea* (zur Strassen, 1986) *Quercus robur* larva found (Kirk, 1996) *Anemone nemorosa* (Trdan, 2001) *Prunus avium, Pyrus elaeagnifolia, Pisum Pistacia sp., Quercus sp., Triticum aestivum.* (Tunc et al., 2012) *Pistacea, Ampelodesma, Carpinus, Quercus* (Marullo & De Grazia, 2013)	flowers (Mound et al., 1976)	UK, throughout Europe (zur Strassen, 2003; Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Cyprus (Srour, 2015), Spanish Mainland (Vierbergen, 2013), France also in greenhouses (Pizzol et al., 2014), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008, Zvaríková et al., 2020), Iran (Bhatti et al., 2009). Intercepted in US from Europe, and the Mediterranean (Nickle, 2003)	No	Yes
Tt0303	***Thrips nigropilosus*** Uzel, 1895 (Chrysanthemum thrips)	Greenhouses, also *Plantago lanceolata, P. maritima* and various *Compositae.* (Mound et al., 1976) *Fraxinus ornus* (Trdan, 2001) *Ocimum basilicum* (zur Strassen & Kuslitzky, 2012) *Achillea* sp. (Marullo & De Grazia, 2013) In Kenya pest on *Pyrethrum* (zur Strassen, 2003).		UK, widespread in Europe (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), Slovenia (Trdan, 2001), Italy (Stoch, 2003, Marullo & De Grazia, 2013), Israel, Cosmopolitan (zur Strassen & Kuslitzky, 2012), Iran (Bhatti et al., 2009), Spanish Mainland (Vierbergen, 2013), France (Pizzol et al., 2014), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003)	No	Yes
Tt0304	***Thrips oneillae*** (Titschack, 1968)	*Alkanna tinctoria* (zur Strassen, 2003).		Spanish Mainland (zur Strassen, 2003; Vierbergen, 2013)	No	No
Tt0305	***Thrips origani*** Priesner, 1926	*Origanum vulgare* (Mound et al., 1976)		UK, widespread in central and southern Europe (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), Slovenia (Trdan, 2001), French Mainland (Vierbergen, 2013), Norway (Gertsson, 2015), Hungary (Jenser, 2011).	No	Yes
Tt0306	***Thrips palmi*** Karny, 1925	Cucurbitaceae, Fabaceae, Solanaceae, Astreraceae, Convolvulaceae (zur Strassen, 2003)		UK (Mound et al., 2018), Italian Mainland (zur Strassen, 2003; Vierbergen, 2013), Sweden, Norway, Finland, Denmark, (Gertsson, 2015), Delhi, India (Kumar et al., 2008). Intercepted in US from Africa (Nickle, 2003).	No	Yes
Tt0307	***Thrips palustris*** Reuter, 1899	*Pedicularis palustris* (zur Strassen, 2003)	flowers (Mound *et al.,* 1976)	UK, Northern Europe (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), Norway (Gertsson, 2015), Hungary (Jenser, 2011), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0308	***Thrips panousei*** zur Strassen, 1968	*Calligonium comosum, Euphedra alata* (zur Strassen, 2003)		Israel (zur Strassen & Kuslitzky, 2012), Morocco (zur Strassen, 2003).	No	Yes
Tt0309	***Thrips pelikani*** Schliephake, 1964	*Carlina, Hieracum* (zur Strassen, 2003)		Corsica, Crete, Greek Mainland (zur Strassen, 2003; Vierbergen, 2013), France (Pizzol et al., 2014), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	No
Tt0310	***Thrips pennatus*** zur Strassen, 1965	?		Azores (zur Strassen, 2003)	No	?
Tt0311	***Thrips poultoni Bagnall, 1933***	?		Morocco and Canary Islands (zur Strassen, 2003)	No	?

Tt0312	***Thrips physapus*** Linnaeus, 1758	*Taraxacum* and other Compositae (Mound et al., 1976) *Taraxacum officinalis,* larva found (Kirk, 1996) *Silybum marianum* (Jenser & Tsanakakis, 1985) *Galactites tomentosa, Centaurea sp., Chrysanthemum coronarium* (zur Strassen, 1986) Yellow asteraceae (Trdan, 2001) *Helianthus annuus* (Trdan et al., 2005) *Coronilla varia, Carthamus sp., Iris sp., Convolvulus sp.* (Tunc et al., 2012) *Vicia faba* (Razi et al., 2013)	flowers (Mound Morrison , Pitkin, & Palmer 1976) Prey to *A intermedius* (Trdan *et al.,* 2005)	UK, widespread in Europe (Mound et al., 1976; Kirk, 1996; zur Strassen, 2003; Mound et al., 2018), Greece (Jenser & Tsanakakis, 1985-05; zur Strassen, 1986-05), Italy (Stoch, 2003), Slovenia (Trdan, 2001; Trdan *et al,* 2005), Serbia & Monenegro (Trdan et al., 2005), Turkey (Tunc et al., 2012), Algeria (Razi, Laamari, Ouamen, & Bernard, 2013), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Serbia (Andjus et al., 2001), Iran (Bhatti et al., 2009), Corsica, Crete, French Mainland, Italian Mainland, Sardinia, Sicily, Spanish Mainland (Vierbergen, 2013), France (Pizzol et al., 2014), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003)	No	Yes
Tt0313	***Thrips pillicchi*** Priesner, 1924	Compositae, e.g. *Senecio*, *Achillea* spp. (Mound et al., 1976) *Tanacetum vulgare* (Trdan, 2001)	flowers Mound *et al.* 1976 UK	UK, found in southern Europe (Mound et al., 1976; zur Strassen,2003; Mound et al., 2018), Slovenia (Trdan, 2001), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Iran (Bhatti et al., 2009), Italian and Spanish Mainlands (Vierbergen, 2013), France (Pizzol et al., 2014), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0314	***Thrips pini*** (Uzel, 1895)	*Abies, Larix, Picea, Pinus* (zur Strassen, 2003)		Italy (Stoch, 2003; zur Strassen, 2003), French Manland (Vierbergen, 2013; zur Strassen, 2003), Sweden, Norway, Finland, Denmark, Iceland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Tt0315	***Thrips praetermissus*** Priesner, 1920	various (zur Strassen, 2003)		French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Poland (Kucharzyk et al, 2001), Finland (Gertsson, 2015), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0316	***Thrips robustus*** Priesner, 1920	*Gentiana* sp. (zur Strassen, 2003)		North Italy (Stoch, 2003), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Finland (Gertsson, 2015), Romania (Sierka et al., 2008).	No	No
Tt0317	***Thrips roepkei*** Doeksen, 1953	*Solanum nigrum* (zur Strassen, 2003)		UK (Mound et al., 2018), Nederlands (zur Strassen, 2003), Slovakia (Zvaríková et al., 2020),	No	Yes
Tt0318	***Thrips inopinatus*** (= ***T. roepkei***) ***Doeksen, 1953***	*Solanum dulcamara* (Mound et al., 1976)	flowers (Morrison, Pitkin, & Palmer 1976)	UK, probably widespread in Europe (Mound et al., 1976), glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Norway (Gertsson, 2015).	No	Yes
Tt0319	***Thrips sambuci*** Heeger, 1854	*Sambucus nigra* (Mound et al., 1976) *Sambucus* sp. (Marullo & De Grazia, 2013)		UK, widespread in Europe (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), Slovenia (Trdan, 2001), Italy and Sardinia (Stoch, 2003; Marullo & De Grazia, 2013), French Mainland, (Vierbergen, 2013), Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Tt0320	***Thrips simplex*** (Morison, 1930)	*Gladiolus sp.* (Trdan, 2001) *Dianthus spp., gladiolus spp.* (Trdan et al., 2005)	P rey to *A. intermedius* (Trdan et al., 2005)	Slovenia (Trdan, 2001; Trdan et al., 2005), South Italy (Stoch, 2003), Slovenia/ Croatia (Trdan et al., 2005), Israel (zur Strassen & Kuslitzky, 2012), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Egypt (zur Strassen, 2014), Sweden, Norway (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (2011), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020).	No	Yes

Tt0321	***Thrips setosus*** Moulton, 1928 Japanese Flower Thrips	Various plants, *Hydrangea* sp. (Mound Mound et al., 2018)		UK, Japan, South Korea, the Netherlands (Vierbergen & Loomans, 2016), France, Germany and Croatia. (Mound et al., 2018).	No	Np
Tt0322	***Thrips sinaiticus*** (Priesner, 1935)	?		Egypt (zur Strassen, 2014)	No	?
Tt0323	***(Thrips spadix)*** (= ***T. brevisetosus***) Hood, 1932	?		Intercepted in US from Africa (Nickle, 2003)	No	?
Tt0324	***Thrips speratus*** (= ***T. emulatus***) zur Strassen, 1978	*Cynachum alatum* (zur Strassen, 2003)		Israel (zur Strassen, 2003; zur Strassen & Kuslitzky, 2012), Delhi, India (Kumar et al., 2008)	No	No
Tt0325	***Thrips tabaci*** Lindeman, 1889 (Onion thrips)	*Allium* sp. (Saliba, 1963) Many flowers and plants, particularly *Compositae* (Mound et al., 1976) *Ferula* sp., flowering plants (Jenser,1982) *Olea europea, Pittosporum tobira, Triiticum vulgare, Isatis tinctoria, Lepidum draba, Rumex acetosella, Euphorbia agrarian, Anthemis maritima* (Jenser & Tsanakakis, 1985) *Anthyllis hermannae, Ruta chalepensis, Sinapis arvensis*. (zur Strassen, 1986) *Allium cepa, taraxacum officinale* larvae found (Kirk, 1996) *Galium verum* (Trdan, 2001) *Allium cepa, A. fistulosum, Helianthus annuus, dianthus spp., medicago sativa, trifolium repens, gladiolus spp. Beta vulgaris, phaseolus vulgaris, pisum sativum, Trifolium pratense, Sambucus nigra* (Trdan et al., 2005) *Sisymbrium irio, Raphanus sp, Reseda lutea, Tagetes lucida, Hirchfeldia incana, lepidium draba, allium cepa* (Fallahzedah et al., 2011) *Phragmites australis (*Kucharzyk *et al.*, 2011) *Rumex* sp., *Vicia sativa, Avena sativa, Vitis vinifera, Echinochloa crus-galli, Zea mays, Verbascum* sp., *Eucalyptus* sp., *Chenopodium* sp., *Olea europaea,* herb, *Crataegus* sp., *Amygdalus communis, Arachis hypogaea, Morus alba, Vitex agnus-castus, Althaea* sp., *Asteraceae, Anthemis* sp., *Chenopodium* sp., *Carthamus* sp., *Solanum melongena, Convolvulus* sp., *Tripleurospermum sp., Datura sp., Sinapis sp., Althaea* sp., *Prunus domestica,* shrub, *Quercus* sp., *Tagetes* sp., *Salvia* sp., *Papaver somniferum, Triticum aestivum,*	leaf (Kirk, 1996) Prey to *A. intermedius* (Trdan *et al.,* 2005) Galls associated with Diptera (Kucharzyk et al,. 2011)	Malta (Saliba, 1963), UK, possibly from Eastern Mediterranean, now worldwide. (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Cosmopolitan (zur Strassen (2003), Tunisia (Jenser, 1982), Greece (Jenser & Tsanakakis, 1985-05; zur Strassen, 1986-05; Baderitakis et al., 2015), Slovenia (Trdan, 2001;Trdan et al., 2005), Italy and Islands (Stoch, 2003), Agricultural pest in Sicily (Rapisarda et al., 2004), Serbia & Montenegro (Trdan et al., 2005), Iran (Fallahzadeh et al, 2011), Poland (Kucharzyk et al. 2011), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Serbia (Andjus et al., 2001), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001). Iran (Bhatti et al., 2009), Iraq (Fattah Hammoodi et al. 2004), Balearic Islands, Corsica, Crete, Greek Mainland, Spanish Mainland (Vierbergen, 2013); Fauna Europaea Web Service, 2004 in Fallahzadeh et al., 2012), France also in greenhouses (Pizzol et al., 2014), Tunisia (Belaam-Kort et al., 2020), Egypt (zur Strassen, 2014), Sweden, Norway, Finland, Denmark, Iceland (Gertsson, 2015), Delhi, India (Kumar et al., 2008), Iran (Mirab-balou et al., 2013), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Croatia (Raspudić et al., 2009). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003).	Yes	N/A

		Lamium sp., *Malus communis, Euphorbia* sp., *Cydonia vulgaris, Asteraceae, Boreava orientalis, Medicago sativa, Berberis* sp., *Hordeum sativum, Cardaria draba, Quercus* sp., *Pisum sativum, Malva* sp., *Melilotus* sp., *Salix* sp., *Sonchus* sp., *Prunus avium, Citrus sinensis, Raphanus sp., Rosa* sp., *Citrus reticulata.* (Tunc et al., 2012) *Medicago* sp. (Baderitakis et al., 2015) *Citrus* sp. (Belaam-Kort et al., 2020)				
Tt0326	***Thrips tarfayensis*** zur Strassen, 1968	*Pulicaria crispa* (zur Strassen, 2003)		Morocco (zur Strassen, 2003)	No	No
Tt0327	***Thrips temperans*** zur Strassen (2003)	*Alcea excubita* (zur Strassen, 2003)		Turkey, (zur Strassen, 2003; Tunc & Hastenpflug-Vesmanis, 2016).	No	?
Tt0328	(***Thrips tenellus***) Trybom, 1913	?		Intercepted in US from Africa (Nickle, 2003)	No	?
Tt0329	***Thrips timidus*** Priesner 1926	*Stachys recta* (zur Strassen, 2003)		Hungary (zur Strassen, 2003; Jenser (2011), Romania (zur Strassen, 2003; Sierka et al., 2008)	No	No
Tt0330	***Thrips trehernei*** (=***Thrips hukkineni***) Priesner, 1927	*Taraxacum* and other Compositae (Mound et al., 1976) *Taraxacum officinale.* larva found (Kirk, 1996) *Taraxacum officinale* (Trdan, 2001) *Scorzonera* sp. (Tunc et al., 2012)	flowers (Mound et al., 1976)	UK, widespread in Europe (Mound et al., 1976; Kirk, 1996; zur Strassen, 2003; Mound et al., 2018), Slovenia (Trdan, 2001), Italy and Sicily (Stoch, 2003), Turkey (Tunc et al., 2012; 2016). Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Iran (Bhatti et al., 2009), Spanish Mainland (Vierbergen, 2013) France (Pizzol *et al.*, 2014), Sweden, Norway, Finland, Denmark, Iceland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Aegean region, Turkey (Tunc et al., 2012), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020). Intercepted in US from Europe? (Nickle, 2003).	No	Yes
Tt0331	***Thrips trybomi*** (Karny, 1908)	*Vaccaria hispanica* (Fallahzedah et al., 2011)		Europe, East Palaearctic on different kind of bushes particularly Tomato's bushes (zur Strassen (2003), Italian Manland (Stoch, 2003; Vierbergen, 2013), Iran (Fallahzadeh *et al.,*2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0332	***Thrips urticae*** Fabricius, 1781	*Urtica dioica* larva found (Kirk, 1996; Trdan, 2001) *Urtica* sp. (Marullo & De Grazia, 2013)	flowers (Mound *et al.*, 1976)	UK, widespread in Europe (Mound et al., 1976; Kirk, 1996, zur Strassen, 2003; Mound et al., 2018), Slovenia (Trdan, 2001), North Italy (Stoch, 2003; Marullo & De Grazia, 2013), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), French and Spanish Mainlands (Vierbergen, 2013), Finland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Poland (Sierka et al., 2008). Slovakia (Sierka et al., 2008; Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003).	No	Yes
Tt0333	***Thrips validus*** Uzel, 1895	Various yellow flowered *Compositae* sp. (Mound et al., 1976) *Taraxacum officinale* larva found (Kirk, 1996) *Leontodon sp.* (Trdan, 2001)	flowers (Mound *et al.*, 1976)	UK, found throughout Europe (Mound et al., 1976; Kirk,1996, zur Strassen, 2003; Mound et al., 2018), Slovenia (Trdan, 2001), North Italy (Stoch, 2003), Serbia (Andjus et al., 2001), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), French, Greek and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015). Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008). Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes

Tt0334	***Thrips verbasci*** (=***Parafrankliniella verbasci)*** (Priesner, 1920)	*Verbascum* sp. (Mound et al., 1976) *Verbascum nigrum* (Marullo & DeGrazia, 2013)		.UK Widespread in Europe (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), Slovenia (Trdan, 2001), Italy (Stoch, 2003; Marullo & DeGrazia, 2013), Iran (Bhatti et al., 2009), Corsica, and Spanish Mainlands (Vierbergen, 2013), France (Pizzol *et al.*, 2014), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0335	***Thrips viminalis*** Uzel, 1895	*Salix* sp. (Mound et al., 1976) *Salix* sp., *Vitis vinifera Alnus* (zur Strassen, 2003)	Leaf buds (Mound *et al.*, 1976)	UK Widespread in Europe. (Mound et al., 1976; zur Strassen, 2003; Mound et al., 2018), North Italy (Stoch, 2003), French and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Aegean region, Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016), Hungary (Jenser (2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Tt0336	***Thrips vuilletti*** (Bagnall, 1933)	Asteraceae (zur Strassen, 2003)		South Italy (Stoch, 2003), Cyprus (Srour, 2015), French and Spanish Mainlands (zur Strassen, 2003; Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Tt0337	***Thrips vulgatissimus*** Haliday, 1836	many plants, particularly white flowers (Mound et al., 1976) *Brassica napus* larvae found (Kirk, 1996) *Petasites albus* (Trdan, 2001) *Chamomilla spp., Vitis vinifera* (Trdan et al., 2005)	flowers (Mound *et al.*, 1976) Prey to *A. intermedius* (Trdan *et al.*, 2005)	UK, widespread in Europe (Mound et al., 1976; Kirk, 1996; zur Strassen, 2003; Mound et al., 2018), Slovenia (Trdan, 2001; Trdan *et al*. 2005), Italy (Stoch, 2003), Glass house species in the Netherlands which settled in the open (Vierbergen, 2001), Iran (Bhatti et al., 2009), Israel (zur Strassen & Kuslitzky, 2012), French and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland, Denmark, Iceland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011), Poland, Romania (Sierka et al., 2008), Croatia (Raspudić et al., 2009), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020). Intercepted in US from Europe (Nickle, 2003)	No	Yes
Tt0338	***Tmetothrips subapertus*** (Haliday, 1836)	*Galium palustre*, *Stellaria graminea* (Mound et al., 1976)		UK, widespread in central Europe (Mound et al., 1976; zur Strassen,2003 Mound et al., 2018), Norway, Finland (Gertsson, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008).	No	No
Tt0339	***Trichromothrips bellus*** Priesner, 1930	?		Egypt (zur Strassen, 2014)	No	?
Tt0340	***Trichromothrips caespitis*** (Priesner, 1932)	?		Egypt (zur Strassen, 2014)	No	?
Tt0341	***Zur Strassenia figuratus*** zur Strassen, (1968)	*Limonium sinuatum* (zur Strassen, 2003)		Morocco (zur Strassen, 2003)	No	No

Suborder Tubulifera: Family Phlaeothripidae: Subfamily Idolothripinae						
Species nº	**Species name**	**Recorded on**	**Plant region**	**Distribution**	**Records from Malta**	**Likely in Malta**
Pi0001	***Allothrips pillichellus*** (Priesner, 1925) ssp. ***bicolor*** Ananthakrishnan, 1964 ssp. ***bournieri*** Mound, 1972	Evergreen thicket on sandy soil and rotten vegetation. (Jenser, 1982) Spore feeding (Mound, 1972) Mycophagous on fungal spores (Marullo & De Grazia, 2013)		Tunisia (Jenser, 1982), South Italy (Stoch, 2003; Marullo & De Grazia, 2013), Hungary, Romania (ThripsWiki, 2021), French Mainland, also the ssp. *bournieri* (Mound, 1972), Spanish Mainland both ssp. (Vierbergen, 2013), Hungary (Jenser (2011), Slovakia (Zvaríková et al., 2020).	No	Yes
Pi0002	***Bacillothrips longiceps*** (O. M. Reuter, 1901)	*Quercus crucifera. Brachypodium retusum?* (zur Strassen, 1986) Mycophagpus on fungal spores (Marullo & De Grazia, 2013)		Greece (zur Strassen, 1986-05), South Italy and islands (Stoch, 2003, Marullo & De Grazia, 2013), French, greek and Spanish Mainlands (Vierbergen, 2013)	No	Yes
Pi0003	***Bacillothrips nobilis = Megalothrips nobilis*** (Bagnall, 1909)	fungal spores on dead *Salix* branches (Mound et al., 1976)		UK, widespread in Europe. (Mound et al., 1976; Mound et al., 2018), Spanish Mainland (Vierbergen, 2013), Finland, Denmark (Gertsson, 2015), Slovakia (Zvaríková et al., 2020).	No	No
Pi0004	***Bactothrips (sic) Bactrothrips buffai*** (Karny, 1921)	Mycophagous on fungal spores (Marullo & De Grazia, 2013)		South Italy (Stoch, 2003; Marullo & De Grazia, 2013), French Mainland, Italian Mainland (Vierbergen 2013)	No	Yes
Pi0005	***Bolothrips bicolor*** (Heeger, 1852)	Grass on rocks (Trdan, 2001) Mycophagous on fungal spores (Marullo & De Grazia, 2013)		Slovenia (Trdan, 2001), North Italy (Stoch, 2003; Marullo & De Grazia, 2013), French and Spanish Mainlandws (Vierbergen, 2013), Sweden, Norway (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Romania (Sierka et al., 2008), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Pi0006	***Bolothrips cingulatus*** (Karny, 1916)	Half-dried grasses (Trdan, 2001)		Slovenia (Trdan, 2001), French, Italian and Spanish Mainlands (Vierbergen, 2013), Hungary (Jenser (2011). Intercepted in US from Africa (Nickle, 2003)	No	Yes
Pi0007	***Bolothrips dentipes*** (O. M. Reuter, 1880)	Feeds on fungal spores at base of *Juncus*, *Carex* and *Spartina* (Mound et al., 1976) Mycophagous on fungal spores (Marullo & De Grazia, 2013) *Phragmites australis* (Kucharzyk *et al.,*2011)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), Italy and Sardegna (Stoch, 2003; Marullo & De Grazia, 2013), Poland (Kucharzyk *et al.,* 2011), French and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Slovakia (Sierka et al., 2008;Zvaríková et al., 2020).	Yes	N/A
Pi0008	***Bolothrips icarus*** (Uzel, 1895)	*mycophagous* on fungal spores (Marullo & De Grazia, 2013)		North Italy (Stoch, 2003; Marullo & De Grazia,2013), French and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Hungary (Jenser (2011), Croatia (Raspudić et al., 2009), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020).	No	Yes

Pi0009	***Bolothrips insularis*** (Bagnall, 1914)	*Polygonium*, *Juncus acutus*, *Polypogon monspeliensis*, *P. maritimus*, *Hyparrhenia hirta*, *Brachypodium retusum*, *Stipa capensis*, *Pipatherium miliaceum* (zur Strassen, 1986) Mycophagous on fungal spores (Marullo & De Grazia, 2013)		Greece (zur Strassen, 1986-05), South Italy and Sicily (Stoch, 2003; Marullo & De Grazia,2013), French Greek and Spanish Mainlands (Vierbergen, 2013), Egypt (zur Strassen, 2014), Canary Islands (Mound & Palmer, 1983).	Yes	N/A
Pi0010	***Bolothrips italicus*** Mound, 1974	Mycophagous on fungal spores (Marullo & De Grazia, 2013)		South Italy and Sicily (Stoch, 2003), Italy and Sicily (Marullo & De Grazia, 2013; Vierbergen, 2013).	No	Yes
Pi0011	***Compsothrips albosignatus*** (O. M. Reuter, 1884)	*Pyrus elaeagnifolia* (Tunc et al., 2012) mycophagous on fungal spores (Marullo & De Grazia, 2013)		Sardinia (Stoch, 2003; Marullo & De Grazia,2013), Turkey (Tunc et al., 2012; 2016), Cyprus (Srour, 2015), Crete,French and Spanish Mainlands (Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Algeria (Mound & Palmer, 1983).	No	Yes
Pi0012	***Compsothrips maroccanus*** Priesner, 1964	Mycophagous on fungal spores (Marullo & De Grazia, 2013)		Sicily (Stoch, 2003; Marullo & De Grazia, 2013) Spanish Mainland (Vierbergen, 2013), Morocco (Mound & Palmer, 1983).	No	Yes
Pi0013	***Compsothrips uzeli*** (Hood, 1952)	Mycophagous on fungal spores (Marullo & De Grazia, 2013)		North Italy (Stoch, 2003; Marullo & De Grazia, 2013; Vierbergen, 2013), Spanish Mainland (Vierbergen, 2013), Romania (Sierka et al., 2008).	No	Yes
Pi0014	***Cryptothrips nigripes*** (O. M. Reuter, 1880)	Dead branches? *Crataegus sp., Spartum juncaeum, Quercus coccifera* (zur Strassen, 1986) Dead branches *Ostrya sp.* (Trdan, 2001) Mycophagous on fungal spores (Marullo & De Grazia, 2013)		UK widespread in Europe (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), North Italy (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), French, and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Croatia (Raspudić et al., 2009), Turkey (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020).	No	Yes
Pi0015	***Megalothrips bonanni*** Uzel, 1895	On fungal spores under bark (Mound et al., 1976) Mycophagous on fungal spores (Marullo & De Grazia, 2013)		UK, widespread but uncommon in central and southern Europe (Mound et al., 1976; Mound et al., 2018), Italy (Stoch, 2003; Marullo & De Grazia, 2013), Poland Kucharzyk et al, 2001), French and Spanish Mainlands (Vierbergen, 2013), Hungary (Jenser (2011), Czechoslovakia (Mound & Palmer, 1983), Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
Pi0016	***Megalothrips delmasi*** Bournier, 1956	Mycophagous on fungal spores (Marullo & De Grazia, 2013)		South Italy (Stoch, 2003; Marullo & De Grazia, 2013), French Mainland (Vierbergen, 2013).	No	Yes
Pi0017	***Megathrips elegans*** (=***Siphonothrips elegans***) (Buffa, 1908)	Mycophagous on fungal spores (Marullo & De Grazia, 2013)		South Italy and Sardinia (Mound & Palmer, 1983; Stoch, 2003; Marullo & De Grazia, 2013).	No	Yes
Pi0018	***Megathrips brevis*** (Bagnall, 1914)	?		Yugoslavia (Mound & Palmer, 1983)	No	?
Pi0019	***Megathrips inermis*** Priesner, 1937	Mycophagous on fungal spores (Marullo & De Grazia, 2013)		Sardinia (Stoch, 2003, Marullo & De Grazia, 2013), French and Spanish Mainland (Vierbergen, 2013)	No	No
Pi0020	***Megathrips flavipes*** (Reuter, 1901)	?		Crete, Greek Mainland (Vierbergen, 2013), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	?
Pi0021	***Megathrips lativentris*** (Heeger, 1852)	On fungal spores from *Betula* and *Quercus leaf litter* (Mound et al., 1976) Mycophagous on fungal spores (Marullo & De Grazia)		UK, widespread in Europe but infrequently collected (Mound et al., 1976; Mound et al., 2018), Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Poland (Kucharczyk & Zawirska, 2001), French and, Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Austria, Yugoslavia, Rumania (Mound & Palmer, 1983), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020).	No	?
Pi0022	***Priesneriella clavicornis*** (Knechtel, 1935)	*Lygeum* sp. (Marullo & De Grazia, 2013)		South Italy (Marullo & De Grazia, 2013), French Mainland, Spanish Mainland (Vierbergen, 2013) Romania (Sierka et al. 2008).	No	Yes

Pp0023	***Priesneriella mavromoustakisi*** (J. C. Crawford, 1948) (= ***Parallothrips mavromoustakisi***)	*Quercus coccifera* (zur Strassen, 1986) Mycophagous on fungal spores (Marullo & De Grazia)		Greece (zur Strassen, 1986-05), Italy and Sardinia (Marullo & De Grazia, 2013), Cyprus (Srour, 2015), French, Greek and Spanish Mainlands (Vierbergen, 2013)	Yes	N/A
Pp0024	***Pseudocryptothrips meridionalis*** Priesner, 1919idolothripinae	?		All Italy (Stoch, 2003; Marullo & De Grazia, 2013), Spanish Mainland (Vierbergen, 2013)	No	?

Family Phlaeothripidae: Subfamily Phlaeothripinae						
Species nº	**Species name**	**Recorded on**	**Plant region**	**Distribution**	**Records from Malta**	**Likely in Malta**
Pp0001	***Abiastothrips shaubergeri*** (=***Holothrips schaubergeri***) (Priesner, 1920)	Dead branches (Mound et al., 1976) dead branches (*Rubus sp.*) (zur Strassen, 1986) hollow twigs (ThripsWiki, 2021)		UK, widespread but not common in Southern Europe (Mound et al., 1976), Greece (zur Strassen, 1986-05), French and Greek Mainland (Vierbergen, 2013), Poland (Kucharczyk & Zawirska, 2001)	No	Yes
Pp0002	***Acaciothrips ebneri*** (Karny, 1920)	*Acacia nilotica* (ThripsWiki, 2021)	leaf galls (ThripsWiki, 2021)	Egypt (zur Strassen, 2014)	No	Yes
Pp0003	***Acanthothrips nodicornis*** (O. M. Reuter, 1880)	Dead branches (Mound et al., 1976)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), Italy (Stoch, 2003; Marullo & De Grazia, 2013), French and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020).	No	Yes
Pp0004	***Aleurodothrips fasciapennis*** (Franklin, 1908)	*Citrus limon*. Predator of whitefly and scale insects (ThripsWiki, 2021)		Belgium (Lock, 2006). Intercepted in US from Europe (Nickle, 2003).	No	Yes
Pp0005	***Amphibolothrips grassei*** *(grassii)* Buffa, 1909 *(Family Urothripidae?)*	*Eucalyptus* sp., *Tamarix* sp. (Jenser, 1982) Dead branches (*Rubus sp., Phyllirea latifolia*) (zur Strassen, 1986) Mycophagous. Dry leaves (ThripsWiki, 2021)		Tunisia (Jenser, 1982), Greece (zur Strassen, 1986-05), South Italy and Sicily (Stoch, 2003; Marullo & de Grazia, 2013), Mediterranean region, French, Greek and Spanish Mainlands (Vierbergen, 2013)	No	Yes
Pp0006	***Amphibolothrips knetcheli*** (Priesner, 1936)	Mycophagous. Oak forest litter (ThripsWiki, 2021)		French, Italian and Spanish Mainlands (Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015)	No	No
Pp0007	***Amphibolothrips marginatus*** (Bournier, 1960)	Mycophagous in leaf litter (ThripsWiki, 2021)		French and Spanish Mainland (Vierbergen, 2013)	No	Yes
Pp0008	***Androthrips ramachandrai*** Karny, 1926	*Ficus benjamina* (Collins & Philippou, 2016)	In galls. probably predatory on *G. uzeli* (Collins & Philippou, 2016)	Cyprus (Collins & Philippou, 2016) India; introduced to USA (California, Florida, Texas, Hawaii), the Galapagos Islands, also Costa Rica, Brazil and Argentina (Mound et al., 2019)	No	Yes
Pp0009	***Apterygothrips carcis*** Marullo & Ravazzi, 2002	*Cyperus* sp. (Marullo & De Grazia, 2013)		Italy (Marullo & De Grazia, 2013)	No	No
Pp0010	***Apterygothrips haloxyli Priesner, 1933***	*Haloxylon schweinfurthi* (ThripsWiki, 2021)	fallen petals (ThripsWiki, 2021)	Egypt (zur Strassen, 2014)	No	No
Pp0011	***Apterigothrips hispanicus*** (Bagnall, 1916)	grasses/ fallen leaves (ThripsWIki, 2021)		Spanish Mainland (Vierbergen, 2013)	No	Yes
Pp0012	***Apterigothrips neolongiceps*** Johansen, 1994 (=***A.longiceps*** zur Strassen, 1968)	*Erica arborea* (ThripsWIki, 2021)	new shoots (ThripsWIki , 2021)	Spanish Mainland (Vierbergen, 2013)	No	No
Pp0013	***Apterigothrips piceatus*** zur Strassen, 1966	*Crataegus* sp. (ThripsWIki, 2021)	flowers (ThripsWIki, 2021)	Spanish Mainland (Vierbergen, 2013)	No	Yes

Pp0014	***Apterygothrips priesneri*** zur Strassen, 1966	*Pinus* sp. (zur Strassen, 1986) *Pinus pinea* (Tunc et al., 2012)	male cones (zur Strassen, 1986)	Greece (zur Strassen, 1986-05), South Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), French, Greek and Spanish Mainland (Vierbergen, 2013)	No	Yes
Pp0015	***Bagnalliella yuccae*** Hinds, 1902	*Yucca* sp. (Mound et al., 2019)	Leaf bases (Mound et al., 2019)	North Italy (Stoch, 2003; Marullo & De Grazia, 2013; Vierbergen, 2013), Hungary (Jenser (2011).	No	Yes
Pp0016	***Bebelothrips flavicinctus*** *(= latus)* Buffa, 1909 *(Family Urothripidae?)*	leaf litter *Pinus halepenses* and *Juniperus* sp. (Jenser, 1982), leaf litter, *Olea europea* (zur Strassen, 1986) Mycophagous on fungal hyphae (Marullo & De Grazia, 2013) *Phragmites australis* (Kucharzyk, *et al.,* 2011) *Medicago strasseri* (Baderitakis et al., 2015)		Tunisia (Jenser, 1982), Greece (zur Strassen, 1986-05), All Italy and islands (Stoch, 2003; Marullo & De Grazia, 2013), Poland (Kucharzyk *et al.,* 2011), Southern Europe (ThripsWiki, 2021), French, Greek and Spanish Mainlands (Vierbergen, 2013).	No	Yes
Pp0017	***Cephalothrips albostriatus*** zur Strassen, 1968	*Globularia eriocephala* (ThripsWiki, 2021)	dead dry branches (ThripsWiki, 2021)	Spanish Mainland (Vierbergen, 2013	No	No
Pp0018	***Cephalothrips coxalis*** Bagnall, 1926	*Juncus* sp., *Salix* sp, Chenopodiaceae (Jenser, 1982) *Juncus acutus, Spartum juncaeum, Polypogon monspeliensis. P. maritimus, Citrus sinensis. Litter?* (zur Strassen, 1986) *Fungi, Spartium*, *Cysticus* and dead shrubs. (zur Strassen, 1994)		Tunisia (Jenser, 1982), Greece (zur Strassen, 1986-05), South Italy and Sicily (zur Strassen, 1994; Stoch, 2003; Marullo & De Grazia, 2013), Cyprus (Srour, 2015), French Mainland, Greek Mainland Italian Mainland, Sicily, Spanish Mainland (Vierbergen, 2013), Egypt (zur Strassen, 2014), Germany (zur Strassen, 1994), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Iran (Bhatti et al., 2009)	No	Yes
Pp0019	***Cephalothrips monilicornis*** (O. M. Reuter, 1880)	Grasses (Mound et al., 1976) *Polypogon maritimus* (zur Strassen, 1986) *Half-dried grasses* (Trdan, 2001) *Zea mays* (Trdan et al., 2005) *Juncus* sp., (Tunc et al., 2012)	leaves (Mound et *al.* 1976) Prey to *A. intermedius* (Trdan *et al.*,005)	UK, widespread in Europe. (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), South Italy and Sicily (Stoch, 2003), Slovenia Croatia, Serbia & Montenegro (Trdan et al., 2005), Turkey (Tunc et al., 2012), French, Greek and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Croatia (Raspudić et al., 2009), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Iran (Bhatti et al., 2009)	No	Yes
Pp0020	***Chiraplothrips graminellus*** Priesner, 1939	*Hyparrhenia hirta* (zur Strassen, 1986) *Cymbopogon hirtus* (De Marzo & Ravazzi, 2005) *Cymbopogon* sp. (Marullo & De Grazia, 2013)		Greece (zur Strassen, 1986-05), S Italy and Sicily (Stoch, 2003; De Marzo & Ravazzi, 2005; Marullo & De Grazia, 2013); Israel (zur Strassen & Kuslitzky, 2012), Cyprus (Srour, 2015), Greek and Spanish Mainlands (Vierbergen, 2013), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Pp0021	***Dolicholepta karnyi*** (=***Leptothrips karnyi***) Trybom, 1911	Predatory (ThripsWiki, 2021)		Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014)	No	No
Pp0022	***Dolicholepta micrura*** (Bagnall, 1914)	*Ziziphus* sp. (ThripsWiki, 2021)		Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014)	No	No

Pp0023	***Dolicholepta proximus*** (Priesner, 1965)	*Acacia ehrenbergiana* (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	Egypt (zur Strassen, 2014)	No	No
Pp0024	***Dolichothrips variapes*** Bagnall, 1921	?		Egypt (zur Strassen, 2014)	No	?
Pp0025	***(Eparsothrips varicornis)*** **(**Bagnall, 1919)	Sugar bush flower *Protea* sp. (ThripsWiki, 2021i)		Intercepted in US from Africa (Nickle, 2003)	No	No
Pp0026	***Euryaplothrips crassus*** Ramakrishna & Margabandhu, 1931	?		Egypt (zur Strassen, 2014)	No	?
Pp0027	***Gigantothrips afer*** (Priesner, 1925)	?		Egypt (zur Strassen, 2014)	No	?
Pp0028	***Gynaikothrips ficorum*** (Marchal, 1908) (Cuban Laurel Thrips)	*Ficus elastica* (Mound et al., 1976) *Ficus microcarpa* (Mifsud et *al.,* 2012) *Ficus benjamina* (Marullo & De Grazia, 2013)	Leaves. Cause gall formation on hostplants (Mound et al., 1976)	UK, native to Southeast Asia but intercepted in Algeria and then in euro Mediterranean region. (Mound et al., 1976; Mound et al., 2018), South Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Malta (Mifsud et *al.,* 2012), Corsica (Reynaud 2010), Crete, Greek Mainland, Italian Mainland, Sardinia, Sicily, Spanish Mainland (Vierbergen, 2013), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020). Intercepted in US from Africa (Nickle, 2003).	Yes	N/A
Pp0029	***Gynaikothrips uzeli*** (Zimmermann, 1900) (Weeping Fig Thrips)	*Ficus benjamina* (Collins & Philippou, 2016)		Cyprus. First found in Germany greenhouse in 1999 (Collins & Philippou, 2016).	Yes	N/A
Pp0030	***Halothrips salicorniae*** Bournier, 1962	*Salicornia* sp. (zur Strassen, 1986)		Greece (zur Strassen, 1986-05), French, Greek and Spanish Mainland (Vierbergen, 2013).	No	Yes
Pp0031	***Haplothrips acanthoscelis*** (Karny, 1910)	*Frankenia hirsuta*, *Trigonella* cf. *rechingeri*, *Lactuca* sp. (zur Strassen, 1986) *Dianthus barbatus* (Trdan, 2001)		Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy (Stoch, 2003), French, Greek and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	Yes?	N/A
Pp0032	***Haplothrips aculeatus*** (Fabricius, 1803)	*Gramineae*, *Juncaceae* and *Cyperaceae* (Mound et al., 1976) *Cyperus badus* (zur Strassen, 1986) *Hordeum distichum* (Trdan, 2001) *Avena sativa, Zea mays Hordeum vulgare, Triticum aestivum* (Trdan et al., 2005) *Phragmites australis* (Kucharzyk, *et al.,* 2011) *Eucalyptus* sp.*, Cynodon dactylon, Phragmites* sp., *Echinocloa crus-galli, Juncus* sp., *Typha* sp., *Ligustrum* sp., *Vitis vinifera, Sinapis sp., Verbascum* sp., *Crataegus sp.* (Tunc et al., 2012) *Medicago* (Baderitakis et al., 2015)	Prey to *A. intermedius* (Trdan et al., 2005)	UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05; Baderitakis et al., 2015), Slovenia (Trdan, 2001; Trdan et al., 2005), Italy and Islands (Stoch, 2003), Croatia, Serbia & Montenegro (Trdan et al., 2005), Poland (*Kucharzyk & Salapa,* 2011), Turkey (Tunc et al., 2012; 2016), Serbia (Andjus et al., 2001), French Mainland, Greek Mainland, Italian Mainland, Sardinia, Sicily, Spanish Mainland (Vierbergen, 2013), Sweden, Norway, Finland, Denmark, Iceland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Iran (Minaei & Mound, 2008), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Croatia (Trdan et al., 2005; Raspudić et al., 2009), Iran (Bhatti et al., 2009),	Yes	N/A
Pp0033	***Haplothrips alexandrinus*** Priesner, 1931	?		French Mainland (Vierbergen, 2013), Egypt (zur Strassen, 2014). Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	?

Pp0034	***Haplothrips alpester*** Priesner, 1914	?		North Italy (Stoch, 2003), French and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland (Gertsson, 2015), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	?
Pp0035	***Haplothrips alpicola*** Priesner, 1950	?		Poland (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	?
Pp0036	***Haplothrips amygdali*** Priesner, 1950	?		Israel (zur Strassen & Kuslitzky, 2012)	No	?
Pp0037	***Haplothrips andresi*** (=***H. cyprioticus***) (=***H. phyllirae***) Priesner, 1931	*Olea europea, Spartum juncaeum* (zur Strassen, 1986) *Fraxinus ornus* Greece (Trdan, 2001) *Pyrus elaeagnifolia, Pinus* sp., *Quercus* sp., *Nerium oleander, Crataegus* sp., *Prunus persica,* shrub, *Vitis vinifera, Malus communis, Cydonia vulgaris, Olea europaea, Pistacia* sp., *Acacia cynophylla, Amygdalus communis.* (Tunc et al., 2012) *Erica, Pistacia, Rosmarinus, Arundo* spp. (Marullo & De Grazia, 2013)		Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), South Italy and Islands (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012; 2016), Cyprus (Srour, 2015), Greek and Spanish Mainlands (Vierbergen, 2013), France (Pizzol et al., 2014), Egypt (zur Strassen, 2014), Iran (Bhatti et al., 2009).	No	Yes
Pp0038	***Haplothrips angusticornis*** (=***Hapedothrips angusticornis)*** Priesner, 1921	*Achillea millefolium* (Trdan, 2001)		Slovenia (Trdan, 2001), French Mainland (Vierbergen, 2013), Slovenia Sweden, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Pp0039	***Haplothrips anthemidinus*** Priesner, 1950	*Asphodelus* sp., *Anthemis tomentosa* (zur Strassen, 1986) *Crataegus* sp. (Tunc et al., 2012)		Greece (zur Strassen, 1986-05), Turkey (Tunc et al., 2012), Israel (zur Strassen & Kuslitzky, 2012), Greek and Spanish Mainlands (Vierbergen, 2013), Aegean region, Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016), Egypt (zur Strassen, 2014).	No	Yes
Pp0040	***Haplothrips arenarius*** Priesner, 1920	*Helychrysium soechas barelieri* (zur Strassen, 1986)		Greece (zur Strassen, 1986-05), French Mainland Greek Mainland, Italian Mainland, Spanish Mainland (Vierbergen, 2013), Hungary (Jenser (2011).	No	Yes
Pp0041	***Haplothrips articulosus*** (=***Trybomiella*** -TW) (=***H. jordanicus***) (Bagnall, 1926)	?		Israel (zur Strassen & Kuslitzky, 2012), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	?
Pp0042	***Haplothrips atriplicis*** Priesner, 1936	*Atriplex halimus* (ThripsWIki, 2021)	In galls of *Asphondylia conglomerata* (ThripsWiki, 2021)	Israel (zur Strassen & Kuslitzky, 2012)	No	Yes
Pp0043	***Haplothrips biroi*** (=***Neoheegeria biroi***) (Priesner, 1928)	*Rosmarinus* sp. (Marullo & De Grazia, 2013)		South Italy (Stoch, 2003; Marullo & De Grazia, 2013), French Mainland (Vierbergen 2013), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser, 2011)	No	Yes

Pp0044	***Haplothrips bodenheimeri*** Priesner, 1928	*Achillea fragrantissima* (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	Egypt (zur Strassen, 2014)	No	Yes
Pp0045	***Haplothrips bluncki*** Priesner, 1951	?		Turkey (Tunc *et al*., 2016)	No	?
Pp0046	***Haplothrips bolacophilus*** Priesner, 1939	*Philodendron* sp. (zur Strassen & Kuslitzky, 2012)		Israel (zur Strassen & Kuslitzky, 2012), Cyprus (Srour, 2015), Greece, Crete, Near East (Vierbergen, 2013), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Pp0047	***Haplothrips cahirensis*** (Trybom, 1911)	?		Israel (zur Strassen & Kuslitzky, 2012), Egypt zur Strassen (2014).	No	?
Pp0048	***Haplothrips cerealis*** Priesner, 1939	?		Turkey (Tunc & Hastenpflug-Vesmanis, 2016)	No	?
Pp0049	***Haplothrips chrysanthemi*** Priesner, 1933	*Chrysanthemum coronarium* (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014)	No	Yes
Pp0050	***(Haplothrips clarisetis)*** (=***Trybomiella***) Priesner, 1930	*Gynandropsis pentaphylla*, *Beta cicla* and *Chenopodium* sp. Also taken on *Kochia muricata*, *Vitex agnus-castus* and Cruciferae sp. Found in the desert on *Anabanis setifera*, *Aerva tomentosa*, *Artemisia herba-alba* and *Juncus acutus* (ThripsWiki, 2021)		Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014 as *Trybormiella clarisetis*), Iran (Bhatti et al., 2009). Intercepted in US from Africa (Nickle, 2003).	No	No
Pp0051	***Haplothrips corticinus*** Priesner, 1964	?		Spanish Mainland (Vierbergen, 2013)	No	?
Pp0052	***Haplothrips cottei*** (Vuillet, 1913)	*Trifolium montanum* (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	North Italy (Stoch, 2003), Libya (Mohammed & Saurub, 2010), French and Spanish Mainlands (Vierbergen, 2013), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Egypt (zur Strassen, 2014).	No	Yes
Pp0053	***Haplothrips crassicornis*** (John, 1924)	Semi dry grassland (Trdan, 2001)		Slovenia (Trdan, 2001), French and Spanish Mainlands (Vierbergen, 2013), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
	Haplothrips cypriotes	?		Cyprus (Srour, 2015).	No	?
Pp0054	***Haplothrips dianthinus*** Priesner, 1924	?		South Italy (Stoch, 2003), Hungary (Jenser (2011), French Mainland (Vierbergen, 2013), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Turkey (Tunc & Hastenpflug-Vesmanis, 2016),	No	?

Pp0055	***Haplothrips distinguendus*** (Uzel, 1895)	*Cirsium*, *Cardus*, and *Scrophularia* (Mound et al., 1976) *Silybum marianum*, *Cardus nutans* (Jenser & Tsanakakis, 1985) *Knautia arvensis* (Trdan, 2001) *Carthamus* sp., *Crataegus* sp., *Pyrus elaeagnifolia*, *Styrax* sp., *Acacia cyanophylla*, herb, *Asphodelus* sp., *Citrus reticulata*, *Cercis siliquastrum*, *Crataegus* sp. (Tunc et al., 2012) *Centaurea*, *Erica* spp. (Marullo & De Grazia, 2013)	flowers (Mound *et al.*, 1976)	UK, widespread in Europe. (Mound et al., 1976; Mound et al., 2018), Northern Greece (Jenser & Tsanakakis, 1985-05), Slovenia (Trdan, 2001), Italy and Sicily (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Turkey (Tunc et al., 2012), Cyprus (Srour, 2015), French, Greek and Spanish Mainland (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Aegean region, Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Iran (Bhatti et al., 2009). Intercepted in US from Europe and the Mediterranean (Nickle, 2003)	No	Yes
Pp0056	***Haplothrips dudichi*** Priesner, 1961	?		Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	?
Pp0057	***Haplothrips eothripinus*** Priesner, 1936	?		Israel (zur Strassen & Kuslitzky, 2012)	No	?
Pp0058	***Haplothrips eragrostidis*** Priesner, 1931	?		Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014).	No	?
Pp0059	***Haplothrips eryngii*** Bagnall, 1934	?		French Mainland (Vierbergen, 2013), South Italy (Stoch, 2003).	No	?
Pp0060	***Haplothrips falsarius*** Priesner, 1966	?		Turkey (Tunc & Hastenpflug-Vesmanis, 2016)	No	?
Pp0061	***Haplothrips flavicintus*** (Karny, 1910)	grass (ThripsWiki, 2021) *Eucalyptus* sp., grass, *Cynodon dactylon*, *Citrus reticulata*, *Avena sativa* (Tunc et al., 2012)		North Italy (Stoch, 2003), (zur Strassen & Kuslitzky, 2012), Cyprus (Vierbergen, 2013; Srour, 2015), Egypt (zur Strassen, 2014), Bulgaria (Karadjova & Krumov, 2015), Aegean region, Turkey (Tunc et al., 2012; Tunc & Hastenpflug-Vesmanis, 2016), Hungary (Jenser (2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Pp0062	***Haplothrips flavitibia*** Williams, 1916	dead twigs (Mound et al., 1976) *Vitis vinifera* (Fallahzedah et al., 2011)		UK Germany, (Mound et al., 1976; Mound et al., 2018), Spanish Mainland (Vierbergen, 2013), Europe: Germany, Spanish mainland (Mound et al., 1976; Fallahzedah et al., 2012), Iran (Bhatti et al., 2009; Fallahzedah et al., 2011)	No	Yes
Pp0063	***Haplothrips floricae*** Knechtel, 1960	?		Spanish Mainland (Vierbergen, 2013), Slovakia (Zvaríková et al., 2020).	No	?
Pp0064	***Haplothrips frustrator*** zur Strassen, 1968	*Statice insignis* (ThripsWiki, 2021)		Spanish Mainland (Vierbergen, 2013)	No	No
Pp0065	***Haplothrips gallarum*** Priesner, 1950	?		Spanish Mainland (Vierbergen, 2013)	No	?
Pp0066	***Haplothrips ganglbaueri*** Schmutz, 1913	*Tagetes lucida* (Fallahzedah et al., 2011) South-East Asia on rice flowers and panicles (Tillekaratn et al., 2007, in Fallahzedah et al., 2012)		Iran (Fallahzedah et al., 2011), Israel (zur Strassen & Kuslitzky, 2012), Pakistan, India, Sri Lanka (Tillekaratn et al., 2007, in Fallahzedah et al., 2012), Egypt (zur Strassen, 2014)	No	Yes
Pp0067	***Haplothrips globiceps*** Bagnall, 1934	?		Turkey (Tunc & Hastenpflug-Vesmanis, 2016)	No	?

Pp0068	***Haplothrips gowdeyi*** (Franklin, 1908)	*Juncus* sp. (Jenser, 1982) Polyphagous. May be predatory (zur Strassen & Kuslitzky, 2012; Mound Hoddle, & Hastings, 2019;)		Tunisia (Jenser, 1982), Israel (zur Strassen & Kuslitzky, 2012), Originates from Africa but widespread in tropical and subtropical countries. (Mound et al., 2019), Cyprus (Srour, 2015), Pakistan, India, Sri Lanka, Greek and Spanish Mainlands (Vierbergen, 2013), Egypt (zur Strassen, 2014), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe, the Mediterranean and Africa (Nickle, 2003).	No	No
Pp0069	***Haplothrips graecus*** Karny, 1914	?		Greek Mainland (Vierbergen, 2013)	No	?
	Haplothrips graminellus	?		Cyprus (Srour, 2015).	No	?
Pp0071	***Haplothrips helianthemi*** Oettingen, 1942	*Helianthemum vulgare* (Trdan, 2001)		UK (Mound et al., 2018), North Italy, Austria (Ravazzi, 2001), Slovenia (Trdan, 2001), Hungary (Jenser (2011).	No	Yes
Pp0072	***Haplothrips heliotropii*** ***(= Trybomiella)*** Priesner, 1935	*Taraxacum officinale* (ThripsWiki, 2021)		Egypt (zur Strassen, 2014)	No	No
Pp0073	***Haplothrips hispanicus*** Priesner, 1924	*Limonium vulgare, Hypecium perforatum* (zur Strassen, 1986) *Lobularia, Eryngium* (Marullo & De Grazia, 2013)		Greece (zur Strassen, 1986-05), Italy (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Cyprus (Srour, 2015), French, Greek and Spanish Mainlands (Vierbergen, 2013), Egypt (zur Strassen, 2014), Bulgaria (Karadjova & Krumov, 2015), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	Yes	N/A
Pp0074	***Haplothrips hukkineni*** Priesner, 1939	*Phragmites, Typha, Oryza* and *Cyperus spp.* (Mound et al., 1976)		UK (Mound et al., 1976; Mound et al., 2018), (zur Strassen & Kuslitzky, 2012), Israel Hungary, Yugoslavia, Albania, Palestine, Italian Mainland (Vierbergen, 2013). Egypt (zur Strassen, 2014), Sweden, Norway (Gertsson, 2015), Hungary (Jenser (2011).	No	Yes
Pp0075	***Haplothrips inopinatus*** Bournier, 1992	?		French Mainland (Vierbergen, 2013)	No	?
Pp0076	***Haplothrips janetscheki*** Priesner, 1957	?		Spanish Mainland (Vierbergen, 2013)	No	?
Pp0077	***Haplothrips jasionis*** Priesner, 1950	*Jasione montana* (Mound et al., 1976)		UK, found in Austria (Mound et al., 1976; Mound et al., 2018), Denmark (Gertsson, 2015).	No	No
Pp0078	***Haplothrips juncorum*** Bagnall, 1913	*Juncus* and *Scirpus* (Mound et al., 1976) *Carex pendula, Juncus acutus, Salicornia* sp. (zur Strassen, 1986) *Symphytum officinale* (Trdan, 2001)	flowers (Mound *et al.* 1976)	UK (Mound et al., 1976; Mound et al., 2018), Greece, France, Germany (zur Strassen, 1986-05), South Italy and Sicily (Stoch, 2003), Slovenia (Trdan, 2001), Israel (zur Strassen & Kuslitzky, 2012), French, Greek and Spanish Mainlands (Vierbergen, 2013), Denmark (Gertsson, 2015), Romania (Sierka et al., 2008).	No	Yes
Pp0079	***Haplothrips knechteli*** Priesner, 1923	*Anthirrhinum majus* (zur Strassen, 1986) *Olea europaea, Amygdalus communis, Prunus domestica, Malus communis, Vitis vinifera,* (Tunc et al., 2012)		Greece (zur Strassen, 1986-05), South Italy (Stoch, 2003), Turkey (Tunc et al., 2012; 2016), Israel (zur Strassen & Kuslitzky, 2012), Greek and Spanish Mainlands (Vierbergen, 2013), Aegean region, Turkey (Tunc et al., 2012), Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
Pp0080	***Haplothrips kurdjumovi*** Karny, 1913	Plants generally (Trdan, 2001) Predator of mites and moth eggs (Marullo & De Grazia, 2013)		Slovenia (Trdan, 2001), North Italy and Sardegna (Stoch, 2003; Marullo & De Grazia,2013), French and Spanish Mainlands (Vierbergen, 2013) Norway, Finland, (Gertsson, 2015), Hungary (Jenser (2011). Slovakia, Romania (Sierka et al., 2008), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes

Pp0081	***Haplothrips leucanthemi*** (Schrank, 1781)	*Chrysanthemum leucanthemum* (Mound *et al.* 1976) *Leucanthemum vulgaris* (Kirk, 1996) *Chrysanthemum leucanthemum* (Trdan, 2001) *Chrysanthemum sp.* (Marullo & De Grazia, 2013)	flowers (Mound *et al.,* 1976)	UK, Widespread in Europe (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Slovenia (Trdan, 2001), North Italy (Stoch, 2003; Marullo & De Grazia, 2013), Close to greenhouses in Netherlands (Vierbergen, 2001), French and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Croatia (Raspudić et al., 2009), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Iran (Bhatti et al., 2009).	No	Yes
	= Haplothrips niger (Osborn, 1883)	*Trifolium uniflorum, Psoralea bituminosa* (zur Strassen, 1986) *Trifolium repens* (Trdan, 2001)		Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Serbia (Andjus et al., 2001), Italy (Stoch, 2003), French, Greek and Spanish Mainlands (Vierbergen, 2013), Hungary (Jenser (2011), Croatia (Raspudić et al., 2009), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020).	No	Yes
Pp0082	***Haplothrips limoniastri*** Priesner, 1931	?		North Italy (Stoch, 2003; Vierbergen, 2013), Egypt (zur Strassen, 2014).	No	?
Pp0083	***Haplothrips longipes*** Bagnall, 1926	?		Spanish Mainland (Vierbergen, 2013)	No	?
Pp0084	***Haplothrips maltbaeki*** Bagnall, 1933	*Cistus* sp. (ThripsWiki, 2021)		French and Spanish Mainlands (Vierbergen, 2013)	No	No
Pp0085	***Haplothrips marrubiicola*** Bagnall, 1932	*Marrubium vulgare* (Mound et al., 1976)	flowers (Mound *et al.,* 1976)	UK (Mound et al., 1976; Mound et al., 2018), Spain and Jugoslavia, Spanish Mainland (Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015).	No	No
Pp0086	***Haplothrips mateolanus*** (=***Trybomiella*** -TW) DeMarzo & Ravazzi, 2002	*Atriplex* sp. (Marullo & De Grazia, 2013)		Italy (Marullo & De Grazia, 2013)	No	Yes
Pp0087	***Haplothrips minisetosus*** Klimt, 1969	?		Slovakia (Zvaríková et al., 2020)	No	?
Pp0088	***Haplothrips minutus*** (Uzel, 1895)	on dead twigs (Mound et al., 1976) *Citrus* sp. (Belaam-Kort et al., 2020)		UK, Western and central Europe. (Mound et al., 1976), Sweden, Norway, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Croatia (Raspudić et al., 2009), Tunisia (Belaam-Kort et al., 2020), Iran (Bhatti et al., 2009).	No	Yes
Pp0089	***(Haplothrips nigricornis)*** ***(= Trybomiella)*** (Bagnall, 1910)	*Diplopappus sp., Europs sp., Olipterus sp.* and *Sebaea sp.* (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	Intercepted in US from Africa (Nickle, 2003)	No	No
Pp0090	***Haplothrips nigricans*** Bagnall, 1934	?		French and Spanish Mainlands (Vierbergen, 2013), Romania (Sierka et al., 2008).	No	?
Pp0091	***Haplothrips ochradeni*** Priesner, 1931	*Ochradenus baccatus*. Also collected from galls of a *Ceutorrhynchus* sp. (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014).	No	No
Pp0092	***Haplothrips odontospermi*** Priesner, 1931	?		Egypt (zur Strassen, 2014)	No	?
Pp0093	***Haplothrips palaestinensis*** Priesner, 1936	*Chrysanthemum, Senecio, Matricaria, Thrincia tuberosa, Aster* and Cruciferae (ThripsWiki, 2021)		Israel (zur Strassen & Kuslitzky, 2012), Cyprus (Srour, 2015; Vierbergen, 2013), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes

Pp0094	***Haplothrips pharaoh*** Priesner, 1930	*Graminae* sp. (ThripsWIki, 2021)		Egypt(zur Strassen, 2014)	No	No
Pp0095	***Haplothrips pannonicus*** Fabian, 1938	*Mixed vegetation* (Trdan, 2001)		Slovenia (Trdan, 2001), Spanish Mainland (Vierbergen, 2013), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Pp0096	***Haplothrips phyllophilus*** Priesner, 1914	?		Spanish Mainland (Vierbergen, 2013), Norway (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015). Poland, Slovakia, Romania (Sierka et al., 2008). Slovakia (Zvaríková et al., 2020).	No	?
Pp0097	***Haplothrips pineticola*** Bagnall, 1926	*Pinus* sp. (ThripsWIki, 2021)		French Mainland and Spanish Mainlands (Vierbergen, 2013)	No	Yes
Pp0098	***Haplothrips plantaginis*** Priesner, 1957	*Plantago coronopus* (zur Strassen, 1986)		Greece (zur Strassen, 1986-05; Vierbergen, 2013), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Pp0099	***Haplothrips propinquus*** Bagnall, 1933	*Achillea millefolium* (Mound et al., 1976)		UK, France and Norway. (Mound et al., 1976; Vierbergen, 2013; Mound et al., 2018) Sweden, Finland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Poland (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	No
Pp0100	***Haplothrips priesnerorum*** Pelikan, 1965	?		Turkey (Tunc & Hastenpflug-Vesmanis, 2016)	No	?
Pp0101	***Haplothrips quercinus*** Priesner, 1950	*Saturea thimbra, Avena sativa* (zur Strassen, 1986)		Greece (zur Strassen, 1986-05), Cyprus (Srour, 2015), Greek Mainland (Vierbergen, 2013)	No	Yes
Pp0102	***Haplothrips rabinovitchi*** Priesner, 1936	?		Israel (zur Strassen & Kuslitzky, 2012), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	?
Pp0103	***Haplothrips reuteri*** (Karny, 1907)	*Anthemis maritima, Anthemis cotula* (Jenser & Tsanakakis, 1985) *Limonium vulgare, ?Centaurea* sp., *Campanula rechingeri, Anthyllis hermannae, Juniperus phoenicea, Echium plantagineum, Micromeria nervosa, Origanum onites, Poypogon monspeliensis, Cardus nutans, Centaurea raphanina mixta, ?Corydothymus* sp. (zur Strassen, 1986), *Centaurea jacea* (Trdan, 2001) *Medicago* sp., *Triticum aestivum*, herb, *Coronilla varia, Anchusa* sp. 2♀♀, *Elaeagnus* sp., *Carthamus* sp., *Rosa canina, Iris* sp., herb, *Asteraceae, Vitis vinifera, Crataegus* sp., *Avena sativa, Amygdalus communis, Hordeum vulgare, Pyrus elaeagnifolia, Althaea* sp., *Carthamus* sp., *Morus alba, Nerium oleander, Centaurea solstitialis, Malva* sp., *Anthemis* sp., *Olea europaea, Tripleurospermum* sp., *Cynodon dactylon, Quercus* sp., *Salvia* sp., shrub, *Daphne sp., Styrax* sp., *Prunus avium*, herb, *Asteraceae, Boreava orientalis, Papaver somniferum*, herb, *Euphorbia* sp., *Amygdalus communis, Malus communis* (Tunc *et al.* , 2012)		Greece (Jenser & Tsanakakis, 1985-05; zur Strassen, 1986-05), Slovenia (Trdan, 2001), Turkey (Tunc et al., 2012; 2016), Israel (zur Strassen & Kuslitzky, 2012), Serbia (Andjus et al., 2001), Iran (Bhatti et al., 2009), Crete, French Mainland, Greek Mainland, Spanish Mainland (Vierbergen, 2013), Egypt (zur Strassen, 2014), Bulgaria (Karadjova & Krumov, 2015), Romania (Sierka et al., 2008). Intercepted in US from Europe (Nickle, 2003)	No	Yes
Pp0104	***Haplothrips rivnayi*** Priesner, 1936	*Chrysanthemum* sp. (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	Israel (zur Strassen & Kuslitzky, 2012), Spanish Mainland (Vierbergen, 2013)	No	Yes
Pp0105	***Haplothrips salloumensis*** Priesner, 1935	?		Spanish Mainland (Vierbergen, 2013), Egypt (zur Strassen, 2014)	No	?

Pp0106	***Haplothrips senecionis*** Bagnall, 1932	*Senecio jacobaea* and *S. aquaticus* larva found (Kirk, 1996)	flowers (Mound et al., 1976)	UK (Mound et al., 1976; Kirk, 1996; Mound et al., 2018), Close to greenhouses in Netherlands (Vierbergen, 2001), French Mainland (Vierbergen, 2013), Sweden, Norway (Gertsson, 2015).	No	Yes
Pp0107	***Haplothrips setiger*** Priesner, 1921	*Senecio*, *Crepis*, *Matricaria*. and *Achillea spp.* (Mound et al., 1976) *Ammophila littoralis*, Caryophylliaceae, *Asteriscus aquaticus* (zur Strassen, 1986) *Knautia arvensis* (Trdan, 2001) *avocado* (zur Strassen & Kuslitzky, 2012)		UK, recorded in Europe. (Mound et al., 1976; Mound et al., 2018), Greece (zur Strassen, 1986-05), Slovenia (Trdan, 2001), Italy and Islands (Stoch, 2003), Israel (zur Strassen & Kuslitzky, 2012), Serbia (Andjus et al., 2001), French, Greek and Spanish Mainland (Vierbergen, 2013), Norway, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe (Nickle, 2003).	Yes	N/A
Pp0108	***Haplothrips setigeriformis*** Fabian, 1938	*Echium plantagineum, Cyperius badus* (zur Strassen, 1986) *Trifolium repens* (Trdan, 2001)		Slovenia (Trdan, 2001), Greek and Spanish Mainland (zur Strassen, 1986-05; Vierbergen, 2013) Norway, Finland (Gertsson, 2015). Hungary (Jenser (2011).	No	Yes
Pp0109	***Haplothrips simplex*** (Buffa, 1909)	*Calendula arvensis* (De Marzo & Ravazzi, 2005) *Calendula* sp. (Marullo & De Grazia, 2013)		South Italy and Sicily (Stoch, 2003; De Marzo & Ravazzi, 2005; Marullo & De Grazia, 2013; Vierbergen, 2013), Tunisia (De Marzo & Ravazzi, 2005).	No	Yes
Pp0110	***Haplothrips siwanus*** Priesner, 1950	*Nicotiana* sp., *Citrus* sp., *Ricinus communis* (zur Strassen & Kuslitzky, 2012)		Turkey, (Tunc & Hastenpflug-Vesmanis, 2016), Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014).	No	Yes
Pp0111	***Haplothrips statices morisoni*** Priesner, 1928 ***Haplothrips statices statices*** (Haliday, 1836)	*Armeria* sp. (Mound et al., 1976)	flowers (Mound *et al.*, 1976)	UK, coastal regions of northern and western Europe (Mound et al., 1976), French and, Italian Mainlands (Vierbergen, 2013), Sweden, Norway, Finland Denmark (Gertsson, 2015), Hungary (Jenser (2011), Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020),	No	?
Pp0112	***Haplothrips subtilissimus*** (Haliday, 1852)	*Quercus* - probably predatory on small arthropods (Mound et al., 1976) *Cardaria draba* (Trdan, 2001) *Batanites aegyptiaca* (zur Strassen & Kuslitzky, 2012) *Alnus, Salix, Ulmus (facultative predator)* (Marullo & De Grazia, 2013)	branches (Mound *et al.* 1976)	UK, widespread in Europe. (Mound et al., 1976; Mound et al., 2018), Slovenia (Trdan, 2001), Italy (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Spanish Mainland (Vierbergen, 2013), France (Pizzol *et al.*, 2014), Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008). Slovakia (Sierka et al., 2008, Zvaríková et al., 2020), Iran (Bhatti et al., 2009). Intercepted in US from Europe (Nickle, 2003).	No	Yes
Pp0113	***Haplothrips talpa*** (=***Trybomiella*** -TW) Priesner, 1931	Grasses (ThripsWiki, 2021)		Egypt (zur Strassen, 2014)	No	Yes
Pp0114	***Haplothrips tamaricinus*** Priesner, 1939	Tamarix sp. (ThripsWiki)	flowers (ThripsWiki, 2021)	Egypt (zur Strassen, 2014)	No	Yes
Pp0115	***Haplothrips tardus*** Priesner, 1927	?		Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014)	No	?
Pp0116	***Haplothrips teucrii*** (=***Trybomiella*** -TW) (Bournier, 1962)	?		French and Spanish Mainlands (Vierbergen, 2013)	No	?

Pp0117	***Haplothrips titschackianus*** zur Strassen, 1966	*Suaeda fructicosa* (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	Spanish Mainland (Vierbergen, 2013)	No	Yes
Pp0118	***Haplothrips tritici*** (Kurdjumov, 1912) (=***Haplothrips cerealis***) Priesner, 1939 ***triciti (sic)***	*Secale cereale, Avena sativa* (Jenser & Tsanakakis, 1985) *Avena sativa* (zur Strassen, 1986) *Triticum vulgare* (Trdan, 2001) *Triticum aestivum* (Trdan et al., 2005) *Triticum aestivum*, herb, *Avena sativa*, *Bromus* sp., *Crataegus* sp., grass, *Hordeum vulgare*, *Quercus* sp., *Avena* sp., *Euphorbia* sp., cereal, herb, *Hordeum sativum* (Tunc et al., 2012) *Citrus* sp. (Belaam-Kort et al., 2020).	Prey to *A. intermedius* (Trdan *et al.*, 2005)	Northern Greece (Jenser & Tsanakakis, 1985), Greece (zur Strassen, 1986-05), Italy and Sicily (Stoch, 2003), Slovenia (Trdan, 2001, Trdan et al., 2005), Serbia & Montenegro (Trdan et al., 2005), Turkey (Tunc et al., 2012;2016), Israel (zur Strassen & Kuslitzky, 2012), Serbia (Andjus et al., 2001). French and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Tunisia (Belaam-Kort et al., 2020), Hungary (Jenser (2011), Slovakia, Romania (Sierka et al., 2008). Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Egypt (zur Strassen, 2014 as *H. cerealis*), Iran (Bhatti et al., 2009; Minaei & Mound, 2008), Iraq (Minaei & Mound, 2008). Intercepted in US from the Mediterranean(Nickle, 2003).	Yes	N/A
Pp0119	***Haplothrips utae*** Klimt, 1969	?		Hungary (Jenser, 2011	No	No
Pp0120	***Haplothrips verbasci*** (Osborn, 1897)	?		Cyprus (Srour, 2015), Slovakia (Zvaríková et al., 2020), Turkey (Tunc & Hastenpflug-Vesmanis, 2016).	No	?
Pp0121	***Haplothrips vuilletti*** Priesner, 1920	*Anthyllis hermannae* (zur Strassen, 1986)		Greece (zur Strassen, 1986-05), Italy and Sicily (Stoch, 2003), French and Spanish Mainlands (Vierbergen, 2013), Denmark (Gertsson, 2015), Hungary (Jenser (2011), Slovakia, (Sierka et al., 2008; Zvaríková et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Pp0122	***Hindsiothrips bonessi*** (Titschack, 1955)	Mycophagous on fungal hyphae (Marullo & De Grazia, 2013)		North Italy (Stoch, 2003; Marullo & De Grazia, 2013), French and Spanish Mainlands (Vierbergen, 2013), Denmark (Gertsson, 2015), Hungary (Jenser (2011).	No	No
Pp0123	***Hindsiothrips navarrensis*** Goldarazena & Mound, 1998	On leaf litter. Pesumably mycophagous (ThripsWiki, 2021)		Spanish Mainland (Vierbergen, 2013)	No	No
Pp0124	***Holothrips schaubergeri*** (Priesner, 1920)	Hollow twigs (ThripsWiki, 2021)		UK (Mound et al., 2018), French Mainland (Vierbergen, 2013), Austria and Oregon, USA (ThripsWiki, 2021), Sweden, Norway (Gertsson, 2015)	No	No
Pp0125	***Hoplandrothrips bidens*** (Bagnall, 1910)	On dead branches (Mound et al., 1976)		UK, Widespread in Europe. (Mound et al., 1976; Mound et al., 2018), Israel (zur Strassen & Kuslitzky, 2012), Crete, French, Greek, and Spanish Mainland (Vierbergen, 2013), Norway, Finland (Gertsson, 2015), Hungary (Jenser (2011), Poland, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Pp0126	***Hoplandrothrips ellisi*** Bagnall, 1914	Mycophagous on fungal hyphae (Marullo & De Grazia, 2013)		UK (Mound et al., 2018), South Italy (Stoch, 2003; Marullo & De Grazia, 2013), French Mainland (Vierbergen, 2013). Intercepted in US from Europe (Nickle, 2003).	No	Yes
Pp0127	***Hoplandrothrips famelicus*** (Priesner, 1926)	*Phragmites australis, plant matter in coot's nest* (Kucharzyk & Salapa, 2011)	Galls in association with diptera (*Lipara* sp.) (Kucharzyk *et al.*, 2011)	Poland (Kucharzyk & Salapa, 2011), Hungary (Jenser, (2011). Slovakia (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020),	No	Yes
Pp0128	***(Hoplandrothrips flavipes)*** Bagnall, 1923	Mycophagous on leaf litter (ThripsWiki, 2021)		Intercepted in US from Africa (Nickle, 2003).	No	Yes
Pp0129	***Hoplandrothrips hungaricus*** Priesner, 1961	?		French, Greek and Spanish Mainlands (Vierbergen, 2013), Hungary (Jenser (2011), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	No

Pp0130	***Hoplandrothrips priesneri*** John, 1927	?		French Mainland (Vierbergen, 2013)	No	No
Pp0131	***Hoplandrothrips williamsianus*** (Priesner, 1923)	*grasses* (Kucharzyk, *et al.* 2004; 2011)		Poland (Kucharzyk, *et al.* 2004; 2011), Sweden, Norway (Gertsson, 2015), Slovakia (Sierka et al., 2008). Slovakia (Zvaríková et al., 2020).	No	No
Pp0132	***Hoplothrips absimilis*** Knechtel, 1954	?		Slovakia (Sierka et al., 2008)	No	?
Pp0133	***Hoplothrips caespitis*** (Uzel, 1895)	Mycophagous on fungal hyphae (Marullo & De Grazia, 2013)		South Italy (Stoch, 2003; Marullo & De Grazia, 2013), French Mainland (Vierbergen, 2013), Hungary (Jenser (2011).	No	Yes
Pp0134	***Hoplothrips carpathicus*** Pelikan, 1961	Fungi (zur Strassen, 1994)		Germany/ Montenegro (zur Strassen, 1994), Sweden, Norway, Finland (Gertsson, 2015), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	No
Pp0135	***Hoplothrips corticis*** (De Geer, 1773)	On dead wood of angiosperms feeding on fungi. (Mound et al., 1976) Dead branches, *Quercus* sp. (Trdan, 2001) Mycophagous on fungal hyphae (Marullo & De Grazia, 2013)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018)), Italy (Stoch, 2003, Marullo & De Grazia, 2013), Slovenia (Trdan, 2001), French Mainland, Italian Mainland (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Hungary (Jenser (2011), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020).	No	Yes
Pp0136	***Hoplothrips eremicola*** Jenser, 1991:	?		Hungary (Jenser, 2011)	No	?
Pp0137	***Hoplothrips fungi*** (Zetterstedt, 1828)	On dead wood of angiosperms feeding on fungi (Mound et al., 1976) Mycophagous on fungal hyphae (Marullo & De Grazia, 2013)		UK, widespread and common throughout Holarctic (though probably under other names) (Mound et al., 1976; Mound et al., 2018), South Italy (Stoch, 2003; Marullo & De Grazia, 2013), French Mainland (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011).	No	Yes
Pp0138	***Hoplothrips germanae*** Bournier, 1961	Mycophagous on fungal hyphae (Maullo & De Grazia, 2013)		South Italy (Stoch, 2003; Maullo & De Grazia, 2013), French Mainland (Vierbergen, 2013).	No	Yes
Pp0139	***Hoplothrips grassei*** Bournier, 1967	?		French Mainland (Vierbergen, 2013)	No	?
Pp0140	***Hoplothripos grisescens*** (Priesner, 1924)	?		Hungary (Jenser, 2011)	No	?
Pp0141	***Hoplothrips longisetis*** (Bagnall, 1911) (=***Maderothrips longisetis***) (Bagnall, 1910)	On dead branches, probably predaceous (Mound et al., 1976)		UK, widespread but infrequent in Europe (Mound et al., 1976; Mound et al., 2018), French and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland (Gertsson, 2015), Hungary (Jenser (2011), Romania (Sierka et al., 2008).	No	Yes
Pp0142	***Hoplothrips lichenis*** Knechtel, 1954	?		Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	?
Pp0143	***Hoplothrips monspeliensis*** Bournier, 1961	?		French Mainland (Vierbergen, 2013)	No	?
Pp0144	***Hoplothrips pedicularius*** (Haliday, 1836)	On dead wood of angiosperms feeding on *Stereum* sp. (Mound et al., 1976) Mycophagous on fungal hyphae (Maullo & De Grazia, 2013)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), South Italy (Stoch, 2003; Maullo & De Grazia 2013), Greece (zur Strassen, 1986-05), French, Greek and Spanish Mainland (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
Pp0145	***Hoplothrips polysticti*** (Morison, 1949)	On dead *Pinus* branches feeding on fungus *Polysticus abietinus*		UK, known only from Scotland (Mound et al., 1976; Mound et al., 2018), Sweden, Finland (Gertsson, 2015) Slovakia (Zvaríková et al., 2020).	No	No

Pp0146	***Hoplothrips quercinus*** Knetchel, 1935	?		Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	?
Pp0147	***Hoplothrips semiaceous*** (Uzel, 1895) (=***Hoplothrips feldsi***) J. C. Crawford, 1939	On dead wood of angiosperms (Mound et al., 1976) Fungi (zur Strassen, 1994) *Ostrya carpinifolia* (Trdan, 2001)		UK, Widespread in Europe (Mound et al., 1976; Mound et al., 2018), Germany (zur Strassen, 1994), Slovenia (Trdan, 2001), French and Spanish Mainland (Vierbergen, 2013), Sweden, Norway, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Hungary (Jenser (2011), Poland, (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
Pp0148	***Hoplothrips ulmi*** (Fabricius, 1781)	On dead wood of angiosperms feeding on fungi (? *Peniophora*) (Mound et al., 1976)		UK, widespread and common in Britain (Mound et al., 1976; Mound et al., 2018), French and Spanish Mainlands (Vierbergen, 2013) Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015) Belgium (Lock, 2006), Hungary (Jenser (2011). Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020).	No	Yes
Pp0149	***Hoplothrips uncolor*** (Vuillet, 1914)	On dead *Pinus* branches feeding on fungus *Polysticus abietinus* (Mound et al., 1976) on fungus on dead *Pistacea abies* (Zvaríková et al., 2020),		UK Probably introduced otherwise from Algeria (Mound et al., 1976; Mound et al., 2018), Sweden, Finland (zur Strassen, 1994; Gertsson, 2015), Slovakia (Zvaríková et al., 2020).	No	Yes
Pp0150	***Idiothrips maghrebinus*** zur Strassen, 1968	*Phyllirea angustifolia* (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	Spanish Mainland (Vierbergen, 2013)	No	No
Pp0151	***Karnyothrips americanus*** (Hood, 1912)	Under maple bark (Thripswiki)		Spanish Mainland (Vierbergen, 2013)	No	No
Pp0152	***Karnyothrips flavipes*** (Jones, 1912)	On dead Coccoidea on mulberry three (Mifsud (unpublished) Predatory on scale insects (Marullo & De Grazia 2013).		Malta (Mifsud unpublished), South Italy (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Cyprus (Srour, 2015), Sardinia, Spanish Mainland (Vierbergen, 2013), Egypt (zur Strassen, 2014), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016). Intercepted in US from Europe? (Nickle, 2003).	Yes	N/A
Pp0153	***Karnyothrips melaleucus*** (Bagnall, 1911)	Predator on grass, bamboo and dead leaves (ThripsWiki, 2021)		UK (Mound et al., 2018), Egypt (zur Strassen, 2014), Norway, Denmark (Gertsson, 2015). Intercepted in US from Europe and the Mediterranean (Nickle, 2003).	No	Yes
Pp0154	***Liophloeothrips pulchrisetis*** Bournier, 1969	?		French Mainland (Vierbergen, 2013)	No	?
Pp0155	***Liophloeothrips hungaricus*** (Priesner, 1924):	?		Hungary (Jenser, 2011), Slovakia (Zvaríková et al., 2020).	No	?
Pp0156	***Liothrips amabilis*** Bagnall, 1927	*Phyllirea angustifolia, Erica arborea, Arbutus unedo* (Ravazzi, 2001)		Sardinia (Ravazzi, 2001), Mediterranean area, French and Spanish Mainland, Morocco (Vierbergen, 2013).	No	No
Pp0157	***Liothrips austricaus*** (Karny, 1909)	*Fraxinus ornus* (Trdan, 2001) *Pistacia* sp. (Tunc et al., 2012)		Slovenia (Trdan, 2001), Sicily (Stoch, 2003), Cyprus (Srour, 2015), Spanish Mainland (Vierbergen, 2013), Turkey (Tunc et al., 2012: 2016), Sweden (Gertsson, 2015), Aegean region, Turkey (Tunc et al., 2012), Hungary (Jenser (2011), Slovakia, Romania (Sierka et al., 2008).	No	No
	Liothrips brevicollis	?		Cyprus (Srour, 2015),	No	?
Pp0158	***Liothrips leucopus*** Titschack, 1958	?		French and Spanish Mainlands (Vierbergen,2013)	No	?
Pp0159	***Liothrips oleae*** (Costa, 1857)	*Olea europea* (Haber & Mifsud, 2007), *Olea* sp. (Marullo & De Grazia, 2013), *Citrus* sp. (Belaam-Kort et al., 2020).	Produces galls on leaves (Haber & Mifsud, 2007)	Italy (Stoch, 2003), Malta (Haber & Mifsud, 2007), Israel (zur Strassen & Kuslitzky, 2012), Italy (Marullo & De Grazia, 2013), French, Italian and Spanish Mainlands (Vierbergen, 2013), Tunisia (Belaam-Kort et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	Yes?	N/A

Pp0160	***Liothrips pragensis*** Uzel, 1895	*Quercus pubescens* (Trdan, 2001) *Quercus* (zur Strassen & Kuslitzky, 2012)		Slovenia (Trdan, 2001), Italy (Stoch, 2003; Marullo & De Grazia, 2013), Israel (zur Strassen & Kuslitzky, 2012), Cyprus (Srour, 2015), southern Europe, Near East. French Mainland (Vierbergen, 2013), Bulgaria (Karadjova & Krumov, 2015), Romania (Sierka et al., 2008). Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	Yes
Pp0161	***Liothrips reuteri*** (=***Ataliothrips reuteri***) (Bagnall, 1913) (Tamarisk thrips)	*Tamarix africana* (De Marzo & Ravazzi, 2005) *Tamarix* sp. (Marullo & De Grazia, 2013) *Juncus* sp., littoral palm grove, ruderal vegetation, Leaves and twigs of *Tamarix* (Bulletin de la Société Fouad Premier d'entomologie, Volume 22)		Israel (zur Strassen & Kuslitzky, 2012), South Italy (De Marzo & Ravazzi, 2005; Marullo & De Grazia, 2013), Tunisia (Jenser, 1982), Mediterranean basin including North Africa, India and Yemen (De Marzo & Ravazzi, 2005), Egypt (zur Strassen, 2014).	Yes	N/A
Pp0162	***Liothrips setinodes*** (O. M. Reuter, 1880)	*Fraxinus* and *Ulmus* (Mound et al., 1976) *Fagus selvaticus* (De Marzo & Ravazzi, 2005)	leaves (Mound *et al.,* 1976)	UK, widespread and common in Britain? found throughout Europe (Mound et al., 1976; Mound et al., 2018), N Italy (De Marzo & Ravazzi, 2005), French and Spanish Mainland (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Slovakia, Romania (Sierka et al., 2008), Turkey (Tunc & Hastenpflug-Vesmanis, 2016), Slovakia (Zvaríková et al., 2020).	No	No
Pp0163	***Liothrips vaneeckei*** Priesner, 1920	Pest on lily bulbs in greenhouses (Mound et al., 1976)		UK Introduced in Europe. May live out of doors (Mound et al., 1976; Mound et al., 2018), South Italy (Stoch, 2003), Israel (zur Strassen & Kuslitzky, 2012), French and Italian Mainlands (Vierbergen, 2013), Norway, Finland, Denmark (Gertsson, 2015), Croatia (Raspudić et al., 2009).	No	No
Pp0164	***Liothrips willcocksi*** (=***Epiliothrips***) (Bagnall, 1921)	?		Egypt (zur Strassen, 2014)	No	?
Pp0165	***Lispothrips crassipes*** (Jablonowski, 1894)	*Rosa glauca* (Trdan, 2001)		Slovenia (Trdan, 2001), North Italy (Stoch, 2003, Marullo & De Grazia, 2013), French and Italian Mainland (Vierbergen, 2013), Finland (Gertsson, 2015), Hungary (Jenser (2011).	No	Yes
Pp0166	***Maderothrips longisetis*** (Bagnall,1910)	?		Slovakia (Zvaríková et al., 2020)	No	?
Pp0167	***Megeugynothrips efflatouni*** Priesner, 1930	*Balanites aegyptica* (ThripsWiki, 2021)	Galls (ThripsWiki, 2021)	Egypt (zur Strassen, 2014)	No	No
Pp0168	***Neoheegeria dalmatica*** Schmutz, 1909	*Phlomis (*Priesner,1960)		Uk (Mound et al., 2018), Italy and Sicily (Stoch, 2003), Israel (zur Strassen & Kuslitzky, 2012), Crete, French Greek and Spanish Mainland (Vierbergen, 2013), Egypt (zur Strassen, 2014), Hungary (Jenser (2011), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	Yes	N/A
Pp0169	***Neoheegeria gigantheus*** (=***ea*** TW) (Priesner, 1934)	*Cistanche lutea* (ThripsWiki, 2021)	flowers (ThripsWiki, 2021)	Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014 as *gigantea*)	No	?
Pp0170	***Neoheegeria sinaitica*** Priesner, 1934	Verbascum sp. (ThripsWiki, 2021)		Egypt (zur Strassen, 2014)	No	Yes
Pp0171	***Neoheegeeria verbasci*** (=***Haplothrips verbasci***??) (Osborn, 1896)	*Verbascum* sp. (Jenser & Tsanakakis, 1985; Tunc et al., 2012)		Northern Greece (Jenser & Tsanakakis, 1985-05), Greece (zur Strassen, 1986-05), Sicily (Stoch, 2003), Turkey (Tunc et al., 2012), French and Spanish Mainlands (Vierbergen, 2013), Hungary (Jenser (2011), Romania (Sierka et al., 2008), Croatia (Raspudić et al., 2009).	No	Yes
Pp0172	***Notothrips albovittatus*** (Schille, 1911)	?		Slovakia (Zvarikova Masarovič, Prokop, & Fedor,,2020)	No	?

Pp0173	***Pezidothrips robiniae*** (Priesner, 1924)	?		Hungary (Jenser, 2011), Romania (Sierka et al., 2008).	No	?
Pp0174	***Phlaeothrips albovittatus*** (Schille, 1911)	?		Poland (Sierka et al., 2008)	No	?
Pp0175	***Phlaeothrips annullipes*** Reuter, 1880	On dead branches particularly *Betula* (Mound et al., 1976)		UK, uncommon in northern Europe (Mound et al., 1976; Mound et al., 2018), Poland (Kucharczyk & Zawirska, 2001) Sweden, Norway, Finland, Denmark (Gertsson, 2015) Belgium (Lock, 2006). Hungary (Jenser (2011). Slovakia (Sierka et al., 2008). Slovakia (Zvaríková et al., 2020),	No	No
Pp0176	***Phlaeothrips bidens (bagnall 1910)***	?		Belgium (Lock, 2006)	No	?
Pp0177	***Phlaeothrips bispinoides*** Bagnall, 1926	*Fagus selvatica* (Trdan, 2001)		Slovenia (Trdan, 2001), Switzerland (zur Strassen, 1994), Hungary (Jenser (2011, Slovakia (Zvaríková et al., 2020).	No	No
Pp0178	***Phlaeothrips bispinosus*** Priesner, 1919	Dead Branches of *Fagus*. (Ravazzi, 2001)		N Italy (Ravazzi, 2001), Greek, and Spanish Mainlands, Switzerland, Germany, Czechoslovakia. (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Hungary (Jenser (2011), Romania (Sierka et al., 2008), Slovakia (Zvaríková et al., 2020),	No	No
Pp0179	***Phlaeothrips coriaceous*** (=***Plaeothrips coriaceous***) Haliday, 1836	On dead branches (Mound et al., 1976) *Tilia cordata* (Trdan, 2001)		UK, widespread in Europe (Mound et al., 1976; Mound et al., 2018), All Italy (Stoch, 2003), Slovenia (Trdan, 2001), French and Spanish Mainlands (Vierbergen, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Slovakia, Romania (Sierka et al. 2008). Croatia (Raspudić et al., 2009).	No	No
Pp0180	***Phlaeothrips denticauda*** Priesner,1914	?		Hungary (Jenser 2011)	No	?
Pp0181	***Phlaeothrips pillichianus*** Priesner, 1924	Mycophagous on fungal spores (Marullo & De Grazia, 2013)		South Italy (Stoch, 2003; Marullo & De Grazia, 2013; Vierbergen, 2013) Hungary (Jenser (2011). Romania (Sierka et al., 2008).	No	Yes
Pp0182	***Plicothrips cameroni*** (Priesner, 1934)	Grass (ThripsWiki, 2021)		Egypt (zur Strassen, 2014)	No	Yes
Pp0183	***Podothrips graminum*** Priesner, 1938	*Arundo pliniana* (De Marzo & Ravazzi, 2005) *Phragmites, Arundo* (Marullo & De Grazia, 2013)		South Italy and Sicily (De Marzo & Ravazzi, 2005; Marullo & De Grazia, 2013; Vierbergen, 2013), Egypt (also zur Strassen, 2014).	No	Yes
Pp0184	***Podothrips semiflavus*** Hood, 1913	*Panicum barbinode*		South Italy (Vierbergen, 2013), Cyprus (Srour, 2015), Egypt (zur Strassen, 2014).	No	No
Pp0185	***Poecilothrips albopictus*** Uzel, 1895	On dead branches (Mound et al., 1976)		UK Widespread in Europe (Mound et al., 1976; Mound et al., 2018), South Italy (Stoch, 2003; Marullo & De Grazia, 2013), Poland (Kucharczyk & Zawirska, 2001) Cyprus, French Mainland, Italian Mainland (Vierbergen, 2013), Sweden (Gertsson, 2015), Hungary (Jenser, 2011), Romania (Sierka et al., 2008), Croatia (Raspudić et al., 2009), Slovakia (Zvaríková et al., 2020).	No	Yes
Pp0186	***Pseudocryptothrips meridionalis*** Priesner, 1919idolothripinae	?		Italy (Stoch, 2003; Marullo & De Grazia, 2013), French and Spanish Mainlands (Vierbergen 2013), Turkey, (Tunc & Hastenpflug-Vesmanis, 2016).	No	?
Pp0187	***Pygmaeothrips angusticeps*** (Hood, 1908)	Fungus feeding (ThripsWiki, 2021)		Egypt (zur Strassen, 2014)	No	Yes
Pp0188	***Sinuothrips hasta*** (Collins, 2000)	?		Turkey (Tunc & Hastenpflug-Vesmanis, 2016)	No	?
Pp0189	***Sophiothrips terminalis*** (Bagnall, 1927)	*Mycophagous on fungal spores* (Marullo & De Grazia, 2013)		South Italy (Stoch, 2003; Marullo & De Grazia, 2013), French and Spanish Mainlands (Vierbergen, 2013).	No	Yes

Pp0190	***Stictothrips leopardinus*** Priesner, 1932	Fungus feeding on dead branches (ThripsWiki, 2021)		Egypt (zur Strassen, 2014)	No	Yes
Pp0191	***Thorybothrips unicolor*** (Schille, 1910)	?		Spanish Mainland (Vierbergen, 2013), Hungary (Jenser (2011), Poland (Sierka et al., 2008).	No	?
Pp0192	***Treherniella afra*** Priesner, 1935	Grasses (Marullo & De Grazia, 2013)		South Italy (Marullo & De Grazia, 2013), Cyprus (Srour, 2015), Israel (zur Strassen & Kuslitzky, 2012), Egypt (zur Strassen, 2014).	No	Yes
Pp0193	***Treherniella infera*** (Priesner, 1922)	*Campanula rechingeri, Hyparrhenia hirta, Pipatherium miliaceum, Astericus aquaticus, helychrysium* (zur Strassen, 1986)		Greece (zur Strassen, 1986-05), South Italy (Stoch,2003), Poland (Kucharzyk & Salapa 2001), Cyprus, French Mainland, Greek and Spanish Mainlands (Vierbergen, 2013), Finland (Gertsson, 2015).	No	Yes
Pp0194	***Tylothrips osborni*** (Hinds, 1902)	Leaf Litter (ThripsWIki, 2021)		Spanish Mainland (Vierbergen, 2013), South Italy (Marullo & De Grazia, 2013).	No	Yes
Pp0195	***Xylaplothrips fulginosus*** (=***Haplothrips fuliginosus***) (Schille, 1911)	On dead twigs or under bark (Mound et al., 1976) *Mycophagous on fungal spores/ predator of mites on leaves* (Marullo & De Grazia, 2013)		UK, Austria (Mound et al., 1976 Mound et al., 2018), Italy (Marullo & De Grazia, 2013), Sweden, Norway, Finland, Denmark (Gertsson, 2015), Bulgaria (Karadjova & Krumov, 2015), Spanish Mainland (Vierbergen, 2013), Belgium (Lock, 2006), Hungary (Jenser (2011), Poland, Slovakia, Romania (Sierka et al., 2008), Slovakia (Sierka et al., 2008; Zvaríková et al., 2020), Croatia (Raspudić et al., 2009). Intercepted in US from Europe (Nickle, 2003)	No	Yes
Pp0196	***Xylaplothrips subterraneus*** (=***Haplothrips subterraneus***) (Crawford JC, 1938)	on lily bulbs (Mound et al., 1976)		UK, Recorded in Nederlands (Mound et al., 1976)	No	Yes
Pp0197	***Xyloplothrips pelikani*** Bournier & Bournier, 1986	?		French Mainland (Vierbergen, 2004)	No	?

Aeolothripidae: 49
Melanthripidae: 32
Faurielliidae: 2
Merothripidae: 1
Stenurothripidae: 2
Dendrothripinae: 11
Panchaetothripinae: 18
Sericothripinae: 13
Thripinae: 341
Idolothripinae: 24
Phlaeothripinae: 197
Total = 691 species

Colour Code

= on trees and/or shrubs
= on trees/shrubs (predatory)
= on conifers
= on conifers (predatory)
= on grasses
= on grasses (predatory)
= on red spider mites (predatory)
= on flowering, non-woody plants
= on flowering n/w plants (predatory)
= on plants with inconspicuous flowers
= mainly on yellow flowers
= mainly on white flowers

= on greenhouse flowers
= on greenhouse plants
= on cultivated flowers
= on trees **and** flowers
= on bulbs
= on leaf litter
= on dead twigs
= on dead twigs (predatory)
= on Fungi/ fungal spores
= on herbs
= mainly Boraginaceae
= mainly Caryophyllaceae

= mainly Cistaceae
= mainly Ericaceae
= mainly Iridiaceae
= mainly Leguminosae
= on *Cardus* sp.
= on *Lonicera* sp.
= recorded in the Maltese Islands

Appendix II: List of Plant species in Literature and Plant species examined

Cultivated/ Alien Species

Host Plant Genus/ Species	Recorded in Malta	Encountered in Fieldwork	Thrips found	Notes on species habitats and locations from Haslam et al. (1977) and Lanfranco (personal communication)
Acacia cyanophylla	✓	✓	✓	
Acacia cyclops	✓	✓		
Achillea millefolium f. *collina*	✓	✓		Cultivated and rarely naturalised.
Aeonium arboreum	✓	✓	✓	
Agave sp.	✓	✓		
Ajuga reptans	✓	✓		Valleys. *Malta*: Wied Balluta, *Gozo*: Xlendi
Aloe sp.	✓	✓	✓	
Albizia julibrissin	✓	✓	✓	
Althaea sp.	✓	✓		
Alcaea rosea/ ficifolia	✓	✓	✓	
Allium cepa	✓	✓		cultivated
Allium fistulosum	✓	✓	✓	
Aloysia citrodora	✓	✓	✓	
Amaranthus cruentus	✓			
Apium graveolens	✓	✓	✓	
Argyranthemum frutescens	✓	✓	✓	
Arbutus unedo	✓			Probably formerly native. Only, occasionally in cultivation; e.g. Wied Għollieqa, Foresta 2000.
Arundo donax	✓	✓	✓	
Azalea indica	✓	✓	✓	
Bassia scoparia	✓			cultivated

Beta vulgaris (= B. cicla)	✓			cultivated
Brassica napus	✓			
Brassica oleracea var. *botrytis*	✓	✓	✓	
Bougainvillea glabra	✓	✓	✓	
Buddleia davidii	✓	✓	✓	
Callistemon speciosus	✓	✓	✓	
Calendula sp.	✓			
Calystegia sepium	✓			Shaded walls, water channels. Buskett
Capsicum annuum	✓	✓	✓	
Carpobrotus eduilis	✓	✓	✓	
Cardiospermum halicabum	✓	✓	✓	
Carya Illinoinensis	✓	✓	✓	
Cassia fistula	✓	✓	✓	
Centaurea sp.	✓	✓	✓	
Cercis silquastrum	✓	✓	✓	
Chrysanthemum leucanthemum = Leucanthemum vulgare	✓			Cultivated in gardens and escaped
Chrysanthemum indicum	✓	✓	✓	
Citrus limon	✓	✓	✓	
Citrus sinensis	✓	✓	✓	
Citrus tangerine/ reticulata	✓	✓	✓	
Citrus x auranthum	✓	✓	✓	
Conyza bonariensus	✓	✓	✓	
Cordyline terminalis	✓	✓	✓	
Cupressus sempervirens	✓	✓	✓	
Cyperus papyrus	✓	✓	✓	

Dahlia pinnata	✓			
Dahlia sp.	✓			
Datura sp.	✓			
Dianthus caryophillus	✓	✓	✓	
Dracaena sp.	✓			
Duranta erecta	✓	✓	✓	
Eleaginus angustifolius	✓	✓	✓	
Eruca sativa	✓	✓	✓	
Eriobotrya japonica	✓	✓	✓	
Eucalyptus gomphocephala	✓	✓	✓	
Euonymus japonicus	✓	✓	✓	
Eupatorium cannabinum	✓	✓		San Anton and other old gardens
Ficus benjamina	✓	✓	✓	
Ficus microcarpa	✓	✓	✓	
Freesia refracta	✓	✓	✓	
Gardenia jasminoides	✓	✓	✓	
Gazania sp.	✓	✓	✓	
Gerbera sp.	✓	✓	✓	
Gladiolus sp.	✓	✓	✓	
Gossypium sp.	✓			
Gypsophila sp.	✓			
Helianthis annuus	✓			
Hyacinthus orientalis	✓	✓	✓	
Ipomoea carnea	✓	✓	✓	
Iris pseudacorus	✓	✓	✓	

Iris xiphium	✓			
Jasminum oleioides	✓	✓	✓	
Lactuca sativa	✓	✓	✓	
Lantana camara	✓	✓	✓	
Leucaena leucocephala	✓	✓	✓	
Ligustrum sp.	✓			*L. japonicum/L. lucidum* in cultivation as ornamentals
Lobelia sp.	✓	✓	✓	
Lobularia maritima	✓	✓	✓	
Lonicera japonica	✓	✓	✓	Occasionally found as a casual
Malus sylvestris/ communis	✓			
Malva arborea	✓	✓	✓	
Melia azerdarach	✓			Naturalized and cultivated
Mentha sp.	✓	✓	✓	
Morus alba	✓			
Musa paradisiaca	✓			
Narcissus sp.	✓	✓	✓	
Nicotiana glauca	✓	✓		Cultivated for ornament and widely naturalized in waste places and on walls
Ocimum basilicum	✓	✓		
Olea europea	✓	✓	✓	
Origanum majorana	✓	✓	✓	
Origanum vulgare	✓	✓		Cultivated and naturalized: (only very rarely) Siġġiewi, Qormi
Osteospermum jucundum	✓	✓	✓	
Parkinsonia aculeata	✓	✓	✓	Only in cultivation (e.g. Hastings Gardens, Valletta); used to be naturalised @ Marsa
Pelargonium sp.	✓	✓	✓	
Pennisetum setaceum	✓	✓	✓	

Phacelia tanacetifolia	✓			Rare casual alien
Phaseolus vulgaris	✓	✓		
Philodendron sp.	✓			
Phytolacca dioica	✓	✓	✓	
Phoenix canariensis	✓	✓		
Phoenix dactylifera	✓	✓	✓	
Phyllirea angustifolia	✓			Probably native but very rare
Pilea microphylla	✓	✓	✓	
Pisum sativum	✓			
Pittosporum tobira	✓	✓	✓	
Plumbago auriculata	✓	✓	✓	
Prosopis juliflora	✓			Very rarely cultivated as at the Argotti (Mesquite)
Prunus domestica	✓	✓		
Prunus dulcis / Amygdalus communis	✓	✓	✓	
Prunus persica	✓	✓	✓	
Punica granatum	✓	✓	✓	
Pyrachantha sp.	✓			Used to be commonly cultivated as ornamental but now discontinued
Pyrus communis	✓	✓		
Ranunculus asiaticus	✓	✓	✓	
Raphanus sativus	✓			
Rhamnus oleoides	✓			
Ricinus communis	✓	✓	✓	
Rosa spp.	✓	✓	✓	
Rosmarinus officinalis	✓	✓	✓	
Salicornia sp.	✓			

Salvia coccinea	✓	✓	✓	
Salvia officinalis	✓	✓	✓	
Schinus terebinthifolius	✓	✓	✓	
Solandra maxima	✓	✓	✓	
Solanum lycopersicum var. *cerasiforme*	✓	✓	✓	
Solanum melongena	✓	✓	✓	
Solanum tuberosum	✓	✓	✓	
Spathyphyllum sp.	✓	✓	✓	
Stagonospora curtisii (on *Hyppaestrum* hybrid)	✓	✓	✓	
Stephanotis floribunda	✓	✓	✓	
Tagetes lucida	✓			
Tamarix gallica	✓	✓	✓	
Tamus (=Dioscorea) communis	✓	✓		Maquis and valleys but very rare; especially in gorges e.g. Mistra
Tradescantia sillamontana	✓	✓	✓	
Triticum aestivum	✓	✓	✓	
Tropaeolum vulgare	✓	✓	✓	
Viburnum tinus	✓			
Vicia faba	✓	✓	✓	
Vitis vinifera	✓	✓	✓	
Yucca gloriosa	✓	✓	✓	Only occasionally in cultivation
Zanthedesca ethiopica	✓	✓	✓	
Zea mays	✓	✓	✓	

146 species

Indigenous Species

Host Plant Genus/ Species	Recorded in Malta	Encountered in Fieldwork	Thrips found	Notes on species habitats and locations from Haslam et al. (1977) and Lanfranco (personal communication)
Acanthus mollis	✓	✓	✓	
Adonis microcarpa	✓			
Allium neapolitanum	✓	✓	✓	
Amaranthus viridis	✓	✓	✓	
Aegilops geniculata	✓	✓	✓	
Agropyron juncaeum	✓			Baħar iċ-Ċagħaq, Mellieħa, Marsa, Għadira s-Safra, Ramla tal-Bir
Ajuga iva	✓	✓	✓	
Alopercurus pratensis	✓			**Damp grassy places**: e.g. Marsa along water course Long extinct; *A. myosuroides* an occasional casual
Amaranthus viridis	✓	✓	✓	
Ambrosia maritima	✓			**Sandy places by the sea:** *Malta*: St. Paul's Bay, Mellieħa, Salini, Marsa, Marfa peninsula, Għajn Riħana, Marsaskala, Għajn Tuffieħa, Baħar iċ-Ċagħaq. *Gozo*: Marsalforn, Qbajjar
Ammophila littoralis				Extinct since the 1980s
Ammophila arenaria	✓			**Sandy maritime places:** *Malta:* St. Paul's Bay, Mellieħa, Wied Gerżuma, Parfa peninsula, Ramla tat-Torri, Għajn Tuffieħa, Baħar iċ-Ċagħaq. *Gozo*: Marsalforn, Qbajjar
Ampelodesma mauretanica	✓			Wied Gerżuma
Anacamptis urtvilleana	✓	✓	✓	
Anacamptis pyramidalis	✓	✓	✓	
Anacamptis collina	✓		✓	Garrigues, rocky steppes – quite frequent
Anchusa sp.	✓			*azurea*: north west side of Malta. Rare in Gozo. *italica*:
Andropogon hirtus	✓			**Common in rocky valleys**
Anthemis cotula	✓			**Fields:** Marsa, Sliema, Floriana, Pietà Only an occasional casual

Anthirrinum siculum	✓	✓	✓	
Anthirrinum tortuosum	✓	✓	✓	
Anthyllis hermanniae subsp. melitensis	✓	✓	✓	Garrigue specifically phrygana
Aristolochia ap.	✓	✓		
Asperula sp.	✓	✓		*aristata*: **Amongst low bushes**: Wied Inċita, Wied Musta – common in garrigues *cynanchica*: **Rocky arid places**.rare
Asphodelus aestivus	✓	✓	✓	
Aster squamatus	✓	✓		Naturalized on roadsides and in waste places. Very common
Astericus aquaticus	✓	✓		**Rocky coastal areas**
Astralagus sp.	✓			*boeticus*: **valleys and fallow fields,** common *hamosus*: **Fields almong crops. gardens and waste ground frequent** *sesameus*: **waste ground and rocky arid places scarce**
Arthrocnemum macrostichium	✓	✓	✓	
Atractylis gummifera	✓	✓	✓	
Atriplex halimus	✓	✓	✓	**Near the sea**. *Malta:* formerly rare. on the bastions and in the ditches of Valletta, Birżebbuġa. Marsaskala, Mellieħa Bay now widely planted. *Gozo:* Wied Xlendi
Avena barbata	✓	✓	✓	
Avena sativa var. *sterilis*	✓	✓	✓	
Ballota nigra	✓			
Bellardia trixago	✓			
Bellis annua	✓	✓	✓	
Bituminaria bituminosa	✓	✓	✓	
Borago officinalis	✓	✓	✓	
Brachypodium retusum	✓	✓	✓	**Shaded places, rather rare**. *Malta*: Girgenti, Buskettt. Ta' Lawrenti, Wied Inċita.
Brassica oleracea	✓	✓	✓	
Brassica rapa	✓	✓	✓	

Brassica sp.	✓	✓	✓	
Bromus diandrus	✓	✓	✓	
Bromus madritensis	✓	✓	✓	
Calendula arvensis	✓	✓	✓	
Calendula sicula (=suffruticosa)	✓	✓	✓	
Cakile maritima	✓	✓	✓	**Maritime places frequent in sandy rocky substrate** e.g. Xlendi, Ramla, Marsalforn, Comino.
Campanula erinus	✓			frequent
Capparis orientalis	✓	✓	✓	
Capparis spinosa	✓	✓	✓	
Cardus cf. pyncocephalus	✓	✓	✓	
Cardaria = Lepidium draba	✓			**Waste places.** *Malta rare* in Central Malta, as between Birkirkara and Mosta, between Qormi and Żebbuġ, Floriana; Lija and Balzan. *Gozo:* below Rabat,lt along the path of Marsalforn between Kerċem and Rabat
Carex sp.	✓	✓	✓	
Carex divisa	✓	✓	✓	
Carex muricata	✓			
Centauria nicaensis	✓	✓	✓	Steppes, garrigue and abandoned agricultural land
Centauria melitensis	✓			
Ceratonia siliqua	✓	✓	✓	
Cercis silquastrum	✓	✓	✓	
Cerinthe major	✓	✓	✓	
Chamaerops humilis	✓	✓		
Chamomilla sp.	✓	✓		*aurea: Malta:* Porte de Bombes, Floriana. *Gozo:* bastions of Victoria. *recutita: Malta and Gozo* a weed in old gardens and waste places. but not common; formally cultivated for medicinal purposes. Addolorata Cemetery.
Chenopodium album	✓	✓	✓	Urban areas, roadsides, rubble and other disturbed areas
Cheirolophus crassifolius	✓	✓	✓	

Chicorium intybus	✓	✓	✓	
Chicorium spinosum	✓	✓	✓	
Cistus sp.	✓	✓	✓	
Cistus monspeliensis	✓			**Arid rocky slopes**. *Gozo:* very rare, frequent at Nadur, between Wied ir-Riħan and Wied Binġemma.
Clematis cirrhosa	✓	✓	✓	**Valleys, sheltered rdum areas, rocks and old walls, often climbing**: **on shrubs and small trees**. *Malta:* Fawwara, Wied Inċita, Wied il-Għasel, Wied iż-Żurrieq, Mtaħtleb, Wjed Gerżuma, Wardija, San Martin, Mellieħa, Baħrija. Għajn il-Kbira, Ġnien il-Kbir, Tal-Virtù, Mtarfa Buskett, Baħrija. *Gozo:* rather rare, Wied il-Lunzjata, Ġgantija San BIas, Pergla.
Clinopodium sp.	✓	✓		Represented by *Clinopodium nepeta = Satureja n., Clamaintha n.* – rather frequent in garrigues and rocky steppes.
Convolvulus althaeoides	✓	✓	✓	
Convolvulus arvensis	✓	✓	✓	
Convolvulus elegantissimus	✓	✓	✓	
Convolvulus oleoides	✓	✓	✓	
Coronopus squamatus	✓	✓	✓	
Corydothymus sp. (*Thymbra*)	✓	✓	✓	
Crataegus monogyna	✓	✓		
Crepis sp.	✓	✓	✓	
Crithmum maritimum	✓	✓	✓	
Cutanda maritima	✓	✓	✓	
Cynodon dactylon	✓	✓	✓	
Cynoglossum creticum	✓	✓	✓	
Cynomorium coccineum	✓	✓		
Cyperus badius	✓			**Along streams, and in irrigated and damp places**. locally frequent
Dactylis glomerata	✓		✓	
Dactylis hispanica	✓		✓	**uncultivated places; also maritime places**. *Malta, Gozo* and *Comino:* frequent
Daucus carota	✓	✓	✓	

Diplotaxis erucoides	✓	✓	✓	
Diplotaxis tenuifolia	✓	✓	✓	
Dittrichia viscosa	✓	✓	✓	
Ecballium elaterium	✓	✓	✓	
Echinophorus spinosus	✓	✓	✓	
Echium plantagineum	✓			**Roadsides in the country**. *Malta:* rare (G. Lanfranco), Wied Inċita, Buskett; Rabat; Mġarr; Binġemma; Ta' Qali
Echium parviflorum	✓	✓	✓	
Echium arenarium	✓			Wied Inċita
Erica multiflora	✓	✓	✓	Karstic terrain including garrigue, rocky hillsides and upper valley sides.
Erodium malachoides	✓	✓	✓	
Erodium moschatum	✓	✓	✓	
Eryngium maritimum	✓	✓	✓	**Sandy sea shores**. *Malta*: Għadira, Marfa peninsula, Ġnejna, Baħar iċ -Ċagħaq, St. Paul's Bay, Golden Bay. *Gozo*: Ramla. *Comino*: Sta. Marija
Euphorbia dendroides	✓	✓	✓	
Euphorbia helionispora	✓	✓	✓	
Euphorbia pinea	✓	✓	✓	
Fedia graciliflora (=cornucopiae)	✓	✓	✓	
Ferula communis	✓	✓	✓	
Foeniculum vulgare	✓	✓	✓	
Frankenia hirsuta	✓			**Maritime rocks and sands**. *Malta, Gozo, Comino. Cominetto* and *Filfla:* Common
Fraxinus angustifolia	✓	✓		Buskett valley
Fumana arabica	✓	✓	✓	
Fumaria sp.	✓	✓	✓	
Galactites tomentosa	✓	✓	✓	

Gallium aparine	✓	✓	✓	
Gastridium phleioides	✓			**Rocky uncultivated places and fields**. *Malta, Gozo* and *Comino*: locally common at Buskett Dingli, Wied Żnuber, Dar il-Bajda. Fawwara, Wied Gerżuma
Gladiolus italicus	✓	✓	✓	
Glaucum flavum	✓			
Glebionis coronaria	✓	✓	✓	
Glyceria sp.	✓			*distans:* Disturbed ground (L.j Mtaħleb.,wied *Incita1ts* REr., = *Puccinellia fasciculate* – recently extinct; last known from Marsa & Salini *plicata*: **Along streams and pools in valleys.** *Malta:* occasional at Għajn Mula; Mtaħleb; Wied Bufula; Għajn Riħana; Buskett; Bahrlja.
Hedera helix	✓	✓	✓	
Hedysarum coronarium	✓	✓	✓	
Hedyrarum spinosissimum captiatum	✓	✓	✓	
Helianthemum vulgare	✓			
Heliotropium europeum	✓	✓		
Helminthotheca ehoides	✓	✓	✓	
Helychrysium melitense	✓	✓	✓	Cliffs. Probably extinct in Malta
Hirchfeldia incana	✓	✓	✓	
Hippocrepis sp.	✓			*ciliata*: arid rocky places e.g. Buskett, St. Paul's Bay, Mellieħa, Wied il-Għasel. *multisiliquosa*: among growing crops. Field margins. in valleys and uncultlvated land. *unisiliquosa*: Field margins and uncultivated land.
Hordeum leporinum	✓	✓	✓	
Hordeum vulgare	✓			Commonly grown as a fodder
Hyparrhennia hirta	✓	✓	✓	
Hypercium perforatum pubescens?	✓	✓	✓	
Hypochaeris acrophorus	✓	✓	✓	
Inula crithmoides	✓	✓	✓	
Iris sp.	✓	✓	✓	Several spp. occur in the wild especially in rocky steppes and garrigues *florentyna, pseudopumilia*

Iris sicula	✓	✓	✓	
Juncus acutus	✓	✓		**Coastal saltmarshes**
Lactuca virosa	✓	✓		**roadside and urban waste places**
Lamium sp.	✓	✓		
Lathyrus clymenium	✓	✓		**Valleys and disturbed ground**
Laurus nobilis	✓	✓	✓	
Lavatera cretica	✓	✓	✓	
Leontodon tuberosus	✓	✓	✓	
Limonium melitensis	✓	✓	✓	
Linum sp.	✓			*strictum*: garrigue, steppe and disturbed ground *trigynum*: garigue Both are common in garrigues & rocky steppes
Linum usitatissimum	✓	✓		Cultivated and a frequent casual on disturbed ground. ~~Garrigue and sandy shores~~
Lotus cyctoides	✓	✓	✓	
Lotus ornithopodoides	✓	✓	✓	
Lobularia maritima	✓	✓	✓	
Lonicera implexa	✓	✓	✓	
Lophochlora cristata	✓	✓	✓	
Lythrium juncaeum	✓			
Malcolmia africana	✓			Valletta, Floriana, Blata l-Bajda.
Malcolmia maritima	✓			Probably long extinct. Valletta, Floriana, Blata l-Bajda.
Matthiola incana melitensis	✓	✓	✓	
Matthiola tricuspidata	✓		✓	
Malva sylvestris	✓	✓	✓	Disturbed ground, garigue
Marrubium vulgare	✓			Used to be frequent until the 1970s; now extremely rare if not extinct.
Matricaria chamomilla	✓	✓	✓	

Medicago arborea	✓	✓	✓	
Medicago marina	✓	✓	✓	Sand dunes
Medicago polymorpha	✓	✓	✓	
Medicago sativa	✓	✓	✓	Occasionally cultivated and may occur as a casual weed (lucerne, alfalfa)
Melilotus sulcatus	✓	✓	✓	
Mentha pulegium	✓	✓	✓	
Mercurialis annua	✓	✓	✓	
Mirabilis jalapa	✓	✓	✓	
Misopanthes orontium	✓	✓	✓	
Moricandia arvensis	✓			Old unconfirmed records only. Gozo
Myrtus communis	✓	✓		Maquis, rare as at Ghajn il-Kbira, Wied Gerzuma; also cultivated (mainly the subsp. t*arentina)*
Narcissus tazzetta	✓	✓	✓	
Nauplius aquaticua	✓			
Nerium oleander	✓	✓	✓	
Nigella damascena	✓	✓	✓	
Oenanthe globulosa	✓			very rare (water courses)
Olea europaea	✓	✓	✓	
Ononis mitissima	✓			clay soil, sometimes disturbed ground
Ornithogalum arabicum	✓	✓	✓	
Orobanche ramosa	✓	✓	✓	
Oxalis pes-caprae	✓	✓	✓	
Pallenis spinosa	✓	✓	✓	Coastal garrigue, steppe and disturbed ground
Pancratium maritimum	✓	✓	✓	

Parietaria judaica	✓	✓	✓	
Papaver rhoeas	✓	✓	✓	
Papaver setigerum	✓	✓	✓	
Parentucellia viscosa	✓			**Garrigue and steppe**
Parietaria judaica	✓	✓	✓	
Periploca angustifolia	✓	✓	✓	
Phagnalon rupestre	✓	✓	✓	
Phalaris minor	✓	✓	✓	**Cultivated and waste places and valleys**
Phlomis fructicosus	✓	✓	✓	
Phragmites australis	✓	✓	✓	
Pinus halepensis	✓	✓	✓	
Pipatherum milliaceum	✓	✓	✓	
Pistacia lentiscus	✓	✓	✓	**Maquis and rocky sides of valleys**
Pistacia terebinthus	✓			Rare; e.g. Ta' Bloq (Marsa), Buskett
Plantago lanceolata	✓	✓	✓	
Plantago major	✓	✓	✓	**Along watercourses**
Plantago serrata	✓	✓	✓	
Poa annua	✓			
Polygonium convolvulus= Bilderdykia c.	✓	✓		Uncommon, mainly on irrigated ground (fields, large gardens)
Polypogon maritimus	✓			**Damp valleys and shady places; also common as an urban weed**
Polypogon monspeliensis	✓			**Damp valleys, marshes**
Populus sp.	✓	✓		
Potentilla reptans	✓	✓	✓	
Prasium majus	✓	✓	✓	

Pteridium aquilinum	✓	✓	✓	
Quercus ilex	✓	✓		**Woodland**
Quercus robur	✓	✓	✓	
Reseda alba	✓	✓	✓	
Reseda lutea	✓			Quite rare, often on arable land
Ranunculus bulbosus	✓	✓	✓	
Ranunculus muricatus	✓	✓	✓	
Reicharda picroides	✓	✓	✓	
Raphanus raphanistrum	✓	✓	✓	**Fields and disturbed ground**
Rhamnus alaternus	✓	✓	✓	**Valley beds and maquis**
Rostraria cristata	✓	✓	✓	Common weedy species
Rubus ulmifolius	✓	✓	✓	
Rumex conglomeratus	✓	✓	✓	
Ruta chalepensis	✓	✓	✓	Frequent in garrigues
Salix alba	✓			Very rare – now mainly at Fiddien. Buskett, Mtaħleb, Girgenti Buskett, Mtaħleb, Girgenti
Salsola melitansis	✓	✓	✓	
Salvia triloba	✓			Occasionally cultivated as a pot-herb; very rare if not extinct in the wild.
Sambucus nigra	✓	✓	✓	**Has been planted at Wied il-Qlejgha ('Chadwick Lakes') Formerly cultivated for medicinal purposes and associated with farmsteads.** Buskett, Baħrija, Wied Għar Dalam
Salicornia ramosissima	✓	✓		**Rare, e.g. Ballut ta' Marsaxlokk. places liable to saline flooding**
Scabiosa maritima	✓	✓	✓	
Scolymus hispanicus	✓			Mostly sand dunes
Senecio bicolor (= Jacobea maritima)	✓	✓	✓	
Silene vulgaris	✓	✓		Along rubble walls, country paths and rocky ground

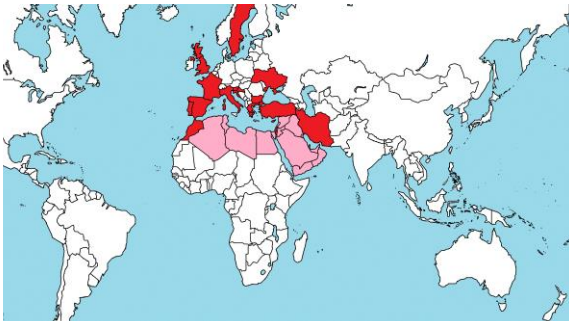
Silybum marianum	✓			Disturbed ground and roadsides
Sinapis alba	✓	✓	✓	
Sisymbrium irio	✓	✓	✓	
Solanum dulcamara	✓	✓	✓	
Solidago sp.	✓			
Sonchus oleraceus	✓	✓	✓	
Sonchus tenerrimus	✓	✓	✓	
Sorgum halepense	✓	✓	✓	
Spartium juncaeum	✓	✓	✓	**Rocky valleys** Ghajn il-Kbira, Buskett at il-Bosk Very rare in the wild but occasionally cultivated e..g. campus.
Stachys ocimastrum	✓			**Rare e.g. Ghar Lapsi -valleys:** Gnejna Buskett, Kordin, Wied il-Ghazel, Wied Inċita
Stipa capensis	✓	✓	✓	
Suaeda fructicosa = vera	✓	✓	✓	
Salsola melitensis	✓	✓	✓	
Symphytum officinale	✓			**Probably extinct Damp shady places:** Wied Babu, Wied iż-Żurrieq
Tamarix africana	✓	✓	✓	**Coastal and sand marshes and sand dunes**
Taraxacum sp.	✓	✓	✓	
Teucrum fructicans	✓	✓	✓	
Thymbra capitata	✓	✓	✓	
Tragopogon hybridus	✓	✓	✓	**Abandoned fields especially with clay soil**
Trifolium campestre	✓			**Frequent - Garrigue and steppe**
Trifolium pratense	✓			**Probably accidental:** Wied Balluta, Marsa, Marsaskala
Trifolium nigrascens	✓	✓	✓	
Typha latifolia	✓			**Water courses:** Gnejna, Fiddien, Marsa, ta' Baldu, Għajn il- Kbira, Chadwick lakes

Typha domingensis	✓			Several water courses and other inundated habitats.
Tulipa sylvestris	✓	✓	✓	
Ulmus sp.	✓			*U. canescens* is native (Wied ir-Rum); *U. minor* is naturalised e.g. Wied il-Luq. Very rare
Urtiica dubia = (mebranacea)	✓	✓	✓	
Urtica urens	✓	✓		
Urtica pilulifera	✓	✓	✓	
Vitex agnus-castus	✓	✓		**Watercourses.** More frequent in Gozo
Ziziphus sativus	✓			cultivated and occasionally naturalised.
Xanthoria parietina	✓	✓	✓	

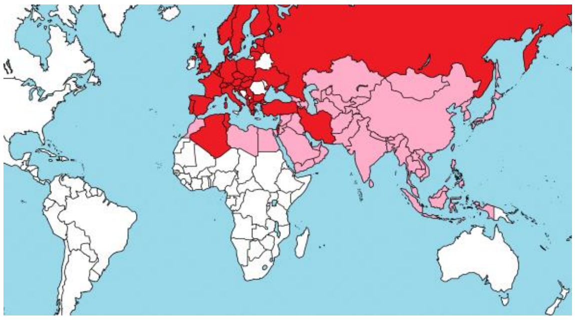
252 species

Appendix III: Species Chorotypes according to Literature

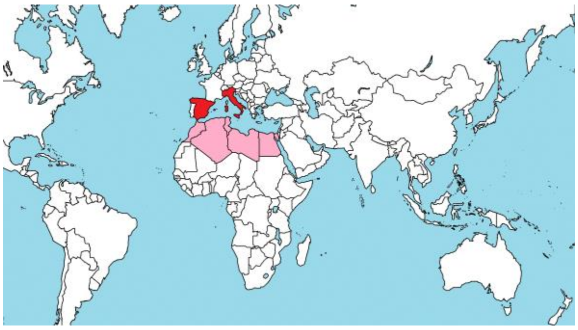
■ = species recorded in country (Palaearctic Region) ■ = species recorded in region
■ = species recorded in country (outside Palaearctic region)



Aeolothrips gloriosus

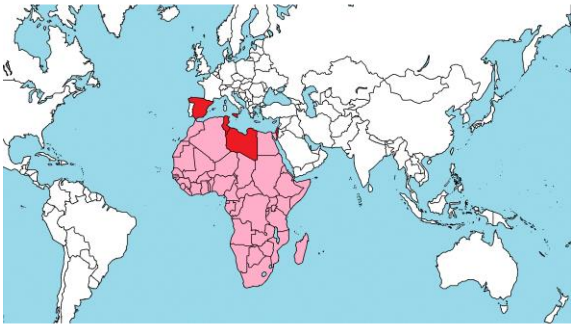


A. intermedius

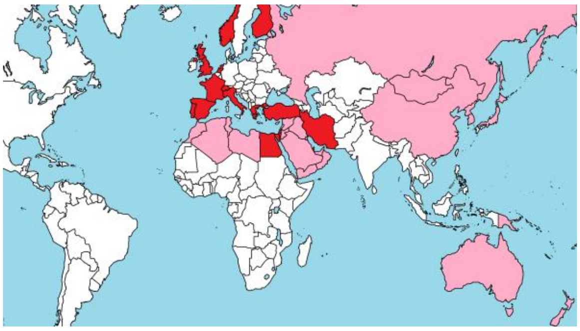


A. melisi

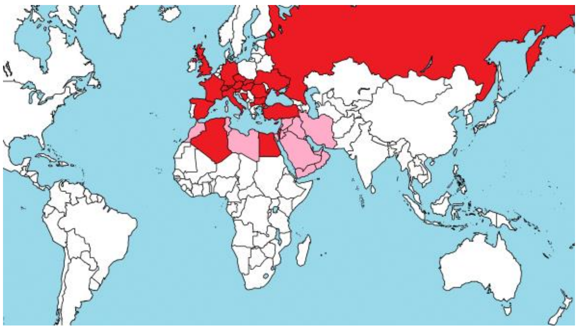
A. tenuicornis



Franklinothrips megalops

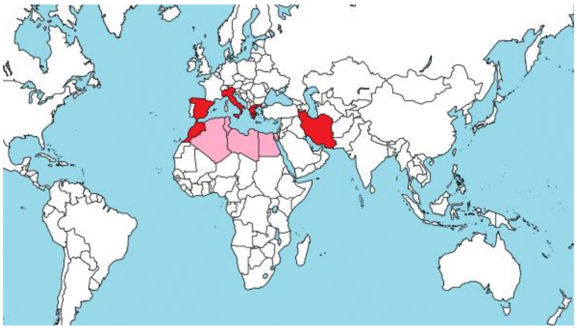


Rhipidothrips brunneus

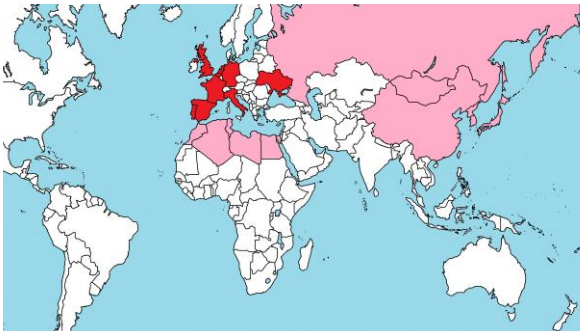


R. gratiosus

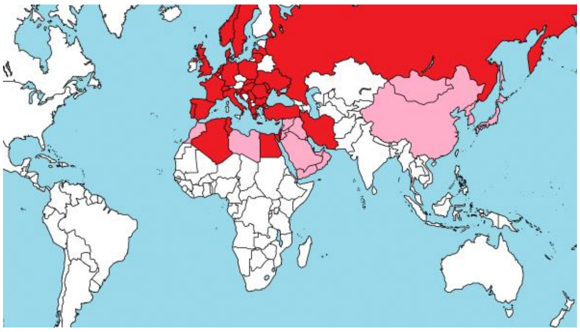
R niveipennis



R. unicolor

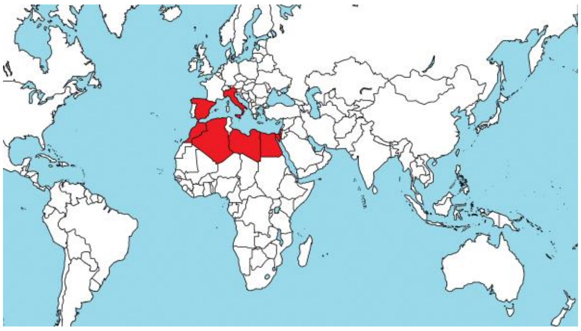


Melanthrips ficalbii



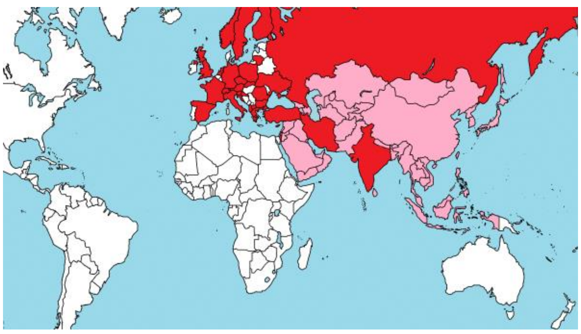
M. fuscus

M. knechteli

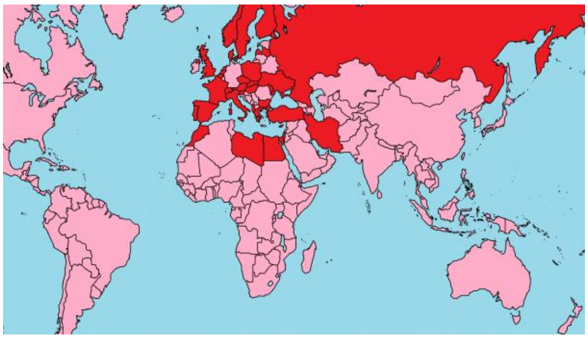


M. lybicus

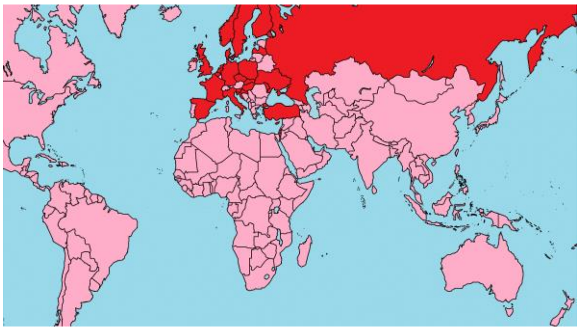
Holarthrothrips tenuicornis



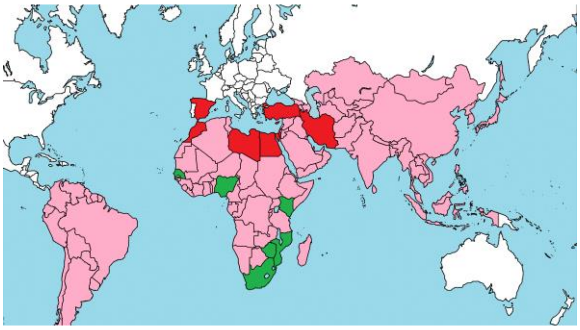
Dendrothrips saltator



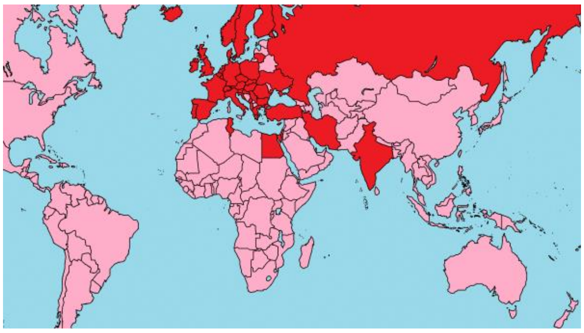
Heliothrips hemorrhoidalis



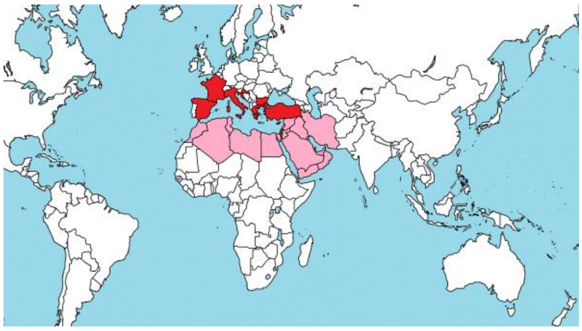
Hercinothrips femoralis



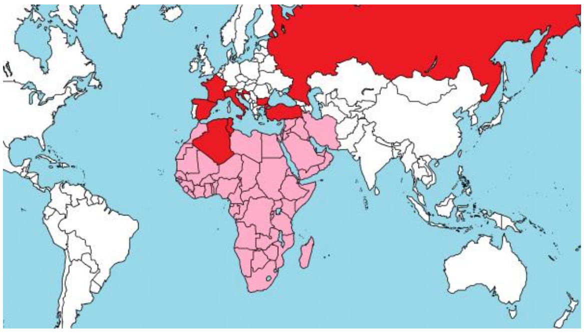
Anaphothrips sudanensis



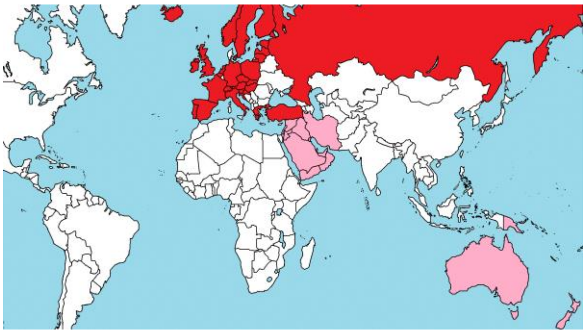
Aptinothrips rufus



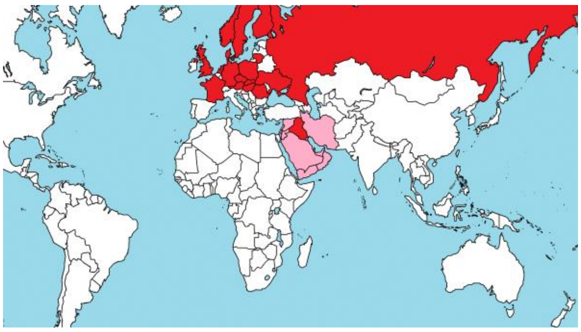
Asphodelothrips croceicollis



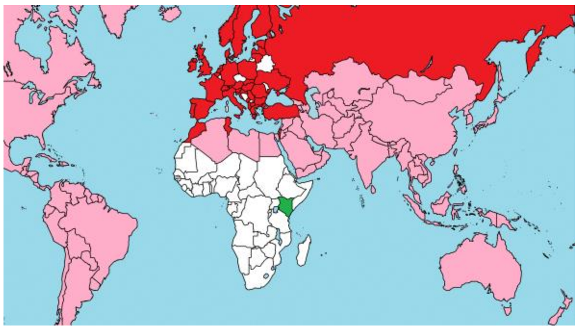
Bregmatothrips dimorphus



Ceratothrips ericae

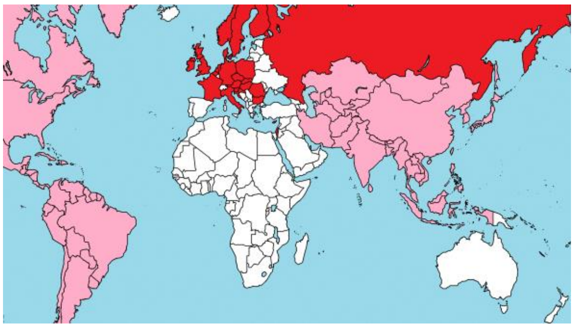


Chirothrips hamatus

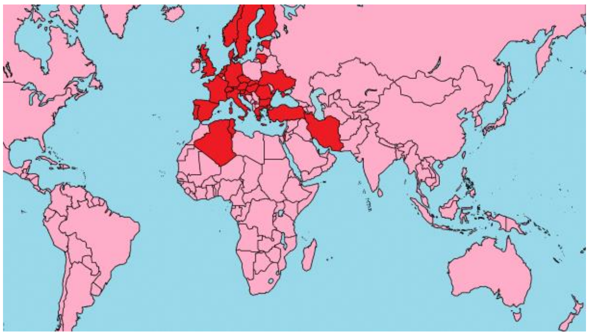


C. manicatus

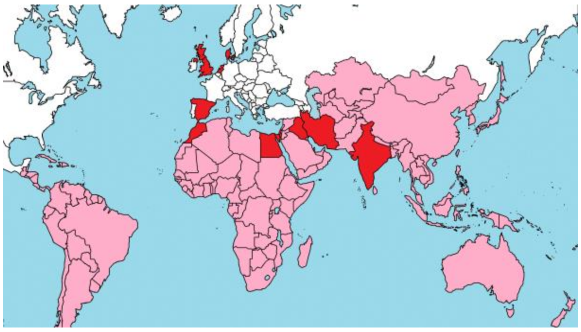
C. meridionalis



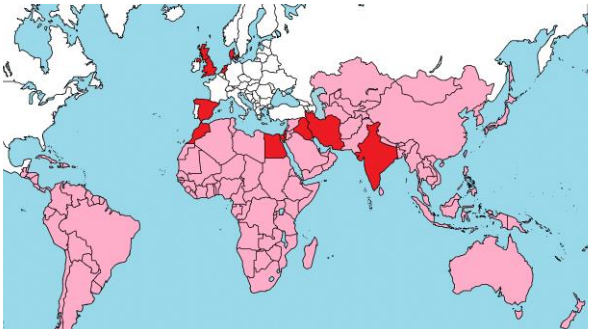
Echinothrips americanus



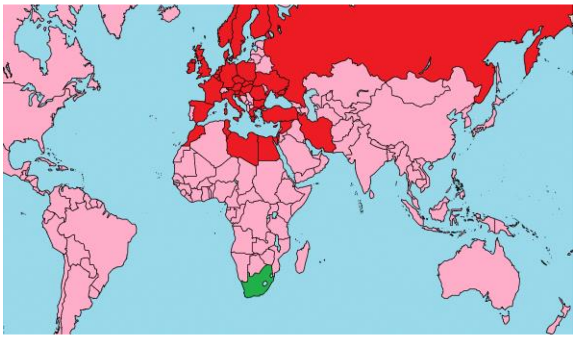
Frankliniella occidentailis



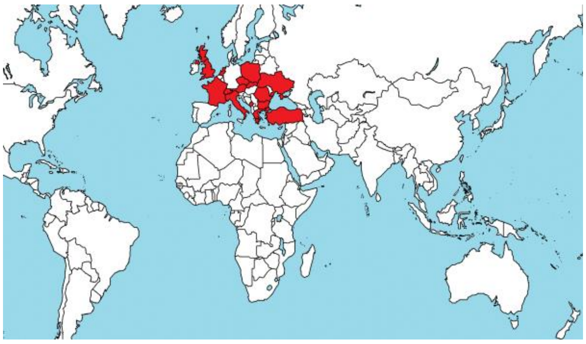
F. schultzei



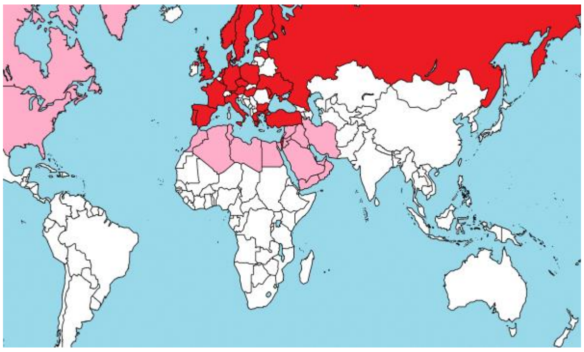
Limothrips angulicornis



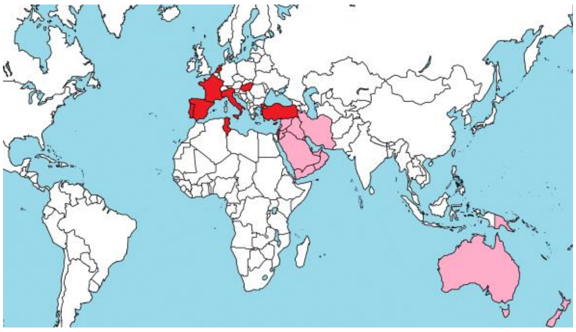
L. cerealium



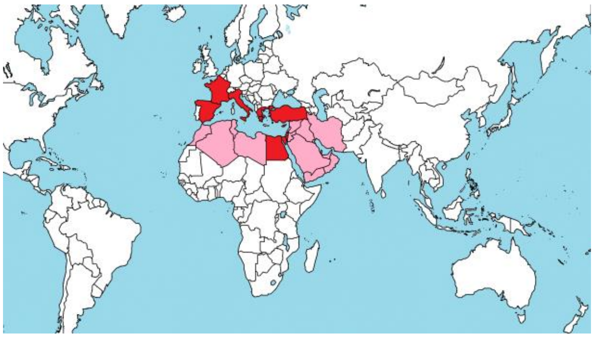
Odontothrips meliloti



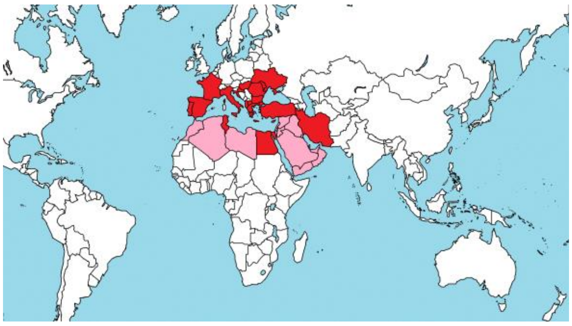
Oxythrips ajugae



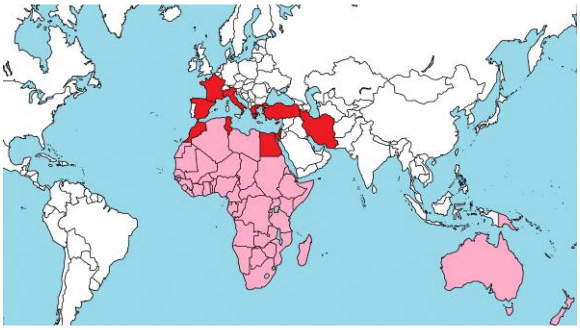
Pezothrips kellyanus



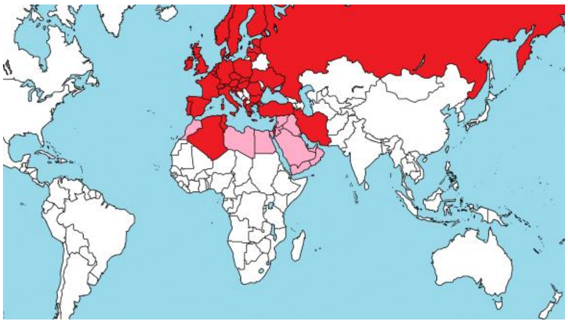
Prosopothrips nigriceps



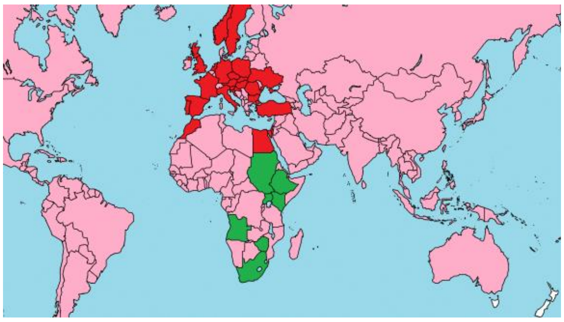
Tenothrips discolor



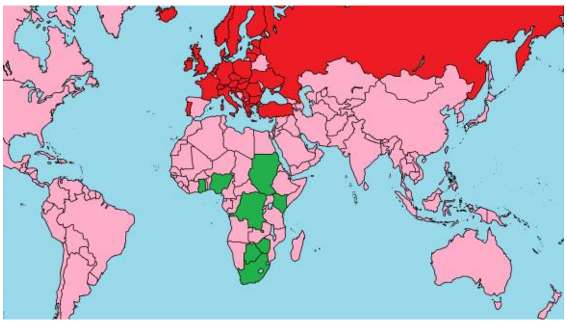
Thrips australis



T. major

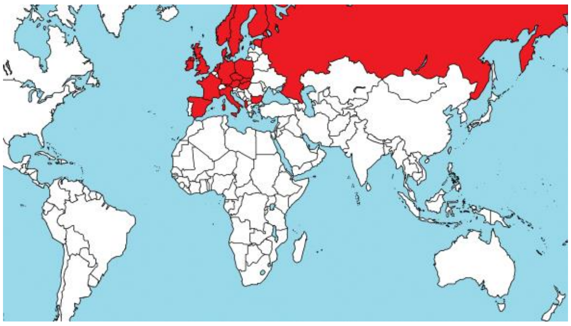


T. simplex

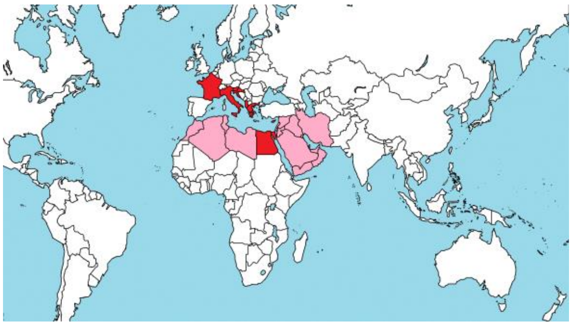


T.tabaci

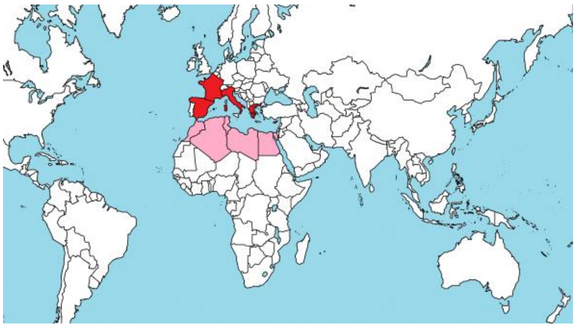
T. tarfayensis



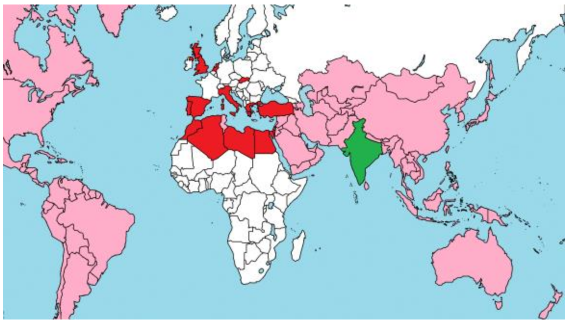
Bolothrips dentipes



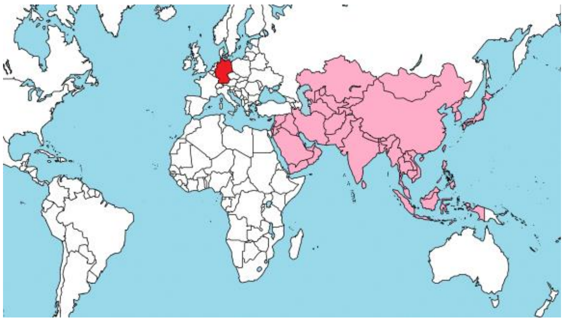
B. insularis



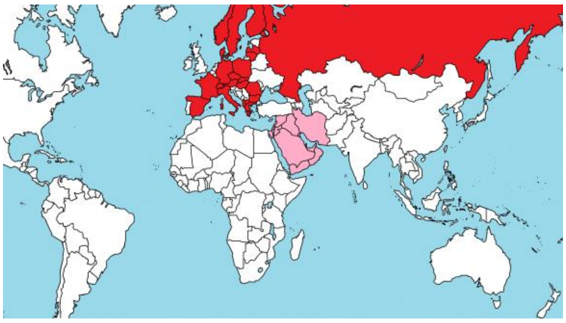
Priesneriella mavromoustakisi



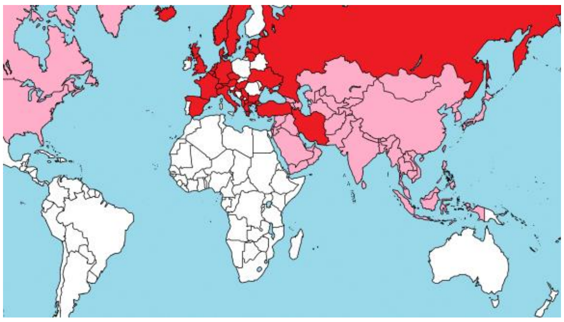
Gynaikothrips ficorum



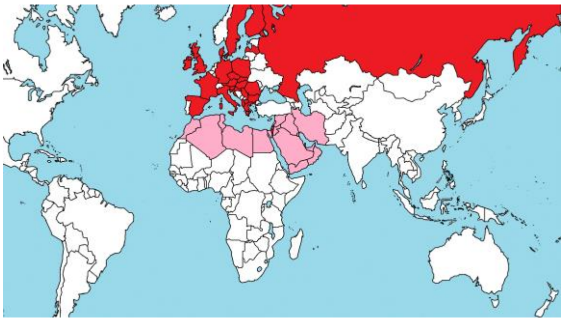
G. uzeli



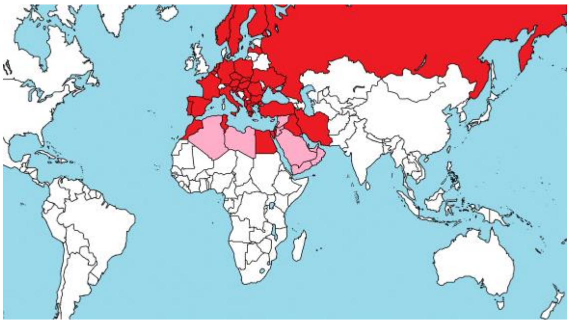
Haplothrips acanthoscelis



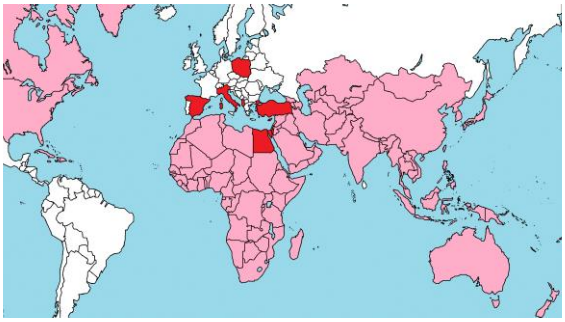
H. aculeatus



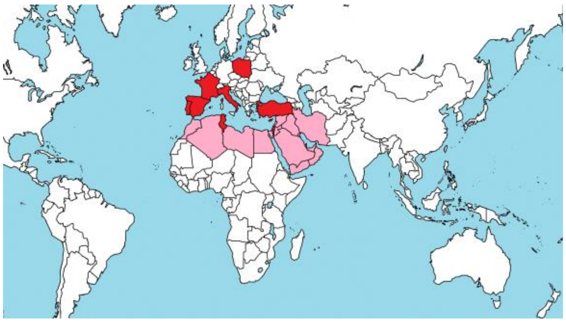
H. setiger



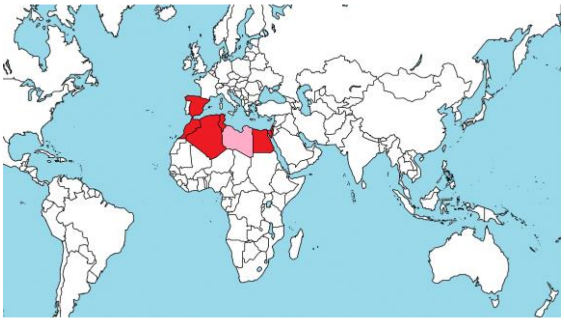
H. tritici



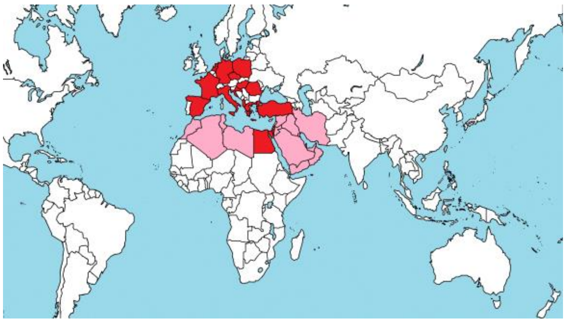
Karnyothrips flavipes



Liothrips oleae



L. reuteri



Neoheegeria dalmatica

Individual specimen description template

Slide no.	**Species**
Character	**Description**
Number of antennal segments	
Shape of antennal segments	
Shape of sensoria on segments III and IV	
Number of sensoria on segments III and IV	
Colour of antennal segments	
Colour and shape of head	
Number of pairs of setae on head	
Length of pairs of setae on head	
Shape of tentorium	
Colour of pronotum	
Number and length of setae on proximal pronotal margin	
Number and length of setae on distal pronotal margin	
Distance between pronotal setae on proximal margin	
Distance between pronotal setae on distal margin	
Basantra and ferna on prosternum	
Presence of teeth or projections on tarsi	
Setae and other characters on leg	
Reticulation on meso and metathorax	
Number and colour of veins on forewing	
Occurrence of hair like structures on forewing	
Shape and colour of forewing	
Presence/ absence of campaniform sensilla	
Shape of endothroracic furcae	
Occurrence of spinula on meso thoracic furca	
Occurrence of spinula on meta thoracic furca	
Craspeda and comb on posterior margin of abdominal segments microtrichia comb	
Position of ctenidia on abdominal segments	
Occurrence of setae on abdominal segments	
Trichobothria on abdominal segment X	
Further notes	
Guides used:	

Species description template

Genus name ***Aeolothrips***

Body size: see individual species

Coloration:

Body Variable, but in most cases brown.

Head Brown in most species.

Antennal segments Variable.

Pronotum Brown in most species.

Pterothorax Brown.

Legs Uniformly brown in most species.

Fore wings With three pale bands alternating with two brown bands. Wing-tip colour pale.

Abdomen Brown, but segments I-VI paler in lighter coloured specimens.

Structural features:

Head

Proportions Generally longer than broad.

Extension beyond eyes None.

Ocelli Present and prominent.

Setae Mostly short.

Compound eyes Compound eyes curved and with a large number of ommatidia.

Texture Often with weak transverse sculpture lines.

Mouth cone variable in length.

Maxillary stylets (Tubulifera) n/a

Palpi 3-segmented.

Antennal segments

No. of segments 9

Proportions Variable but in most cases segment V is longer than VI – IX together.

Sensoria on III and IV 1 per segment. Consisting of a ridge parallel to the length of segment. Length of sensoria variable.

Pronotum

Shape Anterior margin only slightly narrower than posterior.

Texture With little to no sculpture.

Basantra and ferna on prosternum (Tubulifera) n/a

Epimeral sutures (Tubulifera) n/a

Setae on anterior margin As long as discal setae.

Setae on posterior margin As long as discal setae, though in some species with central setae more stout or prominent.

Other setae -

Pterothorax

Texture Transverse reticulation on mesothorax. Reticulate reticulation on anterior metathorax.

Campaniform sensilla Present on both meso- and metathorax.

Metanotal median setae Emerging from anterior margin.

Endofurca "H" shaped in mesothorax of most species, "U" shaped in metathorax of all species.

Spinula Present on both meso- and metathoracic endofurcae.

Mesothoracic sternopleural suture (Tubulifera) n/a

Legs

Texture Legs with hardly any sculpture or, at the most, weak transverse sculpture lines in most species.

Tibiae Not prolonged laterally around tarsus in most species.

Tarsi 2 segmented. Fore tarsus with stout apical recurved ventral hamus.

Wings

Size Both sexes macropterous, with wings being longer than head and thorax together.

Fore wing shape Broad and wide-tipped.

Fore wing veins 2 longitudinal, 4 cross veins and a ring or wing-tip vein, the latter being the same colour as wing membrane in some species and darker than the wing membrane in others.

Hair-like structures on forewing 2 complete rows of setae on longitudinal veins.

Setae on clavus Variable.

Abdomen

Shape of different segments/tergites/ sclerites Tergite I with weak transverse sculpture lines.

Ovipositor Pointing upwards towards abdominal segments.

Tergites

Texture Tergite I with weak transverse sculpture lines.

Campaniform sensilla Absent.

Tricobothria on tergite X (Aeolothripidae) As large as setal bases on same segment.

Sclerites

Setae Sternite VII with three pairs of long postero-marginal setae and two pairs of short setae set away from the margin between S_1 and S_2. Distance between S_1 - S_1 and between S_1 - S_2 varies between and is diagnostic of species.

Craspedum/ microtrichial comb Absent.

Wing bearing setae (Tubulifera) n/a

Ctenidia (Thripidae) n/a

Male features:

Pore plates Absent.

Tubercles on tergites present in some species

Hair-like structures on tergite IX with: a) bifurcate claspers and in some species, paired sickle-shaped setae, b) with lateral setae, and c) with short seta at the base of the clasper not reaching apex of segment. Distance between median setae of tergite IX variable per species.

Setae on tergite X

Endotheca/Adaeagus -

Other features -

Further notes: -

Species name ***Aeolothrips gloriosus*** Bagnall, 1914

Body size: ♀: 1760 - 1940 µm; ♂: ?

Coloration:

Body Mostly yellow with brown areas medially. Body setae dark brown.

Head Yellow with brown areas medially.

Antennal segments Antennal segments I - II and basal half of III are yellow, the apical half of segment III and segment antennal segments V - VI dark brown and segments VII - IX light brown.

Pronotum Yellow with brown areas medially.

Pterothorax Yellow with brown areas medially.

Legs Yellow.

Fore wings With three pale bands alternating with two brown bands. Wing-tip pale.

Abdomen Segments I – II and VII medium brown, III-VI yellow with brown patches, and segments VIII-X dark brown.

Structural features:

Head

Proportions Slightly longer than broad.

Extension beyond compound eyes None.

Ocelli Prominently present between compound eyes.

Setae 12 - 15 pairs. All setae are short except for two pairs of inter-ocellar setae which are darker and thicker than others.

Compound eyes Compound eyes curved and with a large number of ommatidia.

Texture Weak transverse lines of sculpture in the post-ocellar region.

Mouth cone Extends all the way down the length of the pronotum.

Maxillary stylets (Tubulifera) n/a

Palpi 3-segmented

Antennal segments

Number of segments 9

Proportions Antennal segment V is slightly longer than VI - IX.

Sensoria on III and IV 1 per segment. Antennal segment III bears a linear sensorium which is about half the length of the segment, that does not extend past the segment apex. Antennal segment IV with a broad, long sensorium that curves around the segment apex.

Pronotum

Shape Posterior and anterior sides approximately equal in length.

Texture With hardly any sculpture.

Basantra and ferna on prosternum (Tubulifera) n/a

Epimeral sutures (Tubulifera) n/a

Setae on anterior margin All setae on anterior margin as long as discal setae.

Setae on posterior margin All setae except for central two pairs as long as discal setae. Central pair of setae slightly longer, thicker and darker than other setae.

Other setae -

Pterothorax

Texture Transverse reticulation on mesothorax. Reticulate reticulation on anterior metathorax.

Campaniform sensilla Present on both meso- and metathorax.

Metanotal median setae Emerging from anterior margin.

Endofurca "U" shaped in both meso- and metathorax.

Spinula Present on both meso- and metathoracic endofurcae.

Mesothoracic sternopleural suture (Tubulifera) n/a

Legs

Texture Legs with hardly any sculpture.

Tibiae Not prolonged laterally around tarsus.

Tarsi 2 segmented. Fore tarsus with stout apical recurved ventral hamus.

Wings

Size Both sexes macropterous, with wings being longer than head and thorax together.

Fore wing shape Broad and wide-tipped.

Fore wing veins 2 longitudinal, 4 cross veins and a ring or wing-tip vein, the latter being the same colour as wing membrane.

Hair-like structures on forewing 2 complete rows of setae on longitudinal veins.

Setae on clavus 9 marginal setae.

Abdomen

Shape of different segments/tergites/ sclerites Tergite I with weak transverse sculpture lines.

Ovipositor Pointing upwards towards abdominal segments.

Tergites

Texture Tergite I with weak transverse sculpture lines.

Campaniform sensilla Absent.

Tricobothria on tergite X (Aeolothripidae) As large as setal bases on same segment.

Sclerites

Setae Sternite VII with three pairs of long postero-marginal setae and two pairs of short setae set away from the margin between S_1 and S_2. Distance between S_1 - S_1 is larger than that between S_1 - S_2.

Craspedum/ microtrichial comb Absent.

Wing bearing setae (Tubulifera) n/a

Ctenidia (Thripidae) n/a

Male features:

Pore plates n/a

Tubercles on tergites n/a

Hair-like structures on tergite IX n/a

Setae on tergite X n/a

Endotheca/Adaeagus n/a

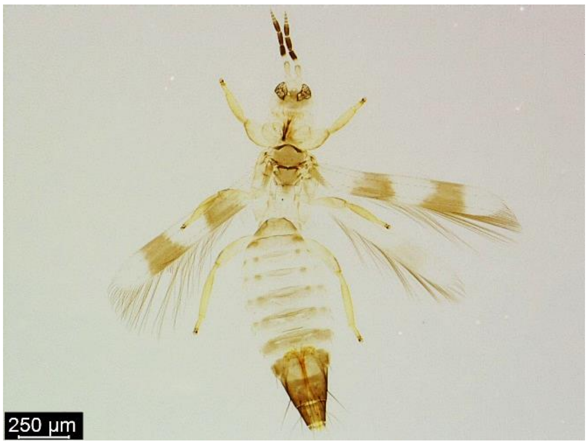
Other features n/a

Further notes:

According to zurStrassen (2003) and Mound et al., (2018), the mid- and hind tibiae are sometimes brown in specimens from Britain and the European continent).

The size range for local specimens matches the sizes described by zurStrassen (2003) which are ♀1710 - 2160 µm.

Species Habitus



Aeolothrips gloriosus (Bagnall, 1914) ♀

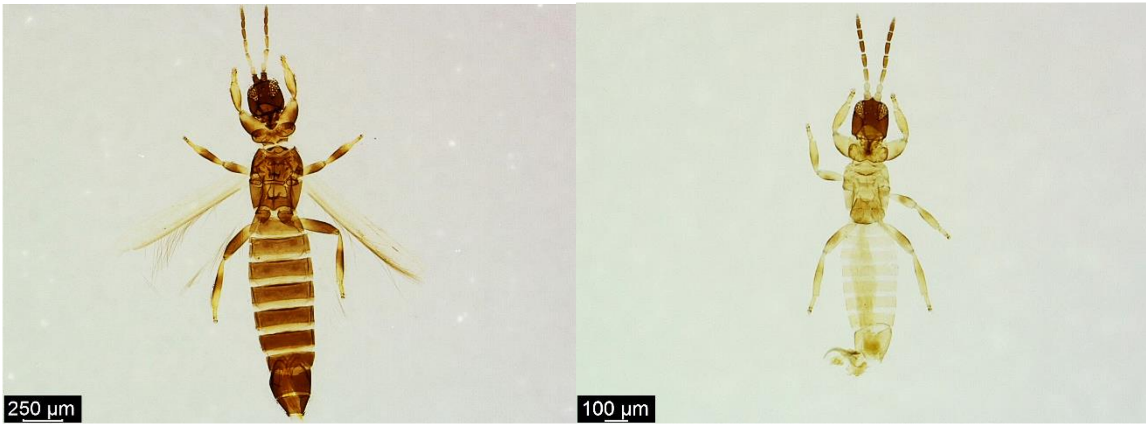
Aeolothrips Intermedius Bagnall, 1934 ♀ and ♂

Aeolothrips melisi Priesner, 1936 ♀ and ♂

Aeolothrips tenuicornis Bagnall, 1926 ♀ and ♂

Franklinothrips megalops Trybom, 1912 ♀

Rhipidothrips brunneus Williams, 1913 ♀



Rhipidothrips gratiosus Uzel, 1895 ♀ and ♂

Rhipidothrips niveipennis Uzel, 1895 ♀

Rhipidothrips unicolor Uzel, 1895 ♀

Melanthrips ficalbii Uzel, 1895 ♀

Melanthrips fuscus Uzel, 1895 ♀ and ♂

Melanthrips knechteli Uzel, 1895 ♀ and ♂

Melanthrips lybicus Priesner, 1936 ♀ and ♂

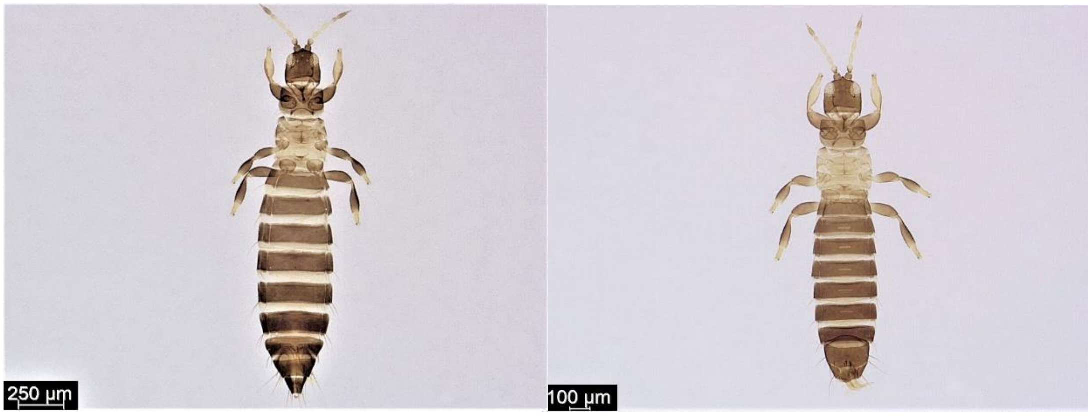
Holarthrothrips tenuicornis Bagnall, 1927 ♀ and ♂

Dendrothrips saltator Uzel, 1895 ♀ and ♂

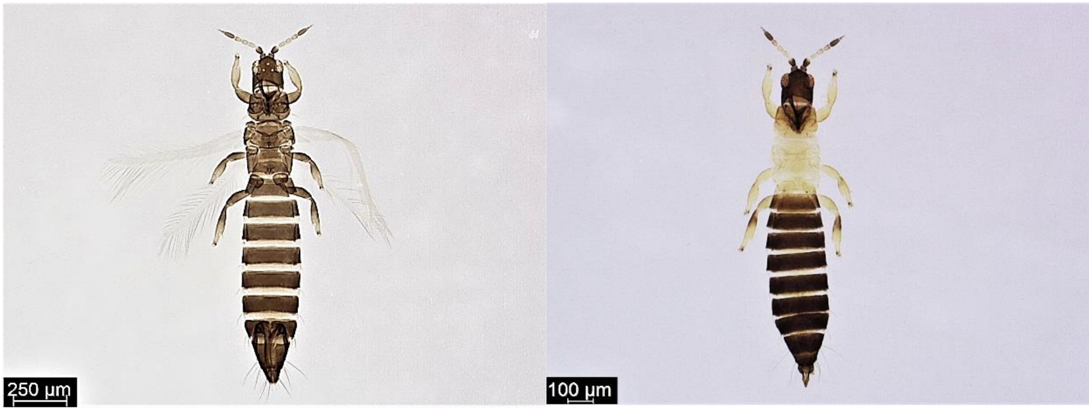
Heliothrips haemorrhoidalis (Bouchè, 1883) ♀

Hercinothrips femoralis (Reuter, 1881) ♀

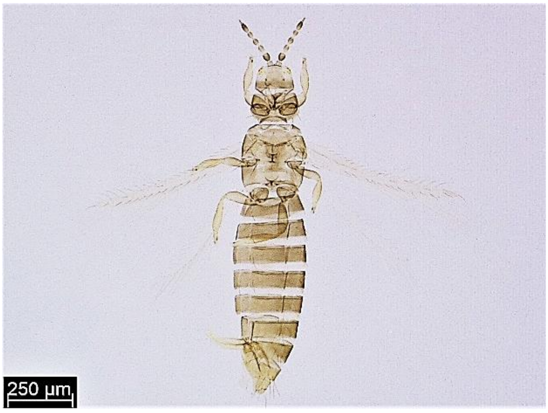
Anaphothrips sudanensis Trybom, 1911 ♀



Asphodelothrips croceicollis (Karnyi, 1914) ♀ and ♂



Bregmatothrips dimorphus (Priesner, 1919) ♀ and ♂



Ceratothrips ericae (Haliday, 1836) ♀

Chirothrips hamatus Trybom, 1895 ♀

Chirothrips manicatus (Haliday, 1836) ♀ and ♂

Chirothrips meridionalis Bagnall, 1927 ♀ and ♂

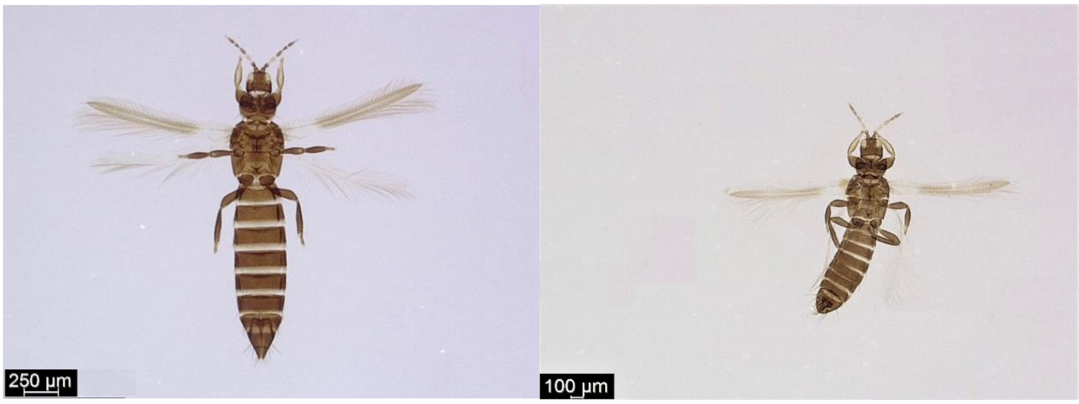
Echinothrips americanus Moulton, 1911 ♀

Frankliniella occidentalis (Pergande, 1895) ♀ and ♂

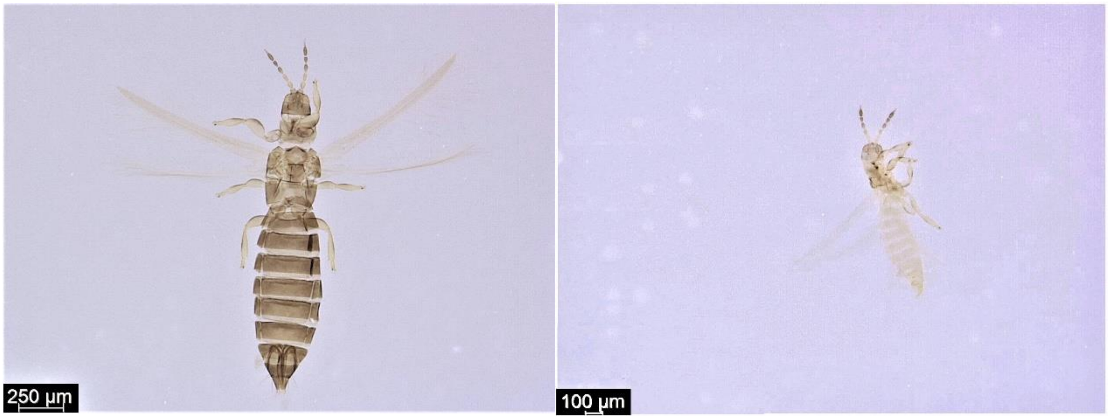
Frankliniella schultzei (Trybom, 1910) ♀

Limothrips angulicornis Jablonowski, 1894 ♀

Limothrips cerealium (Haliday, 1836) ♀ and ♂



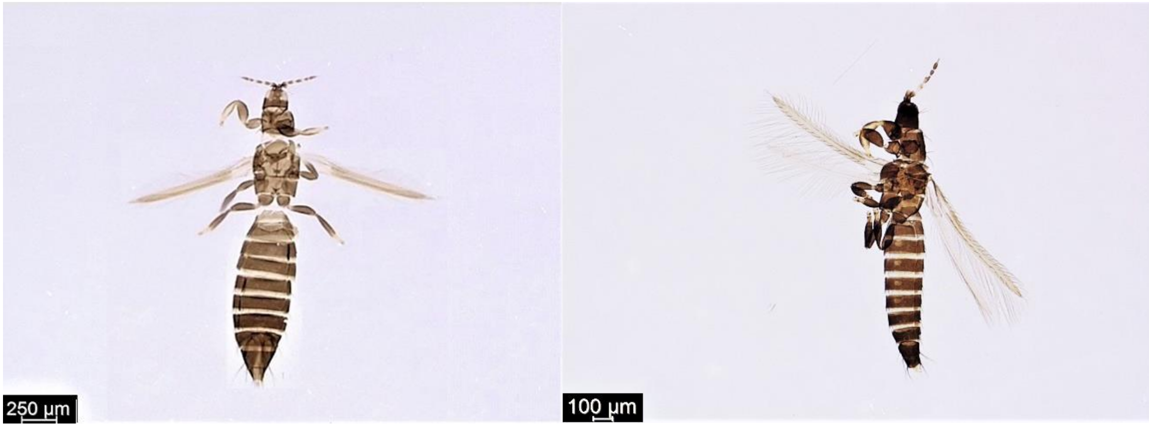
Odontothrips meliloti Priesner, 1951 ♀ and ♂



Oxythrips ajugae Uzel, 1895 ♀ and ♂

Pezothrips kellyanus (Bagnall, 1916) ♂

Prosopothrips nigriceps Bagnall, 1927 ♀



Taeniothrips picipes (Zetterstedt, 1828) ♀ and ♂

Tenothrips discolor (Karnyi, 1907) ♀

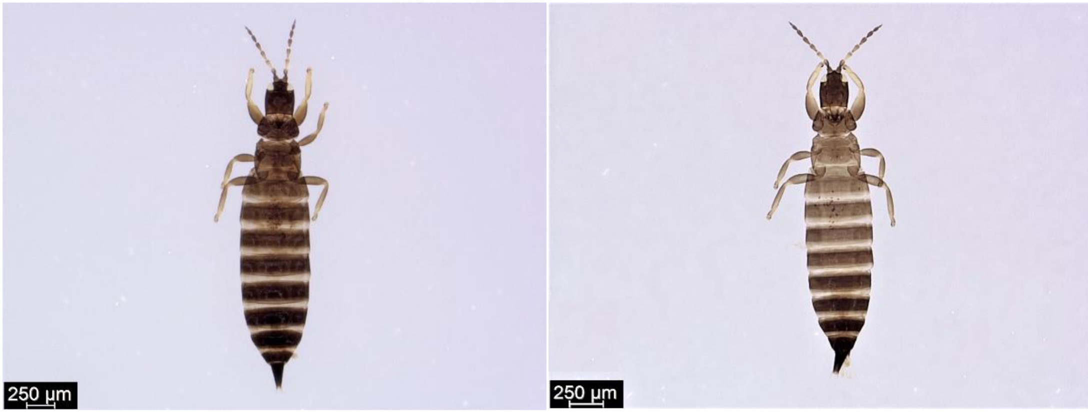
Thrips australis (Bagnall, 1915) ♀ and ♂

Thrips major Uzel, 1895 ♀

Thrips simplex (Morison, 1930) ♀

Thrips tabaci Lindeman, 1889 ♀

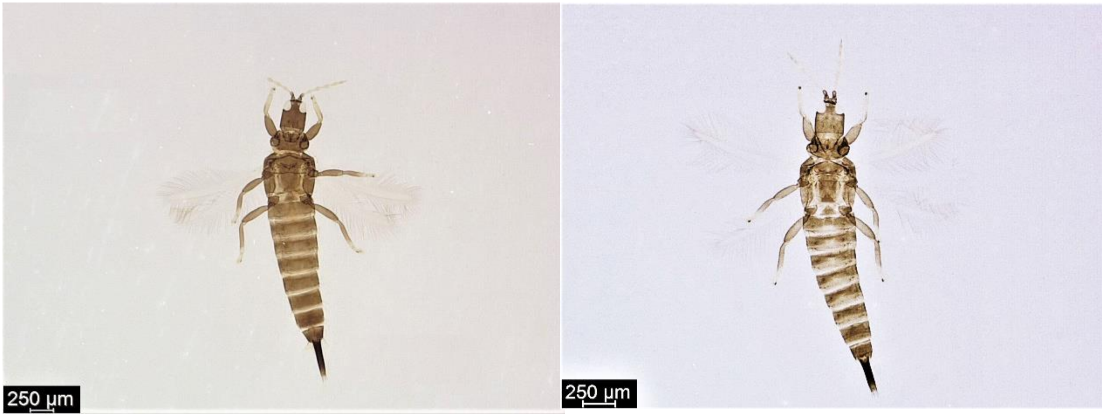
Thrips tarfayensis (zur Strassen, 1968) ♀



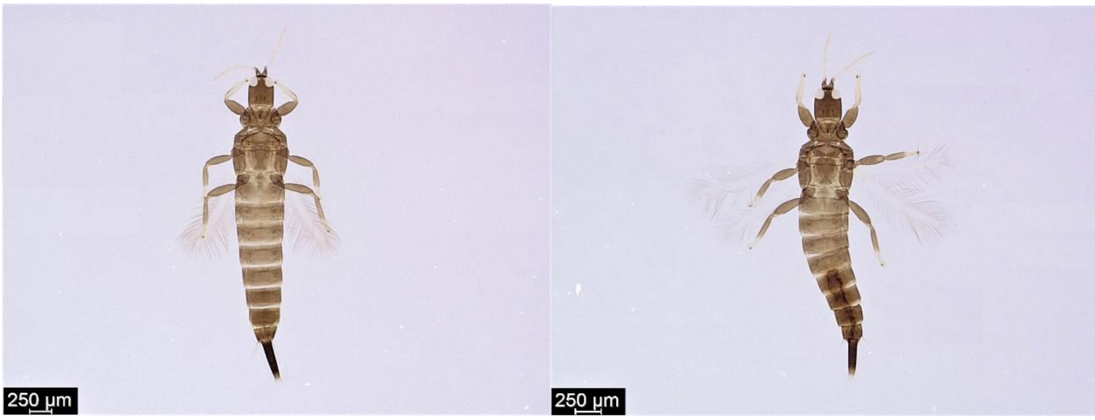
Bolothrips dentipes (Reuter, 1880) ♀ and ♂

Bolothrips insularis (Bagnall, 1914) ♂

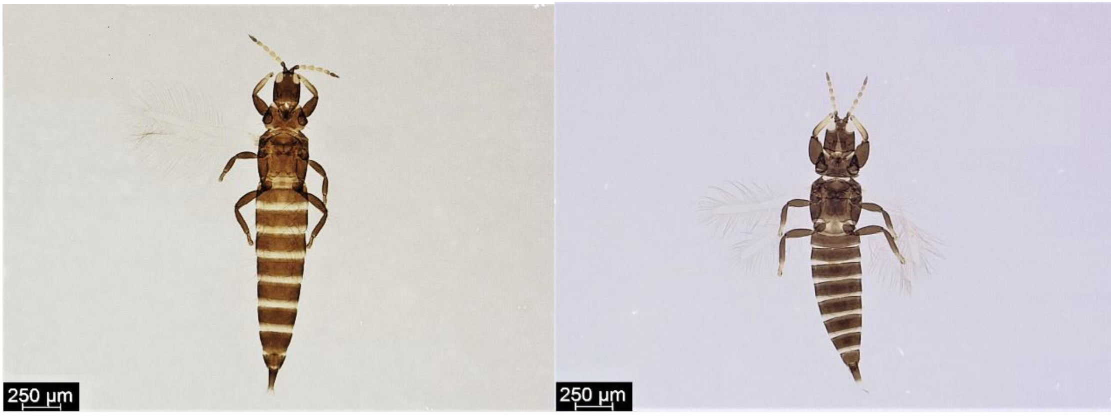
Priesneriella mavromoustakisi (Crawford, 1948) ♀



Gynaikothrips ficorum (Marchal, 1908) ♀ and ♂



Gynaikothrips uzeli (Zimmermann, 1900) ♀ and ♂



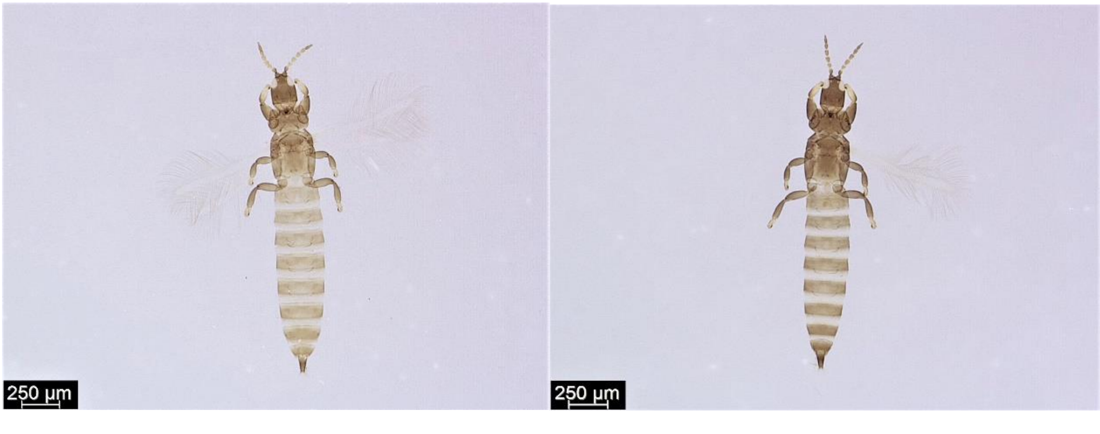
Haplothrips acanthoscelis (Karnyi, 1910) ♀ and ♂

Haplothrips aculeatus (Fabricius, 1803) ♀ and ♂

Haplothrips setiger Priesner, 1921 ♀ and ♂

Haplothrips tritici (Kurdjimov, 1912) ♀

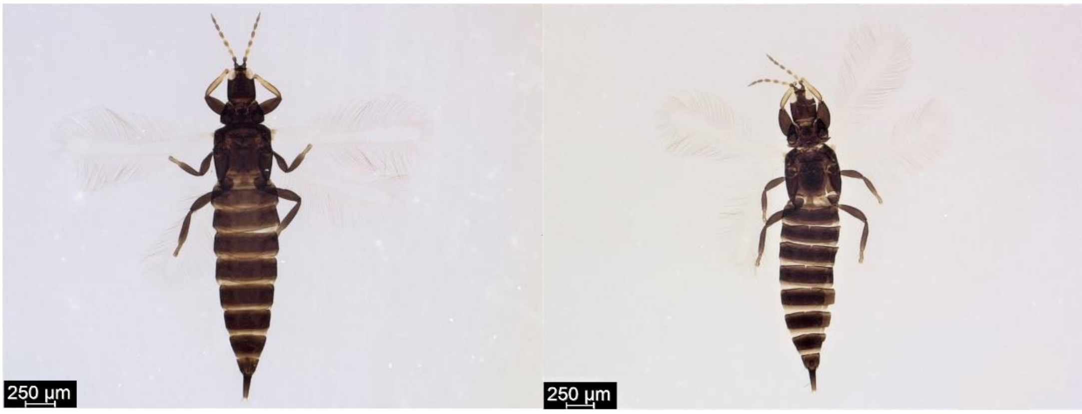
Karnyothrips flavipes (Jones,1912) ♀



Karnyothrips sp. ♀ and ♂

Liothrips oleae (Costa, 1857) ♀

Liothrips reuteri (Bagnall, 1913) ♀ and ♂



Neoheegeria dalmatica Schmutz, 1909 ♀ and ♂