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## **A contribution to the knowledge of the Mantodea (Insecta) fauna of Iran**

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**Abstract:** This paper deals with the fauna of some species of Mantodea from different regions of Iran. In total 17 species from 11 genera (including *Amorphoscelis* STÅL, *Blepharopsis* REHN, *Empusa* COHN, *Eremiaphila* LEFÈBVRE, *Ameles* BURMEISTER, *Armene* STÅL, *Bolivaria* STÅL, *Hierodula* BURMEISTER, *Iris* SAUSSURE, *Mantis* LINNAEUS, *Oxythespis* SAUSSURE) and 5 families (Amorphoscelidae, Empusidae, Eremiaphilidae, Mantidae and Tarachodidae) were collected and identified. An identification key, synonymies and distribution data for the species are given.

**Key words:** Mantodea, Identification key, Amorphoscelidae, Empusidae, Eremiaphilidae, Mantidae, Iran.

### **Introduction**

Iran has a spectacular position between three different ecological zones, the Palaearctic, Afrotropical and Indomalayan. Although most of the Iranian fauna is related to the Palaearctic region, the fauna of the two other regions are also represented and are recorded from different areas of the country, especially the south (ZEHZAD et al. 2002; SAKENIN et al. 2011). From a taxonomic point of view, the Mantodea of Iran are poorly studied by a few disparate studies, either widely separated in time or in the aim of the work itself, since most concern countries other than Iran or orthopteroid insects other than mantids (UVAROV 1938; UVAROV & DIRSH 1952; BEIER 1956; MOFIDI-NEYESTANAK 2000; GHAHARI et al. 2008; SAKENIN et al. 2008a, b & 2011). About 34 species of mantids have been recorded from the country, but the true number of Iranian species of these charismatic predators needs more extensive revision: the current work forms a step in this direction.

The aim of this work is to update knowledge of Iranian Mantodea, through newly collected material from different regions of Iran, and by providing an identification key for the collected species. It takes account of changes in mantid taxonomy either on a world (EHRMANN 2002; OTTE & SPEARMAN 2005; SVENSON & WHITING 2009) or regional basis (e.g. MOHAMMED et al. 2011 on the Mantodea of Egypt).

## Materials and Methods

Species were collected from various localities of different ecological zones mainly by sweep net and searching vegetation visually. Standard information about the names and collecting sites are given. Identification was carried out with the aid of SAUSSURE (1871), INNES (1911, 1912), GIGLIO-TOS (1921, 1927), BEIER (1934, 1935), KALTENBACH (1982, 1996, 1998), OLIVEIRA (2009) and MOHAMMAD et al. (2011).

## Results

In total, seventeen species of eleven genera of Mantodea were collected and identified from various regions of Iran. The list of species is given below with distribution data and identification key.

### Key to species

- 1 Prothorax square, or only a little longer than broad .....2
- 1' Prothorax several times longer than broad (disregarding any lateral lobes or processes) .....4
- 2 Front tibia without spines, or only with delicate spines ventromedially; Abdominal sternite of female without spines.....*Amorphoscelis pantherina*
- 2' Front tibia with two rows of spines; Squat robust insects, 7th abdominal sternite of female with two long spines both sexes brachypterous..... *Eremiaphila* (3)
- 3 Hind wing with large black spot, pronotum tuberculate.....*E. gene*
- 3' Hind wing without such black spot, pronotum without granules .....*E. persica persica*
- 4 Ventromedial spines of anterior femur arranged with long spines separated by 3 or 4 short spines. Antennae of male pectinate .....5
- 4' Ventromedial spines of anterior femur arranged with long spines alternating with short spines (or equal in length). Antennae of male never pectinate.....8
- 5 Pronotum about the same length as anterior coxa, or only a little longer. The lobe on the posterior aspect of the distal anterior coxa does not form a spine; fore wings with marble ornamentation either green or brown ..... *Blepharopsis mendica*
- 5' Pronotum slim, always much longer than anterior coxa. The lobe on the posterior aspect of the distal anterior coxa prolonged into a sharp spin; forewing hyaline.....*Empusa* (6)
- 6 Pronotum only slightly longer than half the length of the elytra .....*E. pennicornis*
- 6' Pronotum only slightly shorter than the elytra .....7
- 7 Edges of the metazone of pronotum denticules provided with strong spines especially in male..... *E. pauperata*
- 7' Edges of the metazon of pronotum without any spines or with very minute spines, especially in the female..... *E. hedenborgii*
- 8 Eyes with terminal spike, directed laterally .....*Oxythespis persica*
- 8' Eyes rounded or at most bluntly conical, directed superiorly .....9
- 9 Antennae and costal margin of elytra of male ciliated. Small or at most medium-sized insects.....10
- 9' Antennae and costal margin of elytra of male not ciliated. Mostly large insects .....13
- 10 Supra-anal plate very small, wider than longer, transverse; the first two external spines at the base of the anterior femora very close to the rest .....*Armene pusilla pusilla*

- 10' Supra-anal plate large, at least as long as wide; the first two external spines at the base of the anterior femora not very close to the rest.....*Ameles* (11)
- 11 Compound eyes conical ending in point .....*A. arabica*
- 11' Compound eyes slightly conical, apex rounded without point..... 12
- 12 Pronotum expanded anteriorly near the head.....*A. picteti*
- 12' Pronotum expanded in the middle.....*A. crassinervis*
- 13 External border of anterior femora smooth between the spines, exceptionally toothed and then with 3 discoidal spines, otherwise 4 discoidal spines ..... 14
- 13' External border of anterior femora toothed between spines. 4 discoidal spines..... 15
- 14 Claw-groove in middle or distal half of anterior femur, forewing without eye spot .....  
.....*Mantis religiosa*
- 14' Claw-groove in proximal half of anterior femur, forewing with eye spot.....  
.....*Hierodula transcaucasica*
- 15 Anterior femur with 4 outer spines, anterior tibia with 8-9 outer spines .....  
.....*Bolivaria brachyptera*
- 15' Anterior femur with 4 outer spines, anterior tibia with 11-12 outer spines .....*Iris* (16)
- 16 Hind wing with very large brown spot and continuous brown thick bands around it .....  
.....*I. coeca*
- 16' Hind wing with different coloration, bright sulphurous near outer margin .....*I. splendida*

### Genus *Ameles* BURMEISTER 1838

*Ameles* BURMEISTER 1838: 531. *Parameles* SAUSSURE 1869: 59, 72.

#### *Ameles arabica* UVAROV 1939

*Ameles arabica* UVAROV 1939: 551-552.

**M a t e r i a l e x a m i n e d :** Hormozgan province: Haji-Abad, (2 adult males), March 2005.

**G e n e r a l d i s t r i b u t i o n :** Saudi Arabia (Type locality), Iran.

**C o m m e n t s :** This species was recorded from various localities in Saudi Arabia by UVAROV (1939) and KALTENBACH (1982).

#### *Ameles crassinervis* DIRSH 1927

*Ameles crassinervis* DIRSH 1927: 57-58.

**M a t e r i a l e x a m i n e d :** Isfahan province: Ardestan, (1 adult female), August 2004.

**G e n e r a l d i s t r i b u t i o n :** Afghanistan, Iran.

#### *Ameles picteti* (SAUSSURE 1869)

*Parameles picteti* SAUSSURE 1869: 72. *Mantis nana* CHARPENTIER 1825. In: RAMEUR 1838: 22-23. *Ameles* [*Parameles*] *picteti* (SAUSSURE 1869). In: GIGLIO-TOS 1927: 162. *Ameles africana* BOLIVAR 1914. In: EHRMANN 1988: 147, 149.

**M a t e r i a l e x a m i n e d :** Semnan province: Shahrud, (1 juvenile, 1 male adult), April 2006.

**G e n e r a l d i s t r i b u t i o n :** Alegria, Italy, Iran, Spain.

### Genus *Amorphoscelis* STÅL 1871

*Amorphoscelis* STÅL 1871.

***Amorphoscelis pantherina* ROY 1966**

*Amorphoscelis pantherina* ROY 1966: 268-270.

Material examined: Hormozgan province: Minab, (1 adult male), April 2007.

General distribution: Iran, Iraq.

**Genus *Armene* STÅL 1877**

*Armene* STÅL 1877.

***Armene pusilla pusilla* (EVERSMANN 1859)**

*Mantis pusilla* EVERSMANN 1859: 124-125. *Ameles alata* SAUSSUER 1872: 51-52.

Material examined: Kurdistan province: Bijar, (3 adult females, 2 juvenile), June 2006.

General distribution: Afghanistan, Iran, Tajikistan, Turkmenistan.

**Genus *Blepharopsis* REHN 1902**

*Blepharopsis* REHN 1902: 316. *Blepharis* AUDINET-SERVILLE 1831: 47.

***Blepharopsis mendica* (FABRICIUS 1775)**

*Mantis mendica* FABRICIUS 1775: 275. *Mantis marmorata* OLIVIER 1792: 641. *Gongylus mendicus* THUNBERG 1815: 295. *Blepharopsis mendica* FABRICIUS 1793 (cited in KRAUSS 1890: 236). *Blepharopsis mendica* EBNER 1921: 113.

Material examined: Sistan & Baluchestan province: Bampur, (1 juvenile, 2 adult females), June 2007.

General distribution: Asia Minor, Cyprus, Canary Islands, Iran, Iraq, Northern Africa.

**Genus *Bolivaria* STÅL 1877**

*Bolivaria* STÅL 1877.

***Bolivaria brachyptera* (PALLAS 1773)**

*Mantis brachyptera* PALLAS 1773: 728. *Mantis commutata* FIEBKR 1853: 95. *Iris pallasii* SAUSSURE 1869: 65.

Material examined: Khuzestan province: Izeh, (2 adult females), October 2007.

General distribution: Afghanistan, Armenia, Iran, Magnolia, Turkey.

**Genus *Empusa* ILLIGER 1798**

*Empusa* ILLIGER 1798: 499.

***Empusa pauperata* (FABRICIUS 1781)**

*Mantis pauperata* FABRICIUS 1781: 346-347. *Empusa btmbertiawi* SAUSSUR 1869: 60-61. *Empusa servitzi* SAUSSURE 1872: 88.

Material examined: Sistan & Baluchestan province: Zahedan, (1 adult male, 1 adult female), May 2005.

General distribution: India, Iran, Sir Lanka.

***Empusa hedenborgii* STÅL 1877**

*Mantis pectinicornis* LINNAEUS 1767: 691 (possible synonym, nomen dubium). *Empusa hedenborgii* STÅL 1877: 77.

**M a t e r i a l e x a m i n e d :** Khuzestan province: Ahwaz, (1 adult male), October 2007.

**G e n e r a l d i s t r i b u t i o n :** Almost all of Africa beyond the Sahara, including Cameroon, Cape Town, Eritrea, Senegal, south west Asia including Iran.

***Empusa pennicornis pennicornis* (PALLAS 1773)**

*Mantis pennicornis* PALUS 1773: 728. *Manti spallasiana* OLIVIER 1792: 637-638. *Gongylus marginatus* THUNBERG 1815: 294. *Empusa (Empusa) orientalis* BURMEISTER 1838: 546-547.

**M a t e r i a l e x a m i n e d :** Kurdistan province: Sanandaj, (1 adult female, 1 juvenile), June 2006.

**G e n e r a l d i s t r i b u t i o n :** China, Iran, Turkmenistan, Uzbekistan, Turkey, Syria.

**Genus *Eremiaphila* LEFÈBVRE 1835**

*Eremiaphila* LEFÈBVRE 1835: 468. *Eremiphila* BURMEISTER 1838: 524. *Centromantis* WERNER 1904: 404.

***Eremiaphila gene* LEFÈBVRE 1835**

*Eremiaphila gene* LEFÈBVRE 1835: 486. *Eremiaphila zetterstedt* (not LEFÈBVRE), (cited in BURMEISTER 1838: 525). *Eremiaphila burmeisteri* SAUSSURE 1871: 252. *Eremiaphila hauensteini* WERNER 1905: 386. *Eremiaphila genei* var. *laevipennis* WERNER 1905: 387.

**M a t e r i a l e x a m i n e d :** Isfahan province: Isfahan, (1 adult female), August 2004.

**G e n e r a l d i s t r i b u t i o n :** Afghanistan, Arabian Peninsula, Armenia, Egypt, Iran, Jordon, Palestine, Syria, Turkey.

***Eremiaphila persica persica* WERNER 1905**

*Eremiaphila persica* WERNER 1905: 388.

**M a t e r i a l e x a m i n e d :** Kerman province: Jiroft, (2 adult females), May 2006.

**G e n e r a l d i s t r i b u t i o n :** Azerbaijani, Iran, Turkey.

**Genus *Hierodula* BURMEISTER 1838**

*Hierodula* BURMEISTER 1838: 536. *Ephierodula* GIGLIO-TOS 1912: 63-64. *Parhierodula* GIGLIO-TOS 1912: 108. *Zopheromantis* TINDALE 1924: 550.

***Hierodula transcaucasica* BRUNNER VON WATTENWYL 1878**

*Hierodula transcaucasica* BRUNNER VON WATTENWYL 1878: 88. *Sphodromantis transcaucasica* (BRUNNER VON WATTENWYL 1878) in KIRPY 1904: 244.

**M a t e r i a l e x a m i n e d :** Khorasan province: Mashhad, (2 adult males), July 2007. Sistan & Baluchestan province: Zabol, (1 adult female), December 2008.

**G e n e r a l d i s t r i b u t i o n :** Afghanistan, Iran, Turkey.

**Genus *Iris* SAUSSURE 1869**

*Iris* SAUSSURE 1869: 64.

***Iris coeca* UVAROV 1931**

*Iris oratoria coeca* UVAROV 1931: 235. *Iris coeca* UVAROV 1931 (cited in MARSHALL 1975: 313) "Examined type and put it as distinct species."

**M a t e r i a l e x a m i n e d :** Ilam province: Dehloran, (2 adult females), August 2006.

**G e n e r a l d i s t r i b u t i o n :** Egypt, Iran, Saudi Arabia, Sudan, Yemen.

***Iris splendida* UVAROV 1922**

*Iris splendida* UVAROV 1922.

**M a t e r i a l e x a m i n e d :** Hormozgan province: Bandar-Abbas, (1 adult female), October 2007. Fars province: Shiraz, (2 adult females), October 2007.

**G e n e r a l d i s t r i b u t i o n :** Afghanistan, Iran.

**Genus *Mantis* LINNAEUS 1758**

*Gryllus (Mantis)* LINNAEUS 1758: 425.

*Mantes* GEOFFROY 1764: 399. *Mantis* LICHTENSTEIN 1802: 18.

***Mantis religiosa religiosa* LINNAEUS 1758**

*Gryllus (Mantis) religiosus* LINNAEUS 1758: 426. *Mantis sancta* FABRICIUS 1787: 228. *Mantis maroccana* THUNBERG 1815: 287. *Mantis pia* AUDINET-SERVILLE 1839: 193. *Mantis radiata* FISCHER-WALDHEIM 1846: 101. *Mantis capensis* SAUSSURE 1872: 46. *Mantis religiosa* LINNAEUS 1758 (cited in WERNER 1913: 211). *Mantis religiosa* LINNAEUS 1758 (cited in STOREY 1918: 50). *Mantis griveaudi* PAULIAN 1959: 33. *Mantis griveaudi* in ROY 1967: 127.

**M a t e r i a l e x a m i n e d :** Ilam province; Dehloran, (3 adult females), August 2006. Fars province: Kazeroon, (2 adult males), September 2006. Kordestan province: Bijar, (2 adult females), April 2007. Khorasan province: Sabzevar, (1 juvenile), June 2007. Khorasan province: Mashhad, (2 juveniles), July 2007. Hormozgan province: Bandar-Abbas, (1 adult female), October 2007. Fars province: Shiraz, (2 adult females), October 2007.

**G e n e r a l d i s t r i b u t i o n :** Holarctic.

**Genus *Oxythespis* SAUSSURE 1871**

*Oxythespis* SAUSSURE 1870: 234. *Oxythespis* SAUSSURE 1871: 127.

***Oxythespis persica* BOLIVAR 1913**

*Oxythespis persica* BOLIVAR 1913: 605-606.

**M a t e r i a l e x a m i n e d :** Isfahan province: Najaf-Abad, (1 adult female), April 2001.

**G e n e r a l d i s t r i b u t i o n :** Iran.

**Discussion**

The Iranian Mantodea has been poorly studied so far. Since Iran is a large country with

various geographical and bioclimatic regions, the species diversity of these beneficial insects is rather diverse. In this paper we record five families of Mantodea from Iran: Amorphoscelidae, Empusidae, Eremiaphilidae, Mantidea and Tarachodidae. The Amorphoscelidae is represented here by one species, *Amorphoscelis pantherina* ROY 1966, restricted in its distribution to Iraq and northern Iran (ERMANN 2002). The family Empusidae is divided into two subfamilies: the Blepharodinae, containing only *Blepharopsis mendica*; and the Empusinae, represented by one genus and 3 species, *Empusa pauperata* (FABRICIUS 1781), *Empusa hedenborgii* STÅL 1877 and *Empusa pennicornis pennicornis* (PALLAS 1773). The Eremiaphilidae is represented here by only one species, *Eremiaphila gene* LEFÈBVRE 1835, common throughout North Africa and the Arabian Peninsula to the Iranian desert (MOHAMMED et al. 2011). The real number of Iranian *Eremiaphila* needs more intensive work on this interesting genus. The family Mantidea represented here by 8 species is the largest family in Iran. It is divided into four subfamilies. The Ameleinae has two genera and four species: *Ameles* with three species (*A. arabica* UVAROV 1939, recorded here as a new record for Iran, *Ameles crassinervis* DIRSH 1927 and *Ameles picteti* (SAUSSURE 1869)); and *Armene*, with one species, *A. pusilla pusilla* (EVERSMANN 1859). The Miomantinae is represented by one species, *Bolivaria brachyptera* (PALLAS 1773). The Oxythespinae is represented by one species, *Oxythespis persica* BOLIVAR 1913. The Paramantinae includes *Mantis* and *Hierodula*, each represented by only one species, *M. religiosa* (LINNAEUS 1758) and *H. transcaucasica* BRUNNER VON WATTENWYL 1878. Finally, the Tarachodidea is represented here by two species of the genus *Iris*, *I. coeca* UVAROV 1931 and *I. splendida* UVAROV 1922.

The study of the Iranian Mantodea acquires its importance from the position of Iran in the Old World, and especially because it belongs to the Palearctic ecozone where the fauna is well known: it also has affinities with many of the surrounding countries in the region. This paper forms a basis for further investigation of the mantids of Iran, and consequently for mapping the distribution of these charismatic predators throughout the Middle East.

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### Zusammenfassung

Vorliegende Arbeit behandelt die Fauna der Mantodea verschiedener iranischer Regionen. Insgesamt gelang der Nachweis von 17 Arten der 11 Gattungen *Amorphoscelis* STÅL, *Blepharopsis* REHN, *Empusa* COHN, *Eremiaphila* LEFÈBVRE, *Ameles* BURMEISTER, *Armene* STÅL, *Bolivaria* STÅL, *Hierodula* BURMEISTER, *Iris* SAUSSURE, *Mantis* LINNAEUS, *Oxythespis* SAUSSURE, die den Familien Amorphoscelidae, Empusidae, Eremiaphilidae, Mantidae und Tarachodidae angehören. Ein Bestimmungsschlüssel sowie Angaben zur Synonymie und Verbreitung ergänzen die Arbeit.

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