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NOTES ON RARE AND INFREQUENT ORTHOPTERA OF THE MALTESE ISLANDS

Louis F. Cassar [1]

ABSTRACT

7 species of Orthoptera whose status in the Maltese Islands is rare or infrequent are discussed. Of these, 2 species namely, *Platycleis albopunctata* (Tettigoniidae) and *Sphingonotus savignyi* (Acrididae), are recorded for the first time.

Details of habitat in which the specimens were recorded are also taken into account.

The list of Maltese Orthoptera has over the years been added to and updated by both local and foreign authors. (BORG, 1939; VALLETTA, 1954; 1955; LANFRANCO, 1955; 1957; BACCETTI, 1973; CILIA, 1975; SCHEMBRI and EBEJER, 1983). The present contribution, based on the accumulation of a number of records from various localities, is intended to supplement previous listings and to further the knowledge of the Orthopterous fauna which occurs in the Maltese Islands.

TETTIGONIIDAE

Phaneropterinae
Odontura stenoxipha (Fieber, 1853) TL: Sicily
Malta: Għadira, ?.07.74, 1 ♂, Leg.: A. Valletta det.: M. La Greca.

This apterous specimen was taken on *Inula crithmoides* L. and is presently deposited in the writer's collection.

Conocephalinae
Homorocoryphus nitidulus (Scopoli, 1786) TL: Italy
syn. *H. mandibularis* Charpentier, 1825.
Malta: Baħrija Valley, 09.10.82, 1 ♀. leg: LFC.

The single specimen was noted at rest on a leaf of *Juncus maritimus* Lam., during daytime. Possibly a remnant of a depleted population which may have existed in the area. The Genus is singly represented in the Mediterranean region, but may be considered cosmopolitan in warmer regions.

Decticinae
Platycleis albopunctata (Goeze, 1778) TL: France
syn. *P. denticulata* Panzer, 1796
P. striata Thunberg, 1815
P. grisea Zetterstedt, 1821 (nec F.)
The records below refer to the subspecies *maura* Zeuner, 1941.
Malta: Għadira, 03.08.76 1 ♂, leg.: LFC
Madliena, 13.06.82, 1 ♂, leg.: S. Fleri Soler det W.J. Reynolds

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The specimens were taken at dusk, while sweeping in pockets of thick vegetation in sand dune (Għadira) and garigue (Madliena) habitats. A number of *Platycleis* sp. specimens have been taken from the mentioned localities on a number of occasions and their determination has yet to be confirmed, since *P. affinis* Fieb. (VALLETTA 1954; LANFRANCO 1955) and *P. intermedia* Serv. (BACCETTI) have also been taken from the Maltese Islands. These two species were determined by the late L. Chopard, Musee National d'Histoire Naturelle, Paris and by B. Baccetti, Istituto di Zoologia dell'Universita di Siena, respectively. *P. albopunctata, P. intermedia* and *P. affinis* may well be widespead in the Maltese Islands considering the many localities from which these species were recorded. However further field investigations would be required in various localities to assess their status more accurately. In a recent publication Schembri and Ebejer included *Platycleis grisea* (Fabricius, 1781) in addition to *P. affinis* and *P. intermedia.* (SCHEMBRI and EBEJER, 1983) In this respect it is worth mentioning that the specimens being recorded in the present work were initially determined as *P. grisea maura* by W.J. Reynolds of the British Museum (Natural History). In a later personal communication Reynolds acknowledged putting the specimens in *grisea* because of the side sclerites and the subgenital plates being fused. However he added that despite this Harz has left them in *albopunctata.* Consequently, he suggested following Harz and referring to the specimens as *albopunctata maura.*

Reynolds further commented that if *albopunctata* and *grisea* were ever to be synonymised, *maura* would definitely be in *albopunctata* since it is the older name. Evidently, these are difficult species to separate and without doubt further study is essential for a more accurate determination. The song would be a great help in such situations, as with most stridulating Orthoptera.

GRYLLIDAE

Gryllinae
Brachytrupes megacephalus (Lefevre, 1827) TL: Sicily
Malta: Għadira, 08.04 to 20.05.83, 19 ♂♂. (not collected).

This population was kept under observation between 08.04 and 20.05.83. All specimens were recorded stridulating at the mouth of their burrows. *B. megacephalus* is an indigenous species and occurs within the Għadira sand dune area in a relatively well-established population. It is however precariously localised and its breeding success depends on the complex and unstable environment of the dune ecosystem.

Marsa, 11.10.83, 1 ♀, leg.: P.M. Sammut.

This female was found aboard a vessel berthed at Grand Harbour, an industrial Port area. The cargo ship, (M/T Mulberry Queen), had sailed to Malta from Augusta (Sicily) via Libya. This species occurs quite commonly in both Sicily and Libya and was probably transported here accidently.

Gozo: Ramla l-Hamra, 09.04.90, 1 ♂, Obs.: LFC. (not collected)

This is the second known record from the island of Gozo, after a lapse of almost 35 years. The first record was of another male which was discovered at Ramla l-Hamra while workmen were shifting sand. (LANFRANCO, 1957) The recent specimen was observed stridulating outside a north-facing burrow excavated in a cultivated area in the hind portion of the dunes.

Gryllus campestris Linnaeus, 1758 TL: Europe
Malta: Msida, 14.08.75, 1 o, leg.: LFC

The specimen was first noted stridulating in a shallow crevice along the sidewalk of an urban area and was eventually attracted from its refuge with over-ripe tomato fruit placed approximately 0.5 metre from the opening. This species, whose distribution comprises Europe, Estern Asia and North Africa, has previously been reported from at least two other localities in Malta. (Sliema — LANFRANCO, 1955; and Cospicua — CILIA, 1975). These sparse occurrences may be attributed to accidental importation.

ACRIDIDAE

Acridinae
Oedaleus decorus (Germar, 1826) TL: Podolsk (SW Russia)

syn. *O. nigrofasciatus* Bonnet & Finot, 1885
O. flavus Werner, 1914 (nec. L.)

Malta: Salina, 27.08.83, 1 ♂, leg.: LFC

This adult specimen was taken from the garigue which outlines the NW bank of the Salina salt-marsh, an area negatively affected by human encroachment. It is situated some 1.5 km from Għallis where two nymphs were recorded in June 1954. (LANFRANCO, 1955). Both localities are on the Island's Northern coastline, receding from inland masses of Upper Coralline limestone which form Ġebel San Pietru (126 m) and Ġebel Għawżara (118 m) assuming the shape of an extended horseshoe sorrounding the agricultural Magħtab/Burmarrad plain. This environment is similar in habitat and conditions to that of Djebel Dyr (1080 m), El Kef in tunisia (approx. 36°10' N: 8°40'E) where the author has recorded several examples of this species over a span of three years. It is relevant to note that the application of various pesticides does not seem to be in common use in the El Kef area as has been in the Magħtab/Burmarrad area in recent years. Assuming that *O. decorus* is indigenous and restricted to this particular area of the Maltese Islands, the use of such chemicals may have contributed to a decline in population numbers. Furthermore, the occurrence of vagrants to supplement the local population, as happens with *Locusta migratoria,* would be insignificant.
Oedaleus decorus is widespread in Africa and the Mediterranean Basin, with a sparse distribution throughout Southwest Asia.

Sphingonotus savignyi Saussure, 1884
Malta: Buskett (limits of Rabat), ?.08.79, 1 ♀, leg.: P.M. Sammut det.: W.J. Reynolds.

This rather worn specimen was taken in arid conditions over a stretch of land sorrounded by profuse vegetation. As far as can be ascertained, this is the first known record for the Maltese Islands, although the Genus is already represented by the commonly occurring *S. caerulans* L.

The distribution of *Sphingonotus savignyi* ranges throughout the North African desert region as far south to Niger; Cape Verde Islands; SW Asia from Saudi Arabia to India.

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ON SOME PREVIOUSLY UNRECORDED BLENNIDAE AND GOBIIDAE FROM MALTESE WATERS (Pisces - Osteichthyes - Perciformes)

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ABSTRACT

Two species of Blennidae, *Scartella cristata* Linne and *Parablennius incognitus* Bath, and a species of Gobiidae, *Gobius geniporus* Val. are recorded for the first time from Maltese coastal waters. Previously recorded species of Blennidae and Gobiidae are also listed with some comments.

INTRODUCTION

At present, the Maltese fish fauna consists of over 300 recorded species out of some 500 fishes known to occur in the Mediterranean (Tortonese 1963). The first records of Maltese fishes appeared as early as 1775, when Locano published a list of 117 fishes (in Forskaal 1775). Since then other workers have continued adding to the number of species. Notable works on Maltese fishes are those of Gulia Gav. (1861), Despott (1919), and Lanfranco (1958). Of these only Lanfranco has attempted to illustrate the species and give some kind of guide to identification. Recently published major revision of the taxonomy of Mediterranean fishes (Hureau & Monod eds. 1973; Tortonese & Hureau eds. 1979 and Whitehead et al eds. 1984-1986) necessitate the revision and updating of all records relating to the Maltese Islands. The present note lists three previously unrecorded species of fishes collected from Maltese coastal waters. These species were identified using published keys and descriptions mainly Soljan (1975); Tortonese (1975); Bath (1977); Miller (in Whitehead et al 1986) and Zander (in Whitehead et al 1986). The specimens are deposited in the author's collection. The nomenclature used in this paper follows Zander (in Whitehead et al 1986) for the Blennidae and Miller (in Hureau & Monod 1973) and Miller (in Whitehead et al 1986) for the Gobiidae.

BLENNIDAE

Scartella cristata Linnaeus 1758 (fig 1)

This species was first noticed at Xgħajra in August 1982 when a specimen was observed in an angler's catch. Another specimen was collected from Delimara on 25th October 1987 in water less than 1 metre deep.

Measurements of the Delimara specimen (mm)

Total Length	81.1
Standard Length	65.2
Head Length	19.0
Head Height	15.9
Snout Length	3.8
Inter-orbital space	3.1
Eye Diameter	4.5

[1]. *No. 1 Margerita Flats, Censu Busuttil Str., Fgura, Malta.*

Indices

Total Length/ Head length	4.26
Standard length/ Head length	3.43
Head length/ Head height	1.19
Head length/ eye diameter	4.20

Characters (l = left, r = right)

Number of nasal tentacles (l/r)	6/6
Number of orbital tentacles (l/r)	9/9
Number of Nucal tentacles	21
Dorsal fin rays	xii - 15
Anal fin rays	ii - 16
Pectoral fin rays	14

Coloration:

Overall yellowish/grey green with dark brown markings distributed as in fig 1; Small white spots at base of dorsal fin; anal fin rays edged with white.

Comparing the morphometric and morphological characteristics of the Maltese specimens with those in Bath (1970) and Balma-Delmastro (1984) for Ligurian specimens, no appreciable differences are evident.

Parablennius incognitus Bath 1968 (figs. 3a and 4)

This species was first taken from Ras il-Fekruna (St. Paul's Bay) in August 1972. After photographing, the specimen was released in the same locality. Final identification was only made in 1986. A similar species *Parablennius zvonimiri* Kolombatovic 1892, was reported for Malta by Jennings (1979). It is possible that Jennings' record actually refers to *P. incognitus* Bath, since his identifications are entirely based on Lythgoe & Lythgoe (1971) and these authors only cite *Blennius zvonimiri* Kolomb. The two species can be separated since the tentacles present above the eye are more complex in *P. zvonimiri*. As figs 3 & 4 indicate the Maltese specimen should be assigned to *P. incognitus* Bath 1968.

Other Blennidae recorded from Maltese waters include:

Blennius occellaris Linnaeus 1758 - First recorded by Trapani (1838) and cited by almost all subsequent authors. This species is common in local waters and especially around Grand Harbour.

Lipophrys pavo (Risso 1810) - First recorded by Gulia (Gav) (1861) as *Ichthyocoris pavo* (Bon.), and cited by other workers. Very common in rock pools and salt pans. (salini).

Lipophrys trigloides (Valenciennes 1836) - This species replaces all previous local references to *Blennius pholis* Linneaus and *Pholis laevis* (Val.) as recorded by Trapani (1838), Gulia (Gav) (1861), Adams (1870), Gulia (Giov) (1889-90); Despott (1919) and Lanfranco (1958). In the Mediterranean true *B. pholis* Linn., have only been reported from Terremolinos in southern Spain. (Bath (1971) as cited in Tortonese (1975)). *P. trigloides* Val. is frequent in shallow water at Delimara.

Lipophrys basilicus (Valenciennes 1836) - First recorded by Jennings (1979). No material has been examined by the author.

Parablennius gattorugine (Brunnich 1768) - First recorded by Gulia (Gav.) (1861) as *Blennius gattorugine* (Linn) and cited by other workers. Frequent in shallow water.

Parablennius tentacularis (Brunnich 1768) - First recorded by Trapani (1838) as *Blennius tentacularis* Linn. Also recorded by Despott (1919) and Lanfranco (1958). No material has been examined by the author.

Parablennius sanguinolentus (Pallas 1811) - First recorded by Baldacchino (1935) and also mentioned by Lanfranco (1958). Barbara (1961) coined a Maltese name for this species which was later reproduced in Bini (1965) and Aquilina (1969)

Aidablennius sphynx (Valenciennes 1836) - First recorded by Lanfranco (1958). Quite common in the various creeks and inlets of Grand Harbour.

Coryphoblennius galerita Linneaus 1758 - First reported by Forskaal (1775) and by Trapani (1838), but not by later workers. This easily recognisable species is characterised by having a simple median erect appendage on top of the head followed by a longitudinal series of filiform appendages. It is a common species all around the Mediterranean, Black Sea and the Atlantic from the Gulf of Guinea to England (Tortonese 1975).

Blennius sp. (nov.)? - Jennings (1979) reports this blenny saying 'closely resembling *B. pavo;* is common in S.E. Maltese waters. Body and fins similar to *B. pavo;* no orbital tentacles at all. The typical black spot behind the eye of *B. pavo* is absent; the body hump less pronounced or absent'. No material agreeing with this description has as yet been observed. It should be noted that *B. pavo* (= *Lipophrys pavo* Risso 1819), *Lipophrys basilicus* Val. 1836, and *Lipophrys fluviatilis* Asso 1801, are somewhat similar species. In *L. basilicus* the head crest ('body hump') is low and almost absent and the black spot behind the eye is absent. *L. basilicus* has already been recorded only by the same author. *L. fluviatilis* has a very oblique profile, no dark spot behind the eye, the crest is low and truncated and no bluish lines appear on the flanks.

L. fluviatilis is found in brackish water lagoons, estuaries and fresh water courses, (Tortonese 1975, Cottiglia 1980)

Aquilina (1987) in his Maltese-English Dictionary, under the word BUDAKKRA writes " VJ says that *budakkra* and *bużullieqa* are used to describe various species of the genus *Blennius,* and gives *budakkra tar-rig (Blennius rouxi)* ".
In this respect Aquilina is referring to an unpublished 'List of Fish names with their Scientific Nomenclature' compiled for the author by V. Jaccarini. It is here assumed that V. Jaccarini, a marine biologist, coined this new Maltese name for *B.rouxi* (= *Parablennius rouxi* Cocco 1833) since he must have met with it in his investigations. This fish is easily recognised by the black-brown longitudinal line from head to caudal fin over a whitish or pale yellowish background. No other published records of this species from the Maltese Islands are known to the author.

GOBIIDAE

Gobius geniporus Valenciennes, 1837 (figs. 2a & b)

In his original description of this species Valenciennes (1837) gave the type locality as "Naples, Sicilie et Malte" (Miller in Hureau-Monod, 1973), thus giving the first record of this species from the Maltese Islands. Subsequent workers on the Maltese Ichthyofauna have not included this species. In August 1985 the author collected two specimens from Birżebbuġa on a sand bottom at the edge of *Posidonia* meadows.

Measurements of the Birżebbuġa specimens (mm)

	I	II
Total Length	76.3	87.2
Standard Length	62.7	73.0
Head Length	18.9	20.1
Head Height	13.0	9.9
Snout Length	3.9	4.5
Interorbital space	1.1	1.3
Eye Diameter	4.0	4.7
Maximum height	12.5	10.5

Indices

Total Length/ Head length	4.04	4.34
Standard Length/ Head length	3.32	3.63
Head height/Head Length	1.45	2.03
Head Length/ eye diameter	4.72	4.28
Total Length/ Max. height	6.10	8.30

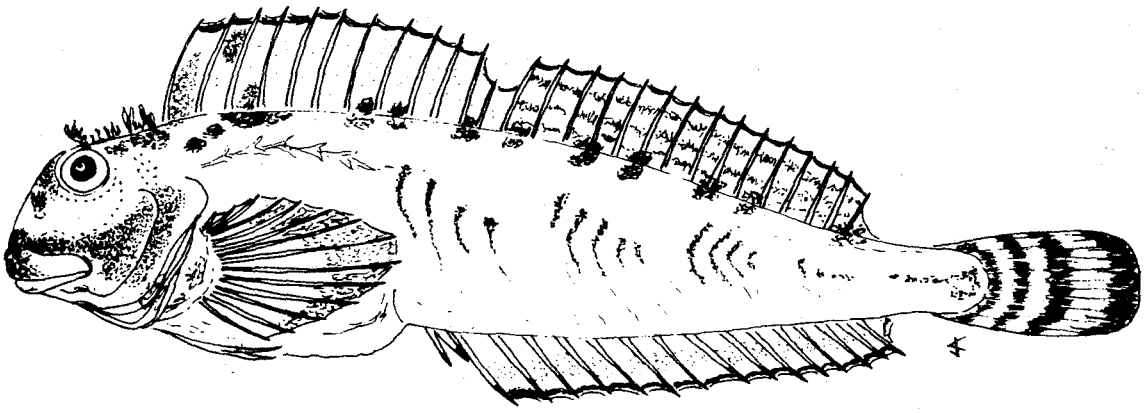

Fig. 1 *Scartella cristata* **Linnaeus 1758 (81.8 mm)**

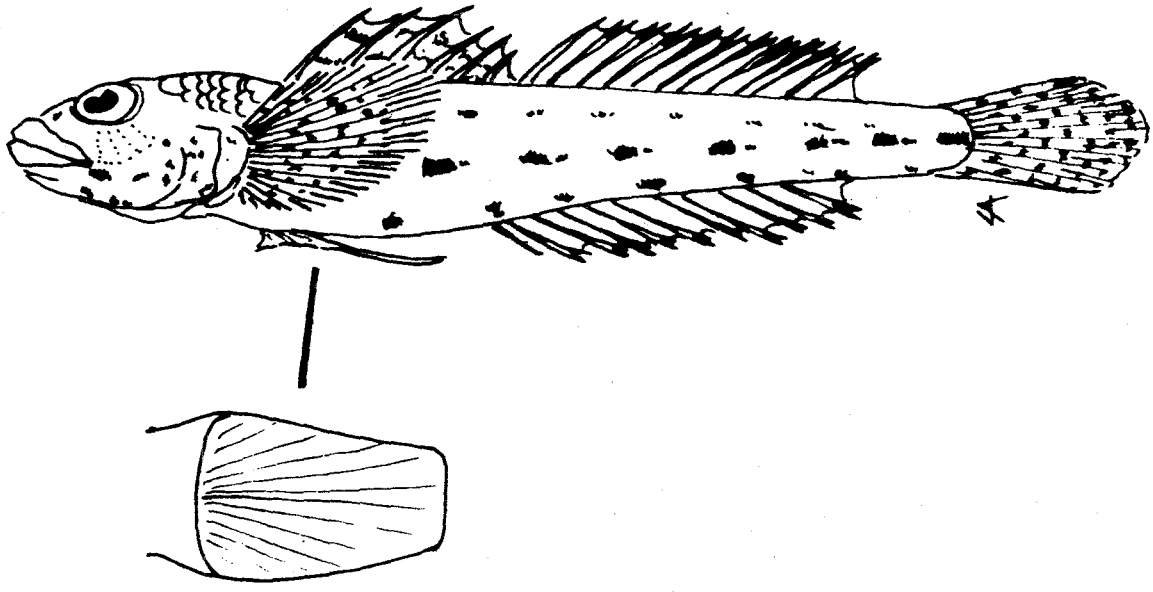

Fig 2. (a) *Gobius geniporus* **Valenciennes 1837 (76.3 mm)**
(b) *G. geniporus* **— pelvic fin.**

Characters	I	II
First dorsal fin rays	vi	vi
Second dorsal fin rays	12	12
Anal fin rays	i-11	i-11
Pectoral fin rays	18	18
Lateral scales	53	54

Coloration: light brown with dark spots and markings; a series of larger spots appear along flanks as in fig 2a; Pelvic fin anterior membrane well developed; pelvic disc posterior edge truncate. (fig 2b)

The Mediterranean Gobiid fauna includes some 50 species divided into 22 genera, most of which are monotypic. At present the Maltese Gobiidae are represented by seven species of the Genus *Gobius* (out of a total of 15 Mediterranean species). Of these, *G. niger* Linneaus 1758 *G. cobitis* Pallas 1811, *G. cruentatus* Gmelin 1789 and *G. paganellus* Linneaus 1758, are very common and have been reported in most local lists. *G. auratus* Risso, 1810, has been recorded by Despott (1919) and Lanfranco (1958). However this species is not well defined and is often confused with *G. luteus* Kolombatovic 1891, (Tortonese 1975). *G. bucchichi* Steindachner 1870 seems to occur on the Northern coast of Malta, however a specimen in the author's collection which may belong to this species is not in a good state of preservation so positive identification is still pending.

Other Maltese Gobiidae are: *Aphia minuta* (Risso 1810), recorded by most authors. *Deltenosteus quadrimaculatus* (Valenciennes 1837), recorded by Lanfranco (1958), as is also *Zosterisessor ophiocephalus* (Pallas 1811). The Genus *Pseudaphia* is represented by *P. ferreri* (de Buen & Fage 1908), recorded only by Despott (1932). Of the eight Mediterranean species of *Pomatoschistus* only *P. minutus* (Pallas 1770), has been recorded (Despott 1919, Lanfranco 1958) as *G. minutus* Lin. This last species is probably a doubtful identification as true *P. minutus* occur only in the Northern Adriatic (Gulf of Venice), Gulf of Genoa and Gulf of Lions (Miller in Whitehead et al, 1986). *P. marmoratus* (Risso 1810), which occurs all around the Mediterranean, would have been a more likely identification. The species of *Pomatoschistus* are very similar and frequent confusion between species occurred in earlier works.

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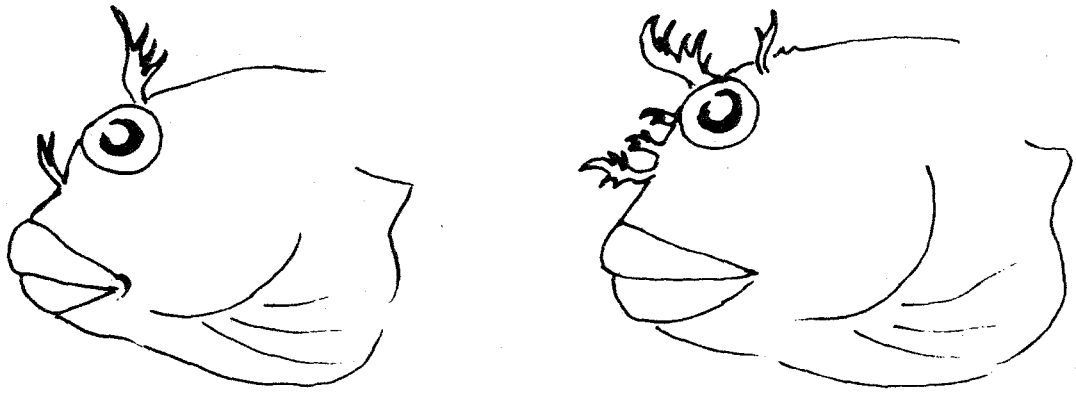

Fig. 3 (a) Head of *Parablennius incognitus* Bath 1968
(b) Head of *P. zvonimiri* Kolomb 1892.
(Both after Tortorese 1975. Redrawn).

Fig. 4 *Parablennius incognitus* Bath 1968
(photo J.L. Cilia)

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A RECENT RECORD OF *UTHETHEISA PULCHELLA* L. (LEPIDOPTERA: ARCTIIDAE) FROM MALTA

David Dandria[1]

Four specimens of *Uthetheisa pulchella* L. (Eng. Crimson Speckled Moth; Malt. Farfett tal-Għobbejra) were observed by the author in an uncultivated field at Hax-Xluq, limits of Siġġiewi, Malta on 4th November 1990. The time of observation was 1400 hrs, and the moths were easily disturbed and took to flight for short distances. The field in question had not been cultivated for some time, and the only plants growing there were clumps of *Brassica rapa* subsp. *sylvestris* (L.) Janchen (Malt. Liftija) and senescent *Heliotropum europaeum* L. (Malt. Għobbejra bajda). The latter is the food-plant most favoured by *U. pulchella* (VALLETTA 1973). Although almost dry, the few leaves remaining on the plants bore signs of having been fed on by lepidopterous larvae. As the second brood of this bivoltine species occurs during October-November and the pupation period is generally about 30 days (VALLETTA 1973), it is probable that the four imagines noted, which appeared to be in good condition, had emerged fairly recently.

U. pulchella has been listed in the Red Data Book for the Maltese Islands as a species "which used to be common locally but which is now probably extinct". (SAMMUT & VALLETTA 1989). The last recorded *U. pulchella* was at Ċirkewwa on 17.10.87 where it was taken at light. (VALLETTA 1988). It is interesting to note that this is not the first time that this conspicuous moth seemed to have disappeared from the Maltese Islands. Valletta has records for the species in 1945, '46, '49, '50, '51, '52, and '53, when it was particularly plentiful. His next record is for 1961, seven years later and this was followed by sightings in '64, '66, and '68. There is then another gap of eighteen years until the 1987 Ċirkewwa record.

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A NOTE CONCERNING THE SCORPIONS (ARACHNIDA: SCORPIONES) OF THE MALTESE ISLANDS (CENTRAL MEDITERRANEAN)

Patrick J. Schembri [1] and Stephen Schembri [2]

ABSTRACT

All scorpions collected from the islands of Malta, Gozo, Comino and St. Paul's belonged to *Euscorpius* (s.str.) *carpathicus* (Linnaeus, 1773) ssp. *candiota* Birula, 1903 as used by Kinzelbach (1975) for populations showing a complex of morphological characters intermediate between *E.carpathicus carpathicus* and *E.mesotrichus* Hadzi. Similar intermediate populations are found in several eastern Mediterranean localities (Greece, some Greek islands and Crete) however the Maltese populations are more heterogenous than any other so far studied. The literature contains records of other species of scorpion from the Maltese Islands whereas the collections of the British Museum (Natural History), London include specimens of *Mesobuthus gibbosus* (Brulle) reportedly collected from Malta. These records are discussed and it is postulated that they are either errors of identification or labelling, or else represent introduced exotics now locally extinct.

INTRODUCTION

It has long been known that scorpions occur in the Maltese Islands; in fact, the Maltese language has three different terms for these animals: *Għakreb* (Serracino-Inglott, 1976 p.153), and *Mqass* or *Imqass* (Serracino-Inglott, 1979 pp. 206-207), (literally meaning 'scissors', an obvious reference to the pincers), both derived from the Arabic, and the more recent *Skorpjun* (Serracino-Inglott, 1984 p. 194), derived from the Italian. Uncertainty however exists as to the number of species which occur and their specific identity.

Gulia (1889-90) in his list of the Maltese names of local flora and fauna records under *"Imkass"* (an old form of the word *Mqass), Scorpio europaeus* as the only species and repeats this record in his later survey of the Maltese fauna (Gulia, 1913). Cremona (1966) in his unpublished compilation of Maltese technical terminology gives *"Imqass* or *Għakreb* var. spec. (Borg) (a) (Butus scorpio europaus) rare (b) (Euscorpio flavicandis) frequent (c) (Euscorpio italicus) common". The "Borg" in this entry refers to Professor John Borg, a medical doctor, botanist and horticulturist who occupied the Chair of Natural History at the University of Malta between 1921 and 1933, and from whom Cremona obtained his information. Apart from occasional generic mentions of scorpions in the popular and semipopular literature (e.g. Lanfranco, 1954; Coke, 1969), no other specific records of scorpions from the Maltese Islands exist. However, in his map of the circummediterranean distribution of scorpions of the family Buthidae, Kinzelbach (1975, legend to Fig. 6) states "Auf Malta lebt ein noch unbestimmter Vertreter der Buthidae" (a species of Buthidae living in Malta is not yet determined).

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The literature therefore contains records of at least three different species of scorpions from the Maltese Islands as follows:

Buthus occitanus (Amoreux, 1789) - the *"Scorpio europaeus"* of Gulia (1889-90, 1913) and the *"Butus scorpio europaus"* of Borg (in Cremona, 1966);

Euscorpius (Polytrichobothrius) flavicaudis (De Greer, 1778) - the *"Euscorpio flavicandis"* of Borg (in Cremona, 1966);

Euscorpius (Polytrichobothrius) italicus (Herbst, 1800) - the *"Euscorpio italicus"* of Borg (in Cremona, 1966);

additionally there is the unidentified buthid mentioned by Kinzelbach (1975).

However, the present authors have only ever met with a single species of *Euscorpius* in the Maltese Islands. The problem of the number of Maltese species and their identity was therefore investigated.

MATERIAL AND METHODS

Scorpions were collected from various localities in the Maltese Islands by systematically searching likely habitats. Specimens were killed and fixed in 70% ethanol. Measurements were taken using vernier calipers while counts of the number of pectine teeth and of trichobothria were made using a stereomicroscope.

Additional to these field and laboratory investigations, attempts were made to trace specimens of scorpions collected from the Maltese Islands in a number of public and private collections.

RESULTS

Specimens of scorpions from the Maltese Islands were traced in two local private collections and in the collections of the British Museum (Natural History), London (BMNH). The collection of Guido Lanfranco (Sliema, Malta) contains specimens collected from Malta between August 1953 and October 1954 and identified as *Euscorpius carpathicus* (L.) by G. Owen Evans of the BMNH in 1956 (G. Lanfranco, personal communication 1987). The collection of Edwin Lanfranco (also of Sliema, Malta) contains a specimen collected from a house in Sliema in 1970 and identified as *E.carpathicus* by D.J. Clark of the BMNH in 1970 (E. Lanfranco, personal communication 1987). The only material from the Maltese Islands in the collections of the BMNH are two specimens of a buthid scorpion labelled as collected on Malta by G.L. Clarke; no precise locality or date of collection are indicated although the latter is probably between 1920-1930 (P.D. Hillyard, personal communication 1986). These two specimens were identified as *Mesobuthus gibbosus* (Brulle) by R. Kinzelbach in 1984 (R. Kinzelbach, personal communication 1984).

A total of 68 specimens were collected from various localities in the Maltese Archipelago during the present study as detailed below:

MALTA

1 spec. Siġġiewi 6.2.77 leg. PJS (SS/RK/01) and 1 spec. 5.7.88 leg. M. Pace (SS/RK/28); 1 spec. Birkirkara 9.11.77 leg PJS (SS/RK/02); 1 spec. Selmun 20.12.79 leg. PJS (SS/RK/03); 1 spec. Għadira 27.12.79 leg. SS (SS/RK/04); 1 spec. Dingli Cliffs 3.11.82 leg. PJS (SS/RK/05); 1 spec. Tal-Kortin (Mistra) 18.3.84 leg. PJS (SS/RK/06); 1 spec. Wied Incita 25.3.84 leg. SS (SS/RK/07); 4 spec. Ballut ta' l-Imġiebaħ 8.4.84 leg. SS & PJS (SS/RK/08); and 3 spec. 11.10.86 leg. PJS & D.M. Johnson (SS/RK/24); 6 spec. Ballut tal-Wardija 8.4.84 leg. SS & PJS (SS/RK/09); 3. spec. Tal-Qroqq (University grounds) 16.4.84 leg. S. Azzopardi & L. Main (SS/RK/10); 2 spec. Wied il-Luq (Buskett) 30.4.84 leg. SS & PJS (SS/RK/11); 4 spec. Beltissebħ (Floriana Bastions) 6.5.84 leg. PJS & M. Gauci (SS/RK/12); 1 spec. Santa Venera 30.5.84 leg. PJS (SS/RK/13); 1 spec. Bingemma Gap 30.3.85 leg. SS (SS/RK/14); 1 spec. Ta' Zammitello (Ġnejna Bay) 12.10.85 leg. D.M. Johnson (SS/RK/15); 1 spec. Birkirkara (Psaila Street) 25.10.86 (SS/RK/25); 2 spec. (no date) (SS/RK/26); and 1 spec. 31.10.87 (SS/RK/27) all leg. D. Galdes Giappone;

6 spec. Malta & Gozo Sept. 1985 - Mar. 1986 leg. SS & D.M. Johnson (SS/RK/23);

GOZO

5 spec. Dwejra 17.5.84 leg. SS (SS/RK/17); 6 spec. Fort Chambray slopes 3.2.85 leg. PJS & M. Gauci (SS/RK/18); 6 spec. Limits of Kerċem 14.2.85 leg. PJS (SS/RK/19); 2 spec. Ramla (clay slopes) 15.2.85 leg. PJS (SS/RK/20);

COMINO

1 spec. Comino 23.6.75 leg. PJS (SS/RK/21); and 3 spec. 22.6.86 leg. SS (SS/RK/22);

ST. PAUL'S ISLANDS

2 spec. St. Paul's Islands 20.4.75 leg. PJS (SS/RK/16).

In general scorpions occurred in three main habitat types: (i) the leaf litter which accumulates underneath trees (e.g. Holm Oak, *Quercus ilex*) and low-growing shrubs (e.g. Carob, *Ceratonia siliqua*); (ii) under stones on clay slopes; and (iii) in association with human habitations, especially in humid microhabitats (e.g. drains, cellars, underneath flowerpots etc); a few specimens also occurred under deeply embedded stones in garigue.

Specimens with reference numbers SS/RK/01 to 25 were sent to Professor Ragnar Kinzelbach of the Institut fur Zoologie, Technische Hochschule Darmstadt for examination and were all identified as *Euscorpius* (s.str.) *carpathicus* (Linnaeus, 1773) ssp. *candiota* Birula, 1903. Two specimens from the series SS/RK/09 have been deposited in the Kinzelbach collection; all other specimens are in the collection of PJS.

For each specimen, the following parameters were determined:

Length of the chela of the pedipalp measured from the tip of the fixed finger to the posterior edge (Ch);

Prosoma length measured from the anterior to the posterior border (Pr);

The number of pectine teeth (PT);

The number of trichobothria on the ventral edge of the tibia of the pedipalp (TPT; see Kinzelbach, 1975).

Chela length and prosoma length are highly positively correlated (Pearson product-moment correlation: r=0.982, d.f.=64, P <0.001); the regression equation is:

$$Ch = 0.575 + 1.678\ Pr;$$

Either Ch or Pr can thus be used as an index of size and hence age.

Scorpions may be sexed on the basis of size and the number of pectine teeth: males have more pectine teeth than females and are smaller (Millot & Vachon, 1949). Kinzelbach gives the following pectine teeth formula for *E.carpathicus:* males 7-10, females 6-9. Of the 66 specimens measured, 20 (30.3%) had an unequal number of teeth on the two arms of the pectine. For these, the average value was taken (PT left + PT right /2).

The correlation between PT and prosoma length is not significant (Pearson product-moment correlation: r=-0.0378, d.f.=64, 0.5<P), showing that PT does not increase with size/age. The frequency distribution of PT (Fig.1) shows two main peaks, one centred on PT=7 and the other on PT=8. To test whether these two peaks represent the different sexes, the mean prosoma length for adult individuals (i.e. with Pr> 2.00mm, see below) with a PT of 7 or less (n=24, $\bar{x}$=4.74mm, s.d.=0.80mm) was compared with that for those with a PT of 7.5 or more (n=28, $\bar{x}$=4.41mm, s.d=1.10mm); the difference was not significant (Student's t-test: t=1.226, 0.2 <P<0.5). The Maltese scorpions, therefore, cannot be sexed on the basis of number of pectine teeth and size by this method.

Reliable counts of TPT could not be made for individuals of Pr ≤2.00mm, of which there were 14 in the sample. These were obviously juveniles. Of the remaining 52 adult specimens, 22 (42.3%) had an unequal TPT on the two pedipalps. For these individuals, the average TPT was calulated (TPT left + TPT right /2).

The correlation between TPT and prosoma length is not significant (Pearson product-moment correlation: r=-0.0217, d.f.=50, 0.5 <P); TPT does not increase with the size/age of the individual. For the sample considered as a whole, the mean TPT is 9.44 (s.d. =0.844, n=52), however the TPT frequency distribution (Fig. 2) shows two main peaks, one (the larger) at TPT=9 (30.8% of the sample) and the other at TPT=10 (25.0% of the sample).

DISCUSSION

With the sole exception of the two specimens in the collections of the BMNH, all scorpions collected from the Maltese Islands belong to the same taxon, identified as *Euscorpius* (s.str.) *carpathicus* (Linnaeus, 1773) (family Chactidae) by all specialists in the group who have examined Maltese material. The two BMNH specimens have been identified as *Mesobuthus gibbosus* (Brullé, 1832) (family Buthidae), a species whose recorded range is Greece, Cyprus and Asia Minor (see map in Kinzelbach, 1975 p.22). One explanation

for the apparently anomalous record of this species from the Maltese Islands is that the species was introduced, possibly through human agency, and subsequently became locally extinct. Another explanation is that the BMNH specimens are mislabelled and did not originate from the Maltese Islands at all.

Gulia's (1889-90; 1913) record of *Scorpio europaeus* (=*Buthus occitanus*) is most likely a misidentifcation and refers to *Euscorpius carpathicus*, especially since Gulia mentions no other species of scorpions from the Maltese Islands. Similarly, Borg's (in Cremona, 1966) records of *Euscorpius flavicaudis* and *Euscorpius italicus* probably refer to different forms within the range of variation of the local population of *Euscorpius carpathicus*. Borg's record of *"Butus scorpio europaus"* (=*Buthus occitanus*) is intriguing since Borg could obviously differentiate between *Buthus* and *Euscorpius.* It is possible that Borg never actually encountered specimens of *Buthus* but accepted previous records (e.g. Gulia's) at face value. Alternatively, Borg's *Buthus* may be an introduced exotic, now extinct from the Maltese Islands. It is worth noting that Professor John Borg was very active at the Argotti Botanical Gardens, then belonging to the University of Malta and also at San Anton Gardens where he was Principal of the Agricultural School for Gardeners (Borg, 1979) and was constantly receiving plant material from abroad. It is also possible that Borg's *'Buthus'* and the *Mesobuthus gibbosus* collected by G.L. Clarke in Malta and now at the BMNH represent the same introduced exotic; certainly the period over which Borg was active (c1895 to 1933) and the probable date of collection of Clarke's specimens (c. 1920-1930) overlap.

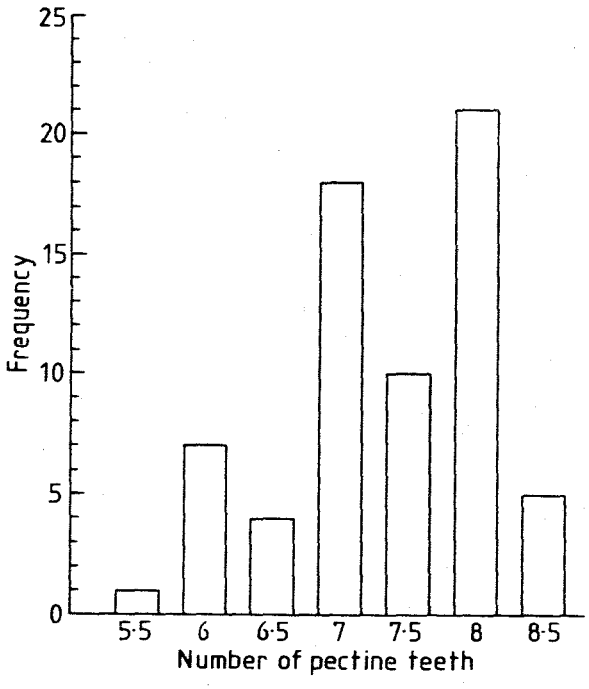

Fig. 1 Frequency distribution of the number of pectine teeth for *Euscorpius carpathicus* from the Maltese Islands.

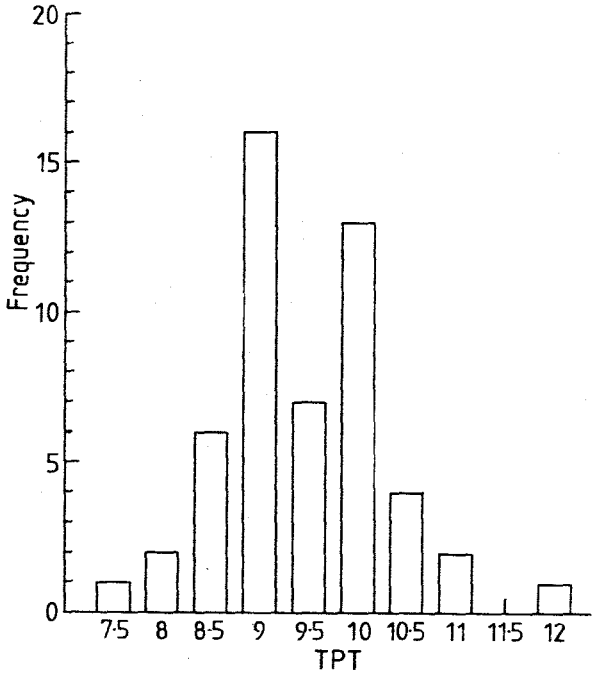

Fig. 2 Frequency distribution of the number of trichobothria on the ventral edge of the tibia of the pedipalp (TPT) for *Euscorpius carpathicus* from the Maltese Islands.

On the basis of his studies of the Aegean scorpions, Kinzelbach (1975) split the *Euscorpius carpathicus* of older authors into two species: *E.carpathicus* s.str. and *E. mesotrichus* Hadzi. These two species are distinguished by a number of characters (see Kinzelbach, 1975 Table 2), chief among which is the number of trichobothria on the ventral edge of the tibia of the pedipalp (TPT); *E.carpathicus* has TPT= (6)7-8(9) *E.mesotrichus* has TPT=10-12(14) (extremes in parentheses). Populations intermediate between *carpathicus* and *mesotrichus* occur in several localities in Greece and on the island of Crete. These intermediate forms are characterized by a TPT of 9-10, a reddish brown coloration without a distinct pattern in black pigment, and by the relative smoothness of the edges of the chelae. A name already being available for forms showing this complex of characters, Kinzelbach (1975) assigned these intermediate forms to *E.carpathicus candiota* (Birula). Kinzelbach is of the opinion that the Maltese populations also belong to this entity. We concur with this view. The majority of specimens studied by us had a TPT in the range 9-10, however, there is also considerable variation; 17.3% of the specimens examined had a TPT of less than 9, which is in the range of *E.carpathicus carpathicus,* while 13.5% had a TPT of more than 10, which is in the range of *E.mesotrichus.* In this respect, the extreme forms are of particular interest: at the lower end, one specimen (SS/RK/11) had a TPT formula of 7:8 while at the upper end four individuals had a TPT formula of 10:11 (SS/RK/15,21,23), two of 10:12 (SS/RK/22,23) and one of 11:13 (SS/RK/23); The Maltese *candiota* population seems to be more heterogeneous than other *candiota* populations so far studied; for example, populations from Kefallinia and Crete both had a TPT range of 8-11 (see Kinzelbach, 1975 Fig. 13). In any case, the presence of a mixed *carpathicus/mesotrichus* population in the Maltese Islands similar to those on Greece, Crete and small Aegean islands, links the Maltese Islands faunistically with the Eastern Mediterranean.

E.carpathicus candiota is found on all three main islands of the Maltese Archipelago as well as on one of the minor islets of the group, and is common where found. On the whole it appears to prefer dark humid habitats (e.g. leaflitter, human habitations) although it also occurs in more arid habitats such as garigue and clay slopes. On the latter, scorpions are particularly abundant, sometimes as many as five individuals being found under a single stone covering an area of only a few tens of square centimetres. However, in both garigue and clay slopes, scorpions may actually be occupying relatively humid microhabitats since the soil under embedded stones retains some moisture even during the very dry Maltese summer, particularly if it is clayey.

ACKNOWLEDGEMENTS

We are very grateful to Professor Dr Ragnar Kinzelbach for studying our collection of scorpions and for supplying us with much useful information and for other help. We are grateful also to Dr. Paul D. Hillyard of the British Museum (Natural History) for information about the specimens in his care, and to Messrs Guido and Edwin Lanfranco for information about specimens in their collections. We thank Ms Joan Anne Farrugia for her technical assistance, Mrs Moira Schembri for help with translation from the German and all those who supplied us with specimens.

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ADDITIONAL NOTE

During recent surveys of the Filfla Island Nature Reserve conducted jointly by the Department of Biology of the University of Malta, and the Secretariat for the Environment of the Ministry of Education and the Interior, two specimens of scorpions were collected and are reported upon below:

1 spec. Filfla Island (plateau) 23.2.90: Ch = 11.30 mm: Pr = 6.00 mm: PT (left/right) = 7/8; TPT (left/right) = 10/9

1 spec. Filfla Island (plateau) 13.3.90: Ch = 6.20 mm: Pr = 4.30 mm; PT (left/right) = 7/7; TPT (left/right) = 9/8.

Both specimens were found under stones embedded in soil. The Filfla scorpions correspond well with *E. carpathicus candiota* as defined by Kinzelbach (1975). It is interesting that the scorpions of Filfla are not different from those of the other islands of the Maltese group as Filfla is the most outlying island of the archipelago and one of the most inaccessible and least visited. This suggests that the Maltese *candiota* populations were not introduced through human agency.

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OCCURRENCES OF SWARMING LOCUSTS (ORTHOPETERA: ACRIDIDAE) IN THE MALTESE ISLANDS DURING 1988.

Louis F. Cassar [1]

ABSTRACT

Two species of acridids, *Schistocerca gregaria* Forsk. and *Locusta migratoria* L., were recorded from the Maltese Islands during April-June 1988. These records were the result of stragglers reaching Maltese shores from the major outbreak areas in North Africa. The correlation of these occurrences with prevailing meteorological conditions and with contemporary records from the European mainland is discussed.
The 1987-88 outbreaks in North Africa are also reviewed.

INTRODUCTION

The 1987/88 locust outbreaks in Africa were considered to be the worst swarmings in the last 50 years. The swarms spread through much of North and Western Africa and even crossed the Red Sea to reach Saudi Arabia.

During the course of the swarming, large numbers of locusts flew across the Mediterranean reaching the shores of southern Europe. With the wind direction favouring their northward spread, locusts departed the north African coast, particularly Tunisia, from points between Cap Blanc and the Gulf of Gabes, reaching, among other localities, central Italy as well as Crete in the eastern Mediterranean. (L. Brader, press comment — FAO Locust Emergency Centre, 1988).

The FAO Locust Emergency Centre compared this plague to an infestation in the 1950's which lasted more than a decade. The Centre, which feared a general infestation of the sub-Saharian region leading to famine in affected areas, termed the 1988 episode as "... an extremely dangerous situation which may have devastating affects on agricultural food production in Africa for years to come". (L. Brader, press comment — FAO Locust Emergency Centre, 1988).

In the Maghreb, where dense locust swarms attacked 3 - 6 million hectares, it was estimated that some 20 - 30 per cent of crops would be adversely affected. Apart from the ineffectiveness of the pesticides initially utilised, the wind direction was quite a significant factor in aiding the spread. For this reason FAO had urged the controlled use of Dieldrin over the affected areas in order to slow down the large-scale migration of locusts in May and June to the Sahel region of Africa.

OCCURRENCES IN THE MALTESE ISLANDS (fig. 1)

Migrating locusts reached Maltese shores in noticeable numbers on at least three known occasions. (fig 1) The first occurrence was that of six Desert Locusts, *Schistocerca gregaria* Forsk, discovered dead on 04 April 1988 at Ramla l-Hamra, Gozo. The condition of the specimens, which were washed ashore on this north facing sandy beach, indicated that these locusts may have been in the water for some days.

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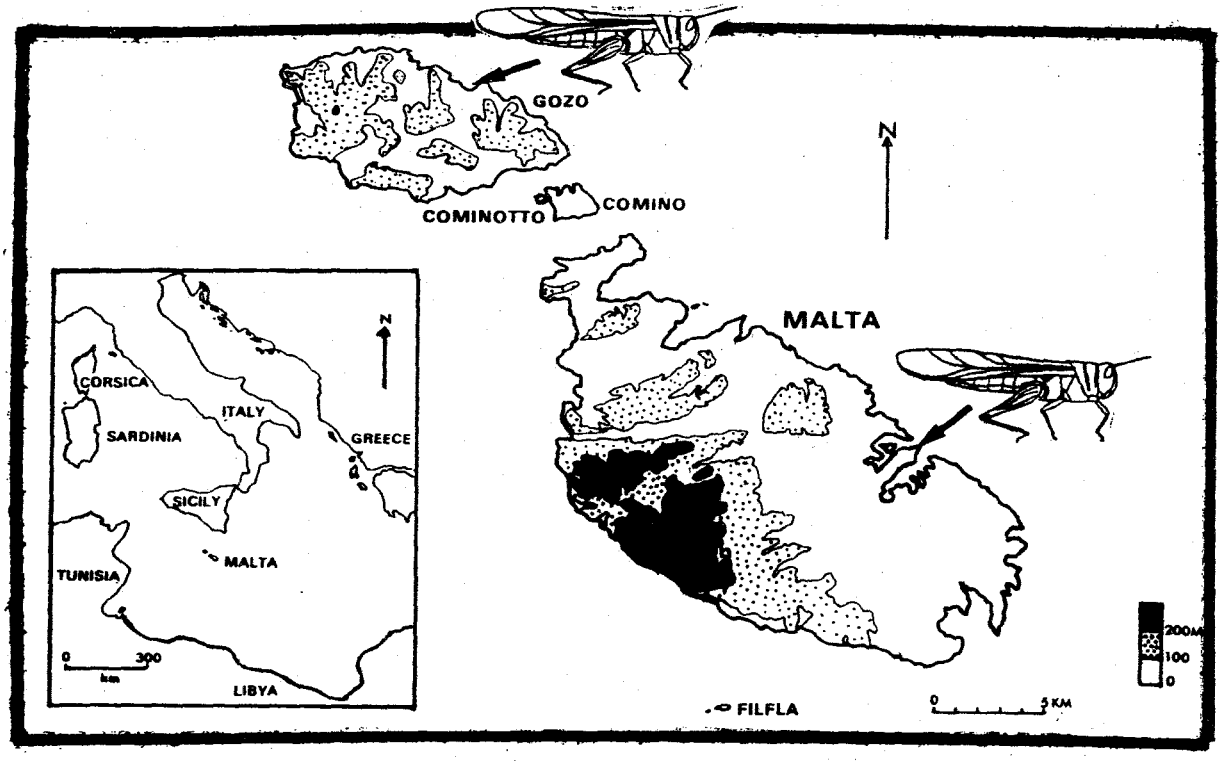

Fig. 1 Indication of occurrence sites *(Map: Courtesy of the MOS)*

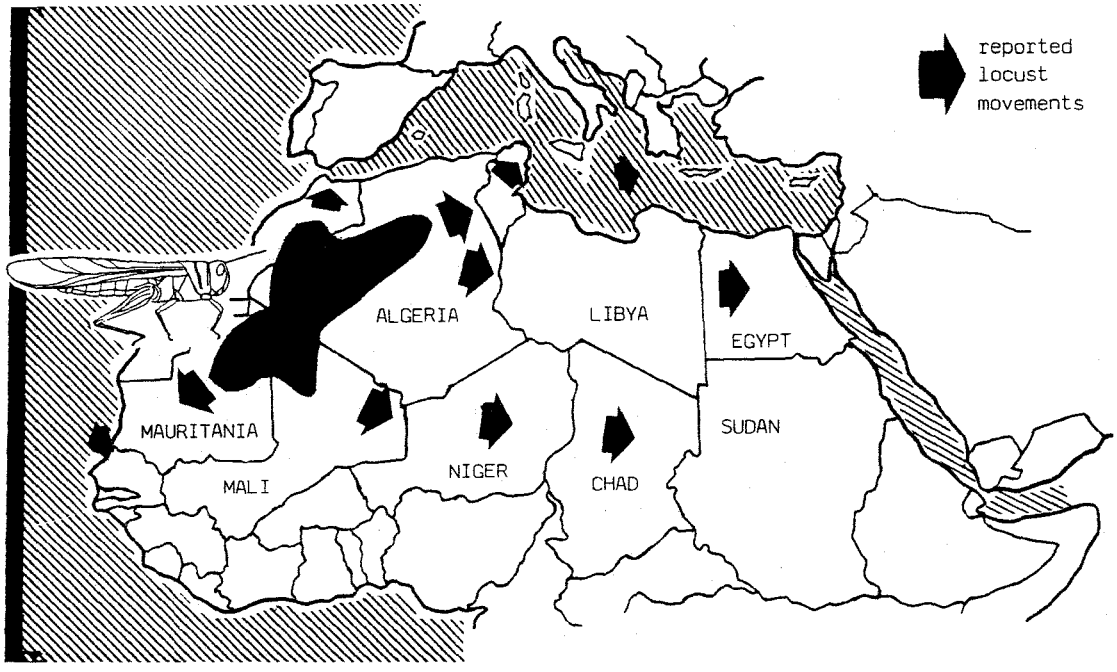

Fig 2. Reported locust movements from original outbreak area

FAO's Senior Migratory Pests Officer Jermey Roffey suggested that these specimens probably originated in Tunisia where there were numerous swarms in March and April. Furthermore, Desert Locusts were also reported from Italy, between Anzio and Rome, at approximately the same time as the locusts on the island of Gozo. (J. Roffey, personal communication 1988).

The average wind speed between 29 March and 03 April of that year was c. 16 knots blowing from a predominantly northwesterly direction. Assuming that the Ramla specimens had in fact formed part of the minor swarms undertaking the crossing towards the Italian mainland, the moderate to somewhat strong prevailing northwesterly winds may have been responsible for bringing the stragglers in close proximity to the north coast of Gozo.

Another occurrence of 5 specimens of *Schistocerca gregaria* was noted at the same locality on 15 June 1988. These specimens were also discovered dead on the shoreline and were probably washed ashore. (M. Gauci, personal communication 1988).

While swarms were still spreading across the northern part of the African Continent, where large scale control was being undertaken, another appearance was made in the Maltese Islands. On 12 May a southeast wind, which had been prevalent during the night, blew in an influx estimated at a few hundred insects. The low density swarm was concentrated mainly on the area between Castille Place in Valletta and the Granaries in Floriana, although numbers of scattered individuals were reported from various localities across the main island.

The number of locusts reaching Malta was not large enough to pose any threat to agriculture. Nonetheless, precautionary spraying was undertaken in various gardens and agricultural sites, in the event that larger swarms should reach the Maltese Islands.Fortunately, wind direction changed to northerly later on in the day and lessened the possibility of further invasions. In fact following this date there did not appear to have been any further reports of *S. gregaria* reaching the Islands.

It may be worth mentioning that the 130 or so specimens from the Valletta/Floriana area examined by the writer, all belonged to one species, namely *Schistocerca gregaria*. One female of *Locusta migratoria migratorioides* L. (Migratory Locust - African subspecies) in the gregarious phase was however taken at Ramla l-Hamra on 29 June, 1988.

Therefore of the five species reported swarming in Africa by FAO, (J. Roffey, personal communication 1990) only *Schistocerca gregaria* and *Locusta migratoria migratorioides* are known to have reached the Maltese Archipelago.

REVIEW OF THE SWARMING ON THE AFRICAN CONTINENT (fig 2.)

The situation in Africa, particularly the North West region, was considered quite serious. The plague continued to spread across to the Sahel Region. (FAO ECLO Locust & Grasshoper Bulletin no. 10).

Of the swarming African locust species, *Schistocerca gregaria* is by far the most damaging and perhaps the most arduous to control. This is because the species has no

geographically determined outbreak areas, unlike its co-swarming allies *Locusta migratoria migratorioides* and *Nomadacris septemfasciata* (The Red Locust) which are somewhat easier to control, as they recede to comparatively small areas after their migrations. *S. gregaria* on the other hand, with a very wide outbreak area presents a real international problem. Its distribution ranges over a relatively vast domain from the southern Iberian peninsula across the whole of northern Africa and Asia Minor, through Iran to Bangladesh and India: an area comprising some sixty countries.

The recent outbreaks followed excessive rains in much of the Sahel (UNDRO NEWS, 1987). Large infestations affected several areas, notably around the Mauritania - Mali borders, central parts of Niger as well as eastern Chad. The somewhat heavy rainful resulted in 'optimal conditions' which induced widespread breeding of locusts chiefly *S. gregaria*) mainly in Sudan and Chad, with further breeding reported in Mauritania, Mali and Niger.

From early Spring of 1987 through to the latter part of 1988, local organisations continued to combat the swarms through large scale ground and aerial control operation. Until mid-June 1988 large scale control of 'hopper' bands of both old and new generation swarms continued in the Maghreb (i.e. Morocco, Algeria and Tunisia), while moderate scale swarm and small scale 'hopper' band control continued in Libya, mainly in Hamada el Hamrah, Sebha, and Wadi el Hayat. Swarms in West African countries, namely Senegal, Mali and Gambia, were reported to be dispersing as control operations continued, while on the continent's eastern sector the situation was noted as calm. In Egypt swarms dispersed into dense groups which were reported in a number of oases in the desert region west of the Nile. Scattered locusts were also reported to have reached el Fayoum and Asyut on the Nile. The rest of East Africa consisting of Ethiopia, Sudan, Djibouti, Somalia, Uganda, Tanzania and Kenya, was by this time reported free of locusts.

Although most countries were in moderate control of the situation by mid-1988, further outbreaks of new generation swarms of varying densities occurred in north central African countries such as Chad (particularly at Bitkine and N'Djamena) and Niger, with major escapes spreading across central African borders. One particular case was that of Angola, where *Locusta migratoria* infestations were reported. (FAO ECLO Locust & Grasshopper Bull., 9). No fresh records were reported from the Mediterranean region after late Summer 1988

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