

New species and new record of Chelonini (Hymenoptera: Braconidae) from western Iran

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Abstract: In 2015 and 2016, the occurrence of the tribe Chelonini (Braconidae, Cheloninae) in the province of Hamadan (western Iran) was surveyed using malaise traps. In total, 12 species were discovered. *Chelonus* (*C.*) *olgae* Kokujev, 1895 is new to the fauna of Iran and one species, *Chelonus* (*Microchelonus*) *subpamiricus* Farahani & van Achterberg sp. nov., is new to science. The diagnostic characters and supplementary illustrations of the newly recorded species are provided.

Key words: Braconidae, Chelonini, *Chelonus*, Iran, new species

1. Introduction

Cheloninae Foerster, 1863, is a large subfamily of Braconidae (Hym.: Ichneumonoidea) with 1523 described species worldwide (Yu et al., 2016). Most species (1077 species) are attributed to the tribe Chelonini Foerster, 1863. The other tribes are small (Adeliini Viereck, 1918 and Odontosphaeropygini Zettel, 1990) to medium-sized (Phanerotomini Baker, 1926). All chelonines are solitary egg-larval endoparasitoids of Lepidoptera, especially Tortricoidea and Pyraloidea (Shaw and Huddleston, 1991).

The genus *Chelonus* (including *Microchelonus* Szépligeti, 1908) is a large taxon with worldwide distribution, containing 974 valid species (Yu et al., 2016) and the genus is in need of revision.

The first published records of Iranian Chelonini were those by Telenga (1941). Subsequently, several species were recorded from Iran by Tobias (1976, 1986), Hedwig (1957), and Huddleston (1984). Based on the latest checklist of Iranian Braconidae (Farahani et al., 2016), only scattered records of Chelonini from western Iran (Kordestan, Lorestan, Kermanshah, and Ilam provinces) have been published. Farahani et al. (2013, 2014) studied the tribe Chelonini and reported 12 species from northern Iran. Currently, 67 species of the subfamily Cheloninae are known from Iran, but many are waiting to be discovered (Farahani et al., 2016), considering the number known from the West Palaearctic region. Here we describe a new species for science of the genus *Chelonus* from Iran, as well as presenting the faunistic data for other Chelonini from

the western part of Iran. As the fauna of this subfamily in Iran has been poorly studied, the aim of the present work was to enlarge our knowledge of the zoogeography and the fauna of Iranian braconids.

2. Materials and methods

This study was carried out in Hamadan province in western Iran from April to November 2015 and 2016. Five malaise traps were installed in different habitats including the forest, rangeland, a medicinal herb farm, and in a representative orchard (Figure 1). In addition to the malaise traps, 5 light traps were placed in similar habitats. The dried specimens were card-mounted, and treated according to the method of van Achterberg (2009). Identifications were performed based on Huddleston (1984) and Tobias (1986, 2008, 2011). The illustrations were made using an Olympus SZX9 stereomicroscope equipped with a Sony CCD digital camera. Some specimens are deposited in the Insect Collection of the Research Center of Agriculture and Natural Resources (ICRCAN), Hamadan. The holotype and paratype are deposited in the Insect Collection of the Research Institute of Forests and Rangelands (ICRIFR), Tehran.

3. Results

In the present study, 12 Chelonini species were collected and identified from Hamadan Province of Iran, of which *Chelonus* (*Chelonus*) *olgae* Kokujev, 1895 is new to the fauna of Iran and *Chelonus* (*Microchelonus*) *subpamiricus* Farahani & van Achterberg sp. n. is new to science.

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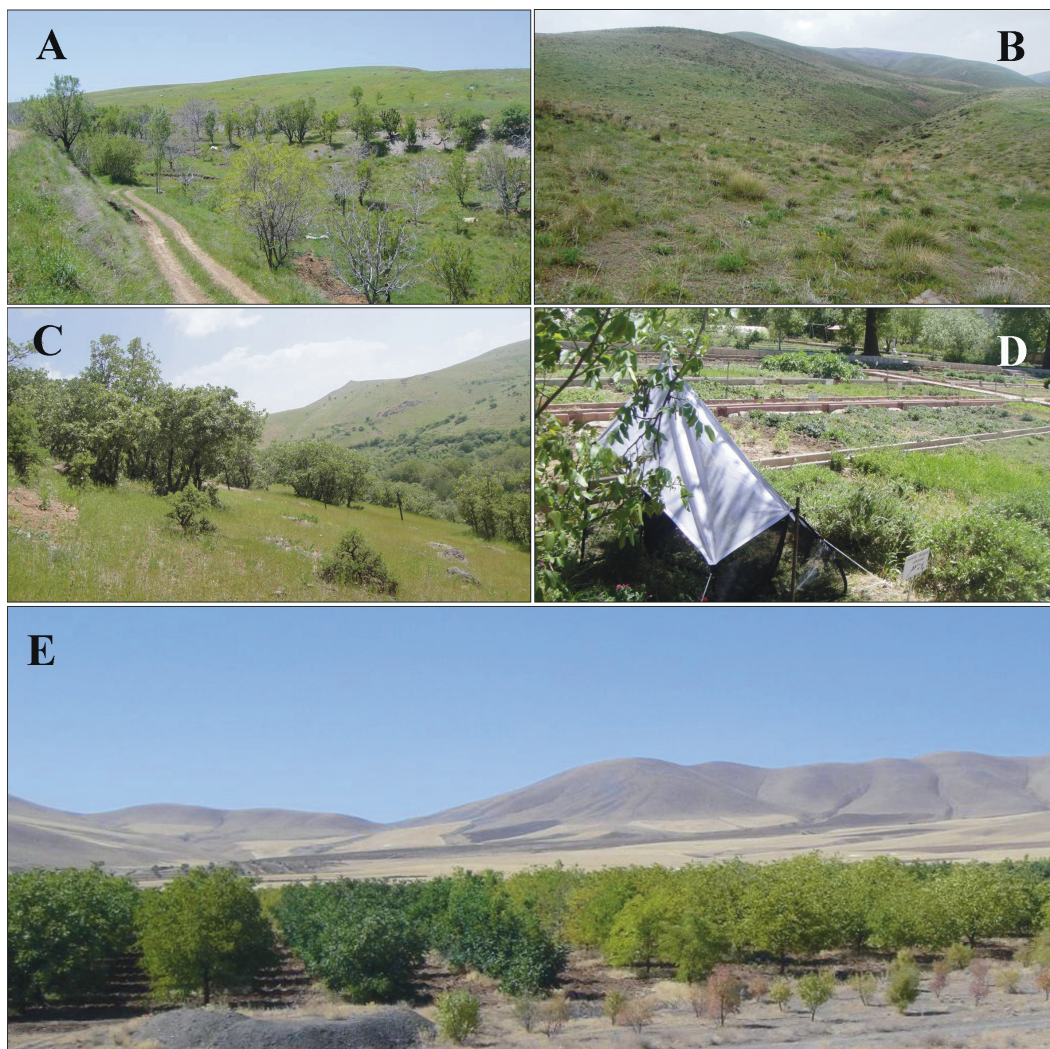


Figure 1. The habitats in which specimens were collected with malaise traps. A- Galehbor, B- Gonbad, C- Gian forest, D- Bu-Ali Sina Medicinal Plants Garden, E- Korzan.

Ascogaster annularis (Nees, 1816)

Material examined: Hamadan province: Nahavand, Gian (34°09'N, 48°13'E, 1650 m a.s.l.), 17.06.2015, 1♂; 21.06.2015, 9♀♀, 2♂♂; 29.06.2015, 19♀♀, 3♂♂; 06.07.2015, 6♀♀, 3♂♂ (ICRCAN); leg.: A. Rajabi Mazhar.

Distribution: Armenia, Austria, Bulgaria, former Czechoslovakia, Finland, France, Georgia, Germany, Hungary, Israel, Iran, Italy, Kazakhstan, Korea, Latvia, Lithuania, Moldova, Netherlands, Poland, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.

Ascogaster grahamsi Huddleston, 1984

Material examined: Hamadan Province: Hamadan, Bu-Ali Sina Medicinal Plants Garden (34°46'N, 48°30'E, 1950 m a.s.l.), 27.06.2015, 1♀ (ICRCAN); leg.: A. Rajabi Mazhar.

Distribution: Austria, China, former Czechoslovakia, France, Germany, Hungary, Israel, Iran, Italy, Korea, Netherlands, Russia, Sweden, Switzerland, Turkey, United Kingdom.

Chelonus (Chelonus) annulipes Wesmael, 1835

Material examined: Hamadan Province: Asadabad, Galehbor (34°50'N, 48°10'E, 2150 m a.s.l.), 18.08.2016, 1♀ (ICRCAN); leg.: A. Rajabi Mazhar.

Distribution: Afghanistan, Armenia, Azerbaijan, Belgium, Bulgaria, Canada, China, Croatia, former Czechoslovakia, France, Georgia, Germany, Greece, Hungary, Iran, Italy, Kazakhstan, Latvia, Lithuania, Moldova, Netherlands, Poland, Romania, Russia, Switzerland, Tajikistan, Turkey, Turkmenistan, USA, Ukraine, United Kingdom, Uzbekistan, former Yugoslavia.

Chelonus (Chelonus) armeniacus Tobias, 1976

Material examined: Hamadan Province: Asadabad, Galehbor (34°50'N, 48°10'E, 2150 m a.s.l.), 03.08.2015, 1♂; 22.09.2016, 1♀; 25.09.2016, 1♀ (ICRCAN); leg.: A. Rajabi Mazhar.

Distribution: Armenia and Iran.

Chelonus (Chelonus) canescens Wesmael, 1835

Material examined: Hamadan Province: Nahavand, Gian (34°09'N, 48°13'E, 1650 m a.s.l.), 25.07.2015, 1♀, 2♂♂; 10.06.2016, 1♀, 1♂ (ICRCAN); leg.: A. Rajabi Mazhar.

Distribution: Belarus, Belgium, Czech Republic, former Czechoslovakia, France, Germany, Hungary, Iran, Italy, Mongolia, Poland, Romania, Russia, Spain, Sweden, Switzerland, Turkey, United Kingdom.

Chelonus (Chelonus) elongatus Szepligeti, 1898

Material examined: Hamadan Province: Asadabad, Galehbor (34°50'N, 48°10'E, 2150 m a.s.l.), 22.06.2015, 1♀; 03.08.2015, 1♂; 10.08.2016, 1♂; Bu-Ali Sina Medicinal Plants Garden (34°46'N, 48°30'E, 1950 m asl), 10.07.2016, 1♀; 25.09.2016, 1♀ (ICRCAN); leg.: A. Rajabi Mazhar.

Distribution: Iran, Mongolia, Russia.

Chelonus (Microchelonus) erythrogaster Lucas, 1849

Material examined: Hamadan Province: Asadabad, Galehbor (34°50'N, 48°10'E, 2150 m a.s.l.), 03.08.2015, 1♀; 10.07.2015, 3♀♀ (ICRCAN); leg.: A. Rajabi Mazhar.

Distribution: Algeria, Croatia, Italy, Russia, Tunisia, former Yugoslavia.

Chelonus (Chelonus) microsomus Tobias, 1964

Material examined: Hamadan Province: Asadabad, Galehbor (34°50'N, 48°10'E, 2150 m a.s.l.), 10.08.2015, 1♀ (ICRCAN); leg.: A. Rajabi Mazhar.

Distribution: Iran, Kazakhstan, Turkey, Uzbekistan.

Chelonus (Chelonus) oculator (Fabricius, 1775)

Material examined: Hamadan Province: Hamadan, Bu-Ali Sina Medicinal Plants Garden (34°46'N, 48°30'E, 1950 m a.s.l.), 21.06.2015, 3♀♀; 10.06.2016, 1♂; 10.07.2016, 7♀♀, 1♂; 25.07.2016, 8♀♀, 8♂♂; 25.08.2016, 1♀; Gonbad (34°41'42"N, 48°42'05"E, 2220 m a.s.l.), 25.09.2016, 1♀ (ICRCAN); leg.: A. Rajabi Mazhar.

Distribution: Afghanistan, Albania, Azerbaijan, Belgium, Bulgaria, Canary Islands, China, Croatia, Czech Republic, former Czechoslovakia, Egypt, Finland, France, Georgia, Germany, Greece, Hungary, Iran, Italy, Kazakhstan, Latvia, Lithuania, Moldova, Mongolia, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine, United Kingdom, Uzbekistan, former Yugoslavia.

Chelonus (Microchelonus) subpamiricus Farahani & van Achterberg sp. nov. (Figures 2A–2F)

Material examined: Holotype: female, Iran: Hamadan Province: Asadabad, Galehbor (34°50'N, 48°10'E, 2150 m a.s.l.), 07.07.2015, 1♀ (ICRIFR); leg.: A. Rajabi Mazhar. Paratype: 1♀, same data as holotype (ICRIFR).

Differential diagnosis: This species can be readily separated by the length of the hind femur (3.0 times its width) and the ratio of marginal cell/2nd submarginal cell from *Chelonus (Microchelonus) pamiricus* Vojnovskaja-Krieger, 1931. Moreover, metasomal carapace gradually narrowed from proximal third; longitudinal diameter of eye 1.7 times height of gena; width of face 2.1 times its height; POL 2.5 times diameter of ocellus.

Description: Female (holotype). Length of body 4.2 mm, length of forewing 3.0 mm.

Head: Antennae long and slender, 16-segmented, slightly shorter than body, granulate; scape elongate, pedicel small, 2.9 and 1.2 times their width respectively, length of the 1st flagellar segment 5.0 times its width, the 2nd flagellar segment as long as the 3rd, apical segments 2.5 times as long as their width; head transverse, 2.0 times as wide as its length in dorsal view, roundly contracted behind eyes, temple 1.2 times as long as transverse diameter of eye in dorsal view (Figure 2A), occiput concave, ocelli small, not on line, maximum diameter of the lateral ocellus: postocellar line: ocular-ocellar line as 9:23:35; vertex with transverse rugae behind ocelli, longitudinal diameter of eye 1.7 times height of gena; face transverse in frontal view, width of face 2.1 times its height, coarsely reticulate-punctate; clypeus protuberant, denticles absent (Figure 2B); length of maxillary palp slightly longer than of length of face with clypeus together.

Mesosoma: mesoscutum punctate (Figure 2C); mesoscutum with more distinct longitudinal of rugae before scutellum; propodeum coarsely sculpture, with small lateral teeth.

Wings: Anterior margin of marginal cell of forewing shorter than pterostigma (Figure 2D); radial cell of forewing about as long as the 2nd submarginal cell.

Legs: Hind coxa coarsely rugose; length of hind femur 3.0 times its width, with minute punctures, hind tibia and tarsus equal in length.

Metasoma: Metasomal carapace gradually narrowed from proximal third, not bent apically; length of metasomal carapace 2.2 times its width in middle, densely and rather coarsely punctate, with longitudinal rugae in basal, becoming weaker toward its posterior part (Figure 2E), in lateral view rather flat; apical sternites projecting from under carapace (Figure 2F); ovipositor projecting beyond apical sternite.

Coloration: Body black; antenna black, except brownish basal segments (Figure 2F); maxillary palp brownish, mandible brownish; wings slightly infusate, basal half with pale yellowish veins (Figure 2D); legs mostly brownish, coxae black, apices of hind femur and tibia infusate.

Distribution: Iran.

Etymology. The Latin preposition “sub” indicates the close relation of this new species to *C. pamiricus*.

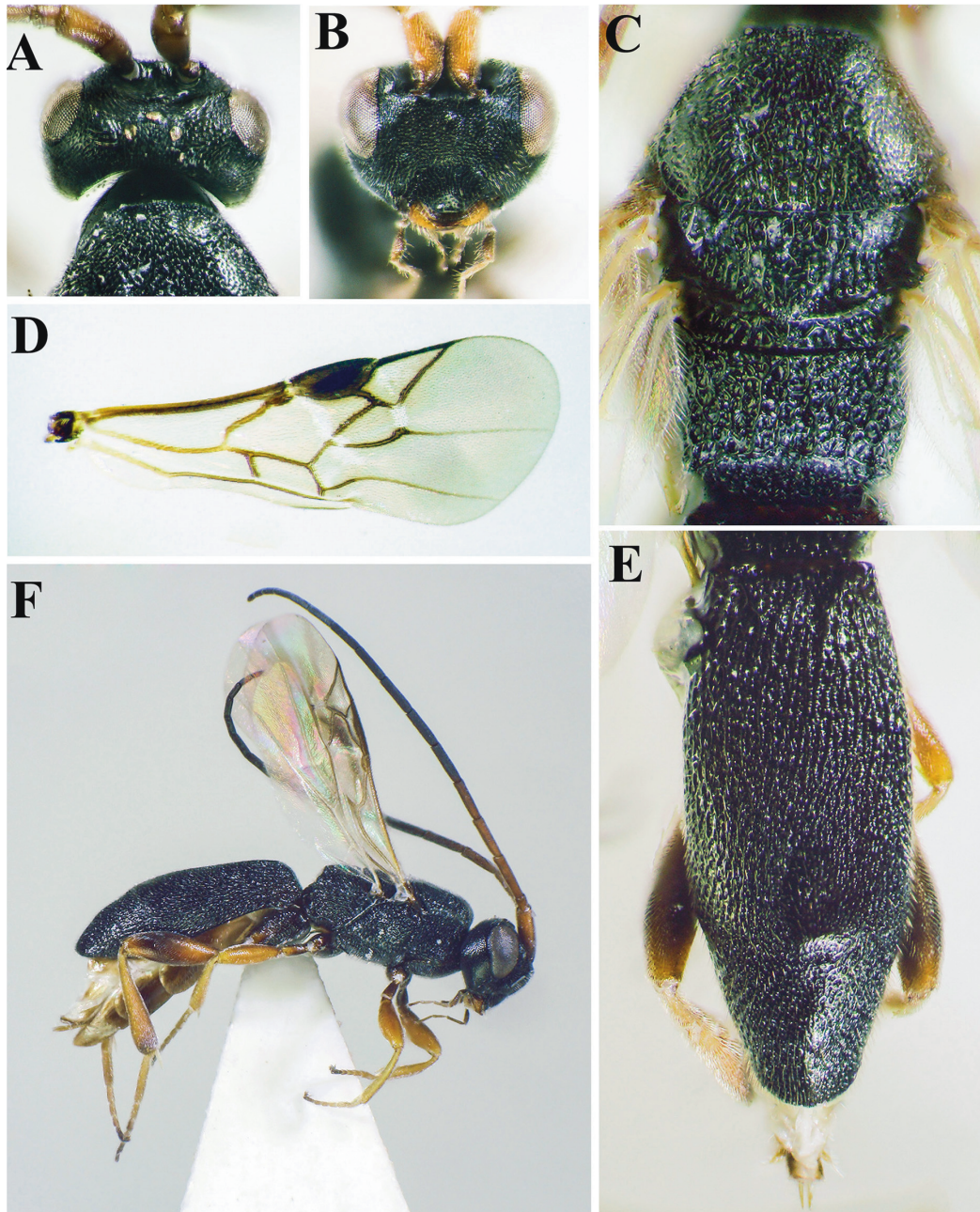


Figure 2. *Chelonus (Microchelonus) subpamiricus* Farahani & van Achterberg sp. nov., A- Head, dorsal view; B- Head, frontal view; C- Mesosoma, dorsal view; D- Forewing; E- Metasoma, dorsal view; F- Female, lateral habitus.

Male. Unknown.

Chelonus (Chelonus) olgae Kokujev, 1895 (Figures 3A–3F)

Material examined: Hamadan Province: Asadabad, Galehbor (34°50'N, 48°10'E, 2150 m a.s.l.), 25.07. 2016, 2♀♀ (ICRIFR); leg.: A. Rajabi Mazhar.

Diagnostic characters (Female): Length of body 6.6 mm; antennae 45-segmented, as long as length of body,

length of the 1st flagellar segment 4.0 times its width, apical segments of antenna twice as long as their width; temple shorter than eye in dorsal view, slightly smoothed sculpture (Figure 3A); width of face twice its height, transversely striate and punctate (Figure 3B); mesoscutum punctate, weakly in anterior part and coarsely in posterior part (Figure 3C); anterior margin of marginal cell of forewing slightly shorter than pterostigma (Figure 3D);

metasomal carapace distinctly narrowed apically (Figure 3E); length of metasomal carapace 2.5 times its maximum width in anterior third, densely and rather coarsely punctate, with longitudinal rugae in basal half (Figure 3E); apical sternites slightly projecting from under carapace (Figure 3F).

Coloration: Body black (Figure 3F); mesosoma reddish (except propodeum), scutellum dark brownish; metasoma black with two indistinct brownish; maxillary palps and

mandibles brownish; wings infusate, basal half with pale yellowish veins; hind leg black, hind tibia black, with a median pale band.

Distribution: Georgia, Germany, Hungary, Kazakhstan, Spain, Turkey, Uzbekistan (Yu et al., 2016), Iran (new record).

Remark: According to the redescription by Tobias (2011) the metasoma should be brownish with pair of yellow basal spots, but the metasoma of the Iranian

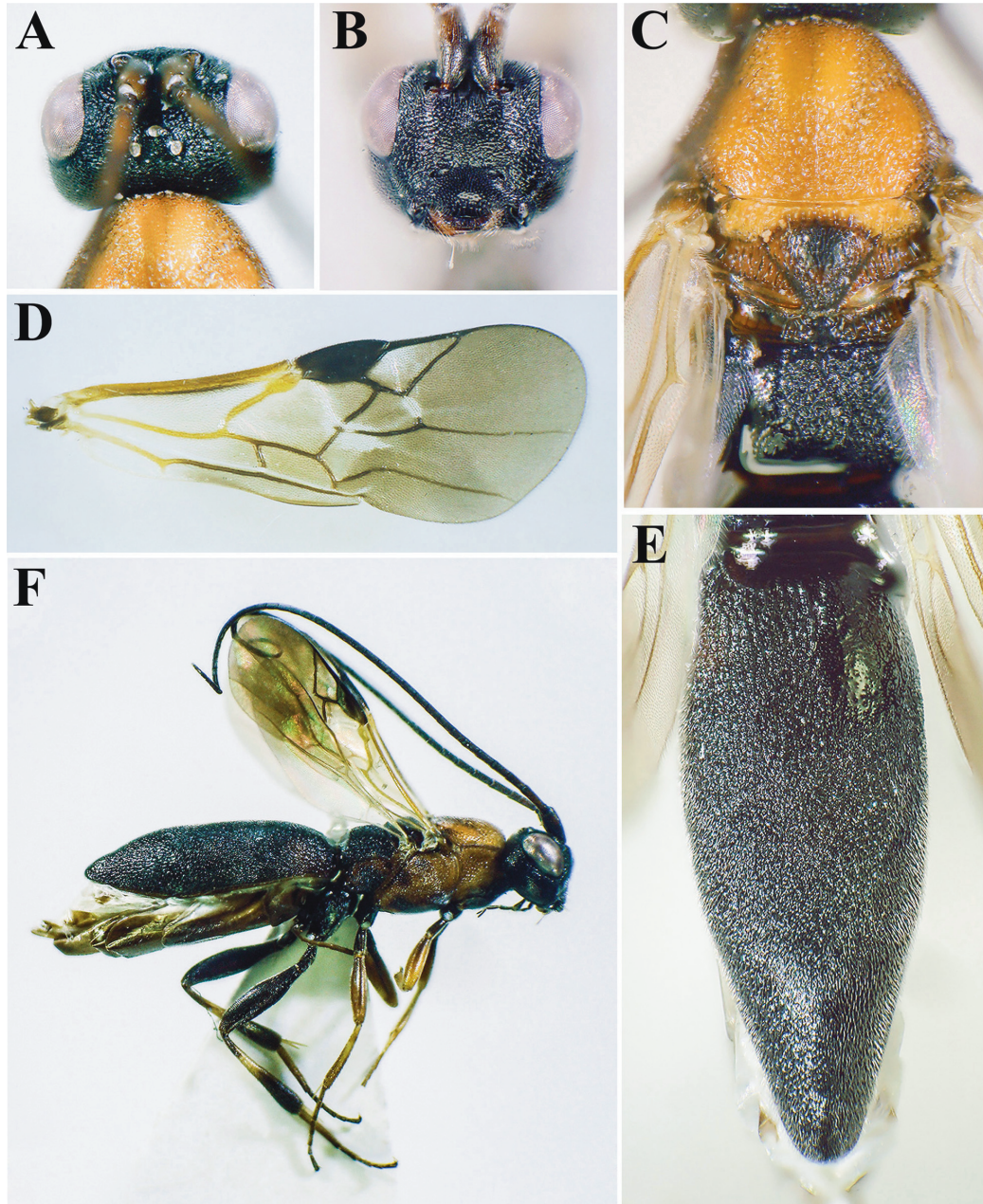


Figure 3. *Chelonus (Chelonus) olgae* Kokujev, 1895, A- Head, dorsal view; B- Head, frontal view; C- Mesosoma, dorsal view; D- Forewing; E- Metasoma, dorsal view; F- Female, lateral habitus.

specimens is black, with indistinct brownish basal spots. We consider the Iranian specimens to be a melanistic form of *C. olgae*.

4. Discussion

Iran is located in the Palearctic region and has an ecologically rich vegetation and a rich fauna of various insects including diverse species of braconid wasps. Hamadan Province is located in western Iran, with a temperate mountainous climate. The material examined of recorded and new species was collected from Galehbor Asad-abad. This area is a semiarid rangeland with a mean of 353 mm of precipitation and altitude up to 2000 m above sea level.

We did not catch any *Chelonus* species with light traps and all the specimens reported here were caught with malaise traps. It seems that malaise traps are an appropriate sampling tool for collecting the tribe Chelonini (van Achterberg, 1993), whereas the tribe Phanerotomini was collected very frequently with light traps. Cheloninae are associated with Lepidoptera, and it is necessary to perform further studies about their biology and host associations.

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- From three provinces adjacent to Hamadan, namely Kordestan, Lorestan, and Kermanshah, 3, 4, and 4 species of Chelonini were recorded, respectively (Farahani et al., 2016). We think most probably many more species of Chelonini exist in Iran. Therefore, further field work in Iran (especially western Iran) should be carried out.
- Regarding the new species described here (*Chelonus subpamiricus* Farahani & van Achterberg sp. nov.), the material examined was collected from Galehbor Asad-abad and can be distinguished by the length of the hind femur (3.0 times its width) and the ratio of the marginal cell/2nd submarginal cell from *Chelonus (Microchelonus) pamiricus* Vojnovskaja-Krieger, 1931.
- Nomenclatural acts:** This work and the nomenclatural acts it contains have been registered in ZooBank. ZooBank Life Science Identifier (LSID) for this publication is: <http://zoobank.org/urn:lsid:zoobank.org:pub:16C80310-4338-4583-85E1-3CBB8E452AC6>
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