J Insect Biodivers Syst 02(2): 181–192

First Online

OPEN ACCESS

JOURNAL OF INSECT BIODIVERSITY AND SYSTEMATICS

JIBS

Research Article

http://jibs.modares.ac.ir

http://zoobank.org/References/50AB8DA8-04C2-4F47-8082-3844BCEE07FF

Review of Iranian Eupelmidae (Hymenoptera: Chalcidoidea), with five new records

Hossein Lotfalizadeh[1*] and Leila Ghadirzadeh[2]

1 *Department of Plant Protection, Agricultural and Natural Resources Research Center of East-Azarbaijan, AREEO, Tabriz, Iran*

2 *Department of Plant Protection, Islamic Azad University, Tabriz Branch, Tabriz, Iran.*

ABSTRACT. Eupelmidae of Iran are revised based on collected material mainly from the northwest and accessible published data. This family in Iran includes 31 species in two subfamilies (Calosotinae and Eupelminae) and seven genera *Anastatus* Motschulsky, 1859 (four species), *Arachnophaga* Ashmead, 1896 (one species), *Brasema* Cameron, 1884 (one species), *Calosota* Curtis, 1836 (one species), *Calymmochilus* Masi, 1919 (one species), *Eupelmus* Dalman, 1820 (22 species) and *Eusandalum* Ratzeburg, 1852 (one species). The genus *Calymmochilus* and four species *Calymmochilus dispar* Bouček & Andriescu, 1967; *Eupelmus pini* Taylor, 1927; *E. splendens* Giraud, 1872 and *E. vindex* Erdös, 1955 are new records for Iran.

Key words: Calosotinae, Eupelminae, Fauna, Parasitoids, Iran

Received: *03 June 2016*

Accepted: *25 June 2016*

Published: *25 June 2016*

Subject Editor: *Ehsan Rakhshani*

Citation: Lotfalizadeh, H. and Ghadirzadeh, L. 2016. Review of Iranian Eupelmidae (Hymenoptera: Chalcidoidea) with some new records. *Journal of Insect Biodiversity and Systematics*, 2(2): 181–192.

Introduction

Eupelmidae including three subfamilies Calosotinae, Neanastatinae and Eupelminae, have more than 900 species in 51 genera worldwide (Noyes 2015). Only 10 species in three genera have been reported from Iran (Fallahzadeh *et al.* 2008; Noyes 2015). These wasps are primary or secondary parasitoids and ecto or endoparasitoids of different orders of insects (Gibson 1995). Malaise or pan traps and rearing from hosts are the best method for collecting members of this family (Gibson 1989, 1995).

Keys to world genera of Calosotinae and Neanastatinae are provided by Gibson (1989), and world genera of Eupelminae by Gibson (1995). Recently, Al Khatib *et al.* (2015) studied *urozonus*-group of *Eupelmus* in the Palaearctic region. Most recently, Gibson and Fusu (2016) revised *Euplemus* species in the Palaearctic region. Substantial contributions to knowledge of Iranian Eupelmidae were made by Kalina (1981b, 1988) who described some species, Lotfalizadeh *et al.* (2006, 2012) and Mohammadi *et al.* (2011) who reared specimens from galls of *Diplolepis fructuum* (Rübsaamen, 1882) (Cynipidae) on *Rosa canina*, Fallahzadeh *et al.* (2008) who reared specimens from *Bellatella germanica*

Corresponding author: Hossein Lotfalizadeh, E-mail: *hlotfalizadeh@gmail.com*

(L.) (Blattaria: Blattellidae), Lotfalizadeh and Khalghani (2008) who reported hymenopterous parasitoids of xylophagus beetles, Mahdavi and Madjdzadeh (2013) who reared specimens from Cynipidae (Hymenoptera), Lotfalizadeh and Hashemi (2015) who reared parasitoids of *Oxystoma ochropus* (Germar), and Ghadirzadeh *et al.* (2016) who reported *Brasema stenus* (Bouček).

Our general collecting in the northwest of Iran has contributed additional information that is the main aim of the present study.

Material and methods

Specimens were collected by the authors mainly in nature reserves from north-western Iran using a standard sweep net, yellow pan traps, a Malaise trap, and by host rearing during 1996–2015. Several species were obtained from dead wood inhabited by xylophagous insect larvae, from cynipid galls and from other hosts (Table 1).

Specimens were preparations based on Noyes (1982). Generic identifications were made using Peck *et al.* (1964), Medvedev (1988) and Gibson (1995), and specific identification using all the available keys and descriptions (Kalina 1981a,b, 1988; Askew and Nieves-Aldrey 2000, 2004; Gibson 1989, 1995, 2010; Gibson and Fusu 2016). Specimens are deposited in the insect collection of the Department of Plant Protection, East-Azarbaijan Research Center for Agriculture and Natural Resources, Tabriz, Iran.

Results

Based on examination of 125 specimens, 17 species were identified from our material. Previously reported species from Iran were also added to this list for a total of 30 species in two subfamilies: Calosotinae (one species) and Eupelminae (29 species).

Subfamily Calosotinae
I- Genus: *Calosota* Curtis, 1836
1-*Calosota metallica* (Gahan, 1922)

Material examined: Iran, East-Azarbaijan province, Khosroshah, Agricultural Research Station, 1346 m, N 37º58'28" E 46º02'55", vii.2012, H. Lotfalizadeh (1♀).

This species was reported from Iran without exact locality (Gibson 2010) but it was collected from northwest of Iran in a Malaise trap. It is widely distributed in the Palaearctic and Nearctic regions as a parasitoid of Coleoptera (Scolytidae), Diptera (Cecidomyiidae, Tephritidae), Hymenoptera (Eurytomidae), and Lepidoptera (Tortricidae) (Noyes 2015).

Subfamily Eupelminae
II- Genus: *Anastatus* Motschulsky, 1859

This genus includes four species in Iran. Bayegan *et al.* (2013) reported *Anastatus intrroptus* (Nikolskaya 1952) from northern Iran but our recent examination showed that this record is a misidentification.

2-*Anastatus bifasciatus* Geoffroy, 1785

Material examined: Iran, East-Azarbaijan province, Khosroshah, Agricultural Research Station, 1346 m, N 37º58'28" E 46º02'55", 6.ix.2014, H. Lotfalizadeh, Malaise trap (1♀).

This species has been reported on eggs of *Eurygaster integriceps* Puton (Hem.: Scutelleridae) and an unknown moth (Lepidoptera) (Iranipour *et al*. 1998). It is widely distributed in the Palaearctic region, North Africa, US (Noyes 2015), and Iran (Iranipour *et al*. 1998).

3- *Anastatus dlabolai* Kalina, 1981

Kalina (1981a) described this species based on collected specimens from Kerman province, Deh-Bakri. It may be endemic to Iran. Mehrnejad reported this species as parasitoid of *Kermania pistaciella* Amsel (Lepidoptera: Tineidae).

4- *Anastatus tenuipes* Bolivar y Pieltian, 1925

Material examined: Iran, East-Azarbaijan province, Khosroshah, Agricultural Research Station, 1346 m, N 37º58'28" & E 46º02'55", Malaise trap, 8.ix.2014, H. Lotfalizadeh (3♀♀). Sistan & Baluchestan province, Zabol, Hirmand, 6.iv.2011, ex *Hyles linenta* on *Vitis* sp., S. Taheri (2♀♀).

This species widely distributed in the Afrotropical, Nearctic and Palaearctic regions and has known as a parasitoid of Blattellidae and Blattidae (Noyes 2015). Our examined specimens were collected from southeast and northwest of Iran as egg parasitoids of *Hyles lineata* (Fabricius) (Lepidoptera: Sphingidae) on *Vitis* sp.

5- *Anastatus* sp.

Material examined: Iran, East-Azarbaijan province, Khosroshah, Agricultural Research Station, 1346 m, N 37º 58' 28" E 46º 02' 55", 14.ix.2010, H. Lotfalizadeh (1♀).

We could identify this species using current keys.

III-Genus: *Arachnophaga* Ashmead, 1896

6- *Arachnophaga matritensis* (Bolivar y Pieltain, 1934)

This species has been reported as parasitoid of *Kermania pistaciella* Amsel (Lepidoptera: Tineidae) (Mehrnejad, 2008).

IV-Genus: *Brasema* Cameron, 1884

This genus with 54 known species (Noyes 2015) includes only one species in Iran (Ghadirzadeh *et al.* 2016).

7- *Brasema stenus* Bouček, 1968

Material examined: Iran, East-Azarbaijan province, Khosroshah, Agricultural Research Station, 1346 m, N 37º58'28" E 46º02'55", Malaise trap, H. Lotfalizadeh , vii.2008 (2♀♀), viii.2008 (3♀♀), 5.viii.2009 (2♀♀) 16.viii.2009 (2♀♀), 2.x.2009 (3♀♀ & 1♂), 18.vii.2010(7♀♀ & 2♂♂), 21.vii.2010 (2♀♀ & 1♂), 2.viii.2010 (13♀♀ & 1♂).

In the Palaearctic region, *Brasema stenos* known from some European countries (Noyes 2015) and the Middle East (Ghadirzadeh *et al.* 2016). Two hymenopterous families, Cynipidae and Eurytomidae, have been recorded as hosts.

V- Genus: *Calymmochilus* Masi, 1919

This is first record of the genus from Iran. This is a small genus, includes 10 nominal species in the world (Noyes 2015).

8-*Calymmochilus dispar* Bouček & Andriescu, 1967

Material examined: Iran, East-Azarbaijan province, Yam,vii. 2002, H. Lotfalizadeh (1 ♀).

This species known from some European countries from Spain to Armenia (Noyes 2015). It is a new record for Iran.

VI- Genus: *Eupelmus* Dalman, 1820

Nine species of *Eupelmus* were collected. Including the 13 previously reported species, there are 21 species in Iran. These species belong to the subgenera *Eupelmus* Dalman, 1820 (17 species), *Macroneura* Walker, 1837 (4 species), and *Episolindelia* Girault, 1914 (1 species).

9- *Eupelmus* (*Eupelmus*) *annulatus* Nees, 1834

Material examined: Iran, Golestan province, Aliabad, 1.vii.2013, ex Cynipidae on *Quercus castaneifolia*, 36°54'N 54°53'E, 140m, A. Gol (3♀♀).

*Eupelmus annulatus*is widely distributed in Europe, Canada, USA (Noyes 2015) and Iran (Gibson, 2011). It is parasitoid of Coleoptera (Buprestidae, Curculionidae), Hymenoptera (Cynipidae, Diprionidae) and Lepidoptera (Lymantriidae, Momphidae, Psychidae, Tortricidae) (Noyes, 2015).

10- *Eupelmus* (*Eupelmus*) *azureus* Ratzeburg, 1844

Eupelmus azureus has recently been reported from Iran (Gibson and Fusu 2016).

11- *Eupelmus* (*Eupelmus*) *bicolor* Gibson & Fusu, 2016

Eupelmus bicolor belongs to the *splendens* species-group. It was reported from Kermanshah and Lorestan provinces as a parasitoid of *Andricus cecconii* Kieffer, 1901 (Hymenoptera: Cynipidae) on *Quercus brantii* Lindl. (Gibson and Fusu 2016).

12- *Eupelmus* (*Eupelmus*) *cerris* Förster, 1860

Sadeghi *et al.* (2009) reared this species as parasitoid of *Pseudoneuroterus macropterus* (Hartig, 1843) galls (Hymenoptera: Cynipidae) on *Quercus brantii.*

13- *Eupelmus* (*Episolindelia*) *cicadae* Giraud, 1872

This species was reported by OILB (1971) from Iran but Noyes (2015) believes the identification needs confirmation.

14- *Eupelmus* (*Macroneura*) *coleophorae* (Kalina, 1981)

This species was collected from Semnan (Shahroud) and Qazvin (Abyek) provinces (Kalina1981b). It known only from Iran and Uzbekistan (Noyes 2015).

15- *Eupelmus* (*Eupelmus*) *confusus* Al Khatib, 2015

Thisrecently described species is mostly distributed in the European countries of Mediterranean Basin and reported from Iran (Al Khatib *et al.* 2015). It is parasitoid of *Diplolepis* (Hym.: Cynipidae) on *Rosa canina* (Gibson and Fusu 2016).

16- *Eupelmus* (*Eupelmus*) *fulvipes* Förster, 1860

Material examined: East-Azarbaijan province, Zonuz, ex. gallon *Rosa damascena,* vii.1996, H. Lotfalizadeh (1 ♀), same data, vii.2002 (2♂♂ & 5♀♀).

Lotfalizadeh *et al.* (2006) reported this species as a parasitoid of rose gall wasp, *Diplolepis fructuum* (Rübsaamen, *1882)* (Hymenoptera: Cynipidae). Gibson and Fusu (2016) placed this species in the *fulvipes* species-group of *Eupelmus.*

17- *Eupelmus* (*Eupelmus*) *gelechiphagus* Gibson & Fusu 2016

Type material of this species was collected from central Iran as parasitoid of *Amblypalpis olivierella* Ragonot (Lepidoptera: Gelechiidae) on *Tamarixa phylla* (L.) (Tamaricaceae) (Gibson and Fusu 2016).

18- *Eupelmus* (*Macroneura*) *impennis* (Nikol'skaya, 1952)

Material examined: East-Azarbaijan province, Khosroshah, Agricultural Research Station, 1346 m, N 37º58'28" E 46º02'55", Malaise trap, 25.viii.2009, H. Lotfalizadeh (1♀), same data, 16.ix.2012 (1♀). West-Azarbaijan province, Maku and Shot, 25.vi.2010, ex rose gall wasp *Diplolepis fructuum* on *Rosa canina*, R. Mohammadi (2♀♀).

This species has been reported from Europe (Noyes 2015) and Iran (Mohammadi *et al*. 2011).

19- *Eupelmus* (*Eupelmus*) *iranicus* Kalina, 1988

The type specimen was collected from northern Iran and was recently reported from Greece, Israel, Libya and Somalia (Gibson and Fusu 2016). This species was placed in the *iranicus* species-group (Gibson and Fusu 2016).

20- *Eupelmus* (*Eupelmus*) *longicaudus* Kalina, 1988

The type material of this species was collected from southeast Iran. Gibson and Fusu (2016) included this species in the *fulgens*-group.

This species has been reported as parasitoid of *Kermania pistaciella* Amsel (Lepidoptera: Tineidae) (Mehrnejad, 2008).

21- *Eupelmus* (*Eupelmus*) *martellii* Masi, 1941

Material examined: East-Azarbaijan province, Norduz, Malaise trap,19.ix.2010, H. Lotfalizadeh (1♀).

This species has been reared on leaf-galls on *Salix alba* L. in Kerman (Mahdavi and Madjdzadeh 2013). Our specimen was collected from north-western Iran in a completely different ecosystem. It seems that this species widely distributed in Iran.

22- *Eupelmus* (*Eupelmus*) *mehrnejadi* Gibson & Fusu, 2016

This recently described species is based on collected material from central and western of Iran. It was reared as parasitoid of *Kermania pistaciella* Amsel (Lepidoptera: Tineidae) or a facultative hyperparasitoid of this through *Chelonus kermakiae* (Tobias, 2001) (Hymenoptera: Braconidae) on *Pistacia vera* (Mehrnejad and Basirat 2009) and *Aphelonyx persica* Melika *et al*., 2004 (Hymenoptera: Cynipdae) galls on *Quercus brantii* Lindl. (Fagaceae) (Gibson and Fusu 2016). Mehrnejad (2008) reported this species as *Eupelmus longicornis* (Kalina, 1981).

23- *Eupelmus* (*Eupelmus*) *microzonus* Förster, 1860

Material examined: Iran, East-Azarbaijan province, Khosroshah, Agricultural Research Station, Malaise trap, 1346 m, N 37º58'28" E 46º02'55",5.xii. 2007, H. Lotfalizadeh (1♀), same data, 5.xii.2007 (2♀♀), 19.x.2007 (1♀), 14.vii.2009 (2♀♀), 1.viii.2009 (1♀), 15.viii.2009 (1♀), 30.ix.2009 (3♀♀). East-Azarbaijan province, Mianeh, Malaise trap, 23.vi.2014 (2♀♀). Ardabil province, Namin, Patakhor, 25.vi. 2012S. M. Hashemi (4♀♀).

This species was reported from Europe, Caucasus, North Africa, Middle Asia and Iran as parasitoid of Cynipidae (Gibson and Fusu 2016). In Iran it is a parasitoid of *Oxystoma ochropus* (Germar, 1818) (Coleoptera: Apioninae) (Lotfalizadeh and Hashemi 2015).

24- *Eupelmus* (*Macroneura*) *muellneri* Ruschka, 1921

Eupelmus muellneri was reported under *Macroneura muellneri* from Tehran and Markazi provinces as parasitoid of *Ruguloscolytus mediterraneus* (Eggers, 1922) (Coleoptera: Scolytidae) and *Sphenoptera davatchii* Descarpentries, 1960 (Coleoptera: Buprestidae) (Lotfalizadeh & Khalghani 2008).

25- *Eupelmus* (*Eupelmus*) *pini* Taylor, 1927

Material examined: Iran, East-Azarbaijan province, Khosroshah, Agricultural Research Station, 1346 m, N 37º58'28" E 46º02'55", Malaise trap, 19.vii. 2009, H. Lotfalizadeh (1♀).

This Holarctic species is a parasitoid of xylophagous beetles: Anobiidae, Cerambycidae, Curculionidae, Scolytidae (Coleoptera). Our collected specimen was collected in a Malaise trap where *Pinus* sp. was widely planted. *Eupelmus pini*has been reported from 22 countries (Gibson and Fusu 2016) but is a new record for Iran.

26- *Eupelmus* (*Eupelmus*) *pistaciae* Al Khatib, 2015

This species is associated with *Pistacia* spp. (Anacardiaceae) (Al Khatib *et al*. 2015); therefore, it is widely distributed in the Mediterranean Basin where it's host, *Megastigmus pistaciae* Walker, 1871 (Hymenoptera: Torymidae), is present. On *Pistacia vera* L. and *P. atlantica* Desfontaines (Gibson and Fusu 2016). Paratypes of this species were collected from Iran (Al Khatib *et al.* 2015).

27- *Eupelmus* (*Eupelmus*) *splendens* Giraud, 1872

Material examined: Iran, Kermanshah province, Chalabeh, 26.i.2012, ex Cynipidae on *Quercus* sp., M. Zardouei (2 ♀♀).

This species known from Europe (Gibson and Fusu 2016) and is a new record for Iran. It belongs to the *splendens* species group. Our examined specimens were reared from oak galls (Cynipidae).

28-*Eupelmus* (*Eupelmus*) *urozonus* Dalman, 1820

Material examined: Iran, East-Azarbaijan province, Yam, 5.v.2002, ex *D. fructuum* galls on *R. canina,* H. Lotfalizadeh (6♀♀), 18.v.2002 (8♀♀& 2♂♂), 12.ix.2003 (3♀♀ & 2♂♂). East-Azarbaijan province, Marand, 17.viii.2003, exgall on *Rosa damascena*, H. Lotfalizadeh (4♀♀). Tehran, Evin, 6.vi.2002, *D. fructuum* galls on *R. canina,* H. Lotfalizadeh (11♀♀). West-Azarbaijan province, Salmas, 16.vii.2015, ex stem gall on *Salix alba*, Lotfalizadeh (2♀♀ & 1♂). Iran, East-Azarbaijan province, Arasbaran, ex *Megastigmus amicorum* on *Juniperus* sp., H. Lotfalizadeh (2♀♀).

This species was reared as a parasitoid of a gall making insect on *Salix alba*andon *Megastigmus amicorum* Bouček, 1969 (Hymenoptera: Chalcidoidea, Torymidae) in our recently examined collections. *Diplolepis fructuum* (Rübsaamen) (Hymenoptera: Cynipidae) on *Rosa canina* L. in north-western Iran (Lotfalizadeh *et al*. 2006) and on *R. beggeriana* Schrenk in central Iran (Mahdavi and Madjdzadeh 2013) have also been listed as hosts of this species. This species is included in the *urozonus*-group (Gibson and Fusu 2016).

29- *Eupelmus* (*Macroneura*) *vesicularis* (Retzius, 1783)

Material examined: Iran, East-Azarbaijan, Kaleibar, 15.ix.2013, Malaise trap, H. Lotfalizadeh (3♀♀). West-Azarbaijan province, Maku and Shot, 25.vi.2010, ex rose gall wasp *Diplolepis fructuum* on *Rosa canina*, R. Mohammadi (3 ♀♀).

This species was recorded from Europe, Caucasus, North-Africa (Noyes 2015) and Iran (Mohammadi *et al*. 2011). It is known from five other *Diplolepis* species including *mayri* (Schlechtendal), *nervosa* (Curtis), *nodulosa* (Beutenmiiller), *rosae* (L.) and *spinosissma* Giraud.

30- *Eupelmus* (*Eupelmus*) *vindex* Erdös, 1955

Material examined: Iran, East-Azarbaijan province, Khosroshah, Agricultural Research Station, 1346 m, N 37º58'28" E 46º02'55", Malaise trap, 27. viii. 2009, H. Lotfalizadeh (1♀), 9.x.2011, (1♀).

This is first report of *E. vindex* from Iran. It is reported from Algeria, Azerbaijan, Bulgaria, France, Greece, Hungary, Israel, Italy, India, Romania, Tunisia and Turkey (Gibson and Fusu 2016).

VII- Genus: *Eusandalum* Ratzeburg, 1852
31- *Eusandalum inerme* (Ratzeburg, 1848)

Material examined: Iran, Fars province, ii.2005, ex Buprestidae on *Ficus carica*, (3♀).

This species is a common parasitoid of numerous species of xylophagous beetles from different Coleoptera: Anobiidae, Bostrichidae, Buprestidae, Cerambycidae and Scolytidae in some European countries. This species was reported on an unknown buprestid species in Iran (Lotfalizadeh and Khalghani 2008).

Discussion

This review is the first attempt to review the eupelmids of Iran and their biological associations. It includes 31 species in two subfamilies (Calosotinae and Eupelminae) and seven genera *Anastatus* Motschulsky (four species), *Arachnophaga* Ashmead, 1896 (one species), *Brasema* Cameron (one species), *Calosota* Curtis (one species), *Calymmochilus* Masi (one species), *Eupelmus* Dalman (22 species) and *Eusandalum* Ratzeburg (one species) (Table 1). *Calymmochilus* and four species *Calymmochilus dispar* Bouček & Andriescu, *Eupelmus pini* Taylor, *E. splendens* Giraud and *E. vindex* Erdös are new records for Iran. Reported genera and species from Iran and adjacent countries show that the fauna of Iran is better explored than for adjacent countries (Fig. 1). After Noyes (2015), within listed species and genera for these countries two genera *Euplemus* and *Anastatus* are most common genera, respectively (Table 2).

Table 1. Eupelmidae of Iran with their distribution and reported hosts (* new record for Iran).

Subfamily	Genus	Species	Distribution in Iran (province)	Host	References
Calosotinae	*Calosota* Curtis	*C. metallica* (Gahan)	East-Azarbaijan	Unknown	Gibson (2010)
Eupelminae	*Anastatus* Motschulsky	*A. bifasciatus* Geoffroy	East-Azarbaijan	*Eurygaster integriceps* (Scutelleridae)	Iranipour *et al*. (1998) Present study
		A. dlabolai Kalina	Kerman	*Kermania pistaciella* Amsel (Tineidae)	Kalina (1981a), Mehrnejad (2008)
		A. tenuipes Bolivar y Pieltian	East-Azarbaijan, Sistan & Baluchestan, Fars	*Hyles lineata* (Sphengidae); *Bellatella germanica* (Blattellidae)	Present study Fallahzadeh *et al*. (2008)
		Anastatus sp.	East-Azarbaijan	Unknown	Present study
	Arachnophaga Ashmead	*Arachnophaga matritensis* (Bolivar y Pieltain)	Kerman	*Kermania pistaciella* (Tineidae)	Mehrnejad (2008)
	Brasema Cameron	*B. stenus*Bouček	East-Azarbaijan	Unknown	Ghadirzadeh and Lotfalizadeh (2016)
	Calymmochilus Masi	*C.dispar* Bouček & Andriescu*	East-Azarbaijan	Unknown	Present study
	Eupelmus Dalman	*E. annulatus* Nees	Golestan	Cynipidae	Present study Gibson (2011)
		E. azureus Ratzeburg	Without exact locality	Cynipidae	Gibson and Fusu (2016)
		E. bicolor Gibson & Fusu	Kermanshah, Lorestan	*Andricus cecconii*(Cynipidae)	Gibson and Fusu (2016)
		E. cerris Förster	Without exact locality	*Pseudoneuroterus macropterus* (Cynipidae)	Gibson and Fusu (2016)
		E. cicadae Giraud	Without exact locality	Unknown	OILB (1971)
		E. coleophorae (Kalina)	Semnan, Qazvin	Unknown	Kalina (1981b)
		E. confusus Al khatib	Without exact locality	*Diplolepis* sp.(Cynipidae)	Al Khatib (2015)
		E. fulvipes Förster	East-Azarbaijan	*Diplolepis fructuum* (Cynipidae)	Lotfalizadeh *et al.* (2006)
		E. gelechiphagus Gibson & Fusu	Kerman	*Amblypalpis olivierella* (Gelechiidae)	Gibson and Fusu (2016)
		*E. impennis*Nikol'skaya	East-Azarbaijan, West-Azarbaijan	*D. fructuum* (Cynipidae)	Mohammadi *et al*. (2011)
		E. iranicus Kalina	Aliabad	Unknown	Kalina (1988b)
		E. longicaudus Kalina	Nikhshakr (riv.)	Unknown	Kalina (1988b)

Table 1. Continued

Eupelmus Dalman	*E. macroneura* Walker*	East-Azarbaijan	Unknown	Present study
	E. martellii Masi	East-Azarbaijan Kerman	*Pontania* sp. (Tenthredinidae)	Present study Mahdavi and Madjdzadeh (2013)
	E. mehrnejadi Gibson & Fusu	Kerman	*Kermania pistaciella* (Tineidae), *Aphelonyx persica* (Cynipidae)	Gibson and Fusu (2016)
	E. microzonus Förster	Without exact locality Ardabil East-Azarbaijan	Unknown	Gibson (2011) Lotfalizadeh and Hashemi (2015) Present study
	E. muellneri Ruschka	Tehran, Markazi	*Ruguloscolytus mediterraneus* (Scolytidae), *Sphenoptera davatchii* (Buprestidae)	Lotfalizadeh & Khalghani (2008)
	E. pini Taylor*	East-Azarbaijan	Unknown	Present study
	E. pistaciae Al khatib	Without exact locality	*Megastigmus pistaciae* (Torymidae)	Al Khatib *et al.* (2015)
	E.splendens Giraud*	Kermanshah	Cynipidae	Present study
	E. urozonus Dalman	Kerman East-Azarbaijan, Tehran, Kerman West-Azarbaijan East-Azarbaijan	*Kermania pistaciella* Amsel (Tineidae), *Diplolepis fructuum* (Cynipidae), *Megastigmus amicorum* (Torymidae)	Mehrnejad (2008) Lotfalizadeh *et al.*(2006), Lotfalizadeh *et al.* (2012), Mahdavi and Madjdzadeh (2013) Present study
	E. vesicularis Retzius	East-Azarbaijan, West-Azarbaijan	*Diplolepis fructuum* (Cynipidae)	Mohammadi *et al.* (2011), Present study
	E. vindex Erdös*	East-Azarbaijan	Unknown	Present study
Eusandalum Ratzeburg	*E. inerme* (Ratzeburg)	Fars	Buprestidae	Lotfalizadeh and Khalghani (2008)

Table 2. Comparative study of presented species in Iran and neighbouring countries (after Noyes, 2015) (+, present).

Species	Iran	Afganistan	Armenia	Azerbaijan	Iraq	Pakistan	Turkey	Turkmenistan
Calosota aestivalis Curtis							+	
Calosota metallica (Gahan)	+						+	
Anastatus bifasciatus Geoffroy	+						+	
Anastatus brevicaudus Kalina		+						
Anastatus dlabolai Kalina	+						+	
Anastatus japonicus Ashmead								
Anastatus longicornis Abdul-Rassoul & Al-Sandouk					+			
Anastatus splendens Nikol'skaya				+				
Anastatus tenuipes Bolivar y Pieltian	+							
Arachnophaga matritensis (Bolivar y Pieltain)	+							
Brasema rara (Kalina)								+
Brasema stenus Bouček	+							
Calymmochilusdispar Bouček & Andriescu	+		+					
Eupelmus annulatus Nees	+						+	
Eupelmus aseculatus (Kalina)				+				
Eupelmus azureus Ratzeburg	+						+	
Eupelmus bicolor Gibson & Fusu	+							
Eupelmus cerris Förster	+							
Eupelmus cicadae Giraud	+							
Eupelmus coleophorae (Kalina)	+							
*Eupelmus confusus*Al Khatib	+							
Eupelmus fulgens Nikol'skaya								+
Eupelmus fulvipes Förster	+			+				
Eupelmus gelechiphagus Gibson & Fusu	+							
Eupelmus infimbriatus Gibson & Fusu								+
*Eupelmus impennis*Nikol'skaya	+							
Eupelmus iranicus Kalina	+							
Eupelmus lanceolatus Gibson & Fusu							+	
Eupelmus longicaudus Kalina	+							
Eupelmus macroneura Walker	+							
Eupelmus martellii Masi	+							
Eupelmus mehrnejadi Gibson & Fusu	+							
Eupelmus microzonus Förster	+						+	+
Eupelmus muellneri Ruschka	+							
Eupelmus nitidus Nikol'skaya								+
Eupelmus orientalis (Crawford)					+			
Eupelmus pini Taylor	+							
Eupelmus pistaciae Al Khatib	+						+	
Eupelmus seculatus (Ferrière)				+			+	
Eupelmus splendens Giraud	+							
Eupelmus stramineipes Nikol'skaya								+
Eupelmus tachardiae (Howard)						+		
*Eupelmus tibicinis*Bouček				+				
Eupelmus urozonus Dalman	+	+	+			+	+	
Eupelmus vesicularis Retzius	+						+	+
Eupelmusvindex Erdös	+							
*Eusandalum afganum*Bouček		+						
Eusandalum inerme (Ratzeburg)	+							
Eusandalum puella (Nikol'skaya)								+
Pentacladia eques (Haliday)								+
Pentacladia hatayensis Doganlar							+	
Tineobius indicus (Ferrière)						+		

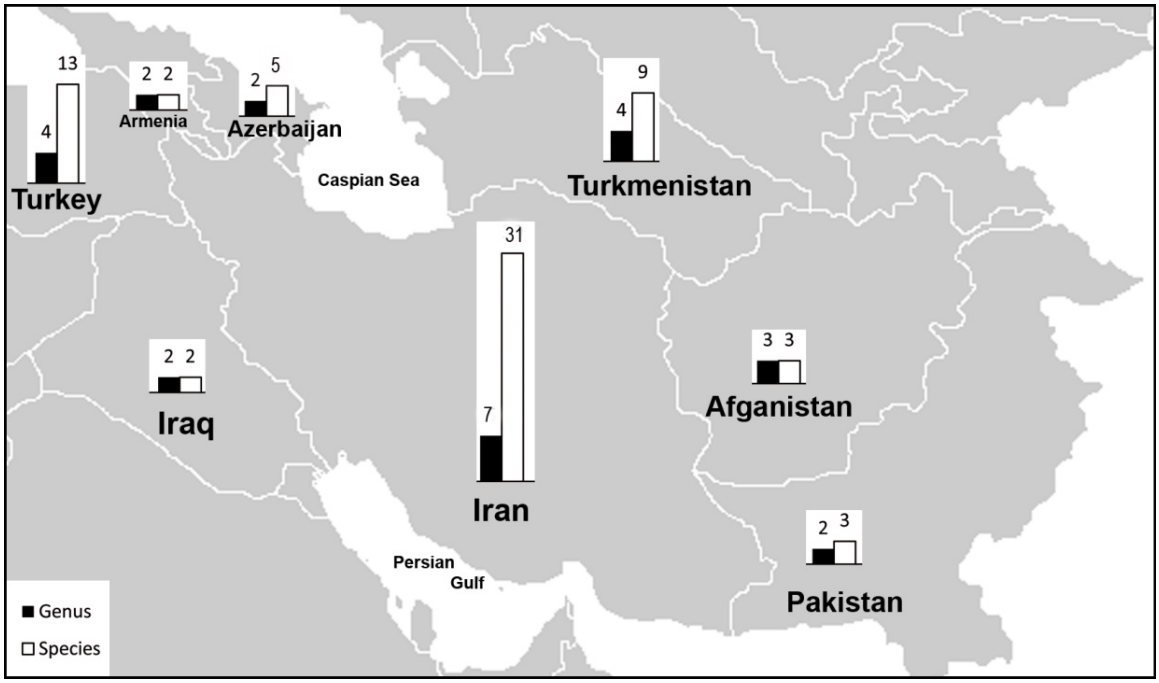

Figure 1. Number of genera and species of Eupelmidae in Iran (afther present study) and neighbouring countries (after Noyes, 2015).

Acknowledgments

We are grateful to three anonymous reviewers for constructive comments and recommendations on an earlier version of this paper.

References

Al Khatib, F., Fusu, L., Cruaud, A., Gibson, G., Borowiec, N., Rasplus, J.–Y., Ris, N. and Delvare, G. 2015. Availability of eleven species names of *Eupelmus* (Hymenoptera, Eupelmidae) proposed in Al Khatib *et al*. (2014). *ZooKeys,* 505: 137–145.

Askew, R.R. and Nieves–Aldrey, J.L. 2000. The genus *Eupelmus* Dalman, 1820 (Hymenoptera, Chalcidoidea, Eupelmidae) in Peninsular Spain and the Canary Islands, with taxonomic notes and descriptions of new species. *Graellsia,* 56: 49–61.

Askew, R.R. and Nieves–Aldrey, J.L. 2004. Further observations on Eupelminae (Hymenoptera, Chalcidoidea, Eupelmidae) in the Iberian Peninsula and Canary Islands, including descriptions of new species. *Graellsia,* 60(1): 28–29.

Bayegan, Z.A., Lotfalizadeh, H., Zargaran, M.R. and Pooraiiouby, R. 2013. First report of *Anastatus interruptus* (Nikol'skaya, 1952) (Hym.: Chalcidoidea, Eulophidae) from Iran. Proceedings of the 21th Iranian Plant Protection Congress, 25–28 August 2013, Urmia, p. 488.

Fallahzadeh, M. Asadi, R. and Talebi, A.A. 2008. The first record of *Anastatus* (*Anastatus*) *tenuipes* (Hym.: Eupelmidae), a parasitoid of *Bellatella germanica* (Blattaria: Blattellidae) in Iran. *Journal of Entomological Society of Iran,* 28(1): 99–100.

Ghadirzadeh, L., Lotfalizadeh, H. and Kazemi, M.-H. 2016. *Brasema stenus* (Bouček, 1968): A rare species in the Palaearctic region. *Biharean Biologist*, In press.

Gibson, G.A.P. 1989. Phylogeny and classification of Eupelmidae, with a revision of the world genera of Calosotinae and Metapelmatinae (Hymenoptera: Chalcidoidea). *Memoirs of the Entomological Society of Canada,* 149: 1–121

Gibson, G.A.P. 1995. Parasitic wasps of the subfamily Eupelminae: Classification and revision of world genera (Hymenoptera:

Chalcidoidea, Eupelmidae). *Memoirs on Entomology, International,* 5: 1–421 pp.

Gibson, G.A.P. 2010. *Calosota* Curtis (Hymenoptera, Chalcidoidea, Eupelmidae) - review of the New World and European fauna including revision of species from the West Indies and Central and North America. *ZooKeys,* 55: 1–75.

Gibson, G.A.P. and Fusu, L. 2016. Revision of the Palaearctic species of *Eupelmus* (*Eupelmus*) Dalman (Hymenoptera: Chalcidoidea: Eupelmidae). *Zootaxa,* 4081(1): 001–331.

Iranipour, Sh., Kharrazi Pakdel, A. and Radjabi, Gh. 1998. Introduction of a chalcid species from Eupelmidae for Iran. Proceedings of the 13th Iranian Plant Protection Congress, 23–27 August 1998, Karaj, Iran.Vol. 1-Pests, p.: 5.

Kalina, V. 1981a. The Palaearctic species of the genus *Anastatus* Motschulsky, 1860 (Hymenoptera, Chalcidoidea, Eupelmidae) with descriptions of new species. *Silvaecultura Tropicaet Subtropica, Prague,* 8: 3–25.

Kalina, V. 1981b. The Palaearctic species of the genus *Macroneura* Walker, 1837 (Hymenoptera, Chalcidoidea, Eupelmidae), with descriptions of new species. *Sbornik. Vedeckeho Lesnickeho Ustavu Vysoke Skoly Zemedelske v Praze,* 24: 108–109.

Kalina, V. 1988. Descriptions of new Palearctic species of the genus *Eupelmus* Dalman with a key to species (Hymenoptera, Chalcidoidea, Eupelmidae). *Silvaecultura Tropica et Subtropica,* 12: 1–33.

Lotfalizadeh H. and Hashemi, S.M. 2015. Parasitoids (Hymenoptera: Chalcidoidea) of the seed eater weevil, *Oxystoma ochropus* (Germar) (Coleoptera: Apionidae) in northwestern Iran. *Acta Entomologica Serbica,* 20: 145–150.

Lotfalizadeh, H. and Khalghani, J. 2008. Hymenopterous parasitoids (Hym.: Chalcidoidea) of xylophagus beetles in Iran. *Entomofauna,* 19: 249–264.

Lotfalizadeh, H., Rajabi, M. and Madjdzadeh, S.M. 2012. Parasitoid community of *Diplolepis fructuum* (Rübsaamen) (Hym.: Cynipidae) in Kerman province, with checklist of associated Hymenoptera fauna in Iran. *North-Western Journal of Zoology,* 8 (1): 125–131.

Lotfalizadeh, H., Rasplus J.–Y. and Delvare, G. 2006. Rose gall wasps and their associated fauna (Hymenoptera) in Iran. *Redia,* 139: 73–85.

Mahdavi, M. and Madjdzadeh, S.M. 2013. Contribution to the knowledge of Chalcidoidea (Pteromalidae and Eupelmidae) of Iran. *North-Western Journal of Zoology,* 9(1): 94–98.

Mehrnejad, M.R. 2008. The primary and secondary parasitoids of the Pistachio twig borer moth, *Kermania pistaciella* Amsel (I). *Applied Entomology and Phytopathology,* 76(1): 158.

Mohammadi, R., Lotfalizadeh, H. and Pashaei–Rad, Sh. 2011. First report of two brachypterous species of *Euplemus* (Hym.: Chalcidoidea, Eupelmidae) from Iran. *Applied Entomology and Phytopathology,* 79(2): 273–276.

Medvedev, G.S. 1988. *Key to the insects of European part ofUSSR. Vol 3, Hymenoptera, Part II*. Nauka Publisher Leningrad, 1341 pp.

Mehrnejad, M.R. and Basirat, M. 2009. Parasitoid complex of the pistachio twig borer moth, Kermania pistaciella, in Iran. *Biocontrol Science and Technology,* 19: 499–510.

Noyes, J.S. 1982. Collecting and preserving chalcid wasps (Hymenoptera: Chalcidoidea). *Journal of Natural History,*16: 315–334.

Noyes, J.S. 2015. Universal Chalcidoidea Database. Available from: *http:// www.nhm.ac.uk/entomology/chalcidoids/index.html* (accessed 27 December 2015).

OILB 1971. *Liste d'identification des entomophages* 8. pp.30 OILB, Genève.

Peck, O., Bouček, Z. and Hoffer, A. 1964. Keys to the Chalcidoidea of Czechoslovakia (Insecta: Hymenoptera). *Memoirs of the Entomological Society of Canada,* 34: 1–120.

Sadeghi, S.E., Yarmand, H., Zamani, S.M. Ali, B., Zeinaly, S., Mehrabi, A., Talebi, A.A. and Azizkhani, E. 2009. Insects associated with forest communities and poplar plantations in Iran. pp. 265–283, *In*: Kharazipour, A.R., Schopper, C., Muller, C. & Euring, M. (Eds.), *Review of Forests, Wood Products and Wood Biotechnology of Iran and Germany* – Part III. Universitatsverlag Gottingen, Gottingen.

مرور خانواده Eupelmidae (Hymenoptera: Chalcidoidea) در ایران، به همراه پنج گزارش جدید

حسین لطفعلی زاده[1] و لیلا قدیرزاده[2]

۱ مرکز تحقیقات کشاورزی و منابع طبیعی آذربایجان شرقی، تبریز، ایران
۲ گروه گیاهپزشکی، دانشگاه آزاد اسلامی، شعبه تبریز، تبریز، ایران

* پست الکترونیکی نویسنده مسئول مکاتبه: *hlotfalizadeh@gmail.com*
تاریخ دریافت: ۱۴ خرداد ۱۳۹۵، تاریخ پذیرش: ۵ تیر ۱۳۹۵، تاریخ انتشار: ۵ تیر ۱۳۹۵

چکیده: خانواده Eupelmidae بر اساس نمونه های جمع آوری شده از شمال غرب ایران و اطلاعات منتشر شده قابل دسترس مورد بازبینی قرار گرفت. این خانواده در ایران شامل ۳۱ گونه در دو زیرخانواده (Calosotinae و Eupelminae) و هفت جنس *Anastatus* Motschulsky, 1859 (چهار گونه)، *Arachnophaga* Ashmead, 1896 (یک گونه)، *Brasema* Cameron, 1884 (یک گونه)، *Calosota* Curtis, 1836 (یک گونه)، *Calymmochilus* Masi, 1919 (یک گونه)، *Eupelmus* Dalman, 1820 (۲۲ گونه) و *Eusandalum* Ratzeburg, 1852 (یک گونه) می باشد. جنس *Calymmochilus* و چهار گونه شامل *Calymmochilus dispar* Bouček & Andriescu, 1967، *Eupelmus pini* Taylor, 1927، *E. splendens* Giraud, 1872 و *E. vindex* Erdös, 1955 گزارش های جدید از ایران هستند.

واژگان کلیدی: Calosotinae، Eupelminae، فون، پارازیتویید، ایران.