

Some new data and corrections on Iranian encyrtid wasps (Hymenoptera: Chalcidoidea, Encyrtidae) fauna

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Abstract. Thirty-six species of encyrtids were examined. Five new records of genera and seven new records of species were added to the Iranian fauna of Encyrtidae. New distribution records of 13 species were added to newly published checklist of Iranian fauna. Five misidentifications were corrected. The study increases the encyrtids of Iran to 102. This research presents extended distribution of 13 species in Iran.

Key Words: Encyrtidae, fauna, new records, parasitoid, misidentification, Iran.

Introduction

The Encyrtidae (Hym.: Chalcidoidea) belong to subfamilies Encyrtinae and Tetracneminae with approximately 4000 nominal species in 483 genera (Noyes 2010). Encyrtids live in a great range of biological diversities. Most encyrtids are primary or secondary parasitoids. They attack the eggs, larvae or pupae of various arthropod groups such as Diptera, Coleoptera, Hemiptera, Hymenoptera, Lepidoptera, Neuroptera, Orthoptera and also Acarina (Ferrière 1953). Within these wide range of hosts, these wasps are the most important biological agents in the classic biological control programmes. Therefore, a number of encyrtids has been used successfully for control of mealybugs pests (Pseudococcidae) and many soft scale (Coccidae) (Noyes 1985). Spite the very different climates in Iran (from hot and dry to cool and wet), the members of these biological control agents need more attention. In addition, there are many species that were identified erroneously or cited incorrectly for this region. Therefore, the aims of the present work are as follows: Providing additional information to the family based on the recent publications and also via examining of some recent collections of encyrtids from Iran and amending some previously published misidentifications.

During final preparation of an updated checklist of encyrtids of Iran I received an article that covered part of my prepared manuscript, therefore I exclude checklist of this family. In this recent article, Fallahzadeh and Japoshvili (2010) summarized all of the published references about Iranian Encyrtidae presenting a checklist of encyrtids of Iran with 93 species in 32 genera. Recently, a new species (*Metaphycus*

davoodii Lotfalizadeh) was described from Iran (Lotfalizadeh 2010).

Materials and Methods

Approximately 250 mounted Iranian specimens collected were examined during this study. These materials were collected by different methods such as sweeping, rearing of hosts and Malaise trapping. Examination of these specimens including 36 species leads me to add some new records of genera and species for Iranian fauna and correct some misidentifications. Some of these new records were presented in the recently published checklist (Fallahzadeh and Japoshvili 2010).

Material examined of each species is presented as follows: Province, city, biological information/association, date of collection, name of collector, number of examined specimens.

All of the species were listed alphabetically in two subfamilies. Under "Note" all of data concerning each species were presented such as biological data of Iranian collection. Also, "Iranian distribution" of each species was presented.

Results and Discussion

I. Subfamily Encyrtinae

I.1. *Blastothrix brittanica* Girault, 1917

Material examined: Tehran province, ex *Eulecanium tiliae* (Hem.: Coccidae) on Quince, summer.2003, (A. Davoodi), 7♀♀ and 8♂♂.

Iranian Distribution. Isfahan province (Dastghybeheshhti et al. 1988).

Note. It was recorded as *Blastothrix sericea* (Dalman) on *Eulecanium coryli* (L.), *E. tiliae* (L.), *Sphaerolecanium prunastri* (Fonscolombe) (Davoodi 2004) but my recent re-examination of the materials shows it was misidenti-

fied (confirmed by J.S. Noyes). Occurrence of *B. britannica* in Iran was reported on *Diaspidiotus prunorum* (Laing) (Dastghyb Beheshti et al. 1988).

I.2. *Blastothrix ilicicola* Mercet, 1921

Material examined: Lorestan province, Borujerd, Khayan, ex Coccidae on Plum, v-vi.2007, (S. Golpayegani), 6♀♀.

Iranian Distribution. Chaharmahal-Bakhtyari province: Shahr-e Kord (Ebrahimi 1993).

Note. Ebrahimi (1993) has reported *B. ilicicola* from western part of Iran and my examined specimens have been reared recently in Lorestan province. It is known as parasitoid of Coccidae and Kermesidae on *Quercus* spp. (Fagaceae) and *Prunus domestica* (Rosaceae) (Noyes 2010).

I.3. *Cheiloneurus boldyrevi* Trjapitzin and Agekyan, 1978

Material examined: Azarbaijan-e Sharghi province, Marand, Zonuz, 15.viii.2003, ex hoverfly pupae, (H. Lotfalizadeh), 3♀ and 1♂.

Iranian Distribution. North Khorasan province: Bojnord (Malkeshi et al. 2000).

Note. This hoverfly parasitoid was reared from pupae of *Paragus* sp. (Dip.: Syrphidae) on Rosaceae in the northwestern Iran. It was previously reported by Malkeshi et al. (2000) of an unknown predaceous hoverflies in apple orchard from the northeast of Iran. Fallahzadeh and Japoshvili (2010) list five species of this genus in the checklist but not *C. boldyrevi*.

I.4. *Coelopencyrtus callidii* (Jansson, 1957)

Material examined: Azarbaijan-e Sharghi province, Marand, 10.ix.2003, on dead wood, (H. Lotfalizadeh), 1♀.

Iranian Distribution. New record for Iran.

Note. *C. callidii* is parasitic on cerambycids (Col.) and apids (Hym.) (Noyes 2010) and studied specimen was collected on an infected dead wood by scolytid and bostrichid beetles (Col.) in the northwest of Iran. This genus has not yet been recorded in Iran.

I.5. *Copidosoma floridanum* (Ashmead, 1900)

Material examined: Azarbaijan-e Sharghi province, Marand, 10.ix.2003, on dead wood, (H. Lotfalizadeh), 2♂.

Iranian Distribution. New record for Iran.

Note. *Copidosoma* Ratzeburg with 187 nominal species is a specious taxon with two species in Iranian fauna [*C. pistacinellae* Hoffer and *C. varicorne* (Nees)]. The studied materials were collected on dead wood by xylophagous beetles (Col.: Scolytidae). It may be associated with scolytids or its parasitoids (such as Braconidae).

I.6. *Discodes coccophagus* (Ratzeburg, 1848)

Material examined: Lorestan province, Borujerd, Karkikhan, v-vi.2007, ex Coccidae on Plum and Peach, (S. Golpayegani), 5♀♀ and 1♂.

Iranian Distribution. Khorasan-e Razavi province (Talebi et al. 2009) and Fars province: Mian-Jangale (Fallahzadeh and Japoshvili 2010).

Note. Talebi et al. (2009) and Fallahzadeh and Japoshvili (2010) reported this species from several sites in the northeast and south of Iran and this research extends its distribution to east of Iran. *D. coccophagus* is parasitoid of *Sphaerolectanium prunastri* (Hem.: Coccidae) on Rosaceae (Trjapitzin 1989, Talebi et al. 2009) and *Cerapterocerus mirabilis* Westwood (Hym.: Encyrtidae).

I.7. *Encyrtus aurantii* (Geoffroy, 1785)

Material examined: (1) Tehran province, ex *Coccus hesperidum* (Hem.: Coccidae) on oleander, summer.2003, (A. Davoodi), 2♀♀. (2) Lorestan province, Brujerd, Gheshlagh, ex Coccidae on apple, v-vi.2007, (S. Golpayegani), 1♀ and 1♂.

Iranian Distribution. Iran (Trjapitzin and Myartseva 2004), Guilan and Tehran provinces (Davoodi 2004), Mazandaran and Guilan provinces (Farahbakhsh 1961) and Chaharmahal-e Bakhtiyari province (Esfandiari et al. 2005).

Note. Three species from the genus *Encyrtus* have been recorded from Iran (Fallahzadeh and Japoshvili 2010). *E. aurantii* as a cosmopolitan species lives parasitically on hemipterous families (Coccidae, Diaspididae, Eriococcidae and Pseudococcidae) on different host plants. It was reported as *Encyrtus lecaniorum* (Mayr) (synonymus of *E. aurantii*) on several scale insect, *Coccus hesperidum*, *Eulecanium coryli*, *E. tiliae*, *S. prunastri* from Iran (Farahbakhsh 1961, Davoodi 2004, Esfandiari et al. 2005) and this research shows it occurs in the west of Iran.

I.8. *Epitetracnemus intersectus* (Fonscolombe, 1832)

Material examined: Lorestan province, Brujerd, Khayan, v-vi.2007, ex Dispididae on Apple, (S. Golpayegani), 1♀.

Iranian Distribution. Tehran and Kerman provinces (Chojai 1989, Yazdani and Rajabi 1993).

Note. It is a parasitoid of *Lepidosaphes ulmi* (L.) (Hem.: Diaspididae) in the west of Iran although the families Acleridae, Asterolecaniidae, Coccidae and Diaspididae, are known as hosts of this species.

I.9. *Eupoecilopoda perpunctata* (Masi, 1942)

Material examined: Ardebil province, Moghan, Pars-Abad, vii.2000, ex Coccinellidae, (H. Lotfalizadeh), 1♀.

Iranian Distribution. Kerman province (Yazdani and Mehrnejad 1993).

Note. This specimen was reported as parasitic on lacewings (Neu.: Chrysopidae) (Trjapitzin 1978, 1989) but for the first time it was reared on pupae of leady beetle, *Scymnus* sp. (Col.: Coccinellidae) which is predator of cotton aphid, *Aphis gossypii* Glover on egg plant. This biological association is new.

I.10. *Habrolepis dalmanni* (Westwood, 1837)

Material examined: Markazi province, Arak, Khomein, v-vi.2007, ex *Didesmococcus* (Hem.: Coccidae) on Almond, (S. Golpayegani), 1 ♀.

Iranian Distribution. Kerman province (Yazdani and Rajabi 1993).

Note. It has been recorded on several hemipterous families Asterolecaniidae, Diaspididae, Pseudococcidae and lepidopterous family of Lyonetiidae and Yazdani and Rajabi (1993) reported this species on *Melanaspis inopinata* (Leonardi) (Hem.: Diaspididae), from central part of Iran and this report extends its distribution to the west of Iran.

I.11. *Heterococcidoxenus schlehtendali* (Mayr, 1876)

Material examined: Ilam province, Shirvan-Chardavol, Malayis tarp, vii.2003, (B. Gharali), 1 ♀.

Iranian Distribution. New record for Iran.

Note. The genus *Heterococcidoxenus* Ishii was not reported in Iran. Two species were known in this genus that Bouček (1977) mentioned *H. schlehtendali* as a parasitoid of Scolytidae in Germany and UK.

I.12. *Homalotylus quaylei* Timberlake, 1919

Material examined: Fars province, Shiraz, ex Coccinellidae, v.1998, (H. Lotfalizadeh), 4 ♀♀.

Iranian Distribution. Iran (OILB 1971), Khuzestan province (Novin et al. 2000).

Note. This common parasitoid was reported from southwest of Iran on *Nipaeococcus viridis* (Newstead) on citrus (Novin et al. 2000). My examined collection was reared on *Nephus bipunctatus* (Kugelann) and *Hyperaspis polita* Weise and was reported as *Homalotylus ephippium* (Ruschka) (Xu and Lotfalizadeh 2000). It has been mentioned as parasitic on different genera of ladybirds such as, *Hyperaspis*, *Nephus*, *Pharoscygnus*, *Scymnus*, and *Sidis* (Noyes 2010).

I.13. *Homalotylus turkmenicus* Myartseva, 1981

Material examined: Fars province, Shiraz, ex ladybirds, v.1998, (H. Lotfalizadeh), 4 ♀♀.

Iranian Distribution. Iran (Tryapitzin 1989, Ameri et al. 2007), Fars province: Jahrom (Fallahzadeh ad Japoshvili 2010).

Note. It was reported as *Homalotylus ephippium* (Xu and Lotfalizadeh 2000) but my recent re-examination showed it is *H. turkmenicus* (confirmed by J.S. Noyes).

This is a gregarious parasitoid of *Hyperaspis polita* Weise and solitary on *Nephus bipunctatus* (Kugelann) (Lotfalizadeh and Ahmadi 2000).

I.14. *Mayridia pulchra* Mercet, 1921

Material examined: Azarbaijan-e Sharghi province, Marand, 10.ix.2003, swept on grass, (H. Lotfalizadeh), 1 ♀.

Iranian Distribution. New record for Iran.

Note. This genus had not been reported from Iran. *Mayridia pulchra* is associated with Asteraceae and Poaceae.

I.15. *Microterys ericeri* Ishii, 1923

Material examined: Tehran province, ex *Coccus hesperidium* on Mulberry, summer.2003, (A. Davoodi), 1 ♀.

Iranian Distribution. New record for Iran.

Note. Davoodi (2004) reported this species as *Microterys nietneri* on *Coccus hesperidium* (Hem.: Coccidae) from Iran but her loaded materials sent to me belonged to two different species *Microterys nietneri* and *Microterys ericeri*, that were all reported as *Microterys ericeri*. This identification was confirmed by J.S. Noyes.

I.16. *Microterys hortulanus* Erdős, 1956

Material examined: (1) Tehran province, ex Coccidae (Hemiptera) on prune, summer.2003, (A. Davoodi), 5 ♀ and 3 ♂. (2) Markazi province, Arak, Marzijaran, v-vi.2007, ex Coccidae on Almond, (S. Golpayegani), 2 ♀♀.

Iranian Distribution. East Azarbaijan and Tehran provinces (Davoodi 2004).

Note. It is a parasitoid of soft scales *Eulecanium coryli*, *S. prunastri* and *D. unifasciatus* (Archangelskaya) (Hem.: Coccidae) on Rosaceae that my examined specimens have been reared on Almond (*Amigdalus comminus*).

I.17. *Ooencyrtus cinctus* Prinsloo, 1987

Material examined: Tehran province, Azadi park, Eshragh park, Shahr park and Velenjak, 7.vi- 20 viii.2005, ex *Bucculatrix ulmella*, (V. Baniameri and A. Mohammadi-pour), 10 ♀♀.

Iranian Distribution. Tehran province (Baniameri and A. Mohammadi-pour 2007).

Note. *O. cinctus* is an endoparasitoid which adults parasitize the larval and pupal stages of *Bucculatrix ulmella* Zeller (Lep.: Bucculatricidae) on elm tree (Ulmaceae). It is known just from South Africa (Prinsloo 1987) as parasitoid of an unknown moth of the genus *Bucculatrix*. Another species of this genus [*Ooencyrtus bucculatrix* (Howard, 1883)] that is parasitoid of Cecidomyiidae (Dip.), Coccidae (Hem.) and Bucculatricidae (Lep.) and known from the Nearctic region (Noyes 2010) may be a synonym of *O. cinctus*, but it needs to be confirmed examining its type materials.

I.18. *Ooencyrtus fecundus* Ferrière & Voegelé, 1961

Material examined: Azarbaijan-e Sharghi province, Bonab-e Jadid, ex *Eurygaster integriceps* (Het.: Scutelleridae), summer.2008, (Z. Nozad-e Bonab), 10 ♀♀.

Iranian Distribution. New record for Iran.

Note. The genus *Ooencyrtus* has five species in Iran (Fallahzadeh and Japoshvili 2010). *Ooencyrtus fecundus* is a common egg parasitoid of Scutelleridae and Pentatomidae (Heteroptera), especially a well known economic pest of wheat (Sunn pest, *Eurygaster integriceps* Puton).

I.19. *Prionomitus mitratus* (Dalman, 1820)

Material examined: Ilam province, Shirvan-Chardaval, Malayis tarp, vii.2003, (B. Gharali), 1♀.

Iranian Distribution. New record for Iran.

Note. The genus *Prionomitus* Mayr is a small group with nine nominal species in the world, but occurrence of the genus and species did not record from Iran.

I.20. *Prochiloneurus bolivari* Mercet, 1919

Material examined: Markazi province, Arak, v-vi.2007, ex Coccidae on Almond, (S. Golpayegani), 1♀.

Iranian Distribution. Fars province: Jahrom (Fallahzadeh and Japoshvili 2010).

Note. This species is a parasitoid of some encyrtids and aphelinids on Coccidea, Eriococcidae and Pseudococcidae. Fallahzadeh and Japoshvili (2010) reared it on *P. ficus* (Hem.: Pseudococcidae) on grape.

I.21. *Psyllaephagus pistaciae* Ferrière, 1961

Material examined: Azarbaijan-e Sharghi province, Tabriz, Near Airport, ex pistachio psylla, 11♂♂.

Iranian Distribution. Kerman province (Ferrière 1961, Herting 1972, Trjapitzin 1989, Mehrnejad and Emami 2005).

Note. Fallahzadeh and Japoshvili (2010) listed five species of *Psyllaephagus* from Iran. Within these species *P. pistaciae* is a solitary endoparasitoid of pistachio psylla *Agonoscaena pistaciae* Burckhardt and Lauterer and *Agonoscaena targionii* (Lichtenstein) (Hem.: Psyllidae) in the pistachio-growing areas of Iran (Mehrnejad and Copland 2006). Recently I received specimens reared on the same host collected from northwest of Iran.

I.22. *Syrphophagus aphidivorus* (Mayr, 1876)

Material examined: (1) Ardebil province, Moghan, Pars-Abad, vi.2002, ex *Aphis gossypii* Glover (Hem.: Aphidae) on Cotton, (H. Lotfalizadeh), 6 ♀♀ and 1♂. (2) Khorasan Razavi, Mashhad, vi.2009, ex *Aphis fabae* (A. Hosseini), 15 ♀♀.

Iranian Distribution. Iran (Japoshvili and Noyes 2005): Ardebil province, Pars-Abad (Lotfalizadeh 2002),

Kerman province: Rafsanjan (Mehrnejad and Emami 2005), Tehran province (Rakhshani et al. 2004).

Note. It was reared on *Aphis gossypii* Glover (Hem.: Aphididae) in the northwest of Iran (Lotfalizadeh 2002) and walnut aphid, *Chromaphis juglandicola* (Kaltenbach) (Rakhshani et al. 2004). Recently I examined specimens reared from *Aphis fabae* Scopoli on *Euonymus japonicus* and *Solanum nigrum* from northeast of Iran. Mehrnejad and Emami (2005) reported this species as a secondary parasitoid of *Aphis gossypii* and *A. craccivora* via *Lysiphlebus fabarum*.

I.23. *Zaomma lambinus* (Walker, 1838)

Material examined: Lorestan province, Borujerd, Khaman, v-vi.2007, ex *Lepidosaphes* (Hem.: Dispididae) on Plum, (S. Golpayegani), 1♀.

Iranian Distribution. Iran (Trjapitzin 1989), Tehran province (Chodjai 1989), Chahar Mahalbakhtiari, Esfahan, Fars, Markazi, Tehran and Semnan provinces (Radjab 1989).

Note. *Zaomma lambinus* as a cosmopolitan species is widely distributed in Iran and was mentioned as a primary and secondary parasitoid of some hemipterous pests of the families Asterolecaniidae, Coccidae, Diaspididae and Eriococcidae.

II- Subfamily: Tetracneminae

II.1. *Coccidoxenoides perminutus* Girault, 1915

Material examined: (1) Fars province, Shiraz, vi.1998, ex *Planococcus vovae*, (H. Lotfalizadeh), 3 ♀♀ 2 ♂♂. (2) Tehran, Peykan-shahr, v.2005, ex same host on *Cupressus* sp., (A. Ameri), 2♀.

Iranian Distribution. Tehran province (Talebi et al. 2008a).

Note. This species has been previously reported surprisingly under *Ooencyrtus kuvanae* (Howard) (Xu and Lotfalizadeh 2000). Also, it was found in the recently collected specimens in Tehran on same host. *C. perminutus* was reported on several scale insects (Hem.: Diaspididae) and mealybugs (Hem.: Pseudococcidae) but not on *Planococcus vovae* (Nasonov), which is a new host for this species.

II.2. *Tetracnemus diversicornis* (Mercet, 1923)

Material examined: Azarbaijan-e Sharghi province, Marand, 10.ix.2003, swept on grass, (H. Lotfalizadeh), 1♀.

Iranian Distribution. New record for Iran.

Note. The genus *Tetracnemus* has not yet been reported from Iran.

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