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WHITEFLY PARASITOIDS FROM THE MALTESE ISLANDS.

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ABSTRACT

Nine whitefly parasitoids in three different families (Aphelinidae, Eulophidae and Platygasteridae) are recorded from the Maltese Islands. An *Amitus* sp. and a *Euderomphale* sp. are recorded for the first time as occuring on *Tetralicia ericae* Harrison. Notes on introduced species for biological control of whitefly pests are also included.

INTRODUCTION

Information on local whitefly parasitoids is very limited and very few local works have been published on the group. Borg (1935) mentioned *Prospaltella coniugata* [probably referring to *Encarsia tricolor* Foerster (= *Prospalta conjugata* Masi)], as an effective parasitoid of the European Cabbage Whitefly, *Aleyrodes proletella* (Linnaeus). However, no direct evidence is cited as to whether such material was actually collected from the Maltese Islands. One of us (D.D.) contributed an article in Il-Biedja Llum (Anon., 1985) documenting the introduction of *Cales noacki* (Howard), for the biological control of the newly introduced pest, *Aleurothrixus floccosus* (Maskell). A recent work (Mifsud, 1993, unpublished), mainly dealing with the taxonomy of whiteflies and their parasitoids in the Maltese Islands, mentions seven hymenopteran parasitoids.

The present work updates our current knowledge of whitefly parasitoids. Where possible, information on local biological control of whitefly pests is also given.

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SPECIES LIST

Aphelenidae

Cales noacki Howard, 1907

Material examined: Malta: Zejtun 12/X/92 14♂♂ ; 5♀♀; Buskett 20/XI/92 2♀♀; B'Kara 28/XI/92 6 ♂♂, 4♀♀; all from *Aleurothrixus floccosus* (Maskell) on *Citrus aurantium*.

Distribution: *C. noacki* is Neotropical in origin, but has been successfully introduced into the Nearctic and Palaearctic Regions as a biological control agent against *Aleurothrixus floccosus* (Maskell) (Viggiani & Carver, 1988).

Notes: *C. noacki* was purposely introduced in the Maltese Islands in 1986 (Anon., 1986) to control the newly introduced citrus whitefly *A. floccosus* (Maskell). It was released in the following localities in Malta: Sliema, Birkirkara, St. Venera, Gwardamangia and Balzan.

Encarsia formosa Gahan, 1924

Material examined: Reared material from introduced *Encarsia formosa* (Msida: University; Marsa: Department of Agriculture).

Distribution: *E. formosa* is a native of the Americas (Speyer, 1927) but has been introduced throughout the world for the biological control of the greenhouse whitefly *Trialeurodes vaporariorum* (Westwood).

Notes: *E. formosa* was not found naturally occurring in the Maltese Islands. It has been introduced in 1990 as a biological control agent against *T. vaporariorum* (Westwood) in greenhouses, in the following localities: Ghammieri, Pwales, Dingli, Birkirkara, Buskett and Burmarrad in Malta and in Xewkija and Nadur in Gozo.

Encarsia lutea (Masi, 1909)

Material examined: Malta: Sliema 26/XI/92 2♂♂; 1♀ from *T. vaporariorum* on *Mentha spicata*. Gozo: Dwejra 6/X/92 2♂♂ ; 1♀ from *B. tabaci* on *Solanum nigrum*.

Distribution: Originally described as a parasite of Aleyrodidae in South Western Europe (Masi, 1909), *E. lutea* is now known to be a cosmopolitan species (Polaszek *et al.*, 1992).

Notes: *E. lutea* is not host-specific, having been recorded on more than 16 whitefly species throughout the world (Lopez-Avilla, 1986; Viggiani, 1987; Yasnosh, 1989; Polaszek *et al.*, 1992).

Encarsia tricolor Foerster, 1878

Material examined: Malta: Marsaskala 23/XI/93 6♀♀ from *Aleyrodes proletella* on *Brassica* sp.

Distribution: Palaearctic.

Notes: The commonest and best-known host of *E. tricolor* is the cabbage whitefly *Aleyrodes proletella* (Linnaeus); however, it is known to occur on various other whitefly species (Mazzone, 1976; Viggiani & Laudonia, 1985).

***Encarsia* sp.**

Material examined: Malta: Zejtun 11/X/92 1♀; Zejtun 14/X/92 1♂. Gozo: Ghajnsielem 6/X/92 2♂♂. All from *Dialeurodes citri* (Ashmead) on *Citrus aurantium*.

Notes: An important parasitoid which was introduced in various parts of Italy for the biological control of *Dialeurodes citri* is *Encarsia lahorensis* How. So far, this parasitoid has not been found in the Maltese Islands.

Eretmocerus mundus Mercet, 1931

Material examined: Malta: Bahrija 4/IX/92 2♀♀ from *Bemisia tabaci* (Gennadius) on *Helianthus tuberosus*. Gozo: Ghajnsielem, Dwejra, Victoria 3/X/92 and Marsalforn, Sara Valley 6/X/92 (several specimens collected on *Brassica* sp. infested with *B. tabaci)*.

Distribution: *E. mundus* was originally described on material obtained from Spain and Italy (Viggiani, 1965). It is known to occur throughout the Palaearctic region, having been introduced into various countries as a biological control agent of the tobacco whitefly *Bemisia tabaci*.

Notes: *E. mundus* probably entered the Maltese Islands with the introduction of its host species, *Bemisia tabaci,* since no information is available on artificial introductions. From observations made, *E. mundus* seems to be a well established species, especially on the Island of Gozo.

Eretmocerus sp.

Material examined: Malta: Buskett 3/X/93 2♀♀ from *Bemisia afer* (Priesner & Hosny) on *Ceratonia siliqua* (Linnaeus).

Notes: So far, in Italy the only *Eretmocerus* parasitoid obtained from *B. afer* is *E. roseni* (Viggiani & Battaglia, 1983).

Eulophidae

Euderomphale sp.
Material examined: Malta: Selmun, 1♂; 1♀. In *Tetralicia ericae* Harrison on *Erica multiflora.*

Notes: No species of *Euderomphale* has been recorded from *Tetralicia ericae* Harrison. Since the material available for study had not yet emerged from its host, certain characteristics could not be clearly observed. The genus is represented in the Italian fauna by two species: *E. bemisae* Viggiani a parasitoid obtained from *Bemisia citricola* Gomez- Menor [= *B. afer* (Priesner & Hosny)] (Viggiani, 1977), and *E. chelidonii* Erdos reared from *Aleyrodes lonicerae* Walker (Mazzone, 1988).

Platygasteridae

Amitus sp.

Material examined: Malta: Ghajn Hadid (Selmun) 26/XI/92 1♀; 23/XI/93 2♀♀; all from *Tetralicia ericae* Harrison on *Erica multiflora.*

Notes: No species of *Amitus* had been previously recorded on *T. ericae.*

DISCUSSION

During the present work nine hymenopteran parasitoids (eight of which new to the Maltese entomofauna) were reared from seven whitefly species. The Maltese whitefly parasitoid complex is rather similar to that of the Italian and Sicilian fauna, although some differences are encountered. Whitefly parasitoids which have reached the Maltese Islands due to the accidental introduction of the host species are represented by *Encarsia lutea* (Masi) introduced with its host species *Bemisia tabaci* (Gennadius) and *Trialeurodes vaporariorum* (Westwood); and *Eretmocerus mundus* Mercet introduced with *Bemisia tabaci.*

Cales noacki Howard was deliberately introduced in the Maltese Islands to control the newly introduced whitefly pest - *Aleurothrixus floccosus* (Maskell)

(Anon., 1985). Whether the prior introduction of *C. noacki* had occurred naturally with the introduction of its host species is not known; however it seems to be a well established species in the Maltese Islands.

Encarsia formosa Gahan was introduced on several occasions to control the greenhouse whitefly *Trialeurodes vaporariorum* (Westwood). During this study, *E. formosa* was not found occurring naturally outside greenhouses.Interesting whitefly parasitoids were reared from *Tetralicia ericae* Harrison and *Bemisia afer* (Priesner & Hosny). The only hymenopteran parasitoid previously recorded from *T. ericae* was an *Encarsia* sp. of the *lutea* (Masi) group (Iaccarino & Viggiani, 1988). In the present study, two hymenopterous parasitoids were reared from *T. ericae*: *Euderomphale* sp. (Chalcidoidea, Eulophidae) and *Amitus* sp. (Proctotrupoidea, Platygasteridae).

An *Eretmocerus* sp., possibly indigenous, (Mifsud, 1994) emerged from *Bemisia afer*.

This present note highlights the need for further study to be undertaken on the Maltese whitefly parasitoid complex. At present several investigations are in progress to evaluate the exact identification of poorly represented material.

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