

Checklists of the Eucharitidae and Ormyridae (Hymenoptera: Chalcidoidea) of Iran

HASSAN GHAHARI¹ & LÜTFIYE GENÇER²

¹Department of Plant Protection, Yadegar- e- Imam Khomeini (RAH) Shahre Rey Branch, Islamic Azad University, Tehran, Iran; e-mail: hghahari@yahoo.com

²Cumhuriyet University, Science Faculty, Department of Biology, 58140, Sivas, Turkey;
e-mail: gencer@cumhuriyet.edu.tr

GHAHARI H. & GENÇER L. 2018: Checklists of the Eucharitidae and Ormyridae (Hymenoptera: Chalcidoidea) of Iran. *Acta Musei Moraviae, Scientiae Biologicae* (Brno) (2017) **102(2):** 145–157. – The fauna of Iranian Eucharitidae and Ormyridae (Hymenoptera: Chalcidoidea) are summarized. Five species of Eucharitidae within two genera, *Eucharis* Latreille and *Stilbula* Spinola, and 13 species of Ormyridae from the genus *Ormyrus* Westwood are recorded for the country.

Key words. Chalcidoidea, *Eucharis*, *Ormyrus*, *Stilbula*, gall wasps, distribution, Iran

Introduction

The Eucharitidae (Hymenoptera: Chalcidoidea) constitute a monophyletic family of solitary parasitoids of ant pupae. Its members are distributed in almost every zoogeographical region in the world but are most abundant in the tropics (HERATY 2002; GADALLAH *et al.* 2014). The family includes 65 genera and 463 species worldwide, classified into four subfamilies: Akapalinae (single genus), Gollumiellinae (2 genera), Oraseminae (13 genera) and Eucharitinae (49 genera) (NOYES 2016, HERATY 2017). Among the 65 genera, only *Eucharis* has been recorded to date from Iran (together with the new record of *Stilbula* herein). A total of 47 species of *Eucharis* and 41 species of *Stilbula* have previously been described (HERATY 2017). Eucharitidae are usually indirect parasitoids of ants that oviposit into plant tissues, after which the active first instar or planidium seeks out the host ant. Sometimes the ants collect the larvae during hatching, or directly after it. Using various behavioural strategies, the planidia are carried to the nest where they first attack the host larva and then develop on the ant pupa (BOUČEK 1956; HERATY 2002; TORRÉNS 2013). *Eucharis* have been reared from *Cataglyphis* Förster, *Formica* Linnaeus and *Messor* Forel (Formicidae) (HERATY 2002, LACHAUD & PÉREZ-LACHAUD 2012).

The family Ormyridae is one of the smallest families of Chalcidoidea, with 147 valid species worldwide, comprised of three genera: *Ormyrus* Westwood (145 species), *Ormyrulus* Bouček (one species) and *Eubeckerella* Narendran (one species) (NOYES 2016). *Ormyrus* Westwood is the largest and the most widespread genus in the family (GENÇER 2014, ZEROVA & SERYOGINA 2015). Most species of *Ormyrus* are parasitoids of gall-makers belonging to the families Agaonidae, Cynipidae, Eurytomidae, Pteromalidae (Hymenoptera), Agromyzidae, Cecidomyiidae, Tephritidae (Diptera), Coleoptera, and

Thysanoptera (Thripidae). The hosts of *Eubeckerella* remain unknown, but *Ormyrus* are parasitoids of a gall midge (Diptera: Cecidomyiidae) (BOUČEK 1986; ZEROVA & SERYOGINA 1998; NARENDRAN 1999; YAO & YANG 2004; NOYES 2016).

The family Eucharitidae is poorly represented in Iran, with only four known species (LOTFALIZADEH 2008; GHAHARI *et al.* 2016; SAMIN & FARZANEH 2016). The fauna of Iranian Ormyridae has been closely studied by a number of authors (GHARALI & ZEROVA 2004; GHAHARI *et al.* 2010, 2016; LOTFALIZADEH *et al.* 2012; SAMIN 2015), and 11 species of *Ormyrus* have been recorded from the country (MORAVVEJ *et al.* 2016). Recently, two additional species were recorded by SAMIN & FARZANEH (2016). Iran forms a large part of the Iranian plateau, and covers an area of 1,623,779 km². It is bordered to the north by the Caucasus Mountains, the Middle Asian natural regions, and the Caspian Sea (27 m below sea level), to the west by the Anatolian and Mesopotamian regions, to the east by the eastern part of the Iranian plateau (Afghanistan and adjacent west Pakistan) and the Baluch-Sindian region, and finally to the south by the Persian Gulf and Gulf of Oman, which are connected by the latter to the Indian Ocean (Fig. 1). Climatologically, Iran is a predominantly arid and semi-arid country, but the northern slopes of the Alburz ranges and the Caspian lowlands receive 800 to 2000 mm annual rainfall, making them the most humid parts of the country. The Dasht-e Kavir and Dasht-e Lut deserts are the driest areas, with an annual precipitation of less than 150 mm. The highlands receive between 250 and 800 mm (ZEHZAD *et al.* 2002).

The aim of this paper is to catalogue all the currently published data on Iranian Eucharitidae and Ormyridae (Hymenoptera: Chalcidoidea), and is a continuation of a series of checklists of Chalcidoidea of Iran (see STOJANOVA & GHAHARI 2009, Eurytomidae and Torymidae; GHAHARI & VAN NOORT 2011, Agaonidae; ABD-RABOU *et al.* 2013, Aphelinidae; GHAHARI *et al.* 2014, Signiphoridae; GHAHARI *et al.* 2015a, Pteromalidae).

Material and methods

Published data on the Eucharitidae and Ormyridae fauna of Iran is summarized herein. The checklist comprises the following: the valid taxon name, published records with provincial distribution or, where this information is not available – “Iran (no locality cited)” is given, synonyms in records, general distribution. Classification, nomenclature and distribution data as suggested by ZEROVA & SERYOGINA (2015) and NOYES (2016) have been followed. The provinces of Iran appear in Fig. 1.

Results

Checklists for the Eucharitidae and Ormyridae species of Iran revealed the presence of five species within two genera, *Eucharis* and *Stilbula* for Eucharitidae, and 13 species of *Ormyrus* for Ormyridae. The list of species below appears alphabetically, with distribution data. One species, *Stilbula cyniformis* (Rossi, 1792) (Eucharitidae) is a new record for the fauna of Iran.

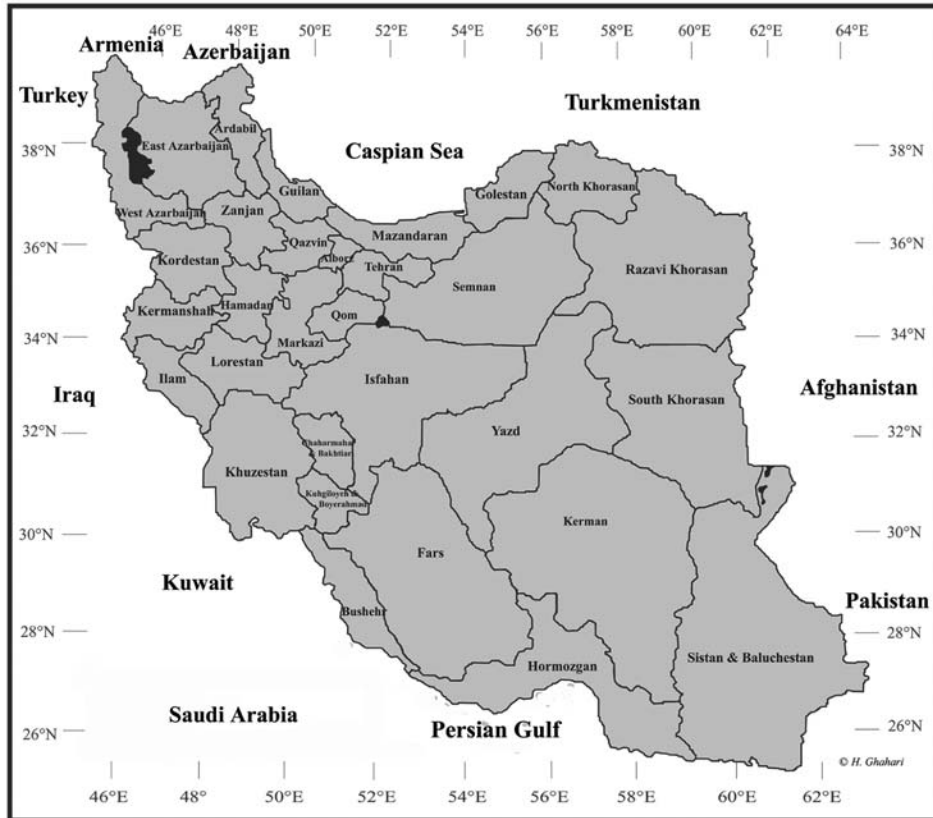


Fig. 1. Map of Iran with boundaries of provinces.

Family Eucharitidae Walker, 1846

Subfamily Eucharitinae Walker, 1846

Genus *Eucharis* Latreille, 1804

***Eucharis adscendens* (Fabricius, 1787)**

Eucharis (Eucharis) adscendens (Fabricius, 1787).

Distribution in Iran. East Azarbaijan (LOTFALIZADEH 2008), Golestan (GHAHARI *et al.* 2016).

General distribution. Austria, Belarus, Bosnia Herzegovina, Croatia, Czech Republic, Germany, Hungary, Italy, Kazakhstan, Lithuania, Moldova, Poland, Romania, Russia, Serbia, Slovakia, Transcaucasus, Turkey, Ukraine, former USSR.

***Eucharis carinifera* Gussakovskiy, 1940**

Eucharis (Eucharis) carinifera Gussakovskiy, 1940.

Distribution in Iran. Golestan (Shahkuh) (NIKOL'SKAYA 1952; HERATY 2017), Iran (no locality cited) (BOUČEK 1977; LOTFALIZADEH 2008; NOYES 2016).

General distribution. Armenia, Iran, Kazakhstan, Russia, Serbia, Transcaucasus, Ukraine, Uzbekistan.

***Eucharis punctata* Förster, 1859**

Eucharis (Psilogastrellus) punctata Förster, 1859.

Distribution in Iran. Gilan (SAMIN & FARZANRH 2016).

General distribution. Algeria, Austria, Bulgaria, Croatia, Egypt, Europe, Macedonia, Tunisia, Turkey, former Yugoslavia.

***Eucharis rugulosa* Gussakovskiy, 1940**

Eucharis (Eucharis) rugulosa Gussakovskiy, 1940.

Distribution in Iran. Tehran (LOTFALIZADEH 2008).

General distribution. Russia, Ukraine.

Genus *Stilbula* Spinola, 1811

***Stilbula cyniformis* (Rossi, 1792)**

Material examined. Mazandaran province, Savadkooh, 36°05'N 52°55'E, 2♀, 14.vi.2011, Malaise trap. **New record for the fauna of Iran.**

General distribution. Austria, Azerbaijan, Bosnia Herzegovina, Caucasus, China, Croatia, Czech Republic, Europe, France, Germany, Hungary, Italy, Japan, Kazakhstan, Korea, Macedonia, Moldova, Romania, Russia, Slovakia, Turkey, Ukraine, USA, former Yugoslavia.

Comments. The genus *Stilbula* is here recorded for the first time for Iran. *Stilbula cyniformis* is associated with certain species of Formicidae and Sphecidae (Hymenoptera) (NOYES 2016).

Family Ormyridae Förster, 1856

Genus *Ormyrus* Westwood, 1832

***Ormyrus bingoeliensis* Doğanlar, 1991**

Distribution in Iran. Lorestan (LOTFALIZADEH *et al.* 2012).

General distribution. Iran, Turkey.

Comments. Association with *Chilaspis israeli* Sternlicht (Hymenoptera: Cynipidae) on *Quercus brantii* (LOTFALIZADEH *et al.* 2012).

***Ormyrus bucharicus* Zerova, 1985**

Distribution in Iran. Qazvin (LOTFALIZADEH *et al.* 2012).

General distribution. Iran, Uzbekistan.

***Ormyrus cupreus* Askew, 1998**

Distribution in Iran. East Azarbaijan (LOTFALIZADEH *et al.* 2012).

General distribution. Europe, Iran, Spain.

***Ormyrus diffinis* (Fonscolombe, 1832)**

Distribution in Iran. East Azarbaijan (LOTFALIZADEH *et al.* 2012), Golestan, Mazandaran, Northern Khorasan (GHAHARI *et al.* 2016), Khuzestan (GHAHARI *et al.* 2010).

General distribution. Bulgaria, Caucasus, Croatia, Czech Republic, France, Germany, Hungary, Iran, Israel, Kazakhstan, Moldova, Montenegro, Russia, Serbia, Slovakia, Spain, Tajikistan, Turkey, Turkmenistan, Ukraine, former Yugoslavia.

***Ormyrus discolor* Zerova, 2005**

Distribution in Iran. Lorestan, Razavi Khorasan (LOTFALIZADEH *et al.* 2012).

General distribution. Iran, Israel.

***Ormyrus graciosus* (Förster, 1860)**

Distribution in Iran. East Azarbaijan (GHAHARI *et al.* 2010), Golestan, West Azarbaijan (SAMIN 2015), Ilam (GHARALI & ZEROVA 2004; LOTFALIZADEH *et al.* 2012; LOTFALIZADEH & GHARALI 2014).

General distribution. Armenia, Austria, Bulgaria, Caucasus, Czech Republic, Finland, France, Georgia, Germany, Hungary, Iran, Kazakhstan, Netherlands, Poland, Russia, Serbia, Slovakia, Spain, Sweden, Switzerland, Turkey, Turkmenistan, Ukraine, UK, Uzbekistan.

Comments. Association with safflower cynipid gall wasp, *Isocolus tinctorius* Melika et Gharali (Hymenoptera: Cynipidae) on wild safflower, *Carthamus oxycantha* (LOTFALIZADEH & GHARALI 2014).

***Ormyrus longicornis* Bouček, 1969**

Distribution in Iran. Guilan (SAMIN & FARZANEH 2016, on *Quercus brantii*).

General distribution. Azerbaijan, Bulgaria, Europe, Georgia, Russia (Dagestan), Turkey.

***Ormyrus nitidulus* (Fabricius, 1804)**

Distribution in Iran. East Azarbaijan, Lorestan (AZIZKHANI *et al.* 2005, 2008; LOTFALIZADEH *et al.* 2012), Fars, Khuzestan (GOLESTANEH *et al.* 2008), Ilam (NAZEMI-RAFIE *et al.* 2007), Kermanshah (NAZEMI-RAFIE *et al.* 2007; AZIZKHANI *et al.* 2008; LOTFALIZADEH *et al.* 2012), Kordestan (NAZEMI-RAFIE *et al.* 2007; LOTFALIZADEH *et al.* 2012), West Azarbaijan (ZARGARAN *et al.* 2008; LOTFALIZADEH *et al.* 2012), Iran (no locality cited) (AZIZKHANI *et al.* 2005; SADEGHI *et al.* 2009; TAVAKOLI *et al.* 2010).

General distribution. Algeria, Andorra, Austria, Azerbaijan, Belgium, Bosnia Herzegovina, Bulgaria, Caucasus, Croatia, Czech Republic, Denmark, France, Georgia, Germany, Greece, Hungary, Iran, Italy, Jordan, Netherlands, North Africa, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, UK, USA, former Yugoslavia.

Comments. Association with gall wasps (Hymenoptera: Cynipidae): *Andricus askewi* Melika et Stone on *Quercus infectoria*, *Andricus caputmedusae* (Hartig) on *Q. infectoria*, *Andricus coriarius* (Hartig) on *Q. infectoria* and *Quercus petraea*, *Andricus curtisii* (Muller) on *Q. infectoria*, *Andricus lucidus* (Hartig) on *Q. infectoria*, *Andricus megalucidus* Melika, Stone, Sadeghi et Pujade-Villar on *Q. infectoria*, *Andricus tomentosus* (Trotter) on *Q. infectoria*, *Andricus truncicolus* (Giraud) on *Q. infectoria*, *Cynips quercusfolii* (Linnaeus) on *Q. infectoria* and *Q. macranthera* (NAZEMI-RAFIE *et al.* 2007; LOTFALIZADEH *et al.* 2012), *Andricus ceconii* Kieffer, 1901 on *Q. brantii*, *Andricus moreae* (Graeffe 1905) on *Q. infectoria*, *Andricus multiplicatus* Giraud on *Q. brantii*, *Andricus stonei* Melika, Tavakoli et Sadeghi on *Q. infectoria* (NAZEMI-RAFIE *et al.* 2007), *Andricus galeatus* (Giraud), *Andricus mayri* (Wachtl), *Andricus polycerus* (Giraud), *Andricus pseudoaries* Melika, Stone et Sadeghi on *Quercus petraea* and *Q. macranthera*, *Andricus quercustozae*, *Cynips divisa* Hartig, *Cynips quercus* (Fourcroy) (Hymenoptera: Cynipidae) (LOTFALIZADEH *et al.* 2012), *Andricus sternlichti* (Bellido, Pujade-Villar et Melika) on *Q. infectoria* (NAZEMI-RAFIE *et al.* 2007; ZARGARAN *et al.* 2008; LOTFALIZADEH *et al.* 2012), *Aphelonyx persica* Melika, Stone, Sadeghi et Pujade-Villar on *Q. brantii* (AZIZKHANI 2006; NAZEMI-RAFIE *et al.* 2007; LOTFALIZADEH *et al.* 2012).

***Ormyrus orientalis* Walker, 1871**

Distribution in Iran. Chaharmahal & Bakhtiari, East Azarbaijan, Isfahan (LOTFALIZADEH *et al.* 2012; LOTFALIZADEH & GHARALI 2014), Kordestan (MODARRES AWAL 1997 as *Ormyrus hungaricus* Erdős, 1946), Kuhgiluyeh & Boyerahmad (SAEIDI 2013, 2015), Mazandaran (SAMIN 2015), Qazvin (LOTFALIZADEH *et al.* 2012), Razavi

Khorasan (GHAHARI *et al.* 2010; LOTFALIZADEH *et al.* 2012; SAMIN 2015), Tehran (MOVAHEDI-FAZEL *et al.* 1998), Iran (no locality cited) (OILB 1971; BOUČEK 1977; KHATIMA & REZA 2015).

General distribution. Afghanistan, Azerbaijan, Belarus, Bulgaria, Caucasus, Croatia, Czech Republic, Dominican Republic, France, Georgia, Germany, Greece, Hungary, India, Iran, Iraq, Italy, Moldova, Montenegro, Pakistan, Russia, Serbia, Slovakia, Spain, Sri Lanka, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan.

Comments. Association with safflower fruit fly, *Acanthiophilus helianthi* (Rossi) (Diptera: Tephritidae) on safflower, *Carthamus oxycantha* (MODARRES AWAL 1997 as *O. hungaricus*; LOTFALIZADEH *et al.* 2012; LOTFALIZADEH & GHARALI 2014), and *Carthamus tinctorius* (SAEIDI 2013, 2015; KHATIMA & REZA 2015), *Phytomyza orobanchiae* Kaltenbach (Diptera: Agromyzidae) (MOVAHEDI-FAZEL *et al.* 1998).

***Ormyrus pallens* Lotfalizadeh et Askew, 2012**

Distribution in Iran. Kermanshah, Lorestan (LOTFALIZADEH *et al.* 2012).

General distribution. Endemic to Iran.

Comments. Association with *Neuroterus lanuginosus* Giraud and *Pseudoneuroterus macropterus* (Hartig) (Hymenoptera: Cynipidae) on *Quercus brantii* (LOTFALIZADEH *et al.* 2012).

***Ormyrus pomaceus* (Geoffroy, 1785)**

Distribution in Iran. East Azarbaijan (GHAHARI *et al.* 2010 as *Ormyrus punctiger* Westwood, 1832; LOTFALIZADEH *et al.* 2012), Fars (GOLESTANEH *et al.* 2008; LOTFALIZADEH *et al.* 2012), Kermanshah (NAZEMI-RAFIE *et al.* 2007; LOTFALIZADEH *et al.* 2012), Khuzestan (GOLESTANEH *et al.* 2008), Kordestan (DAVATCHI & CHODJAI 1969, and MODARRES AWAL 1997 as *O. punctiger*; NAZEMI-RAFIE *et al.* 2007; LOTFALIZADEH *et al.* 2012), Lorestan (AZIZKHANI *et al.* 2008), Mazandaran (LOTFALIZADEH *et al.* 2012), West Azarbaijan (ZARGARAN *et al.* 2008; LOTFALIZADEH *et al.* 2012), Zanjan (MODARRES AWAL 1997 as *O. punctiger*), Iran (no locality cited) (OILB 1971; AZIZKHANI *et al.* 2005; RIZZO & ASKEW 2009; SADEGHI *et al.* 2009; TAVAKOLI *et al.* 2010).

General distribution. Andorra, Austria, Bulgaria, Caucasus, China, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iran, Ireland (both Eire and Ulster), Italy, Japan, Jordan, Moldova, Montenegro, Netherlands, Poland, Romania, Russia, Serbia, Slovakia, South Korea, Spain, Sweden, Turkey, Ukraine, UK.

Comments. Association with gall wasps (Hymenoptera: Cynipidae): *Andricus askewi* Melika et Stone on *Q. infectoria* (NAZEMI-RAFIE *et al.* 2007; ZARGARAN *et al.* 2008), *Andricus caputmedusae* (Hartig) on *Q. infectoria*, *Andricus moreae* (Graeffe 1905) on *Q. infectoria*, *Aphelonyx persica* Melika, Stone, Sadeghi et Pujade-Villar on *Q. brantii*, *Andricus stonei* Melika, Tavakoli et Sadeghi on *Q. infectoria*, *Andricus tomentosus*

(Trotter) on *Q. infectoria*, *Andricus truncicolus* (Giraud) on *Q. infectoria*, *Dryocosmus miko*i Melika, Tavakoli, Stone et Azizkhani on *Q. brantii* (NAZEMI-RAFIE *et al.* 2007), *Andricus ceconii* Kieffer, 1901 on *Q. brantii* (AZIZKHANI 2006; NAZEMI-RAFIE *et al.* 2007), *Andricus coriarius* (Hartig) on *Q. petraea* and *Q. infectoria*, *Andricus lucidus* (Hartig) *Q. infectoria*, *Andricus polycerus* (Giraud) on *Q. infectoria*, *Andricus pseudoaries* Melika, Stone et Sadeghi 2008 on *Q. macranthera* and *Q. infectoria*, *Andricus sternlichti* (Bellido, Pujade-Villar et Melika) on *Q. infectoria* (NAZEMI-RAFIE *et al.* 2007; LOTFALIZADEH *et al.* 2012), *Andricus curator* Hartig on *Quercus petraea*, *Andricus mayri* (Wachtl), *Andricus multiplicatus* Giraud on *Q. brantii*, *Biorhiza pallida* (Olivier), *Cynips cornifex* Hartig, *Cynips quercus* (Fourcroy) on *Quercus macranthera*, *Neuroterus lanuginosus* Giraud on *Q. brantii*, *Neuroterus quercusbaccarum* (Linnaeus) on *Quercus petraea*, *Pseudoneuroterus macropterus* (Hartig) on *Quercus castaneifolii* (LOTFALIZADEH *et al.* 2012), *Andricus grossulariae* Giraud on *Quercus brantii* (AZIZKHANI 2006; NAZEMI-RAFIE *et al.* 2007; ZARGARAN *et al.* 2008; LOTFALIZADEH *et al.* 2012), *Andricus megalucidus* Melika, Stone, Sadeghi et Pujade-Villar on *Q. infectoria* (NAZEMI-RAFIE *et al.* 2007; ZARGARAN *et al.* 2008; LOTFALIZADEH *et al.* 2012), *Chilaspis israeli* Sternlicht on *Q. brantii* (AZIZKHANI 2006; LOTFALIZADEH *et al.* 2012), *Neuroterus lenticularis* (Olivier) on *Quercus infectoria* (DAVATCHI & CHODJAI 1969; MODARRES AWAL 1997 as *O. punctiger*), *Neuroterus saliens* (Kollar) on *Q. brantii* (AZIZKHANI 2006; ZARGARAN *et al.* 2008; LOTFALIZADEH *et al.* 2012).

Note. *O. pomaceus* is a smaller insect than the preceding species; it has a more diverse range of host oak galls in which it may attack inquiline *Synergus* and other chalcidoid parasitoids, in addition to the gall-inducers (RIZZO & ASKEW 2009).

***Ormyrus rufimanus* Mayr, 1904**

Distribution in Iran. Golestan (SAMIN & FARZANEH 2016).

General distribution. Austria, Bulgaria, China, France, Germany, Hungary, Poland, Romania, Russia, Spain, Sweden, Ukraine, United Arab Emirates.

Comments. Association with *Dryocosmus* sp. (Hymenoptera: Cynipidae) on *Quercus* sp. (SAMIN & FARZANEH 2016).

***Ormyrus wachtli* Mayr, 1904**

Distribution in Iran. East Azarbaijan (LOTFALIZADEH *et al.* 2012).

General distribution. Austria, Bulgaria, Croatia, Czech Republic, France, Hungary, Iran, Italy, Kazakhstan, Moldova, Romania, Russia, Serbia, Slovakia, Spain, Sweden, Turkey, Ukraine, former Yugoslavia.

Iran Eucharitidae and Ormyridae (Hymenoptera)

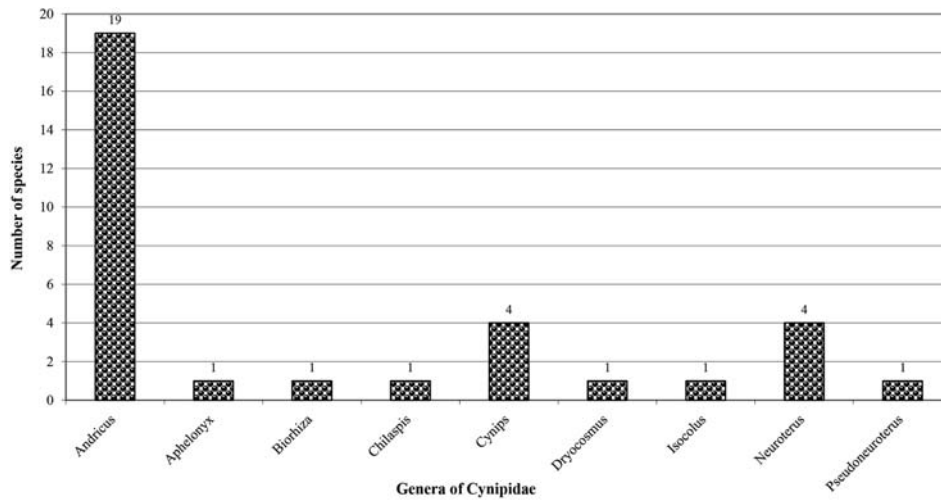


Fig. 2. Number of reported cynipid species as hosts of Iranian Ormyridae.

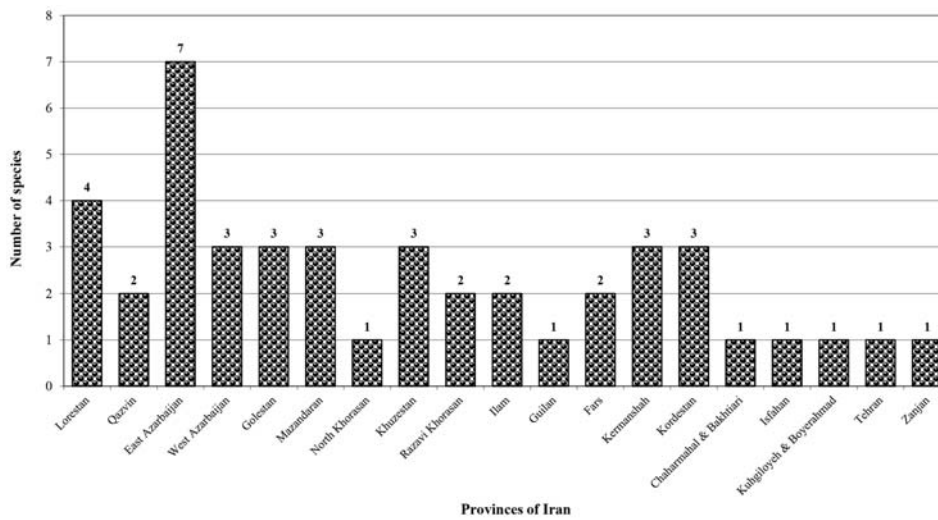


Fig. 3. Number of reported species of Iranian Ormyridae by province.

Discussion and conclusion

Five Eucharitidae species are known from Iran, although considering the various geographical regions and the climates range in the country, and also the species diversity of Iranian Formicidae (PAKNIA *et al.* 2008; GHAHARI *et al.* 2009, 2015b; GHAHARI & COLLINGWOOD 2011, 2013), it may be assumed that more remain to be discovered. It should be noted that the members of Eucharitidae, together with Aphelinidae, Encyrtidae and Eulophidae, are the most important biological control agents of ants (HERATY 2002).

Thirteen species of Ormyridae are known from Iran. The fauna of Turkey is quite similar to that of Iran, with a total of 13 species, of which eight are distributed in both countries; in addition, Azerbaijan and Turkmenistan share three species, and all other neighbouring countries (Afghanistan, Armenia, Iraq and Pakistan) share only one species. In addition to the eight shared species, the other five species in Turkey are: *Ormyrus ardahanensis* (Doğanlar), *O. kazovaensis* (Doğanlar), *O. salmanticus* Nieves-Aldrey; *O. tschami* (Doğanlar) and *O. yeschilirmaka* (Doğanlar) (GENÇER 2014). One species, *Ormyrus pallens* Lotfalizadeh et Askew, is endemic to Iran. Since the species diversity of ormyrids has by no means been studied comprehensively throughout Iran, further faunistic surveys are required. Further, studies of their taxonomy, biology, host association and role in forest ecosystems are also necessary.

Among the 13 ormyrid species in Iran, the host-associations of two species, *Ormyrus nitidulus* and *O. pomaceus* have been studied exhaustively as the parasitoids of various gall wasps (Cynipidae). A total of 33 host species of Cynipidae have been recorded for Iranian Ormyridae, of which 19 species are related to the genus *Andricus*, 14 species to other Cynipidae genera (Fig. 2), one species to Tephritidae (*Acanthiophilus helianthi* (Rossi)) (Diptera), and one species to Agromyzidae (*Phytomyza orobanchiae* Kaltenbach) (Diptera).

Systematic collection has taken place in only 19 of the 31 Iranian provinces. Among them, East Azarbaijan, with seven recorded species, has the highest diversity, followed by Lorestan province with four species (Fig. 3). These results are biased towards the provinces in which the majority of sampling has been done. Most species have been recorded from north-western parts of Iran (East Azarbaijan and West Azarbaijan provinces: 7+3 records, respectively); it may be assumed that there is a considerable diversity of species in western and southern areas (Chaharmahal & Bakhtiari, Fars, Ilam, Kermanshah, Kordestan, Kuhgiluyeh & Boyerahmad and Lorestan provinces) because of high diversity of oak trees in these regions. The Zagros mountain range (total length of 1,500 km) is located in these provinces; it begins in north-western Iran, roughly corresponding to Iran's western border, and spans the whole length of the western and south-western Iranian plateau, ending at Bushehr province. The Zagros Mountains contain several ecosystems. Prominent among them are forest and forest steppe areas with a semi-arid climate. It is therefore assumed that a number of other species remain to be discovered by faunistic samplings in the western and south-western areas of Iran.

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