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Mantids (Dictyoptera: Mantodea) from the Palestinian Territories with an updated list

Elias N. Handal, Aysha M. Al Wahsh, Reinhard Ehrmann, Zuhair S. Amr, Roberto Battiston & Mazin B. Qumsiyeh

Abstract

A total of seventeen species of the order Mantodea were recorded from the Palestinian Territories belonging to five families (Empusidae, Eremiaphilidae, Mantidae, Tarachodidae and Toxoderidae) and thirteen genera (*Ameles, Blepharopsis, Empusa, Eremiaphila, Eremoplana, Holaptilon, Iris, Mantis, Microthespis***,** *Miomantis, Pareuthyphlebs, Rivetina,* and *Sphodromantis*). *Ameles syriensis, Rivetina syriaca* and *Eremiaphila braueri* are new records for the Palestinian Territories. Their presence in this area is updated and discussed in a biogeographic and conservation perspective. Further researches on specific issues on their taxonomy and biology are here raised and evidenced.

Zusammenfassung

Für Palästina (Westjordanland und Gazastreifen) ergaben sich Nachweise von insgesamt 17 Fangschrecken-Arten (Mantodea) aus fünf Familien (Empusidae, Eremiaphilidae, Mantidae, Tarachodidae and Toxoderidae) und 13 Gattungen (*Ameles, Blepharopsis, Empusa, Eremiaphila, Eremoplana, Holaptilon, Iris, Mantis, Microthespis, Miomantis, Pareuthyphlebs, Rivetina,* and *Sphodromantis*). *Ameles syriensis, Rivetina syriaca* und *Eremiaphila braueri* sind Neunachweise. Im vorliegenden Beitrag werden zu deren Vorkommen Erkenntnisse über Biogeographie, Gefährdung, Schutz, Taxonomie und Biologie vorgetragen.

Introduction

Praying mantids, also known by the locals in the Arab world as the "Lord's horse" or "Prophet's horse", represent a large group of insects worldwide with more than 2500 described (EHRMANN 2002, BATTISTON et al. 2010, ROY 2014, PATEL & SINGH 2016). Members of Mantodea are carnivores that feed on other species of insects and occasionally on small vertebrates thus having potential as biological control agents (SYMONDSON et al. 2002).

Few studies were undertaken on the Mantodea of Middle East. From the most recent regional overviews, CAESAR et al. (2015) listed about 43 species from Iraq, Jordan, Lebanon, Syria and Turkey. Other studies were conducted in Egypt (MOHAMMAD et al. 2011), Jordan (BATTISTON & FONTANA 2005, ABU-DANNOUN & KATBEH-BADER 2007, EID et al. 2009), the Arabian Peninsula (KALTENBACH 1982, 1984, 1991), and Turkey (DEMIRSOY 1977, ÇIPLAK & DEMIRSOY 1997); Turkey and Cyprus (EHRMANN 2011), and the Mediterranean basin (BATTISTON et al. 2010).

Two species were first described from Palestine: *Eremiaphila brunneri* (WERNER 1905), and *Holaptilon pusillulum* (BEIER 1964). Most of our knowledge on the Palestinian Territories is based on old literature (BRULLÉ 1832, COSTA 1878, GIGLIO-TOS 1893, KRAUSS 1909, BUXTON & UVAROV 1923, BUXTON 1924, UVAROV 1923, 1931, 1933, 1939a and b, ENSLIN 1929, BODENHEIMER 1933, 1935, 1937, 1953, BEIER 1964, KALTENBACH 1963, AMITAI 1991). This communication reports on the mantids studied at the Palestine Museum of Natural History (PMNH, www.palestinenature.org) at Bethlehem University.

Materials and Methods

Field trips were conducted to collect mantids from the different parts of the Palestinian Territory between 2012-2016 covering 46 localities (Table 1, Figure 1). All specimens were preserved and deposited at the Palestine Museum of Natural History (PMNH). Identification was done according to BATTISTON et al. (2010), MOHAMMAD et al. (2011) and original descriptions.

Table 1: List of visited localities and their coordinates.

Location	N	E	Location	N	E
Ain Hijla	31° 49' 29.4312"	35° 30' 38.0124"	Mikhmas	31° 52' 4.8936"	35° 15' 57.3912"
Ain Samia	31° 58' 35.4"	35° 20' 28.9926"	Nahaleen	31° 40' 50.6532"	35° 6' 53.5674"
Ain Sinia	31° 58' 17.9904"	35° 13' 41.5122"	Nuwaima	31° 52' 51.3978"	35° 27' 35.7078"
Ain Yabroud	31° 57' 6.012"	35° 14' 59.9172"	Salfit	32° 4' 42.8514"	35° 10' 21.8238"
Ajul	32° 1' 23.106"	35° 10' 48.09"	Taiba	31° 57' 22.266"	35° 17' 58.5132"
Al Qarn	31° 37' 8.166"	35° 7' 34.0422"	Tal Al Assour	31°58′ 37.6752″	35°16′ 43.428″
Al Walaja	31° 43' 46.9812"	35° 9' 37.332"	Tarqumia	31° 34' 33.8376"	35° 1' 3.1722"
Al-Aqaba	32° 20' 10.211"	35° 25' 3.376"	Tulkarem	32° 25' 28.8084"	35° 5' 19.0134"
Al-Mazra'a ash-Sharqiya	32° 0' 1.823"	35° 17' 2.895"	Ubaidieh	31° 43' 17.8098"	35° 17' 38.7384"
Artas	31° 41' 17.4726"	35° 11' 26.0946"	Um Tut	32° 26' 48.6882"	35° 18' 39.6102"
Auja	31° 56' 57.6198"	35° 28' 18.6558"	Wadi Al Bathan	32° 15' 22.2006"	35° 19' 16.9212"
Bani Nua'im	31° 31' 12.9252"	35° 10' 3.5934"	Wadi Al Haramya	31° 59' 39.4074"	35° 13' 45.141"
Batter	31° 43' 34.1652"	35° 8' 18.2286"	Wadi Al Makhrour	31° 43' 0.7248"	35° 9' 28.9866"
Beit Qad	32° 28' 8.146"	35° 21' 28.009"	Wadi Al Quff	31°37′ 9.6414″	35°7′ 34.6614″
Beit Sahour	31° 41' 45.3402"	35° 13' 53.7918"	Wadi Al Ta'amra	31° 39' 20.3868"	35° 16' 51.4632"
Bethlehem	31° 43' 4.242"	35° 12' 18.0072"	Wadi Al Zarka	32° 3' 21.5562"	35° 2' 21.0372"
Bir Zeit	31° 58' 20.2584"	35° 11' 47.724"	Wadi Fukeen	31° 42' 8.6466"	35° 5' 55.4742"
Dar Salah	31° 42' 5.544"	35° 14' 51.7308"	Wadi Mukata'	32° 29' 47.2554"	35° 15' 42.5592"
Dayr Balout	32° 3' 20.448"	35° 2' 0.024"	Wadi Qana	32° 9' 31.3236"	35° 7' 9.6348"
Dayr Jreer	31° 57' 51.102"	35° 17' 41.2116"	Yabroud	31° 58' 24.1284"	35° 14' 35.505"
Idhna	31° 33' 42.3396"	34° 59' 12.7062"	Yatta	31° 26' 32.8122"	35° 6' 39.6606"
Jericho	31° 51' 34.31"	35° 28' 5.01"	Zababda	32° 23' 7.7526"	35° 19' 1.5486"
Mar Saba	31° 42' 14.562"	35° 19' 51.4488"	Zatara	31° 40' 22.2522"	35° 15' 19.0764"

Results

A total of seventeen species belonging to five families (Mantidae, Empusidae, Eremiaphilidae, Tarachodidae and Toxoderidae) of praying mantids were identified from the Palestinian Territories. From the family Mantidae we recorded ten species (*Ameles kervillei* Bolivar, 1911*, Ameles syriensis* Giglio-Tos, 1915*, Holaptilon pusillulum* Beier, 1964, *Sphodromantis viridis viridis* (Froskål, 1775)*, Mantis religiosa religiosa* Linnaeus 1758*, Eremoplana inflex* Uvarov, 1924*, Rivetina syriaca* (Saus-

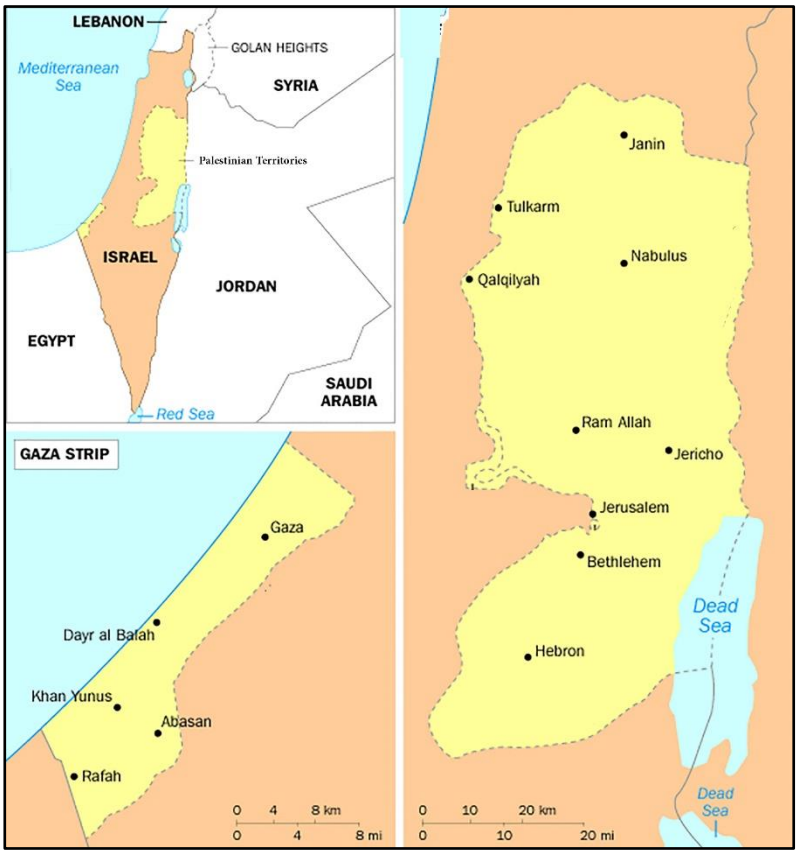

Figure 1: Map showing the Palestinian Territories.

sure, 1869), *Rivetina byblica* La Greca and Lombardo 1982, *Microthespis dmitriewi* Werner 1908 and *Miomantis paykullii* Stål 1871. From the family Empusidae we recorded two species (*Blepharopsis mendica* (Fabricius 1775) and *Empusa fasciata* Brullé 1832), from the family Tarachodidae one species *Iris oratoria* (Linnaeus 1758), and from the family Eremiaphilidae three species (*Eremiaphila braueri* Krauss 1902, *Eremiaphila brunneri* Werner 1905 and *Eremiaphila* cf. *uvarovi* Bodenheimer 1933). Family Toxoderidae, one species, *Pareuthyphlebs palmonii* (Uvarov, 1939) was recorded.

Family Mantidae Latreille, 1802

Ameles kervillei Bolivar, 1911

Material examined: Beit Sahour (PMNH4530, 26.4.2014); Beni Nua'im (PMNH1714-6, 7.4.2013); Yatta (PMNH6598, 13.5.2015); Taiba (PMNH1755-17, 12.4.2013). Observed in Bir Zeit (May, 2017).

Remarks: *Ameles kervillei* was recorded form the Jordan Valley, Palestine based on specimens in the Natural History Museum in London (AGABITI et al. 2010). It was recorded from the Levant and Egypt (BATTISTON et al. 2010, MOHAMMAD et al. 2011). *A. kervillei* is a small mantis, and is difficult to locate (ABU-DANNOUN & KATBEH-BADER 2007). The male of this species has never been described and AGABITI et al. (2010) hypothesized that *A. massai* Battiston and Fontana 2005 (known only for male specimens) may be a synonym of *A. kervillei*. However, similar characters are also shared by *A. wadisirhani* Kaltenbach 1982 also known only for the male specimen. The taxonomy of these three species need to be better investigated on large series of specimens from all supposed species complemented by molecular analysis. This species was collected both in semi-arid regions near Beni Nuaim and in Mediterranean mesic climates such as Taiba and Bir Zeit.

Ameles syriensis Giglio-Tos, 1915 (Fig. 2-D)

Material examined: Taiba (PMNH1734-17, 12.4.2013); Nahaleen (PMNH1735-7, 2.5.2013; PMNH1735-10, 2.5.2013); Wadi Al Quff (PMNH3800, 15.3.2014); Al-Aqaba (PMNH4050, 18.4.2014); Bethlehem (PMNH8169; PMNH8170, 30.4.2016); Yatta (PMNHE10452, 15.4.2017).

Remarks: This is a new record for historic Palestine. It was recorded from Jordan, Syria and Turkey (ABU-DANNOUN & KATBEH-BADER 2007, AGABITI et al. 2010, BATTISTON et al. 2010). It can be recognized from similar species of *Ameles* by less conical eyes with an apical tubercle (AGABITI et al. 2010). This species was collected from different habitats and biogeographic zones ranging from Mediterranean to Irano-Turanian.

Holaptilon pusillulum Beier, 1964

Material examined: Wadi Fukeen (PMNH6681, 27.5.2015).

Remarks: This species was first described from Jerusalem (BEIER 1964) but has not been observed or collected in Palestine since then. It has been however recently reported from Jordan (ABU-DANNOUN & KATBEH-BADER 2007). This record confirms the presence of this species near its type locality (Wadi Fukeen is to the Southwest of Jerusalem) more than fifty years later. This rare species needs further studies to determine its population stability and whether conservation measures are needed.

Sphodromantis viridis viridis (Froskål, 1775)

Material examined: Salfit (PMNH6798, 3.2015).

Remarks: *S. viridis* is a xerothermic species with a wide and expanding distribution in Africa, Asia and Europe (BATTISTON et al. 2017). EHRMANN (2011) mentioned specimens at Staatliches Museum für Naturkunde Karlsruhe, Germany collected from historic Palestine without defined localities. However, Salfit region is of more Mediterranean climate and certainly not semi-arid areas were the species was reported in Jordan (ABU-DANNOUN & KATBEH-BADER 2007) and Egypt (LA GRECA 1966). Comparisons on a larger series of specimens are thus necessary to better define the morphological variation between desert dwelling forms and this Salfit record in the region in the East Mediterranean. Our Salfit specimen maybe closer to European populations than those other populations but more studies are needed.

Mantis religiosa religiosa Linnaeus, 1758 (Fig. 2-B)

Material examined: Wadi Qana (PMNH5197, 1.2.2014); Bethlehem (PMNH8258, 16.11. 2016).

Remarks: *M. religiosa* is a widely distributed species, extending across Asia, Africa, Europe and North America (EHRMANN 2011). The presence of this species in different habitats and various vegetations is known and here confirmed (BATTISTON & FONTANA 2010).

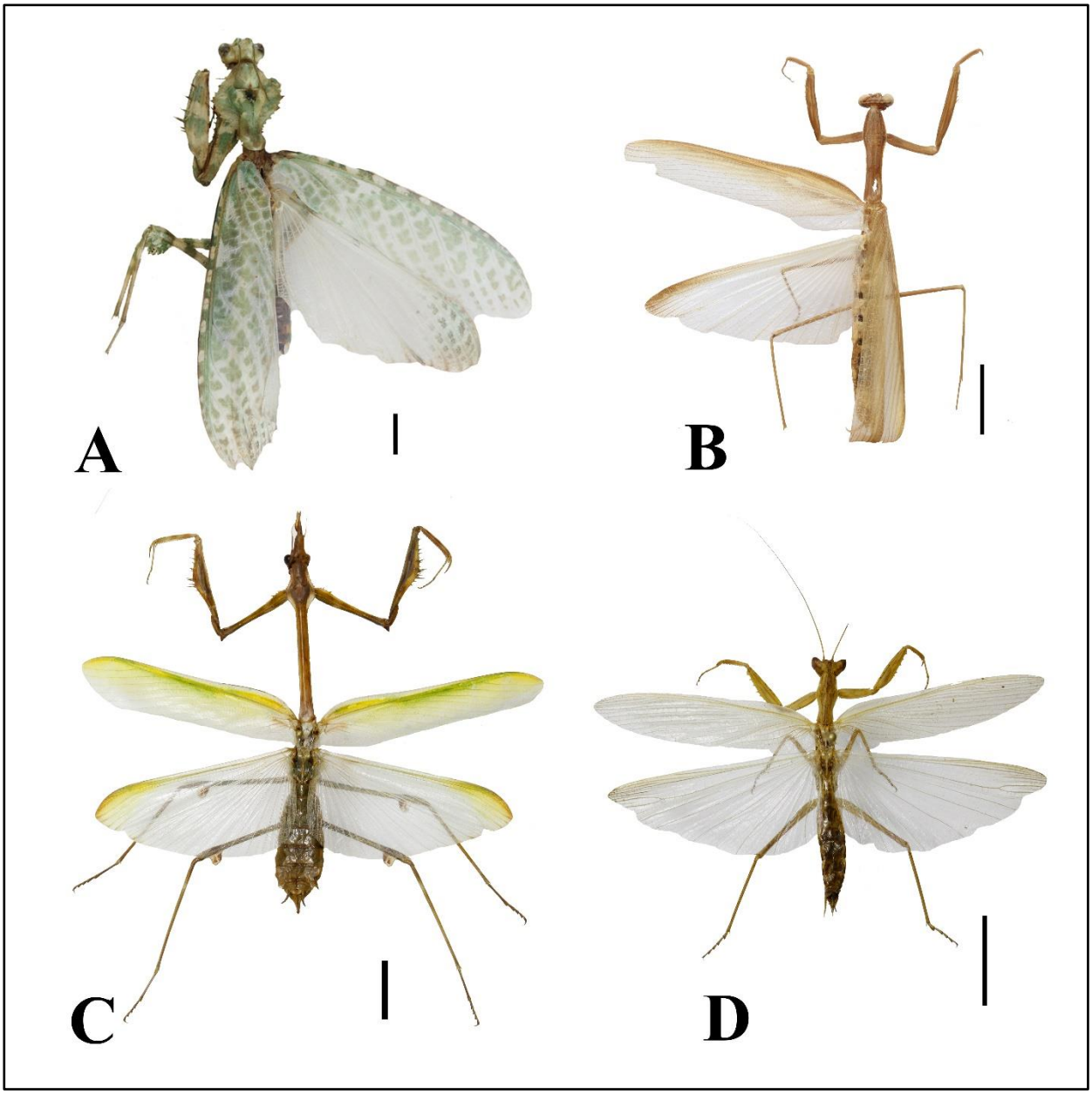

Figure 2: A: *Blepharopsis mendica* ♀. B: *Mantis religiosa* ♀. C: *Empusa fasciata* ♀. D: *Ameles syriensis* ♂. Bar = 10mm.

***Eremoplana inflex* Uvarov, 1924 (Fig. 3-B)**

Material examined: Mikhmas (PMNH1759-2, 24.5. 2013); Dar Salah (PMNH5443, 26.12.2014); Bethlehem (PMNH7824, 19.5.2016); Ain Yabroud (PMNH8002, 27.7.2016).

Remarks: This very large mantis is found in Sudan, Egypt, the Eastern Mediterranean and into Saudi Arabia (EHRMANN 1996). In Palestine individuals have been found from Mediterranean hills and to the edge of the semi arid regions (e.g. Dar Salah and Mikhmas).

***Rivetina syriaca syriaca* (Saussure, 1869)**

Material examined: Ain Samia (PMNH7242, 7.9.2015); Artas (PMNH4706, 12.8.2014); Mar Saba (PMNH7843, 27.5.2016; PMNH7842, 27.5.2016; PMNH7844, 27.5.2016).

Remarks: The taxonomy of this genus is problematic and need a revision. *R. syriaca* is found in western Asia and distinguished from the western-distributed *baetica* group by the shape of the pronotum markedly toothed, the short tegminae and the larger fore femora. Our specimens, the first in Palestine are compatible with *syriaca* group (already known to be present from Central Asia in Tadschikistan, Transcaspius, Utsh-Adzhi and Turkey (BATTISTON et al. 2010) and its presence in all the Eastern Mediterranean coast, can be expected.

Rivetina byblica La Greca and Lombardo, 1983 (Fig. 3-A)

Material examined: Mar Saba (PMNH1748-3, 13.5.2013); Ubaidieh (PMNH1748-4, 13.5.2013); Mikhmas (PMNH1759-11, 23.5.2015); Beit Sahour (PMNH1802-4, 12.6. 2013); Zababda (PMNH1805-7, 13.6.2013); Um Tut (PMNH1806-3, 13.6.2013); Wadi Al Quff (PMNH1951, 20.6.2013); Bethlehem (PMNH3129, 11.21.2014); Al Walaja (PMNH-4644, 8.8.2014); Wadi Fukaeen (PMNH4696, 9.8.2014; PMNH4704, 7.8.2014); Artas (PMNH4711-20, 12.8.2014); Idhna (PMNH4968, 23.8.2014); Wadi Qana (PMNH5197, 1.2.2014); Nuwaima (PMNH6506, 24.4.2015); Wadi Tammra (PMNH6901, 3.6.2015); Wadi Al Ta'amra (PMNH6907, 3.6.2015); Wadi Fukeen (PMNH7077, 29.7.2015); Wadi Al Makhrour (PMNH7188, 31.8.2015); Wadi Mukata' (PMNH7712, 8.4.2016); Mar Saba (PMNH7841, 27.5.2016; PMNH7847, 27.5.2015; PMNH8003, 27.7.2016); Al Qarn (PMNH8000, 29.7.2016); Ain Hijla (PMNH8004, 18.4.2014); Mar Saba (PMNH8007, 27.7.2016; PMNH8008, 27.7.2016); Al Mazra'ah Al Sharqia (PMNH8116, 10.8.2016; PMNH8118, 10.8.2016; PMNH8122, 10.8.2016; PMNH8142, 10.8.2016; PMNH8260, 10.8.2016); Dayr Greer (PMNH8124; PMNH8129, 27.7.2016); Tal Al Assour (PMNH-8125, 27.7.2016; PMNH8126, 27.7.2016; PMNH8127, 27.7.2016); Ajul (PMNH8141, 3.8.2016); Yabroud (PMNH8144, 27.7.2016; PMNH8149, 27.7.2016; PMNH8151, 27.7.2016); Wadi Quff (PMNH8184, 5.2016); Ojja (PMNH8259, 25.7.2016) Wadi Al Zarka (PMNH E10649, E10650, E10657, E10653, 28.4.2017); Yatta (PMNH E1040, E10371, E10381, 25.3.2017).

Remarks: This is the most common species in the West Bank, it has been observed in different habitat (Mediterranean, semi-arid and arid). It was originally described by LA GRECA & LOMBARDO (1982) from Wadi Shu'ayb, Jordan (previously recorded as *Rivetina baetica* Rambur, 1839). It was reported from Palestine, Jordan, Syria and Turkey. We found this species in a variety of habitats and biogeographical zones in Palestine.

Miomantis paykullii Stål, 1871

Material examined: Wadi Fukeen (PMNH43, 2012).

Remarks: BATTISTON et al. (2010) reported this species from "Israel" without specific locality or specimens. Its presence in Palestine at the easternmost edge of its distribution need to be carefully studied and monitored as it may be affected by climatic changes and declining in one part of its range while expanding in another.

Microthespis dmitriewi Werner, 1908

Material examined: Jericho (female), (NMB: Naturhistorisches Museum Basel, Switzerland).

Remarks: It was reported from Palestine by BODENHEIMER (1933). Its distribution range extends over Ethiopia, Yemen, Iran, Oman, reaching as far as Pakistan (EHRMANN 2002).

Family Empusidae Burmeister 1838

Blepharopsis mendica (Fabricius 1775) (Fig. 2-A)

Material examined: Battir (PMNH1952, 16.6.2016); Mar Saba (PMNH7846, 27.5.2016); Ain Yabroud (PMNH8001, 27.7.2016); Dayr Balout (PMNH E10610, 2.5.2017). Observed in Bir Zeit (April, 2016), Bethlehem (June, 2016), and Yatta (April, 2017).

Remarks: This is a widespread species extending over North Africa and the Sahara, the Middle East, to India (ABU-DANNOUN & KATBEH-BADER 2007; BATTISTON et al. 2010) and Turkey (KOÇAK & KEMAL 2017). EHRMANN (2011) reported on specimens collected from historic Palestine without defined localities at the Staatliches Museum für Naturkunde Karlsruhe (SMNK), Germany. This species was collected on thorny bushes in various habitats in Palestine (Jerusalem, Khirbat an Natsh (31.40N-35.13E), 12 km S Jerusalem, 11 male, 8 female).

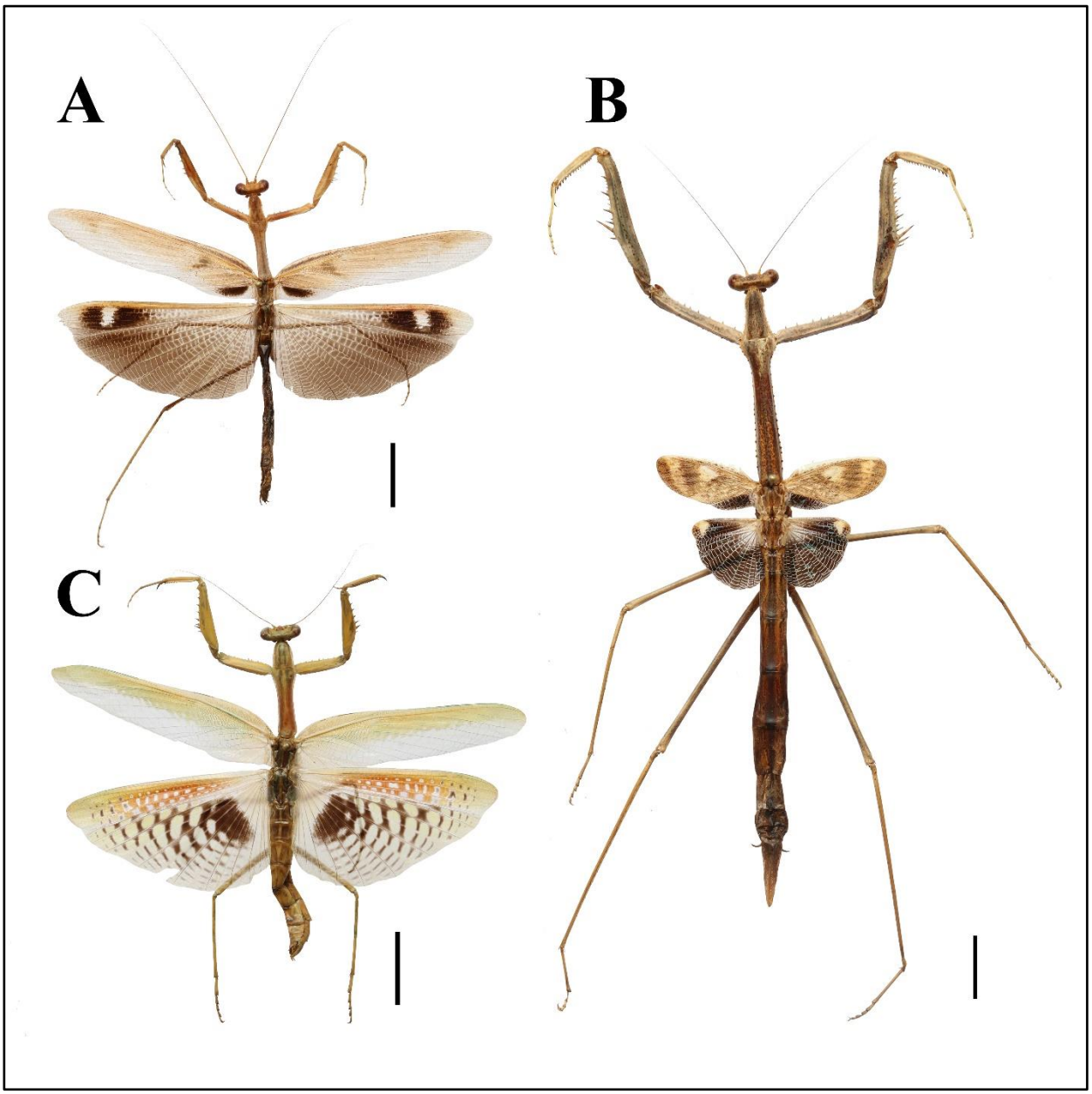

Figure 3: A: *Rivetina byblica* ♂. B: *Eremoplana inflex* ♀. C: *Iris oratoria* ♂. Bar = 10mm.

Empusa fasciata Brullé, 1832 (Fig. 2-C)

Material examined: Tarqumia (PMNH1712-26, 4.4.2013); Artas (PMNH4734, 13.8. 2014); Bethlehem (PMNH4864, Fall 2012) Wadi Qana (PMNH5243, 1.2.2014); Wadi Al Makhrour (PMNH 5555, 23.1.2015); Beit Sahour (PMNH5796, 25.2.2015); Beit Qad (PMNH6637, 18.3.2015); Wadi Al Bathan (PMNH7268, 19.9.2015); Wadi Al Haramya (PMNH7686, 3.3.2016); Battir (PMNH7853, 5.5.2016); Dayr Jreer (PMNH8130, 27.7.2016); Ain Sinia (PMNH8157, 20.6.2016); Yatta (PMNH E10461,15.4.2017; PMNHE10404, 25.3.2017).

Remarks: *E. fasciata* is a common and widely distributed species in the West Bank. It has a wide range of distribution extending from Eastern Europe to southern Asia (ROY 2004). Only two adults were caught while the rest of the specimens were nymphs, confirming that the life cycle of this species even in the southernmost edges of its distribution tends to overwinter with nymphs and adults present in late spring. ABU-DANNOUN & KATBEH-BADER (2007) reported also the high proportion of nymphs in the collected species from Jordan and gave notes on its habitat preference. We collected this species from various habitats throughout the West Bank.

Family Tarachodidae Giglio-Tos, 1919

Iris oratoria (Linnaeus, 1758) (Fig. 3-C)

Material examined: Wadi Al Makhrour (PMNH7199, 31.8.2015); Ubaidieh (PMNH5131, 28.8.2014); Bethlehem (PMNH8261, 17.8.2016). Observed in Zatara (August 2016).

Remarks: The Mediterranean praying mantid is wide distributed species from West Mediterranean to India (BATTISTON et. al. 2010) and common in Palestine. More details on its behavior and biology were discussed by BRACKENBURY (1991) and ABU-DANNOUN & KATBEH-BADER (2007).

Family Eremiaphilidae Saussure, 1869

Eremiaphila braueri Krauss, 1902

Material examined: Zatara (PMNH8257, 11.2016).

Remarks: This is the first record for this species for historic Palestine. It is known from the Arabian Peninsula (KALTENBACH 1982, 1991) and Jordan (ABU-DANNOUN & KATBEH-BADER 2007). Accounts on the behavior of this species were given by ROONWALL (1938) and ABU-DANNOUN & KATBEH-BADER (2007).

Eremiaphila brunneri Werner, 1905

Material examined: Beit Sahour (PMNH1802-3, 12.6.2013); Ain Hijla (PMNH4008, 18.4. 2014); Wadi Qana (PMNH5245, 1.2.2014); Tulkarem (PMNH6069, 19.3.2015); Wadi Al Ta'amra (PMNH6903, 3.6.2015; PMNH6904, 3.6.2015; PMNH7295, 21.9.2015; PMNH 7297, 21.8.2015; PMNH7777, 3.2016); Dayr Balout (PMNH7125, 10.8.2015); Mar Saba (PMNH8006, 27.7.2016).

Remarks: This is an endemic species to Palestine and seems to be common in the West Bank from various habitats. It was first described from Jerusalem (WERNER 1905).

***Eremiaphila* cf. *uvarovi* Bodenheimer, 1933**
Material examined: Mar Saba (PMNH7845, 27.5.2016).

Remarks: This species was originally described from Ma'an, Jordan and reported from Palestine (BODENHEIMER 1933 and 1953: 228-229).

Family Toxoderidae Saussure, 1869

***Pareuthyphlebs palmonii* (Uvarov, 1939) (Fig. 4)**
Material examined: SMNS, 16.♂. Collector and year of collection unknown

Remarks: This species was originally described from Palestine as *Xenomantis palmonii* (UVAROV 1939b). It is endemic to Palestine.

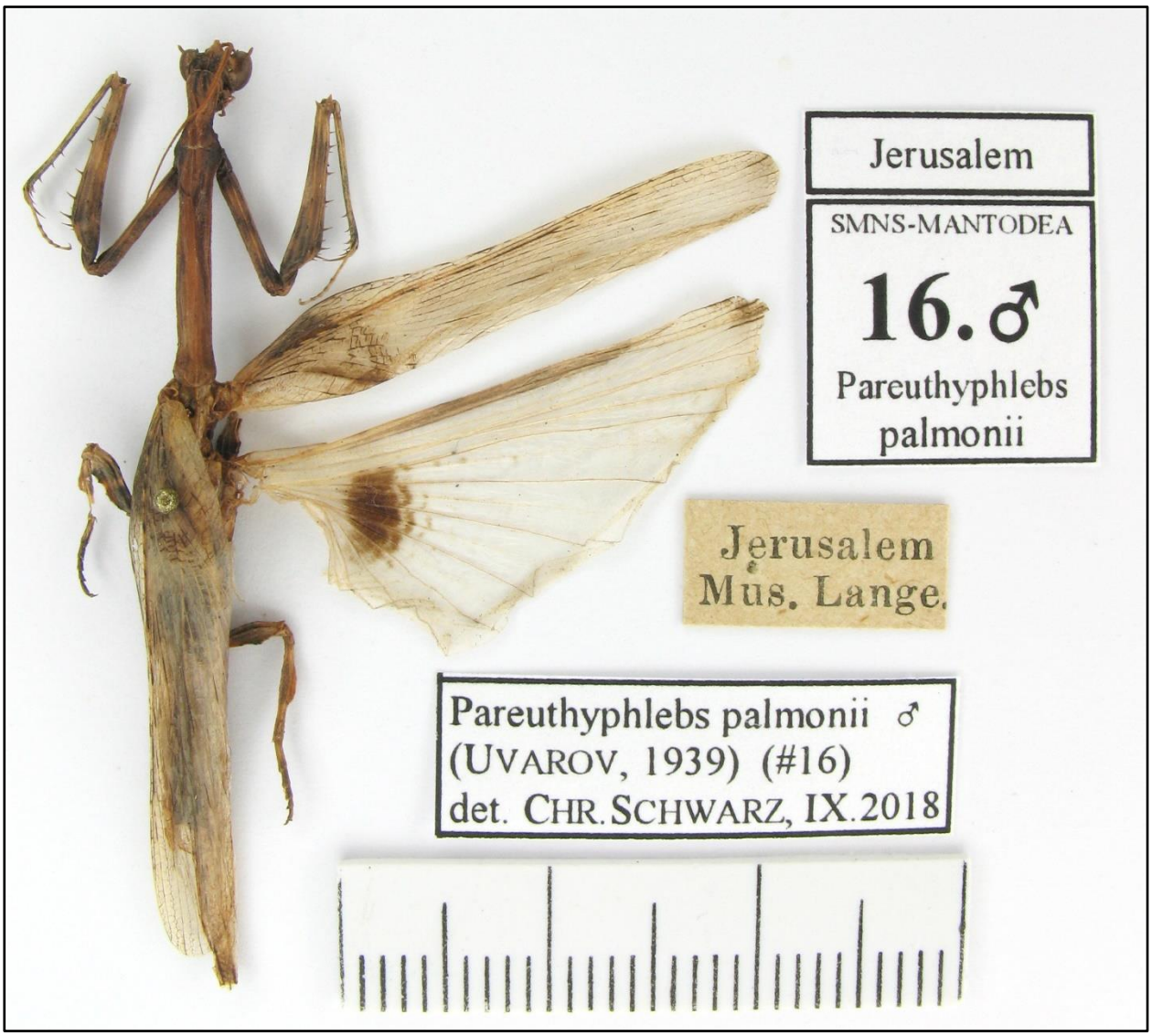

Figure 4. *Pareuthyphlebs palmonii*.

Discussion

Despite its small area (5,655 km²), the Palestinian Territory of the West Bank includes four main biogeographical zones: the Irano-Turanian, Saharo-Arabian, Sudanian penetration area and Mediterranean thus with rich fauna and flora (ZOHARY 1947, WHYTE 1950).

The mantid fauna of Palestine is relatively rich with 30 species (see Table 2). By comparison, 11, 16, 23, 46, and 60 species were recorded from Syria, Jordan, Turkey and Cyprus, the Arabian Peninsula, and Egypt respectively (KALTENBACH 1991, EHRMANN 2002, 2011, ABU-DANNOUN & KATBEH-BADER 2007, MOHAMMAD et al. 2011). Previous records of mantids from historic Palestine includes a total of 30 species (BODENHEIMER 1935, 1937, UVAROV 1939b, BEIER 1964, EHRMANN 2011).

However, the list of mantids of Palestine requires further investigation, since some of the listed species was based on old records. For example, *Microthespis dmitriewi* is a rare species and was listed by BODENHEIMER (1937) and there is only a single record from Jordan (ABU-DANNOUN & KATBEH-BADER 2007). *Pareuthyphlebs palmonii,* an Ethiopian species with limited localities in Palestine, and the presence of *Geomantis larvoides* should be verified.

The mantids of the Palestinian Territories have different zoogeographical affinities. Species of the genus *Ameles* are circum-Mediterranean with 17 known species, and are represented by four species here (BATTISTON et al. 2010). *Blepharopsis mendica* is an African species that extend over North Africa and the Sahara eastwards reaching India. It seems that *Bolivaria* is a Near Eastern or Central Asian genus. According to EHRMANN (2011) *Bolivaria kurda* is a synonym for *Bolivaria brachyptera* (PALLAS 1773), thus this genus is represented by a single species within its range. The genus *Empusa* is represented by seven species within the Euro-Mediterranean region, with four known species from Palestine. Species of this genus has a wide range of distribution across the African content, southern Europe, Middle East to as far as China. *Eremoplana infelix* is confined to the Great Rift along the Red Sea reaching as far as Lebanon (BATTISTON et al. 2010). The genus *Holaptilon* is so far endemic to Jordan and Palestine, with *H. pusillulum* as a single known species.

Hypsicorypha gracilis is a North African species that extends its distribution to the Arabian Peninsula (BATTISTON et al. 2010). The distribution range of *Iris oratoria* is circum-Mediterranean, extending to as far as India (BATTISTON et al. 2010). *Mantis religiosa* has a cosmopolitan distribution covering most continents. *Microthespis dmitriewi* has a unique distributional pattern, extending from East Africa, across Arabia to Pakistan. Species of the genus *Eremiaphila* have a wide range across North Africa and the Sahara, Middle East to as far as Pakistan, with 46 described species, many of them, including the six represented in this area need further taxonomic evaluation.

Table 2: List of mantids recorded from Palestine and data source (EHRMANN 2002).

Family	**REFERENCES**
Mantidae	
Ameles aegyptiaca Werner 1913	BODENHEIMER (1937)
Ameles heldreichi Brunner de Wattenwyl 1882	BODENHEIMER (1937), EHRMANN (2002), AGABITI et al. (2010), BATTISTON et al. (2010)
Ameles kurvillei Bolivar 1911	AGABITI et al. (2010)
Ameles syriensis Giglio-Tos 1915	This report
Bolivaria brachyptera (Pallas 1773)	BODENHEIMER (1937), EHRMANN (2002)
Eremoplana infelix Uvarov 1924	BODENHEIMER (1933), EHRMANN (2002), BATTISTON et al. (2010)
Geomantis larvoides larvoides Pantel 1896	BODENHEIMER (1937)
Holaptilon pusillulum Beier 1964	BEIER (1964), BATTISTON et al. (2010)
Mantis religiosa religiosa Linnaeus 1758	BODENHEIMER (1933), BATTISTON et al. (2010)
Microthespis dmitriewi Werner 1908	BODENHEIMER (1937), BATTISTON et al. (2010)
Miomantis paykullii Stål 1871	EHRMANN 2002, BATTISTON et al. (2010)
Riventina baetica baetica (Rambur 1838)	BODENHEIMER (1937), BATTISTON et al. (2010)
Rivetina byblica La Greca & Lombardo 1983	LA GRECA & LOMBARDO (1983), EHRMANN (2002), BATTISTON et al. (2010)
Rivetina syriaca syriaca (Saussure 1869)	This report
Sphodromantis viridis viridis (Froskål 1775)	EHRMANN (2002, 2011)
Empusidae	
Blepharopsis mendica (Fabricius 1775)	BODENHEIMER (1937), EHRMANN (2002, 2011), BATTISTON et al. (2010),
Empusa fasciata Brullé 1832	BRULLÉ (1832), BODENHEIMER (1937), EHRMANN (2002)
Empusa hedenborgii Stål 1877	BODENHEIMER (1937)
Empusa uvarovi Chopard 1921	BODENHEIMER (1937), BATTISTON et al. (2010)
Empusa longicollis Ramme 1951	RAMME (1951), BATTISTON et al. (2010)
Hypsicorypha gracilis (Burmeister 1838)	BODENHEIMER (1937), BATTISTON et al. (2010)
Tarachodidae	
Iris oratoria (Linnaeus 1758)	BODENHEIMER (1937), EHRMANN (2002, 2011), BATTISTON et al. (2010)
Eremiaphilidae	
Eremiaphila ammonita Uvarov 1933	UVAROV (1933)
Eremiaphila arabica Saussure 1871	BODENHEIMER (1937) listed as *E. dawydowi* WERNER (1905)
Eremiaphila braueri Krauss 1902	This report
Eremiaphila brunneri Werner 1905	WERNER (1905), UVAROV (1933), BODENHEIMER (1937)
Eremiaphila gene Lefebvre 1835	BODENHEIMER (1937), UVAROV (1939), EHRMANN (2011)
Eremiaphila uvarovi Bodenheimer 1933	BODENHEIMER (1933, 1937)
Toxoderidae	
Pareuthyphlebs occidentalis Werner 1928	EHRMANN (2002), BATTISTON et al. (2010)
Pareuthyphlebs palmonii (Uvarov, 1939)	UVAROV (1939b) listed as *Xenomantis palmonii,* EHRMANN (2002)

The genus *Eremiaphila* has a well-known problematic taxonomy and is in need of a revision: the validity of many species is under debate and species identification can be done only on large series of specimens (BATTISTON et al. 2010). The specimens here collected have been identified in three different species using traditional characters for univocal identification such as wings without black spots and smooth dumples on the hind wing for *Eremiaphila braueri*, the lateral edges of the pronotum with small denticles, dark spot on the hind wing for *Eremiaphila brunneri* and the tegmina without long and black semilunar transversal fascia that is narrow anteriorly for *Eremiaphila* cf. *uvarovi*, according to their original descriptions. Further researches however need to be done on a large series of specimens to confirm the presence of populations of these species in Palestine and the validity of their taxonomy.

Since most of the records for this are form Bodenheimer in the thirties of the last century, the rediscovery of some species here recollected in this area after more than 70 years raise interesting questions and problems on the stability of their populations and habitats, and give some other perspectives on their conservation, in particular for the endemic species or species with their type locality in Palestine. A notable case that should be evidenced is the rediscover of the *Holaptilon pusillulum* few kilometers far from its type locality after 51 years from its original description and disappearance from the scientific records, except for few records recently reported for Jordan (ABU-DANNOUN & KATBEH-BADER 2007) but the presence of a Jordanian population needs to be verified. This unique and important Palestinian population, apparently rare and present in scarce numbers need to be studied in its biology and urgent local and international conservation actions are strongly encouraged.

VIVONA & BATTISTON (2010) reported an analysis for the conservation status for the Euro-Mediterranean Mantids. They considered *Ameles aegyptiaca, Eremiaphila uvarovi, Holaptilon pusillulum, Pareuthyphlebs palmonii,* and *Pareuthyphlebs occidentalis* as seriously threatened, *Ameles kervillei*, *Ameles syriensis*, *Geomantis larvoides* and *Miomantis paykullii* at potential risk, while the other species are not threatened or at favorable conditions. Further studies on the ecology and habitat preference should be undertaken in the near future to better understand this little known group of insects and address the many challenges facing potential human threats (QUMSIYEH et al. 2017).

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References

ABU-DANNOUN, O. & KATBEH-BADER, A. (2007): Mantodea of Jordan, - Zootaxa 1617: 43-56.

AGABITI, B., SALVATRICE, I. & LOMBARDO, F. (2010): The Mediterranean species of the genus *Ameles* Burmeister1838 (Insecta Mantodea: Amelinae) with a biogeographic and phylogenetic evaluation. - Boletín de la Sociedad Entomológica Aragonesa (S.E.A.) 47: 1-20.

AMITAI, P. (1991): Handbuch der Insekten von Israel und andere Arthropoden. – Keter, (534950): 331 (Mantodea: 54-61, 186-189, 260-261) pp.; Jerusalem.

BATTISTON, R., ANDRIA, S. & RUZZANTE, G. (2017): The silent spreading of a giant mantis: a critical update on the distribution of *Sphodromantis viridis* (Forskål 1775) in the Mediterranean islands (Mantodea: Mantidae). - Onychium 13: 25-30.

BATTISTON, R. & FONTANA, P. (2005): Contribution to the knowledge of the genus *Ameles* (Burmeister 1838) with the description of a new species from Jordan (Insecta Mantodea). - Atti Accademia Roveretana degli Agiati a (8):173-197.

BATTISTON, R. & FONTANA, P. (2010): Colour change and habitat preferences in *Mantis religiosa*. - Bulletin of Insectology 63 (1): 85-89.

BATTISTON, R., PICCIAU, L., FONTANA, P. & MARSHALL, J. (2010): Mantids of the Euro-Mediterranean Area. - World Biodiversity Association, Verona, 239 pp.

BEIER, M. (1964): Ein neues Mantiden-Genus aus Israel. - Israel Journal of Zoology 13 (4):184-186.

BODENHEIMER, F.S. (1933): Eine neue *Eremiaphila*-Art (Orthoptera-Mantodea). - Mitteilungen der Deutsche Entomologische Gesellschaft, Berlin 4: 79-80.

BODENHEIMER, F.S. (1935): Animal life in Palestine. - L. Mayer, Jerusalem, 313–317pp.

BODENHEIMER, F.S. (1937): Prodromus Faunae Palestinae. - Memoires de L' Institut d' Egypt, Cairo Egypte 23: 221-222.

BODENHEIMER, F.S. (1953): Problems of animal ecology and physiology in deserts. – Research Council of Israel, Special Publication (2): 205-229.

BUXTON, P.A. & UVAROV, B.P. (1923): A contribution to our knowledge of Orthoptera of Palestine. - Bulletin of the Entomological Society of Egypt 16: 167-214 (171-174).

BUXTON, P.A. (1924): Heat, moisture and animal life in deserts. Proceedings of the Royal Society of London, Serie B 96: 123-131.

BRACKENBURY, J. (1991): Wing kinematics during natural leaping in the mantids *Mantis religiosa* and *Iris oratoria.* - Journal of Zoology 223: 341-356.

BRULLÉ, G.A. (1832): La partie des Insectes dans l'ouvrage de la commission scientifique de Morée. Zoologie - Insectes - Orthopteres - Mantides. - Levrault, F.G., Paris, 3 (2): I-XXIX, 64-400 (Mantodea: 83-84, fig. 4-5).

CAESAR, M., ROY, R., LEGENDRE, F., GRANDCOLAS, P. & PELLENS, R. (2015): Catalogue of Dictyoptera from Syria and neighbouring countries (Lebanon Turkey Iraq and Jordan). - Zootaxa 3948 (1): 71-92.

ÇIPLAK, B. & DEMIRSOY, A. (1997): Mantodea (Insecta) fauna of Malatya vicinity (Turkey) and some remarks on the mantises of Anatolia. - Journal of Orth. Research 6: 105-111.

COSTA, A. (1878): Relazione di un viaggio per l'Egitto, la Palestina e le Coste della Turchia Asiatica, per Ricerche zoologiche. - Atti R. Acc. Sci. Fis. Mat. Napoli, 7 (2): 1-40.

DEMIRSOY, A. (1977): Turkiye faunasi. Mantodea. (Insecta: Orthopteroid) seri: 8, Bölüm:4, Sayi: 10. Atatürk Universitesi yayinlari 499. Universite matbaasi, Erzurum, 53 pp.

EHRMANN, R. (1996): Die Mantodea-Fauna von Ägypten. - Entomol. Zeitschrift Frankfurt a. M. 106(10): 410- 424.

EHRMANN, R. (2002): Mantodea Gottesanbeterinnen der Welt. - Natur und Tier, Verlag, 519 pp.

EHRMANN, R. (2011): Mantodea from Turkey and Cyprus (Dictyoptera: Mantodea). - Articulata 26 (1):1-42.

EID, E., KATBEH-BADER, A., AL-OTOOM, M. & OTHMAN, Y. (2009): Contribution to the Entomofauna of Dibeen Forest Reserve in Jordan. - Centre for Entomological Studies, Ankara 49: 19-41.

ENSLIN, E. (1929): Entomologische Streifzüge in Palästina. - Entomologisches Jahrbuch von Dr. D. Krancher, Leipzig 1929: 1-13, Taf. 1-4.

GIGLIO-TOS, E. (1893): Viaggio del Dr. Ernesto Festa in Palestina, nel Libano e regioni vicine. V.- Ortotteri. - Bollettino dei Musei di Zoologia ed Anatomia Comparata della Reale Universitá, Torino 8 (164): 1-18, pl. 6.

KALTENBACH, A. (1982): Insects of Saudi Arabia Mantodea. - Fauna of Saudi Arabia 4: 29-72.

KALTENBACH, A. (1984): New species and further records of Mantodea from Saudi Arabia and Oman, - Fauna of Saudi Arabia 6: 203-209.

KALTENBACH, A. (1991): A further contribution to the knowledge of the Mantodea of the Arabian Peninsula, - Fauna of Saudi Arabia 12: 246-255.

KOÇAK, A.Ö. & KEMAL, M. (2017): *Blepharopsis mendica* in Euphrates region of South Turkey (Mantodea, Empusidae). - Centre for Entomological Studies Ankara Cesa News, Ankara (ausgeliefert: 18. VI. 2017), (138): 1-4.

KRAUSS, H.A. (1909): 1. Teil: Dermaptera und Orthoptera aus Ägypten, der Halbinsel Sinai, Palästina und Syrien. - In: KNEUCKER, A.: Zoologische Ergebnisse zweier in den Jahren 1902 und 1904 durch die Sinaihalbinsel unternommener botanischer Studienreisen nebst zoologischen Beobachtungen aus Ägypten, Palästina und Syrien. - Verhandlungen des Naturwissenschaftlichen Vereins in Karlsruhe 21: 79-165 (Mantodea: 99-102).

LA GRECA, M. (1966): Sulle *Sphodromantis* del gruppo *viridis* dell'Africa settentrionale ed occidentale. - Eos, Madrid 42(3-4): 493-516.

LA GRECA, M. & LOMBARDO, F. (1983): Le specie Mediterranee e dell'Asia occidentale del gen. *Rivetina* Berl. e Chop. (Insecta, Mantodea). - Animalia, Catania 9 (1-3) (1982): 345-393.

MOHAMMAD, S.K., GAD ALLA, S.M., EL-HAMOULY, H., EHRMANN, R. & NASSER, M.G. (2011): Mantodea of Egypt. - Zootaxa 3044: 1-27.

PATEL, S. & SINGH, R. (2016): Updated checklist and distribution of Mantidae (Mantodea: Insecta) of the World. - International Journal of Research Studies in Zoology 2: 17-54.

QUMSIYEH, M., HANDAL, E., CHANG, J., ABULIA, K., NAJAJREH, M. & ABUSARHAN, M. (2017): Role of museums and botanical gardens in ecosystem services in developing countries: Case study and outlook. - International Journal of Environmental Studies 74 (2): 340-350.

ROONWALL, M, (1938): The frightening attitude of a desert mantid *Eremiaphila braueri* Kr., (Orthoptera Mantodea). - Proceedings of the Royal Entomological Society of London (A) 13: 71-72.

ROY, R. (2004): Réarrangements critiques dans la famille des Empusidae et relations phylogénétiques (Dictyoptera, Mantodea). - Revue française d'Entomologie, Paris, (nouvelle série) 26 (1): 1-18.

Roy, R. (2014): A historical review of nomenclature and high-level classification of praying mantises (Mantodea), including a provisional checklist of the names associated to suprageneric ranks. - Zootaxa 3797 (1): 9-28.

SYMONDSON, W.O.C., SUNDERLAND, K.D. & GREENSTONE, M.H. (2002): Can generalist predators be effective biocontrol agents? - Annual Review of Entomology 47: 561-594.

UVAROV, B.P. (1923): A contribution to our knowledge of Orthoptera of Palestine. - Bulletin de la Société Entomologique d'Égypte: 167-174.

UVAROV, B.P. (1931): XXXI. Notes on the Genus *Iris* Saussure (Orthoptera Mantidæ). - Journal of Natural History 8 (45): 234-238.

UVAROV, B.P. (1933): LXXII. Notes on new and little-known Orthoptera from Palestine. - Journal of Natural History 11 (66): 663-672.

UVAROV, B.P. (1939a): Studies in the Arabian Orthoptera. II. New and little-known Mantidae and Phasmidae. - Journal Linnean Society Zoology, London 11 (274): 547-559.

UVAROV, B.P. (1939b): XV. New and less-known Palestinian Orthoptera. - Journal of Natural History 4 (20): 216-227.

VIVONA, M. & BATTISTON, R. (2010): A Red List for Euro-Mediterranean mantids. - In: BATTISTON, R., PICCIAU, L., FONTANA, P. & MARSHALL, J.: Mantids of the Euro-Mediterranean Area. - World Biodiversity Association, Verona: 190-196.

WERNER, F. (1905): Ergebnisse einer zoologischen Forschungsreise nach Ägypten und dem ägyptischen Sudan, I, Die Orthopterenfauna Ägyptens mit besonderer Berücksichtigung der Eremiaphilen - Sitzungsberichte der Akademie der Wissenschaften mathematisch-naturwissenschaftliche Klasse 114: 357-436.

WHYTE, R.O. (1950): The Phytogeographical zones of Palestine. - Geographical Review 40 (4): 600-614.

ZOHARY, M. (1947): A vegetation map of western Palestine. - Journal of Ecology 34: 1-19.