



## A survey of braconid wasps (Hymenoptera: Braconidae: Euphorinae, Homolobinae, Macrocentrinae, Rogadinae) in Kerman province, southeastern Iran

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**ABSTRACT.** The fauna of the braconid subfamilies Euphorinae, Homolobinae, Macrocentrinae and Rogadinae were studied in Kerman province. Specimens were collected using Malaise traps and sweeping net during 2013–2014. A total of 14 species and eight genera were collected and identified. Among the collected material, *Aleiodes (Chelonorhogas) ruficornis* (Herrich-Schaffer, 1838) is a new record for the fauna of Iran. All species are new for the fauna of Kerman province.

**Key words:** Braconidae, fauna, new record, Iran

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### Introduction

Braconid wasps (Hymenoptera: Braconidae) represent an important group of parasitic Hymenoptera in biodiversity studies. They are worldwide in distribution with about 19,801 described species (Yu *et al.* 2012), play a major ecological role in the regulation of many other insect groups. They are used in the biological control of agricultural and forest pests (Coronado *et al.* 2004). The vast majority of the braconids are parasitoids of other insects. The most common hosts of braconid parasitoids are the larvae of Lepidoptera, Coleoptera, and Diptera (Wharton *et al.* 1997). Euphorinae is one of the most interesting

and diversified subfamily of Braconidae including about 55 genera from 16 tribes and about 1,213 species distributed all around the world, of which 456 species are known from the Palaearctic region (Yu *et al.* 2012). This subfamily is one of only two groups of Ichneumonoidea that include species developing entirely on the adult stages of other insects or attacking subadults of hemimetabolous orders (Quicke 2015) and usually characterized by the petiolate or very elongate first metasomal tergite and the reduction of vein CU1b of fore wing (Shaw and Huddleston 1991; van Achterberg 1993a).

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The subfamily Homolobinae comprises 62 species in three genera and two tribes. All homolobines are koinobiont endoparasitoids of Lepidopteran larvae, mainly belonging to the Noctuidae and Geometridae, but with records from other families including Erebiidae (Lymantriinae) and Lasiocampidae (Quicke 2015). Most species have short ovipositors and attack exposed hosts (Shaw and Huddleston 1991). The subfamily Macrocentrinae includes 236 species and eight genera. Macrocentrines are all koinobiont endoparasitoids of lepidopteran larvae, and most species are gregarious (Beyarslan *et al.* 2013).

The subfamily Rogadinae is a cosmopolitan subfamily of koinobiont endoparasitoids of Lepidoptera (Shaw 1997). All Rogadinae induce the hardening of the host larva before pupation, producing a "mummy" which conceals the parasitoid pupa (Shaw *et al.* 1997). More than 1159 Rogadinae species have been described in 58 recognized genera, which most of them are restricted to northern Europe, Asia, and North America (Yu *et al.* 2012). Recently, several studies have been done on Euphorinae (Hedwig 1957; Aubert 1966; Herard *et al.* 1979; Arbab and McNeill 2001; Abbasipour 2001; Nikdel *et al.* 2004; van Achterberg 1979; Lashkari-Bod *et al.* 2011; Farahani and Talebi 2012; Farahani *et al.* 2013a,b; Ameri *et al.* 2014; Sedighi and Madjdzadeh 2015), Homolobinae (Achterberg 1979; Farahani *et al.* 2012b), Macrocentrinae (Aubert 1966; van Achterberg 1993b; Farahani *et al.* 2012a; Hasanshahi *et al.* 2016) and Rogadinae (Telenga 1941; Hedwig 1957; Shenefelt 1975; Lashkari-Bod *et al.* 2011; Farahani *et al.* 2015). The number of Euphorinae, Homolobinae, Macrocentrinae and Rogadinae known from Iran has reached to 53, 3, 7 and 27 species, respectively (Farahani *et al.* 2016). The objective of this study (being part of our ongoing research

on the braconid fauna of Iran) is to improve our knowledge of the family Braconidae in Iran.

### Material and methods

The braconid specimens were collected using a standard Sweep net and Malaise traps mostly in alfalfa fields (*Medicago sativa* L.) and *Triticum aestivum* L. at different altitudes located in Kerman province during 2013–2014. Majority of specimens were collected using sweep net and in few cases, the specimens were collected by Malaise traps. Four Malaise traps were used for collecting of samples. The specimens were collected from the traps and sorted weekly. The collected specimens were subsequently dried and mounted on cards using AXA method (van Achterberg 2009). The external morphology of specimens was studied using NIKON™ SMZ800 stereomicroscope. The collected species were identified using the keys and diagnostic literatures: van Achterberg (1979, 1993b), Papp (1991), Stigenberg and Ronquist (2011), Farahani *et al.* (2013b), van Achterberg and Shaw (2016).

Morphological terminology follows van Achterberg (1993a). Nomenclature and distributional data are mainly used from Yu *et al.* (2012). The specimens were deposited in the Insect Collection of the Zoological Museum of Shahid Bahonar University of Kerman, Kerman, Iran (ZMSBUK). Abbreviations used in the text: S. n: Sweeping net; M. t: Malaise trap.

### Results

A total of 14 species and eight genera belonging to four subfamilies, Euphorinae, Homolobinae, Macrocentrinae and Rogadinae were collected and identified. Among the collected material the species *Aleiodes* (*Chelonorhogas*) *ruficornis* is a new record for the fauna of Iran. All species are new for the fauna of Kerman province. The recorded species are listed below:

**Subfamily Euphorinae Foerster, 1862*****Dinocampus coccinellae* (Schränk, 1802)**

**Material examined:** 1♀, S.n, Bidkhan (29°34' N 56°30' E, 2943 m a.s.l.), 01.VIII.2014; 1♀, S.n, Negar (29°53' N 56°46' E, 2096 m a.s.l.), 21.VIII.2014; leg.: F. Abdolzadeh; 1♀, S.n, Dashtkar (29°55' N 56°37' E, 2073 m a.s.l.), 21.VIII.2014; leg.: F. Abdolzadeh; 1♀, M.t, Sirch (30°11' N 57°34' E ), 25.V.2013, leg.: Sh. Mohebban.

***Leiophron deficiens* (Ruthe, 1856)**

**Material examined:** 1♂, S.n, Bidkhan (29°41' N 56°31' E, 2760m a.s.l.), 14.VII.2014; leg.: F. Abdolzadeh.

***Leiophron (Peristenus) relictus* (Ruthe, 1856)**

**Material examined:** 7♀, 1♂, S.n, Negar (29°53' N 56°46' E, 2101 m a.s.l.), 04.IX.2014; 1♀ 1♂, S.n, Bidkhan (29°34' N 56°30' E, 2943 m a.s.l.), 14.VII.2014; leg.: F. Abdolzadeh.

***Meteorus rubens* (Nees, 1811)**

**Material examined:** 1♀, 1♂, S.n, Bidkhan (29°35' N 56°30' E, 2852 m a.s.l.), 18.VI.2014; 1♀, 1♂, S.n, Bidkhan (29°34' N 56°30' E, 2943 m a.s.l.), 14.VII.2014; leg.: F. Abdolzadeh.

***Perilitus (Perilitus) aethiops* Nees, 1834**

**Material examined:** 1♂, S.n, Dashtkar (29°50' N 56°39' E, 2117 m a.s.l.), 22.VIII.2013; leg.: M. Ranjbar; 20♀, 22♂, S.n, Negar (29°51' N 56°47' E, 2097 m a.s.l.), 26.IX.2014; 6♀, 3♂ S.n, Dashtkar (29°53' N 56°42' E, 2081 m a.s.l.), 04.IX.2014; 2♀, 3♂ S.n, Dashtkar (29°55' N 56°38' E, 2073 m a.s.l.), 30.V. 2014; leg.: F. Abdolzadeh; 1♀ S.n, Bidkhan (29°42' N 56°33' E, 2315 m a.s.l.), 12.IX.2014; leg.: F. Abdolzadeh.

***Wesmaelia petiolata* (Wollaston, 1858)**

**Material examined:** 1♂, S.n, Dashtkar (29°55' N 56°38' E, 2073 m a.s.l.), 21.VIII.2014, leg.: F. Abdolzadeh.

**Subfamily Homolobinae van Achterberg, 1979*****Homolobus (Apatia) truncator* (Say, 1829)**

**Material examined:** 2♀, S.n, Bidkhan (29°35' N 56°30' E, 2751 m a.s.l.), 24.VII.2014; leg.: F. Abdolzadeh.

**Subfamily Macrocentrinae Foerster, 1862*****Macrocentrus collaris* (Spinola, 1808)**

**Material examined:** 3♀, 3♂, S.n, Bidkhan (29°35' N 56°30' E, 2751 m a.s.l.), 14.VII.2014; 1♀, S.n, Bidkhan (29°41' N 56°31' E, 2435 m a.s.l.), 12.IX.2014; 1♀, 3♂, S.n, Bidkhan (29°42' N 56°33' E, 2917 m a.s.l.), 25.IX.2014; 2♀, 4♂, S.n, Bidkhan (29°34' N 56°30' E, 2941 m a.s.l.), 24.X.2014; 2♀, 2♂, S.n, Bidkhan (29°34' N 56°30' E, 2935 m a.s.l.), 28.VIII.2014; 3♀, S.n, Bidkhan (29° 35' N 56°30' E, 2751 m a. s. l.), 14.VII.2014; 1♀, 1♂, S.n, Bidkhan (29°34' N 56°30' E, 2884 m a.s.l.), 15.VIII.2014; 1♀, 1♂, S.n, Dashtkar (29°54' N 56°39' E, 2077 m a.s.l.), 04.IX.2014; 1♀, S.n, Negar (29°52' N 56°47' E, 2095 m a.s.l.), 26.IX.2014, leg.: F. Abdolzadeh.

***Macrocentrus flavus* Vollenhoven, 1878**

**Material examined:** 1♀, S.n, Kuhbanan (31°27' N 56°15' E, 2183 m a.s.l.), 02.VII.2014; leg.: S. Kazemi; 1♀, S.n, Bidkhan (29°42' N 56°33' E, 2941 m a.s.l.), 24.X.2014, leg.: F. Abdolzadeh.

**Subfamily Rogadinae Foerster, 1862*****Aleiodes (Aleiodes) bicolor* (Spinola, 1808)**

**Material examined:** 2♀, S.n, Sirch (30°12' N 57°32' E, 1760 m a.s.l.), 12.IX.2014; leg.: M. Iranmanesh; 1♀, 1♂ S.n, Negar (29°52' N 56°47' E, 2093 m a.s.l.), 04.IX.2014; 2♂, S.n, Bidkhan (29°34' N 56°30' E, 2941 m a.s.l.), 24.X.2014; 1♀, 1♂, S.n, Bidkhan (29°34' N 56°30' E, 2943 m a.s.l.), 01.VIII.2014; 2♀, 1♂, S.n, Bidkhan (29°39' N 56°31' E, 2483 m a.s.l.), 01.VIII.2014; 2♀, S.n, Bidkhan (29°35' N 56°30' E, 2910 m a.s.l.), 28.VIII.2014; 2♀, 2♂, S.n, Bidkhan (29°35' N 56°37' E, 2867 m

a.s.l.), 01.VIII.2014; S.n, Dashtkar (29°55' N 56°39' E, 2077 m a.s.l.), 04.IX.2014, leg.: F. Abdolalizadeh.

***Aleiodes (Aleiodes) circumscriptus* (Nees von Esenbeck, 1834)**

**Material examined:** 2♀, S.n, Bidkhan (29°35' N 56°30' E, 2861 m a.s.l.), 12.IX.2014; 1♀, S.n, Bidkhan (29°39' N 56°31' E, 2483 m a.s.l.), 28.VIII.2014; 1♂, S.n, Bidkhan (29°35' N 56°30' E, 2867 m a.s.l.), 01.VIII.2014; 1♂, S.n, Bidkhan (29°34' N 56°30' E, 2939 m a.s.l.), 25.IX.2014; 1♂, S.n, Bidkhan (29°39' N 56°30' E, 2504 m a.s.l.), 25.IX.2014; 1♀, S.n, Bidkhan (29°34' N 56°30' E, 2943 m a.s.l.), 01.VIII.2014; 1 ♀, S.n, Bidkhan (29°35' N 56°30' E, 2861 m a.s.l.), 01.VIII.2014; 2♀, S.n, Bidkhan (29°35' N 56°30' E, 2751 m a.s.l.), 14.VII.2014; 1 ♀, S.n, Bidkhan (29°35' N 56°30' E, 2867 m a.s.l.), 15.VIII.2014; 1♀, S.n, Bidkhan (29°35' N 56°30' E, 2751 m a.s.l.), 14.VII.2014; S.n, Negar (29°53' N 56°46' E, 2096 m a.s.l.), 21.VIII.2014, leg.: F. Abdolalizadeh.

***Aleiodes (Aleiodes) nocturnes* (Telenga, 1941)**

**Material examined:** 1♀, S.n, Negar (29°53' N 56°46' E, 2095 m a.s.l.), 30.V.2014; 1♀, S.n, Bidkhan (29°37' N 56°30' E, 3058 m a.s.l.), 11.V.2014; leg.: F. Abdolalizadeh.

***Aleiodes (Chelonorhogas) apicalis* (Brullé, 1832)**

**Material examined:** 1♀, M.t, Bidkhan (29°36' N 56°29' E, 3058 m a.s.l.), 18.VI.2014; leg.: F. Abdolalizadeh.

**\**Aleiodes (Chelonorhogas) ruficornis* (Herrich-Schaffer, 1838) (Fig. 1A-F)**

**Material examined:** 1♀, M.t, Chatrood (30°36' N 56°55' E, 1874 m a.s.l.), 06.V.2013; 1♀, M.t, Sirch (30°11' N 57°03' E, 2545 m a.s.l.), 19.VI.2013, leg.: Sh. Mohebban; 1♀, 2♂, S.n, Bidkhan (29°35' N 56°30' E, 2861 m a.s.l.), 28.VIII.2014; S.n, Negar (29°53' N 56°46' E, 2094 m a.s.l.), 26.IX.2014, leg.: F. Abdolalizadeh.

**Diagnostic characters (female):** Body length 6.5–8.2 mm; antenna with 38–42 segments, distinctly shorter than body length; compound eyes medium-sized (Fig. 1A); hypoclypeal depression as wide as its distance from compound eye (Fig. 1B); length of temple 1.1 times compound eye in dorsal view (Fig. 1C); mesopleuron rugose (Fig. 1D); vein 3-SR of fore wing 2.3 times as long as r, length of vein 2-CU1 1.9 times vein 1-CU1 (Fig. 1E); first, second and basal third metasomal tergites with longitudinal striae, second metasomal tergite transverse, 1.5 times wider than its length, with distinct smooth triangular area medio-basally (Fig. 1F).

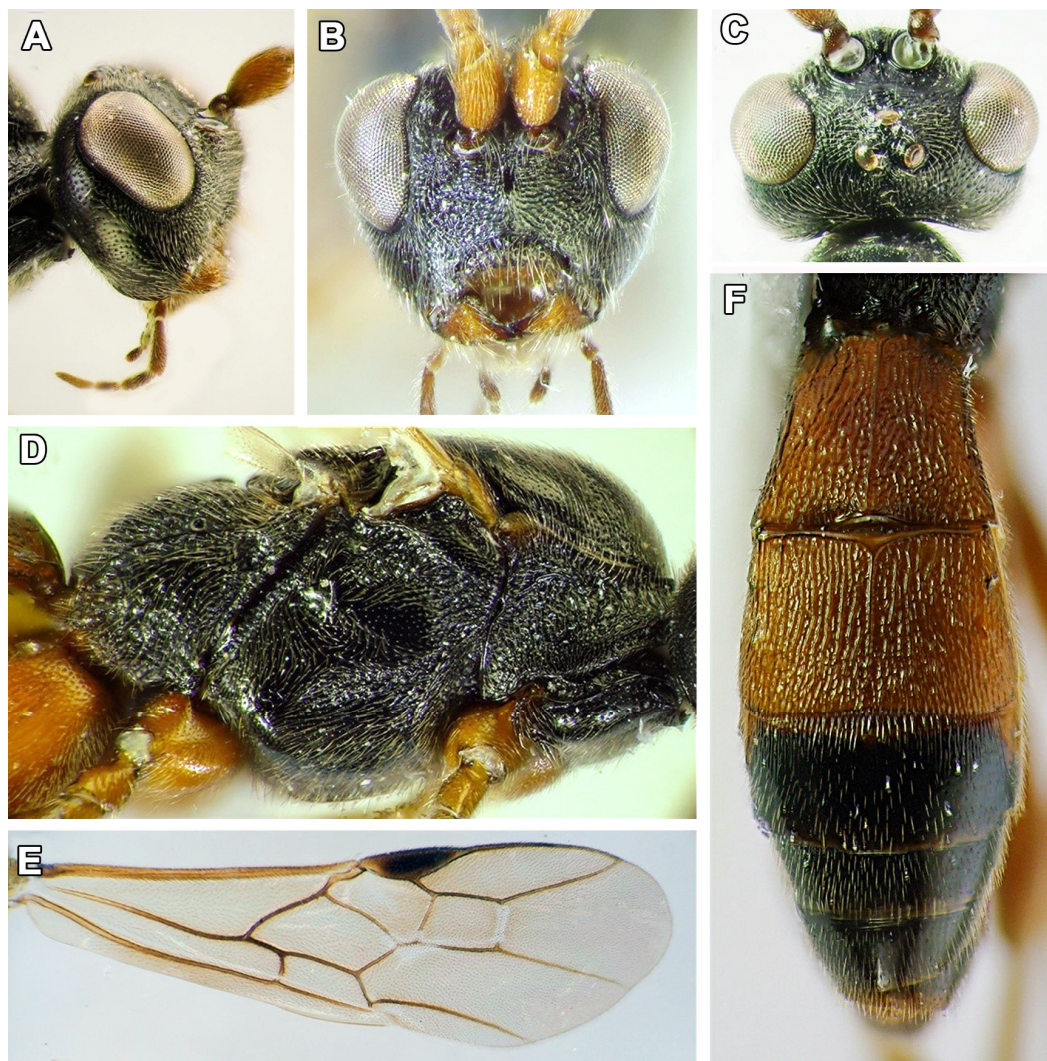
**Coloration:** Body black; antenna brownish, usually apical half dark, head and mesosoma black; legs reddish; first and second metasomal tergites reddish, third metasomal tergite reddish in lateral view, following tergites completely black.

**Distribution in Iran:** Kerman province. New record for Iran.

**Discussion**

In this study, fourteen species of four subfamilies, were identified and recorded from Kerman province, southeast Iran. One species was recorded for the first time for the fauna of Iran. The present number of the species registered in Kerman does not at all approach the true number of the braconid species existing in this province. Distributions of the species according to zoogeographical regions is variable. Among the identified species some of them such as *Dinocampus coccinellae*, *Perilitus* (*Perilitus*) *aethiops*, *Wesmaelia petiolata* and *Macrocentrus collaris* distributed in most zoogeographical regions. However, the species such as *Leiophron deficiens*, *Aleiodes* (*Aleiodes*) *bicolor* and *Aleiodes* (*Aleiodes*) *circumscriptus* have a wide distribution in Palearctic region and they are endemic in this region (Beyarslan 2015). *Aleiodes* (*Chelonorhogas*) *ruficornis* is reported for the first time from Iran in the present study.





**Figure 1.** *Aleiodes ruficornis* (Herrich-Schaffer, 1838): **A.** Head, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Mesosoma, lateral view; **E.** Fore wing; **F.** Metasoma, dorsal view.

It is distributed in the Palearctic and Oriental regions (Germany, Italy, Switzerland and the UK) (Yu *et al.* 2012). This species has not been reported from adjacent countries of Iran so far. *Aleiodes ruficornis* is the koinobiont endoparasitoid of larval stages of the family Nuctuidae (Lepidoptera). Most of the species introduced in this study are parasitoids of lepidoptera and Hemiptera that are important pests of agricultural plants. No data is available on the presence of the collected species in Kerman province. However several studies has been carried out on some species of this study in adjacent provinces (Farahani *et al.*

2013a; Ameri *et al.* 2014; Al-e-Mansour, and Mostafavi 1993; van Achterberg 1993b; Lashkari-Bod *et al.* 2011).

In general the wasps of the mentioned braconids are considered as the most important group of insects which have significant role in biological control of agricultural pests. Some species such as *Perilitus aethiops* and *Aleiodes* (*Aleiodes*) *circumscriptus* are important in the biological control of pest insects (Yu *et al.* 2012). In fact the aim of biological control is to decreases the population of pests as they impose the least damages to the ecosystem (Quicke 2015). With regard to specific

climatic and geographical conditions of Kerman province which has enriched fauna of insects, it can be expected that the number of species of the studied subfamilies and the other species belonging to braconids is high in this region. So, due to the climatic similarities of this province with the other neighboring parts, reporting the different species of this family can be predicted or expected.

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### References

- Abbasipour, H. 2001. Report of endoparasitoid wasp, *Meteorus gyrator* Thunberg (Hym.: Braconidae) on rice army worm, *Mythimna unipuncta* Howarth from Iran. *Journal of Entomological Society of Iran*, 20(2): 101-102.
- Al-e-Mansour, H. and Mostafavi, M.S. 1993. The first record of Braconidae bees on forest and range vegetations in Fars province. *Proceedings of 11<sup>th</sup> Iranian Plan Protection Congress*, p. 236.
- Ameri, A., Talebi, A.A., Rakhshani, E., Beyarslan, A. and Kamali, K. 2014. A survey of Euphorinae (Hymenoptera: Braconidae) of southern Iran, with description of a new species. *Zootaxa*, 3900 (3): 415-428. DOI: <http://dx.doi.org/10.11646/zootaxa.3900.3.5>.
- Arbab, A. and Mcneill, M. 2001. New report of *Microctonus aethiopoides* (Hym.: Braconidae) in Iran. *Journal of Entomological Society of Iran*, 21: 111-112.
- Aubert, J.F. 1966. Listed'identification No. 6 (présentée par le service d'identification des Entomophages). *Entomophaga*, 11: 115-34.
- Beyarslan, A., Gozuacik, C. and Ozgen, I. 2013. A contribution on the subfamilies Helconinae, Homolobinae, Macrocentrinae, Meteorinae, and Orgilinae (Hymenoptera: Braconidae) of southeastern Anatolia with new record from other parts of Turkey, *Turkish Journal of Zoology*, 37: 501-505.
- Beyarslan, A. 2015. Taxonomic survey on the Rogadinae Förster, 1862 (Hymenoptera, Braconidae) in the northeastern Anatolian region, Turkey. *Turkish Journal of Zoology*, 39: 811-819.
- Coronado, J. M., Ruiz, E., and Varela, S.E. 2004. Adenda a Braconidae (Hymenoptera), p. 713-720, In: Llorente, J.E., Morrone, J.J., Yanez, O. and Vargas, I. (Eds.), *Biodiversidad, Taxonomiay Biogeografia de Artropodos de México: Haciauna Sintesis de suconocimiento*. Conabio-Unam. México. 790 pp.
- Farahani, S. and Talebi, A.A. 2012. A review of the tribe Meteorini (Cresson 1887) (Hym.: Braconidae, Euphorinae) in Northern Iran, with eight new records. *Iranian Journal of Animal Biosystematics*, 8: 133-153.
- Farahani, S., Talebi, A.A. and Rakhshani, E. 2012a. First records of *Macrocentrus* Curtis, 1833 (Hymenoptera: Braconidae: Macrocentrinae) from Northern Iran. *Zoology and Ecology*, 22(1): 41-50.
- Farahani, S., Talebi, A.A., Rakhshani, E. and van Achterberg, C. 2012b. First record of *Homolobus infumator* (Lyle, 1914) (Insecta: Hymenoptera: Braconidae: Homolobinae) from Iran. *Check List*, 8(6): 1350-1352.
- Farahani, S., Talebi, A.A. and Rakhshani, E. 2013a. A contribution to the knowledge of Euphorinae (Hym.: Braconidae), with six new records from Iran. *Journal of Entomological and Acarological Research*, 45: 43-51. DOI: <http://dx.doi.org/10.4081/jear.2013.e9>.
- Farahani, S., Talebi, A.A., van Achterberg, C. and Rakhshani, E. 2013b. Three new records of the genera *Leiophron* and *Euphorus* (Hym.: Braconidae: Euphorinae) from Iran. *Journal of Entomological Society of Iran*, 33 (2): 73-79.
- Farahani, S., Talebi, A.A., van Achterberg, C. and Rakhshani, E. 2015. A review of the subfamily Rogadinae (Hymenoptera: Braconidae) from Iran. *Zootaxa*, 3973 (2): 227-250. DOI: <http://dx.doi.org/10.11646/zootaxa.3973.2>.
- Farahani, S., Talebi, A.A. and Rakhshani, E. 2016. Iranian Braconidae (Insecta: Hymenoptera: Ichneumonoidea): diversity, distribution and host association. *Journal of Insect Biodiversity and Systematics*, 2(1): 1-92.

- Hasanshahi, G., Moghbeli Gharaei, M., Mohammadi-Khoramabadi, A., Abbasipour, H. and Papp, J. 2016. First record of the parasitoid wasp *Macrocentrus oriens* (Hym.: Braconidae, Macrocentrinae) from Iran. *Journal of Entomological Society of Iran*, 36 (1): 77-78.
- Hedwig, K. 1957. Ichneumoniden und Braconiden aus den Iran 1954 (Hymenoptera). *Jahresheft des Vereins für Vaterländische Naturkunde*, 112(1): 103-117.
- Herard, F., Mercadier, G., and Abai, M. 1979. Situation de *Lymantria dispar* (Lep.: Lymantriidae) et son complexe parasitaire en Iran, en 1976. *Entomophaga*, 24 (4): 371-384.
- Nikdel, M., Sadeghian, B. and Dordaei, M. 2004. Collection and identification of brown-tail moth's natural enemies in Arasbaran forest. The Joint Agriculture and Natural Resources Symposium, May 14-16, 2004, Tabriz, 1-5.
- Lashkari-Bod, A., Rakhshani, E., Talebi, A.A., Lozan, A. and Žikić, V. 2011. A contribution to the knowledge of Braconidae (Hym.: Ichneumonoidea) of Iran. *Biharean Biologist*, 5: 147-150.
- Quicke, D.L.J. 2015. *The Braconid and Ichneumonid Parasitoid Wasps: Biology, Systematics, Evolution and Ecology*. John Wiley and Sons, Ltd. 752 pp.
- Shaw, M.R. 1997. Rearing parasitic Hymenoptera. *Amateur Entomologist's Society*, Volume 25, Orpington, U.K. pp. 47.
- Shaw, M.R. and Huddleston, T. 1991. *Classification and biology of braconid wasps (Hymenoptera: Braconidae)*. Royal Entomological Society of London. Handbooks for the Identification of British Insects, London, 126 pp.
- Shaw, M.R., Marsh, P.M. and Fortier, J.C. 1997. Revision of North American *Aleiodes* Wesmael (Part 1): the *pulchripes* Wesmael species-group in the New World (Hymenoptera: Braconidae: Rogadinae). *Journal of Hymenoptera Research*, 6: 10-35.
- Shenefelt, R.D. 1975. Braconidae 8: Exothecinae, Rogadinae. In: van der Vecht, J. and Shenefelt, R.D. (Eds.), *Hymenopterorum Catalogus (novo editio)*, W. Junk B.V., The Hague. pp. 1115-1262.
- Stigenberg, J. and Ronquist, F. 2011. Revision of the Western Palearctic Meteorini (Hymenoptera, Braconidae), with a molecular characterization of hidden Fennoscandian species diversity. *Zootaxa*, 3084: 1-95.
- Telenga, N.A. 1941. Family Braconidae, subfamily Braconinae (continuation) and Sigalphinae. *Fauna USSR, Hymenoptera*, 1-466.
- Tobias, V.I. 1986. Subfamily Braconinae. In: Medvedev, G.S. (Ed.), *Keys to the Insects of the European Part of the USSR*. Vol. 3. Hymenoptera. Part 4. Nauka publisher, Leningrad, pp. 156-254.
- van Achterberg, C. 1979. A revision of the subfamily Zelinae auct. (Hymenoptera, Braconidae). *Tijdschrift voor Entomologie*, 122: 241-479.
- van Achterberg, C. 1993a. Illustrated key to the subfamilies of the Braconidae (Hymenoptera: Ichneumonoidea). *Zoologische Verhandelingen*, 283: 1-189.
- van Achterberg, C. 1993b. Revision of the subfamily Macrocentrinae Foerster (Hymenoptera, Braconidae) from the Palearctic region. *Zoologische Verhandelingen*, Leiden, 286, 1-110.
- van Achterberg, C. 2009. Can Townes type Malaise traps be improved. some recent developments. *Entomologische Berichten Amsterdam*, 69 (4): 129 -135.
- van Achterberg, C. and Shaw, M. 2016. Revision of the western Palearctic species of *Aleiodes* Wesmael (Hymenoptera, Braconidae, Rogadinae). Part 1: Introduction, key to the species groups, outlying distinctive species, and revisionary notes on some further species. *ZooKeys*, 639: 1-164. DOI: <https://doi.org/10.3897/zookeys.639.10893>.
- Wharton, R.A., Marsh, P.M. and Sharkey, M.J. 1997. *Manual of the New World Genera of the Family Braconidae (Hymenoptera)*. The International Society of Hymenopterists, 440 pp.
- Yu, D.S., van Achterberg, C. and Horstmann, K. 2012. World Ichneumonoidea. Taxonomy, Biology, Morphology and Distribution. Taxapad (Scientific names for information management) Interactive catalogue on DVD/CDROM. Vancouver, Available from: <http://www.taxapad.com> (accessed 01 January 2017).

## مطالعه زنبورهای خانواده Braconidae (Euphorinae, Homolobinae, Macrocentrinae, Rogadinae) در استان کرمان، جنوب شرق ایران

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**چکیده:** فون خانواده Braconidae (Euphorinae, Homolobinae, Macrocentrinae and Rogadinae) استان کرمان مورد بررسی قرار گرفت. جمعاً ۱۴ گونه متعلق به هشت جنس جمع‌آوری و شناسایی شد. از بین گونه‌های جمع‌آوری شده، گونه *Aleiodes (Chelonorhogas) ruficornis* (Herrich-Schaffer, 1838) برای اولین بار از ایران گزارش می‌شود. همه گونه‌ها برای استان کرمان گزارش جدید می‌باشند.

**واژگان کلیدی:** Braconidae، فون، گزارش جدید، ایران