

Contribution to the knowledge of the Pteromalidae (Hymenoptera: Chalcidoidea) from Khorasan Razavi Province, Northeastern Iran

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Twenty species and nine genera belonging to the family Pteromalidae (Hymenoptera: Chalcidoidea) were collected in the present study in different locations of Khorasan Razavi Province, Northeastern Iran between 2009 and 2010. The identified species belong to three subfamilies: Miscogasterinae (1 species), Ormocerinae (2 species) and Pteromalinae (17 species). *Systasis parvula* Thomson, 1876 and *Mesopolobus sericeus* (Förster, 1770) are reported for the first time from Iran. Short taxonomic comments, available biological data as well as geographical distribution for each species are briefly mentioned.

Key words: Northeast Iran, Hymenoptera, Pteromalidae, Fauna, Parasitoids, Distribution

INTRODUCTION

Parasitic wasps of the family Pteromalidae are one of the numerous and economically important families of the superfamily Chalcidoidea Latreille, 1817 (Noyes, 2012). Despite the clarification of most West-Palaearctic genera by Bouček and Rasplus (1991), there remain numerous unclear species. The great majority of Pteromalidae are primary or secondary parasitoids that attack a large number of insects at various stages of host development. A few species of this family are phytophagous. Some of them develop in the seeds of plants, others are gall maker and others develop as inquilines in galls cause by other insects (Bouček and Rasplus, 1991). They play an important role in the biological control of serious insect pests and many species have been used successfully in biological control programmes worldwide (Bouček and Heydon, 1997; Bouček and Rasplus, 1991; Debach and Rose, 1991).

It seems that the Pteromalid fauna of Iran is very diverse but there is no complete published information on this valuable group in different parts of Iran, however some scattered published information is available (Davatchi and Chodjai, 1989; Goldansaz et al., 1996; Habibpour et al. 2002; Jalilvand and Gholipour, 2002; Lofalizadeh and Ahmadi, 1998, 2000; Lotfalizadeh, 2002a, 2002b, 2004; Lotfalizadeh and Gharali, 2008; Mashhadi-Jafarloo and Talebi-Chaichi, 2002; Mehrnejad, 2002, 2003; Modarres Awal, 1997; Rezaei et al., 2003; Sadeghi and Askary, 2001; Sadeghi and Ebrahimi, 2002; Sakenin Chelav et al., 2008a, 2008b; Sharifi and Javadi, 1971; Steffan, 1968). Recently several new records have been added to the previous studies (Alemansour et al., 2010; Hasani et al., 2011; Hesami et al., 2010; Nazemi-Rafi and Lotfalizadeh, 2010; Mitroiu et al., 2011). Consequently there is inadequate knowledge relating to the Pteromalids of the Northeastern Iran. Hasani et al. (2011) carried out a preliminary study on the Pteromalid fauna of Khorasan Razavi

Province which resulted in 8 new records for the country. The objective of the present paper is to report on our investigation of Pteromalidae in Khorasan Razavi Province, Northeastern Iran, together with new records, some biological information, worldwide distribution of the species recorded, some taxonomic remarks and to summarize all the available literature about Pteromalidae of Iran.

MATERIAL AND METHODS

The material from Northeastern Iran was collected by sweeping and using a Malaise trap. It was preserved in 75% Ethanol until it was partly mounted on cards. Prior to mounting the specimens were treated with hexamethyldisilazane in order to avoid collapsing. A total of 112 specimens were examined in the present study. Voucher specimens from other countries as well as name-bearing types were used for comparison. These specimens were mostly from the Natural History Museum London (BMNH), Narodni Muzeum Prague (NMPC) and the Mitroiu Collection, Iasi, Romania (MICO). Terminology and classification follow Gibson (1997) and Bouček (1988) respectively. Other abbreviations used in the text: Gt = Gastral tergites; M = Marginal vein; P = Postmarginal vein; S = Stigmal vein. Only part of the collected material was identified to species level. The identifications were made using Graham's monograph (Graham, 1969) and other papers listed in the remarks sections. The identified material is deposited in MICO (Mitroiu Collection, Alexandru Ioan Cuza University of Iasi, Faculty of Biology, Romania) and Zoological Museum of Shahid Bahonar University of Kerman, Iran (ZMSBUK). The identified species are ordered based on subfamily name alphabetically and new records are marked with asterisk. General data regarding geographical distribution, biology as well as brief taxonomic comments is given for each species. For further information see Graham (1969) and Noyes (2012).

RESULTS

LIST OF SPECIES

Miscogasterinae

Halticoptera cf. *yoncacus* Doğnar, 2006

Material examined: Iran: Khorasan Razavi province, Torbate Jam, N35°17'29" E60°35'16", 919m, 25.V.2009, swept on Gramineae (A. Hasani), 1♀ 1♂.

Biology: Unknown.

Distribution: *Halticoptera yoncacus* was previously recorded only from Turkey (Doğnar, 2006). This species is recently reported from Iran (Hasani et al., 2011).

Remarks: In Doğnar's key (2006) the examined female runs to couplet 13 and *H. yoncacus*, but M is longer relatively to S; other characters slightly differ from the description too. Thus, even if it is possible to deal with a new species, we hesitate in describing it, as well as its male, until more material is available and the holotype of *H. yoncacus* is examined. However, regarding the male, it might be of interest to note that the stipites are fairly large, their upper margin being about level with the top of the foramen magnum, and distal part of the maxillary palpi is well developed, globose and yellow.

Ormocerinae

Systasis encyrtoides Walker, 1834

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 25♀ 1♂.

Biology: This species is reported mainly from species of Cecidomyiidae (Diptera) such as *Contarinia pisi* (Loew), *C. lentis* Aczel, *Dasineura affinis* (Kieffer), etc. (Noyes, 2012).

Distribution: *Systasis encyrtoides* is widely distributed in the Palaearctic region, from Europe to China (Noyes, 2012). This species is recently reported from Iran (Mitroiu et al., 2011).

Remarks: The European species of *Systasis* Walker were revised by Graham (1969), the species from Kazakstan by Dzhankmen (1996), and the Chinese species by Xiao and Huang (2001).

****Systasis parvula* Thomson, 1876**

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 2♀ 2♂.

Biology: This species was recorded from several species of Cecidomyiidae (Diptera) by Dzhankmen (1996).

Distribution: This species has worldwide distribution and is found in nearly all regions (Noyes, 2012). This species is reported for the first time from Iran.

Remarks: *Systasis parvula* differs from *S. encyrtoides* by its usually smaller size and more clavate antenna, with shorter scape.

Pteromalinae

***Catolaccus crassiceps* (Masi, 1911)**

Material examined: Khorasan Razavi province, Bardaskan, N35°11'28" E57°56'56", 895m, 2.VIII.2009, swept on grass (A. Hasani), 4♀.

Biology: This species was reared from the cocoons of two species of chrysopids, *Chrysoperla carnea* (Stephans) and *Suaris fedtschenkoi* (McLachlan) by Lotfalizadeh and Ahmadi (2000). It was also reared for the first time from the cynipid gall wasp, *Diplolepis fructuum* (Rübsaamen) in Iran by Lotfalizadeh (Lotfalizadeh and Gharali, 2008). Other records, summarized in Noyes (2012), include Curculionidae (Copleoptera), Gelechiidae, Noctuidae, Pieridae and Pyralidae (Lepidoptera) as primary hosts, and Braconidae (Hymenoptera) as parasitoid hosts.

Distribution: This species is distributed from India to Europe and North of Africa (Noyes, 2012). This species is already recorded from Iran (Lotfalizadeh and Gharali, 2008).

Remarks: *Catolaccus crassiceps* can be separated from *C. ater* (Ratzeburg) by its less pilose forewings, having both basal cell and speculum bare.

***Cyrtogaster vulgaris* Walker, 1833**

Material examined: Khorasan Razavi province, Bardaskan, N35°23'31" E57°56'31", 1385m, collected by malaise trap, 2.VIII.2009 (A. Hasani), 3♀.

Biology: In Iran, it was reared from two crucifer leaf miners, *Chromatomyia horticola* (Goureau) and *Liriomyza sativae* Blanchard (Diptera: Agromyzidae) (Lotfalizadeh and Gharali, 2008). Other records, summarized in Noyes (2012), include many species of flies from several families such as Agromyzidae, Chloropidae, Drosophilidae, Lonchaeidae, Lonchopteridae, Opomyzidae, Syrphidae and Tephritidae.

Distribution: This species is widely distributed in West Palaearctic and it is also present in North America and several islands, where it might have been introduced (Noyes, 2012). It is already recorded from Iran (Lotfalizadeh and Gharali, 2008).

Remarks: The genus *Cyrtogaster* Walker is easily recognizable by its deeply emarginate Gt1, the petiolate gaster and the shiny maxillary palpi of males.

***Cyrtopyx cf. latipes* (Rondani, 1874)**

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 2♀.

Biology: *Cyrtopyx latipes* is known to parasitize various species of Coleoptera (Curculionidae), Diptera (Tephritidae) and Lepidoptera (Coleophoridae and Tortricidae) (Noyes, 2012).

Distribution: This species is widely distributed across the Palaearctic region (Noyes, 2012). It is recently reported from Iran (Mitroiu et al., 2011).

Remarks: The Palaearctic species of *Cyrtotypix* Delucchi need revision. Currently there are six described species, but the available descriptions and keys are not enough for a certain identification of species. According to the comparative material examined (BMNH, NMPC), the collected specimens are closest to *C. latipes*, but may eventually prove to represent an undescribed species.

***Dibrachys microgastris* (Bouché, 1834)**

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 3♀.

Biology: It is a common primary parasitoid of many species of Lepidoptera (Arctiidae, Gelechiidae, Nymphalidae, Pieridae, Pyralidae, Tineidae, Tortricidae) and a few Hymenoptera (Apidae, Sphecidae), as well as a hyperparasitoid of Braconidae and Ichneumonidae (Noyes, 2012). Its biology was studied by several authors such as Gülel (1982). In Iran Goldansaz et al. (1996) considered this species as a parasitoid of lesser wax moth, *Achroia grisella* (Fabricius). Mehrnejad (2002, 2003) studied its biological and ecological attributes as a parasitoid of the pistachio twig borer moth, *Kermania pistaciella* Amsel (Lepidoptera: Tineidae). It has been recorded as primary parasitoid of Pyralidae, Chrysomelidae and Anobiidae and hyperparasitoid of Braconidae (Dzhanokmen, 1978). Mashhadi-Jafarloo and Talebi-Chaichi (2002) considered this species as gregarious ectoparasitoid of codling moth. Their field observations in Iran indicated that adults start emerging when apple trees bloom. Males emerge before females from May to November. Three or more complete generations are known in the apple growing area (Lotfalizadeh and Gharali, 2008).

Distribution: *Dibrachys microgastris* is a cosmopolitan species (Noyes, 2012). This species is recently reported from Iran (Mitroiu et al., 2011).

Remarks: The genus *Dibrachys* Förster comprises 21 species that are placed in 2 subgenera, *Dibrachys* sensu stricto and *Allodibrachys* Bouček (Bouček, 1965). The species, *D. cavus*, *D. boarmiae* (Walker), *D. clisiocampae* (Fitch), *D. goettingenus* Doğnar and *D. lignicola* Graham were included in the *cavus* species complex which was placed into the subgenus *Dibrachys* (Graham, 1969). It was very difficult to separate the putative species within this complex and the taxonomic status of these species was unclear. Peters and Baur (2011) revised the taxonomy of the *Dibrachys cavus* species complex. They carried out a complete multivariate morphometric analysis of 21 quantitative characters within all nominal taxa that are included in the *cavus*-complex and concluded that three species, *Dibrachys microgastris* (Bouché, 1834), *Dibrachys lignicola* Graham, 1969, and *Dibrachys verovesparum* Peters and Baur sp. n. are exist within this complex. They proposed the senior synonym of *D. cavus*, *D. boarmiae* and *D. clisiocampae* to be *Dibrachys microgastris* (Bouché, 1834), which was originally described as *Diplolepis microgastris* but assigned to *Dibrachys* and listed as a possible synonym of *D. cavus* by Graham (1969).

***Dinarmus basalis* (Rondani, 1877)**

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 3♀.

Biology: Probably all species attack bruchids (Coleoptera: Bruchidae), mainly in pods of Fabaceae (Bouček, 1988), thus being widely distributed along with stored products, as is the case of this species. The biology of the genus is summarized by Rasplus (1989).

Distribution: *Dinarmus basalis* could be considered as a cosmopolitan species as it occurs in all zoogeographic regions. This species is recently reported from Iran (Hasani et al., 2011).

Remarks: Most Palaearctic species of *Dinarmus* Thomson have been described by Masi and need to be revised and keyed.

***Homoporus semiluteus* (Walker, 1872)**

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 2♀.

Biology: Its host are unknown but the majority of the West Palaearctic species of *Homoporus* Thomson are associated with hosts which develop in grass stems (Bouček and Rasplus, 1991).

Distribution: *Homoporus semiluteus* is distributed in Western, Central and Southern Europe (Noyes, 2012). This species is recently reported from Iran (Hasani et al., 2011).

Remarks: No recent revision of the Palaearctic species of *Homoporus* exists. Graham's account on the genus (1969) is incomplete because it does not take into consideration the species described by Erdős from Central Europe. Thus, the most complete available key is that of Delucchi (1957).

***Mesopolobus deserti* Dzhanokmen, 1994**

Material examined: Khorasan Razavi province, Bardaskan, N35°23'31" E57°56'31", 1385m, collected by malaise trap, 2.VIII.2009 (A. Hasani), 2♀.

Biology: This species was reared from several species of Cecidomyiidae (Diptera) associated with Chenopodiaceae in Kazakhstan (Dzhanokmen, 1994).

Distribution: Recently it was reported to occur only in Kazakhstan (Dzhanokmen, 1994). This species is recently reported from Iran (Hasani et al., 2011).

Remarks: It is a particular species, having a very short P, about equal to S, and the apical margin of forewing without any fringe.

****Mesopolobus sericeus* (Förster, 1770)**

Material examined: Khorasan Razavi province, Eshgh Abad, N36°04'39" E58°42'29", 1118m, 3.IV.2009, swept on *Tamarix* sp. (A. Hasani), 7♀.

Biology: It is a common parasitoid of more than 20 species of gall-making Cynipidae and their inquiline (Hymenoptera) (Noyes, 2012). A large number of the species of the genus *Mesopolobus* attack Cynipid oak galls (Askew, 1961). *Mesopolobus sericeus* is among the species that inhabits Cynipid galls on oak in Britain but it has also been recorded from Cynipid galls on plants other than oak (Askew, 1961).

Distribution: *Mesopolobus sericeus* was previously recorded from Europe and Central Asia (Noyes, 2012). This species is reported from Iran for the first time.

Remarks: So far 94 species of *Mesopolobus* Westwood have been recorded from the Palaearctic region (Noyes, 2012). Available keys are those of Graham (1969) (some West Palaearctic species), and Baur et al. (2007) (species associated with *Ceutorhynchus* Germar, 1824). *Mesopolobus fasciventris* Westwood, 1833 and *M. sericeus* are similar in biology and morphology, the females of both species have elongate body, gaster longer than head, thorax and propodeum together, head in dorsal view with width of postorbital region rather more than half transverse diameter of eye and also the body is green. The antennae have two anneli. *Mesopolobus fasciventris* can be separated from *M. sericeus* by having a strong median incision on the clypeus (Askew, 1961).

***Norbanus cerasiops* (Masi, 1922)**

Material examined: Khorasan Razavi province, Eshgh Abad, N36°03'93" E58°41'91", 1127m, 3.IV.2009, swept on *Tamarix* sp. (A. Hasani), 3♀.

Biology: *Norbanus cerasiops* was recorded as a primary parasitoid of beetles from the genus *Lixus* Fabricius and *Larinus* Dejean (Curculionidae) in stems of *Cirsium*, *Carduus*, *Onopordon*, *Amaranthus* or *Crambe*, (Dzhanokmen, 1999; Rizzo and Mitroiu, 2010). Possibly it also acts as a secondary parasitoid through other parasitic wasps such as *Bracon intercessor* Nees (Braconidae) or *Eurytoma* sp. (Eurytomidae) (Graham, 1969).

Distribution: This species has been reported from Europe, Turkey, Kazakhstan, North Africa and China (Rizzo and Mitroiu, 2010). It is recently reported from Iran (Hasani et al., 2011).

Remarks: This species is easily recognizable from other species of the genus by its large size, blue metallic colour and bright red eyes, and female antennae ending without a clear spicula.

***Pachyneuron aphidis* (Bouché, 1834)**

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 3♀.

Biology: Many dozens of species of mostly Aphididae, Coccidae, Dermestidae, Pseudococcidae and Psyllidae (Hemiptera) are among its hosts (Noyes, 2012).

Distribution: This species is widely distributed in the world (probably introduced in many countries) (Noyes, 2012). It is already reported from North-western Iran (Lotfalizadeh and Gharali 2008) and recently from South-eastern Iran (Mitroiu et al., 2011).

Remarks: This is one of the most common species of *Pachyneuron* Walker. In Iran the species was cited by Haeselbarth (1983). The female can be easily recognizable in having three anelli and five funicular segments, as well as a broad marginal vein and small body size.

***Pachyneuron erzurumicum* Doğnar, 1986**

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 16♀.

Biology: This species is associated with an unidentified species of *Aphis* (Hemiptera: Aphididae) (Doğnar, 1986).

Distribution: This species have been previously recorded from Turkey (Doğnar, 1986), Kazakhstan (Dzhanokmen, 2005) and Western Iran (Lotfalizadeh and Gharali, 2008). It is recently recorded from South-eastern Iran (Mitroiu et al., 2011).

Remarks: *Pachyneuron erzurumicum* is similar to *P. nelsoni* Girault in lacking the marginal fringe on the wings. The examined specimens proved to be conspecific with those deposited in BMNH.

***Pachyneuron groenlandicum* (Holmgren, 1872)**

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 17♀ 1♂.

Biology: This species was recorded as a primary parasitoid of Diptera (mainly Syrphidae), Hemiptera (Aphididae, Coccidae) and Lepidoptera (Noctuidae), and as a hyperparasitoid of other Hymenoptera (Braconidae) (Noyes, 2012).

Distribution: This species is widely distributed across the Palearctic region, Nearctic as well as in India (Noyes, 2012). It is already reported from Western Iran (Lotfalizadeh and Gharali, 2008) and recently from South-eastern Iran (Mitroiu et al., 2011).

Remarks: *Pachyneuron coeruleum* Delucchi and *P. umbratum* Delucchi have been synonymised with *P. groenlandicum* by Bouček and Graham (1978) and Hedqvist (1977), respectively.

***Pachyneuron nelsoni* Girault, 1928**

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 4♀.

Biology: In Iran it was recorded as a gregarious parasitoid of hover flies (Diptera: Syrphidae) in pupal stage (Lotfalizadeh and Gharali 2008), which agrees with its known biology.

Distribution: According to Noyes (2012), this species has a wide distribution being recorded from all continents except the Americas. It is already reported from North-western Iran (Lotfalizadeh and Gharali, 2008).

Remarks: *Pachyneuron nelsoni* can be distinguished from other *Pachyneuron* species by lacking the marginal fringe and a very short and wide M (Doğnar, 1986; Graham, 1969).

***Pseudocatolaccus aragonensis* Askew, 2001**

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 2♀ 1♂.

Biology: According to Askew et al. (2001) it is a parasitoid of *Stefaniola bilobata* (Kieffer) (Diptera: Cecidomyiidae).

Distribution: *Pseudocatolaccus aragonensis* was previously recorded only from Spain (Askew et al., 2001), but the present data shows it has a much wider distribution, suggesting that it is at least a Mediterranean species. This gall-forming species is distributed in Spain and North Africa (De Jong, 2011). It is recently reported from Iran (Hasani et al., 2011).

Remarks: The presence of adults on a variety of herbaceous plants also suggests that *P. aragonensis*, like *P. nitescens* (Walker), is polyphagous (Askew et al., 2001).

***Pteromalus puparum* (Linnaeus, 1758)**

Material examined: Khorasan Razavi province, Eshgh Abad, N36°03'93" E58°41'91", 1127m, 3.IV.2009, swept on *Tamarix* (A. Hasani), 3♂.

Biology: In Iran it was reported by Davatchi and Shodjai (1989) and OILB (1971), as a parasitoid of *Pieris brassicae*, Linnaeus (Lepidoptera: Pieridae) on *Brassica oleracea*. *Pteromalus puparum* is a gregarious primary parasitoid of lepidopteran pupae, being recorded from 17 families of butterflies and moths (Noyes, 2012).

Distribution: This is one of the most well-known species of parasitic wasps, with a cosmopolitan distribution (Noyes, 2012). It is already reported from Iran (Lotfalizadeh and Gharali, 2008).

Remarks: The genus *Pteromalus* is regarded as one of the largest pteromalid genera that has Holarctic distribution (Noyes, 2012).

***Sphégigaster cuscutae* Ferrière, 1959**

Material examined: Khorasan Razavi province, Bardaskan, N35°23'31" E57°56'31", 1385m, 2.VIII.2009, collected by malaise trap (A. Hasani), 2♀.

Biology: *Sphégigaster cuscutae* is a primary parasitoid of *Melanagromyza cuscutae* Hering (Bouček, 1961) (Diptera: Agromyzidae).

Distribution: It is distributed in parts of Europe, Kazakhstan and Yemen (Noyes, 2012). This species is recently reported from Iran (Hasani et al., 2011).

Remarks: The female of *S. cuscutae* is similar to that of *S. pallicornis* (Spinola), but differs in having the hind margin of Gt1 less curved, a more slender flagellum, with less outstanding hairs, and more elongated proximal funicular segments.

***Stenomalina cf. iera* (Walker, 1844)**

Material examined: Khorasan Razavi province, Kashmar, Rivash, N35°28'18" E58°27'30", 1653m, 4.X.2010, swept on grass (A. Hasani), 2♀.

Biology: This species was reported as a primary parasitoid of *Episyrphus balteatus* (De Geer) by Haeselbarth (1989).

Distribution: This species is distributed in Germany, Norway and Sweden (Noyes, 2012). It is recently reported from Iran (Hasani et al., 2011).

Remarks: In Graham's key (1969), the collected female would run to couplet 14 (*S. micans* (Olivier) and *S. iera*). In our specimens malar space is clearly half the length of an eye, but pronotal collar is not so strongly margined as stated by Graham (1969). Moreover, the current distribution of *S. iera*

covers only a small part of North-Western Europe (Noyes, 2012), so it is possible our specimens belong to different species.

DISCUSSION

One of the most significant constraints for local and national insect biodiversity management is the paucity of knowledge of the insect fauna and their distribution. Unfortunately, from the viewpoint of faunistic studies, Northeastern Iran has been paid less attention and examination. However, most species of this family are of economic importance. It is acknowledged that extensive research is required on Pteromalid fauna of Iran, which should encompass species of economic importance and also species that are difficult to identify (species complexes). In the course of this survey of Pteromalidae of Khorasan Razavi Province, 20 species were found, of which 2 species are recorded for the first time from Iran. Therefore, 20 species of Pteromalidae are currently known to exist in Khorasan Razavi Province together with other species that are recently recorded from other parts of Iran (Table 1). The number of species of Pteromalidae is expected to increase if further intensive and careful collections are made.

TABLE 1. List of Pteromalidae species recently recorded from Iran after Lotfalizadeh and Gharali (2008) (Co: Cosmopolitan; Af: Afrotropical; P: Palearctic; O: Oriental; Au: Australasian; Ho: Holarctic).

Subfamily	Species	References	Distribution
Asaphinae	<i>Asaphes suspensus</i> (Nees, 1834)	Mitroiu et al. 2011	Ho
Cleonyminae	<i>Oodera monstrum</i> Nikol'skaya, 1952	Nazemi & Lotfalizadeh, 2010	P
Miscogasterinae	<i>Halticoptera circulus</i> (Walker, 1833)	Mitroiu et al. 2011	Ho
	<i>Halticoptera</i> cf. <i>yoncaus</i> Doğnalır, 2006	Hasani et al. 2011, this paper	P
Ormocerinae	<i>Systasis encyrtoides</i> Walker, 1854	Mitroiu et al. 2011, this paper	P
	<i>Systasis parvula</i> Thomson, 1876	This paper	Co
Pteromalinae	<i>Catolaccus crassiceps</i> (Masi, 1911)	This paper	P, O
	<i>Cheimpachus quadrum</i> (Fabricius, 1787)	Mitroiu et al. 2011	P
	<i>Cyrtogaster vulgaris</i> Walker, 1833	This paper	Ho
	<i>Cyrtophyx</i> cf. <i>latipes</i> (Rondani, 1874)	Mitroiu et al. 2011, this paper	P
	<i>Dibrachys microgastri</i> (Bouché, 1834)	Mitroiu et al. 2011, this paper	Co
	<i>Dinarmus acutus</i> (Thomson, 1878)	Mitroiu et al. 2011	Ho, Af
	<i>Dinarmus basalis</i> (Rondani, 1877)	Hasani et al. 2011, this paper	Co
	<i>Homoporus fulviventris</i> (Walker, 1835)	Mitroiu et al. 2011	P
	<i>Homoporus semiluteus</i> (Walker, 1872)	Hasani et al. 2011, this paper	P
	<i>Mesopolobus arcuus</i>	Alemansour et al. 2010	P
	<i>Mesopolobus deserti</i> Dzhankomen, 1994	Hasani et al. 2011, this paper	P
	<i>Mesopolobus sericeus</i> (Förster, 1770)	This paper	P
	<i>Norbannus arcuatus</i> Xiao & Huang, 2001	Hesami et al. 2010	P
	<i>Norbannus cerasiops</i> (Masi, 1922)	Hasani et al. 2011, this paper	P
	<i>Pachyneuron aphidis</i> (Bouché, 1834)	Mitroiu et al. 2011, this paper	Co
	<i>Pachyneuron erzurumicum</i> Doğnalır, 1986	Mitroiu et al. 2011, this paper	P
	<i>Pachyneuron groenlandicum</i> (Holmgren, 1872)	Mitroiu et al. 2011, this paper	Ho, O
	<i>Pachyneuron nelsoni</i> Girault, 1928	This paper	P, Af, Au, O
	<i>Pseudocatolaccus aragonensis</i> Askew, 2001	Hasani et al. 2011, this paper	P
	<i>Pteromalus puparum</i> (Linnaeus, 1758)	This paper	Co
	<i>Sphbegigaster cuscatae</i> Ferrière, 1959	Hasani et al. 2011, this paper	P
	<i>Sphbegigaster persiana</i> Mitroiu & Madjdzadeh, 2011	Mitroiu et al. 2011	P
	<i>Sphbegigaster truncata</i> Thomson, 1878	Mitroiu et al. 2011	P
	<i>Stenomalina</i> cf. <i>iera</i> (Walker, 1844)	Hasani et al. 2011, this paper	P

The results of this survey are essential for: 1) locating, identifying, evaluating and to develop a complete checklist of pteromalid species and to maintain the reference collections of those species recorded for a wide range of users; 2) providing data that will underpin future control and conservation activities; 3) making data available to scientists and environmental consultants for environmental assessment purposes; 4) allowing authority to design more effective and more efficient control and conservation strategies. Furthermore, Mitroiu et al. (2011) have emphasized the importance of local insects faunistic studies in obtaining information that will help scientists to maintain, discover and protect the natural environment. It is evident that the present work should be considered as an important effort in this direction and add new records which expand our knowledge of the natural history of Iran.

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