

Research Article

A survey on Ichneumonidae of Isfahan province, central Iran

Hossein Barahoei^{1*}, Elham Nader² and Ehsan Rakhshani²

1. Agricultural Research Institute, University of Zabol, Iran.

2. Department of Plant Protection, College of Agriculture, University of Zabol, Iran.

Abstract: Fauna of Ichneumonidae of Isfahan province was studied in 2012. Specimens were collected using sweep net and Malaise trap on various plants from different places in Isfahan. Totally, 18 species belong to 16 genera and 7 subfamilies were collected and identified as: *Anomalon cruentatum* (Geoffroy, 1785) (Anomaloninae); *Exetastes syriacus* Schmiedeknecht, 1910 (Banchinae); *Diplazon laetatorius* (Fabricius, 1781), *Enizemum ornatum* (Gravenhorst, 1829), *Homotropus nigratarsus* (Gravenhorst, 1829), *Homotropus signatus* (Gravenhorst, 1829), *Promethes sulcator* (Gravenhorst, 1829) and *Syrphophilus bizonarius* (Gravenhorst, 1829) (Diplazontinae); *Anisobas cingulatellus* Horstmann, 1997, *Diadromus collaris* (Gravenhorst, 1829), *Heterischnus filiformis* (Gravenhorst, 1829) and *Spilothyrateles nuptatorius* (Fabricius, 1793) (Ichneumoninae); *Exochus castaniventris* Brauns, 1896 (Metopiinae); *Itopectis alternans* (Gravenhorst, 1829), *Itopectis tunetana* (Schmiedeknecht, 1914), *Pimpla spuria* Gravenhorst, 1829 and *Zaglyptus multicolor* (Gravenhorst, 1829) (Pimplinae) and *Aneuclis incidens* (Thomson, 1889) (Tersilochinae). All species are new record for Isfahan province except for *Exochus castaniventris* and *Heterischnus filiformis* is newly recorded from Iran.

Keywords: *Heterischnus filiformis*, distribution, new record, Isfahan

Introduction

The family Ichneumonidae is an extremely large group of insects with about 60,000 estimated species classified into 48 subfamilies (Yu *et al.*, 2012). Species of this family are important biological control agents of insect pests in the orders Coleoptera, Diptera, Hymenoptera and Lepidoptera (Townes, 1971; Wahl, 1993; Gauld *et al.*, 2002; Finch, 2005; Gauld and Dubois, 2006; Sugonyaev, 2006). Until now, 36 species of ichneumonids belonging to 11 subfamilies were reported with host from Iran including: Acaenitinae (1 species), Anomaloninae (2

species), Campopleginae (8 species), Cremastinae (2 species), Cryptinae (8 species), Diplazontinae (2 species), Ichneumoninae (7 species), Pimplinae (5 species) and Xoridinae (1 species) (Barahoei *et al.*, 2012).

Yet, 540 species belonging to 24 subfamilies have been recorded for the fauna of Iran (Nikdel and Diller, 2011; Abbasipour *et al.*, 2012; Barahoei *et al.*, 2012, 2014a; Ghahari and Schwarz, 2012; Mohammadi-khoramabadi and Talebi, 2013), of which 27 species have been reported from Isfahan province (Barahoei *et al.*, 2012, 2014a). Two subfamilies, Ichneumoninae Latreille and Cryptinae Kirby have 199 and 99 reported species, respectively, comprising the most species-rich groups of the ichneumonids Iran.

In this paper we present new information on occurrence of some species of the subfamilies

Handling Editor: Dr. Ali Asghar Talebi

*Corresponding author, e-mail: barahoei@uoz.ac.ir

Received: 28 June 2014, Accepted: 12 November 2014

Published online: 15 December 2014

Anomaloninae, Banchinae, Diplazontinae, Ichneumoninae, Metopiinae, Pimplinae and Tersilochinae from Isfahan province.

Materials and Methods

The sampling was carried out during June–November 2012 in several parts (Ahmadreza, Baba peerahmad-ben, Chamtagh, Darafshan, Filour, Flavarjan, Hoyeh, Jafarabad, Morghab, Najafabad, Nazhvan, Neysian, Sadeghabad, Tanbak) of Isfahan province (Fig. 1). Specimens were collected using sweep net and Malaise traps

on various plants in different habitats including alfalfa, wheat and weeds. The specimens were extracted from the Malaise traps bi-weekly. The collected specimens were moved into ethanol 75%, then dried, pinned, mounted and labeled.

The external morphology of specimens was studied using NIKON SMZ645 stereomicroscope. Terminology of morphological characters follows Gauld (1991). Nomenclature and distribution data are mainly taken from Yu *et al.* (2012). The specimens were deposited in the Insect Collection at Zabol University, Zabol, Iran.

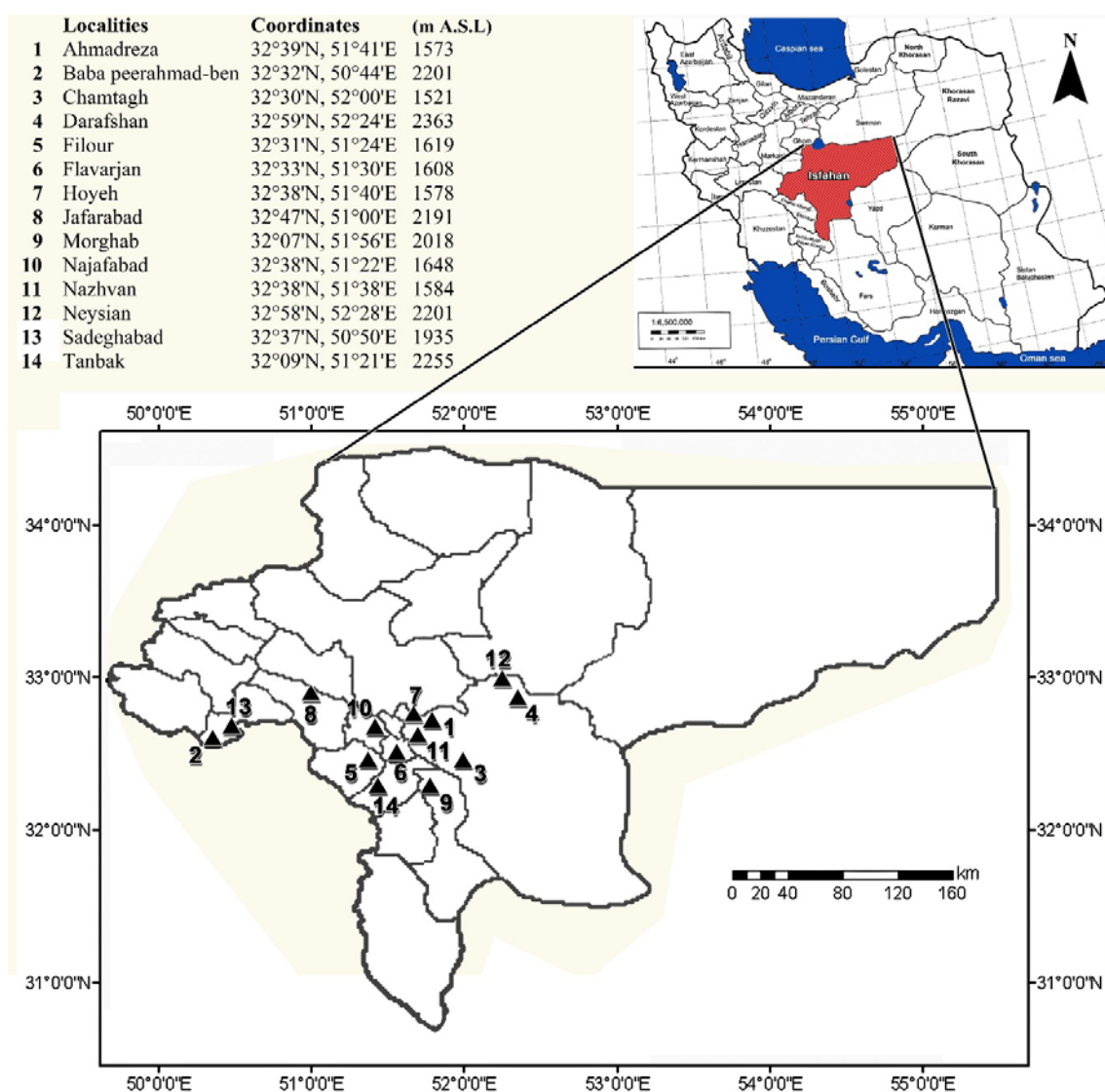


Figure 1 Map of the sampling localities at Isfahan province.

Results

Totally, 144 specimens of Ichneumonidae belonging to six subfamilies, 16 genera and 18 species were collected and identified, of which *Heterischnus filiformis* (Gravenhorst, 1829) (Ichneumoninae) is newly recorded from Iran. All species are new records for Isfahan province except *Exochus castaniventris* Brauns, 1896. The data are sorted according to the valid name, author and year, material examined, distribution in Iran and general distribution.

Subfamily Anomaloninae Viereck, 1918

Tribe Anomalonini Viereck, 1918

Anomalon cruentatum (Geoffroy, 1785)

Material examined: 3♀♀, swept on *Medicago sativa* L., Nazhvan, 27-X-2012, Leg. E. Nader.

Distribution in Iran: Ardabil (Masnadi and Jussila, 2009), Yazd (Zarepour et al., 2009), East Azerbaijan (Ghahari and Jussila, 2011c), Sistan and Baluchestan (Barahoei et al., 2012).

General distribution: Palaearctic and Oriental (Yu et al., 2012).

Subfamily Banchinae Wesmael, 1845

Tribe Atrophini Seyrig, 1932

Exetastessyriacus Schmiedeknecht, 1910

Material examined: 1♀, swept on *Medicago sativa* L., Morghab, 19-VI-2012, Leg. E. Nader.

Distribution in Iran: Khorasan-e-Razavi (Barahoei et al., 2014b).

General distribution: Nearctic, Palaearctic (Yu et al., 2012).

Subfamily Diplazontinae Viereck, 1918

Diplazon laetatorius (Fabricius, 1781)

Material examined: 3♀♀, Malaise trap, Neysian, 06-X-2012; 1♀, Malaise trap, Tanbak, 06-X-2012; 4♀♀, swept on aquatic plants, Hoyeh, 14-VI-2012; 2♀♀, swept on *Cynodon* sp., Jafarabad, 19-VI-2012; 2♀♀, swept on *Cynodon dactylon*, Neysian, 20-VIII-2012; 2♀♀, swept on Poaceae weed, Darafshan, 07-XI-2012; 3♀♀, swept on Poaceae weed, Filour, 28-IX-2012; 1♀, swept on Poaceae weed, Flavarjan, 02-VI-2012; 1♀, swept on Poaceae weed, Najafabad, 29-VI-2012; 4♀♀, swept on

Poaceae weed, Nazhvan, 11-VI-2012; 4♀♀, swept on *Medicago sativa* L., Hoyeh, 14-VI-2012, Leg. E. Nader.

Distribution in Iran: West Azerbaijan, Khorasan-e-Shomali (Malkeshi and Kheiabani, 1997), Guilan, Mazandaran, Qazvin, Tehran (Mohammadi-Khoramabadi et al., 2013b), Kerman (Kolarov and Ghahari, 2005; Mohammadi-Khoramabadi et al., 2014), Chaharmahal-o-Bakhtiari (Nourbakhsh et al., 2008), Mazandaran (Kolarov and Ghahari, 2005; Mohammadi-Khoramabadi et al., 2013b), Sistan and Baluchestan (Barahoei et al., 2013a), Yazd (Zarepour et al., 2008, 2009).

General distribution: Worldwide (Yu et al., 2012).

Enizemum ornatum (Gravenhorst, 1829)

Material examined: 2♂♂, swept on *Cirsium* sp., Morghab, 27-VI-2012; 1♂, swept on *Hordeum* sp., Jafarabad, 19-VI-2012, Leg. E. Nader.

Distribution in Iran: Kerman (Mohammadi-Khoramabadi et al., 2014), Qazvin (Mohammadi-Khoramabadi et al., 2013b), Sistan and Baluchestan (Barahoei et al., 2013a).

General distribution: Nearctic, Palaearctic, Oriental (Yu et al., 2012).

Homotropus nigratarsus (Gravenhorst, 1829)

Material examined: 1♀, swept on aquatic plants, Hoyeh, 14-VI-2012; 1♂, swept on *Cirsium* sp., Morghab, 19-VI-2012, Leg. E. Nader.

Distribution in Iran: Guilan, Mazandaran, Qazvin, Tehran (Mohammadi-Khoramabadi et al., 2013b).

General distribution: Nearctic, Palaearctic (Yu et al., 2012).

Homotropus signatus (Gravenhorst, 1829)

Material examined: 1♂, Malaise trap, Neysian, 06-X-2012; 1♀, swept on *Medicago sativa* L., Hoyeh, 14-VI-2012; 1♀, Malaise trap, Jafarabad, 19-VI-2012, Leg. E. Nader.

Distribution in Iran: Kerman (Sarafi et al., 2014).

General distribution: Nearctic, Palaearctic (Yu et al., 2012).

***Promethes sulcator* (Gravenhorst, 1829)**

Material examined: 1♀, Malaise trap, Tanbak, 06-X-2012; 1♀, swept on *Cirsium* sp., Nazhvan, 11-VI-2012; 1♀, swept on Poaceae weed, Chamtagh, 20-VIII-2012; 2♀♀ 1♂, swept on *Medicago sativa* L., Hoyeh, 16-VI-2012; 1♀ 1♂, Malaise trap, Nazhvan, 11-VI-2012, Leg. E. Nader.

Distribution in Iran: Guilan, Tehran (Mohammadi-Khoramabadi *et al.* 2013b), Sistan and Baluchestan (Barahoei *et al.*, 2013a).

General distribution: Nearctic, Palaearctic, Oriental (Yu *et al.*, 2012).

***Syrphophilus bizonarius* (Gravenhorst, 1829)**

Material examined: 1♀ 1♂, swept on Poaceae weed, Filour, 28-IX-2012; 1♀ 12♂♂, swept on Poaceae weed, Darafshan, 07-XI-2012; 11♂♂, swept on *Medicago sativa* L., Hoyeh, 14-VI-2012; 1♂, Malaise trap, Flavarjan, 02-VI-2012; 2♂♂, Malaise trap, Jafarabad, 19-VI-2012, Leg. E. Nader.

Distribution in Iran: Guilan, Mazandaran, Qazvin, Tehran (Mohammadi-Khoramabadi *et al.*, 2013b).

General distribution: Nearctic, Palaearctic, Oriental (Yu *et al.*, 2012).

Subfamily Ichneumoninae Latreille, 1802**Tribe Ichneumonini Latreille, 1802*****Spilothyrates nuptatorius* (Fabricius, 1793)**

Material examined: 1♂, Malaise trap, Najafabad, 01-VII-2012, Leg. E. Nader.

Distribution in Iran: Golestan (Kolarov and Ghahari, 2005).

General distribution: Palaearctic (Yu *et al.*, 2012).

Tribe Listrodromini Förster, 1869***Anisobas cingulatellus* Horstmann, 1997**

Material examined: 2♀♀ 2♂♂, Malaise trap, Tanbak, 06-X-2012, Leg. E. Nader.

Distribution in Iran: Semnan (Kolarov and Ghahari, 2008), Tehran (Masnadiand Jussila, 2008).

General distribution: Palaearctic (Yu *et al.*, 2012).

Tribe Phaeogenini Förster, 1869***Diadromus collaris* (Gravenhorst, 1829)**

Material examined: 1♂, swept on *Medicago sativa* L., Nazhvan, 27-X-2012; 1♂, swept on *Taraxacum* sp., Neysian, 20-VIII-2012; 3♀♀ 3♂♂, swept on aquatic plants, Hoyeh, 14-VI-2012; 2♀♀, Malaise trap, Nazhvan, 11-VI-2012; 2♂♂, Malaise trap, Hoyeh, 14-VI-2012; 1♀, Malaise trap, Baba peerahmad-ben, 22-VI-2012; 2♀♀, Malaise trap, Nazhvan, 20-VIII-2012, Leg. E. Nader.

Distribution in Iran: Golestan (Kolarov and Ghahari, 2008; Ghahari and Jussila, 2011a), Semnan (Ghahari, 2012), Sistan and Baluchestan (Firuzi Jahantighi *et al.*, 2012; Barahoei *et al.*, 2013a).

General distribution: Neotropical, Ethiopian, Palaearctic, Australasian (Yu *et al.*, 2012).

Heterischnus filiformis* (Gravenhorst, 1829)*(Figs. 2, 3)**

Material examined: 2♀♀ 1♂, Malaise trap, Darafshan, 07-XI-2012; 2♀♀, swept on *Medicago sativa* L., Filour, 28-IX-2012; 1♀, Malaise trap, Ahmadrza, 19-VI-2012; 1♀, Malaise trap, Najafabad, 03-VII-2012, Leg. E. Nader.

Distribution in Iran: new record from Iran.

General distribution: Europe (Yu *et al.*, 2012).

Diagnostic characters: The three basal and the four apical flagellomeres black, others brown, white in the middle (Fig. 3A), flagellar segments with tyloid in male specimen, head black, without yellow drawing, gena weakly punctured, frons with dense and rough punctation, temple deep, occiput weakly punctured (Figs. 2A, B), notauli broad and shallow depressed (Figs. 2C, D), forewings with irregular pentagonal areola, 2m-cu with 2 bullae (Fig. 2E), trochanter brown (Fig. 3A), propodeum carinated, with central areola (Fig. 2F), second abdominal tergite long and wide (Figs. 3A, B), the last two metasomal tergites black with white posterior margins (Fig. 2G), ovipositor sheet short, white in basal 1/4 and black in remaining 3/4 (Fig. 2G), body length: 8-9 mm in female and 6-7 mm in male (Fig. 3).

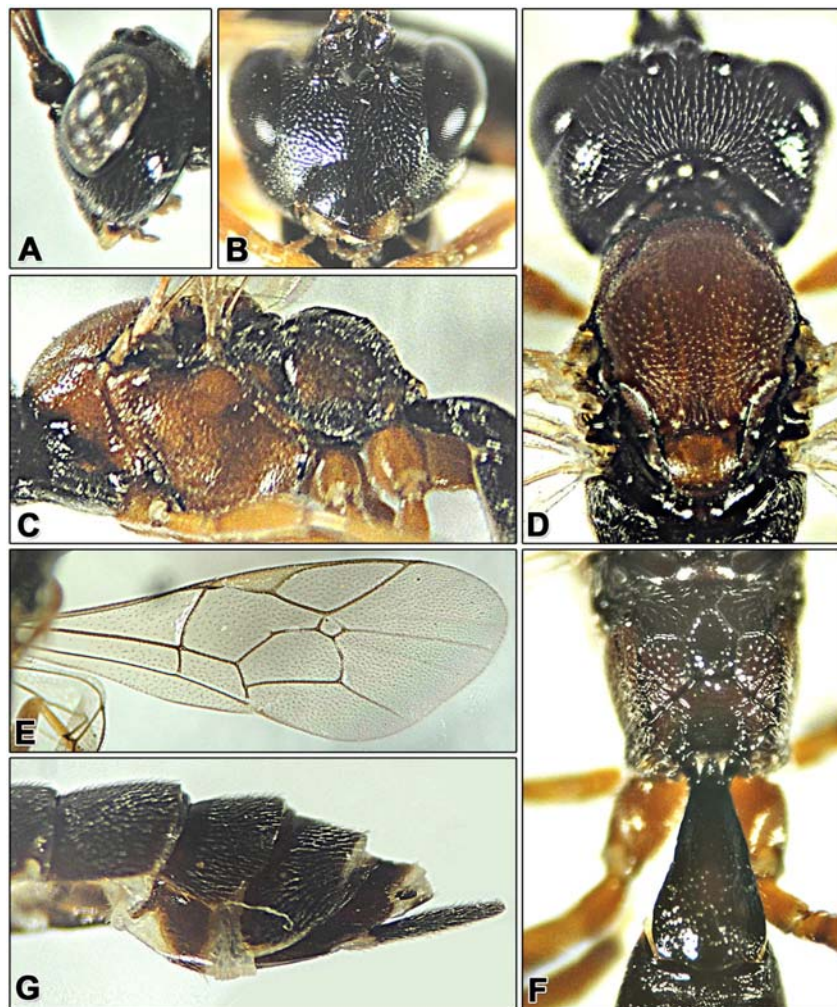


Figure 2 The external morphology of female specimen of *Heterischnus filiformis* (Gravenhorst): A- lateral view of head; B- anterior view of head; C- lateral view of thorax, propodeum and first segment of gaster; D- dorsal view of head and mesoscutum; E- forewing; F- dorsal view of propodeum and first segment of gaster; G- hind segments of gaster and ovipositor sheets.

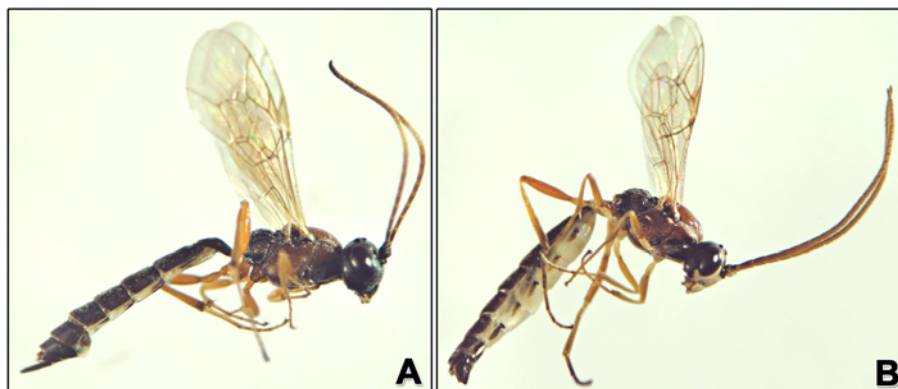


Figure 3 Lateral view of *Heterischnus filiformis* (Gravenhorst): A) female specimen, B) male specimen.

Subfamily Metopiinae Förster, 1869***Exochus castaniventris* Brauns, 1896**

Material examined: 1♂, Malaise trap, Baba peerahmad-ben, 22-VI-2012; 7♀♀ 3♂♂, swept on Poaceae weed, Darafshan, 07-XI-2012; 1♂, swept on *Medicago sativa* L., Filour, 28-IX-2012; 1♂, Malaise trap, Hoyeh, 14-VI-2012; 1♂, swept on *Medicago sativa* L., Morghab, 19-VI-2012; 9♀♀ 7♂♂, Malaise trap, Najafabad, 02-VII-2012; 1♀ 3♂♂, Malaise trap, Nazhvan, 20-VIII-2012; 1♂, swept on *Cirsium* sp., Sadeghabad, 06-VI-2012, Leg. E. Nader.

Distribution in Iran: Isfahan, Tehran (Masnadi and Jussila, 2009), Qazvin (Ghahari and Schwarz, 2012), Semnan (Ghahari, 2012).

General distribution: Palaearctic (Yu *et al.*, 2012).

Subfamily Pimplinae Wesmael, 1845**Tribe Ephialtini Hellén, 1915*****Zaglyptus multicolor* (Gravenhorst, 1829)**

Material examined: 1♀ 1♂, Malaise trap, Ahmadreza, 19-VI-2012; 1♀, Malaise trap, Baba peerahmad-ben, 22-VI-2012, Leg. E. Nader.

Distribution in Iran: Kerman, Khorasan-e-Razavi, Mazandaran, Golestan (Kolarov and Ghahari, 2006), Guilan, Tehran (Mohammadi-Khoramabadi *et al.*, 2013a).

General distribution: Palaearctic, Oriental (Yu *et al.*, 2012).

Tribe Pimplini Wesmael, 1845***Itopectis alternans* (Gravenhorst, 1829)**

Material examined: 1♀, Malaise trap, Tanbak, 06-X-2012, Leg. E. Nader.

Distribution in Iran: Fars (Lotfalizadeh *et al.*, 2012), Guilan (Mohammadi-Khoramabadi *et al.*, 2013a).

General distribution: Palaearctic, Oriental (Yu *et al.*, 2012).

***Itopectis tunetana* (Schmiedeknecht, 1914)**

Material examined: 2♀♀ 1♂, swept on *Taraxacum* sp., Neysian, 20-VIII-2012, Leg. E. Nader.

Distribution in Iran: West Azerbaijan (Akbarzadeh, 2011), Guilan, Tehran (Mohammadi-Khoramabadi *et al.*, 2013a),

Qazvin (Ghahari and Schwarz, 2012), Sistan and Baluchestan (Barahoei *et al.*, 2013a).

General distribution: Palaearctic (Yu *et al.*, 2012).

***Pimpla spuria* Gravenhorst, 1829**

Material examined: 2♀♀, Malaise trap, Nazhvan, 20-VIII-2012, Leg. E. Nader.

Distribution in Iran: Khuzestan, Mazandaran (Kolarov and Ghahari, 2006), Guilan, Tehran (Mohammadi-Khoramabadi *et al.*, 2013a).

General distribution: Palaearctic, Oriental (Yu *et al.*, 2012).

Subfamily Tersilochinae Schmiedeknecht, 1910***Aneuclis incidens* (Thomson, 1889)**

Material examined: 1♀, swept on Poaceae weed, Filour, 28-IX-2012; 1♂, Malaise trap, Tanbak, 06-X-2012, Leg. E. Nader.

Distribution in Iran: Mazandaran (Ghahari and Jussila, 2011a), Kerman, Khorasan-e-Razavi, Sistan and Baluchestan (Barahoei *et al.*, 2013b).

General distribution: Palaearctic (Yu *et al.*, 2012).

Discussion

During this survey eighteen species of six subfamilies of the family Ichneumonidae were collected and identified in association with general field crops of Isfahan province. The subfamily Diplazontinae with seven species (73 Individuals) was the most abundant subfamily in this area during the sampling period. They are koinobiont endoparasitoids of Syrphidae (Diptera) (Sugonyaev, 2006), and this is why they were more common at the middle to end of growing season, when many syrphid species are associating with aphids on field crops. Up to now, 19 species of the subfamily Diplazontinae are reported from Iran (Barahoei *et al.*, 2012; Mohammadi-Khoramabadi *et al.*, 2013b).

Three subfamilies Anomalinae, Banchinae and Metopiinae were only represented by only a single species in alfalfa fields. They were recorded as parasitoids of Lepidoptera larvae (Townes, 1971; Wahl, 1993). *Anomalon cruentatum* has been recorded as parasitoid of

noctuid moth pests like *Agrotis ipsilon* (Hufnagel), which is common in alfalfa and other field crops (Okyar and Yurtcan, 2007). Until now, 13 species from the subfamily Anomaloniinae (Nikdel and Diller, 2011; Barahoei et al., 2012; Ghahari and Schwarz, 2012) and 10 species of Banchinae and seven species of Metopiinae are reported from Iran (Barahoei et al., 2012).

The subfamily Ichneumoninae is one of the largest groups of the ichneumonids (Yu et al., 2012), with only 169 recorded species from Iran, of which seven species had already been reported from Isfahan province (Kolarov and Ghahari, 2005, 2008; Masnadi and Jussila, 2008; Ghahari and Jussila, 2011b; Barahoei et al., 2012; Ghahari and Schwarz, 2012). In the present survey, we found two species of Ichneumoninae, of which *Heterischnus filiformis* is newly recorded for the fauna of Iran. This is also the first record of this species outside Europe. It has also been recorded in association with the noctuid moths (Rudow, 1917).

The recorded species of the subfamily Pimplinae are all considered to have a complicated biology ranging from parasitoid to hyperparasitoid of various insect groups (Aubert, 1969; Pisica and Diaconu, 2000). *Zaglyptus multicolor* is a parasitoid of the spiders (Aubert, 1969). Among 62 recorded species of Pimplinae, none has been yet reported from Isfahan province (Barahoei et al., 2012; Ghahari and Schwarz, 2012; Mohammadi-Khoramabadi et al., 2013a). The relatively small subfamily Tersilochinae with worldwide distribution comprises 234 species in 13 genera, represented with only four recorded species from Iran (Barahoei et al., 2012). They are parasitoids of Coleoptera (Curculionidae), Lepidoptera (Eriocraniidae) (Jordan, 1998) and sawflies (Tenthredinidae and Xyelidae) (Al-Saffar and Aldrich, 1997; Khalaim and Blank, 2011). *Aneuclis incidens* has been recorded as a parasitoid of Anobiidae and Nitidulidae (Starke, 1956; Sedivy, 1983) which can be commonly encountered on flowering weeds within the field crops.

The results of this survey indicates existence of diverse range of the ichneumonids in Isfahan province, many of them are waiting for subsequent explorations. Furthermore, it is

necessary to complement these finding with the biological data, especially on host association and seasonal occurrence.

Acknowledgements

We express our gratitude to Martin Schwarz (Eben 21, A-4202 Kirchschlag, Austria) and Matthias Riedel (Klinik Fallingbostel, Kolkweg 1, D-29683 Bad Fallingbostel, Germany) for identification of some species.

References

- Abbasipour, H., Basij, M., Mahmoudvand, M. and Masnadi, A. 2012. First report of the parasitoid wasp, *Diadegma pusio* (Hym.: Ichneumonidae), from Iran. Journal of Entomological Society of Iran, 32 (2): 127-128.
- Al-Saffar, Z. Y. and Aldrich, J. C. 1997. Factors influencing the survival of *Pontania proxima* that attack crack willow *Salix fragilis*. Biology and Environment. Proceedings of the Royal Irish Academy, 3: 219-223.
- Akbarzadeh, G. H. 2011. Identification of the pupal parasitoid wasps of grape berry moth *Lobesia botrana* (Denis and Schiffermüller) (Lep., Tortricidae) in Orumieh vineyards. Journal of Entomological Research, 3 (2): 95-102.
- Aubert, J. F. 1969. Les Ichneumonides ouest-paléarctique setleurshots 1. Pimplinae, Xoridinae, Acaenitinae. Laboratoire d'Evolution des Etres Organises, Paris. 302 pp.
- Barahoei, H., Rakhshani, E. and Riedel, M. 2012. A checklist of Ichneumonidae (Hymenoptera: Ichneumonoidea) from Iran. Iranian Journal of Animal Biosystematics, 8 (2): 83-133.
- Barahoei, H., Rakhshani, E., Kasparyan, D. R., Schwarz, M. and Riedel, M. 2013a. Contribution on the knowledge of Ichneumonidae (Hymenoptera) in the northern part of Sistan and Baluchestan province, Iran. Acta Zoologica Bulgarica, 65 (1): 131-135.
- Barahoei, H., Bani-Asad, R. and Madjdzadeh, S. M. 2013b. First record of *Diaparsis improvisator* Khalaim, 2005 (Hymenoptera: Ichneumonidae: Tersilochinae) from Iran. Turkish Journal of Zoology, 15 (1): 73-78.

- Barahoei, H., Nader, E. and Rakhshani, E. 2014a. Cryptinae (Hymenoptera: Ichneumonidae) of Isfahan province, central Iran. Turkish Journal of Zoology, in press.
- Barahoei, H., Rakhshani, E., Fathabadi, Kh. and Moradpour, H. 2014b. A survey on the fauna of Ichneumonidae (Hymenoptera) associating with alfalfa fields of Khorasan Razavi province. Iranian Journal of Animal Biosystematics, in press.
- Finch, O. D. 2005. The parasitoid complex and parasitoid-induced mortality of spiders (Araneae) in a Central European woodland. Journal of Natural History, 39 (25): 2339-2354.
- Firuzi Jahantighi, F., Barahoei, H., Vafaei shooshtari, R. and Rakhshani, E. 2012. New Records of Cryptinae Kirby 1837 and Ichneumoninae Latreille, 1802 (Insecta: Hymenoptera: Ichneumonidae) for Iran. Iranian Journal of Entomological Research, 4 (4): 307-312.
- Gauld, I. D. 1991. The Ichneumonidae of Costa Rica, 1. Introduction, keys to subfamilies, and keys to the species of the lower Pimpliform subfamilies Rhyssinae, Poemeniinae, Acaenitinae and Cylloceriinae. Memoirs of the American Entomological Institute, 47: 1-589.
- Gauld, I. D. and Dubois, J. 2006. Phylogeny of the *Polysphincta* group of genera (Hymenoptera: Ichneumonidae; Pimplinae): a taxonomic revision of spider ectoparasitoids. Systematic Entomology, 31 (3): 529-564.
- Gauld, I. D., Wahl, D. B. and Broad, G. 2002. The suprageneric groups of the Pimplinae (Hymenoptera: Ichneumonidae): a cladistic re-evaluation and evolutionary biological study. Zoological Journal of the Linnean Society, 136: 421-485.
- Ghahari, H. 2012. A study on the Ichneumonidae (Hymenoptera) from Jangal-e Abr, Semnan province, Iran. Calodema, 201: 1-4.
- Ghahari, H. and Jussila, R. 2011a. A study on the ichneumonid wasps (Hymenoptera: Ichneumonidae) from some regions of Iran. Linzer Biologische Beiträge, 43 (1): 753-758.
- Ghahari, H. and Jussila, R. 2011b. A contribution to the knowledge of Ichneumon wasps (Hymenoptera: Ichneumonidae) from Azerbaijan-e-Gharbi Province, Northwestern Iran. Linzer Biologische Beiträge, 43 (2): 1277-1284.
- Ghahari, H. and Jussila, R. 2011c. A contribution to the knowledge of Ichneumonidae (Hymenoptera) from Arasbaran and vicinity, Iran. Calodema, 166: 1-5.
- Ghahari, H. and Schwarz, M. 2012. A study of the Ichneumonidae (Hymenoptera: Ichneumonoidea) from the Qazvin province, Iran. Linzer Biologische Beiträge, 44 (1): 855-862.
- Jordan, T. 1998. *Tersilochus curator* Horstmann und *Tersilochus* sp. n. (Ichneumonidae, Tersilochinae), neue Parasitoiden der an Birken minierenden Trugmotten (Lepidoptera, Eriocraniidae). Bonner Zoologische Beiträge, 47 (3-4): 411-419.
- Khalaim, A. I., and Blank, S. M., 2011. Review of the European species of the genus *Gelanes* Horstmann (Hymenoptera: Ichneumonidae: Tersilochinae), parasitoids of *xyelid* sawflies (Hymenoptera: Xyelidae). Proceedings of the Zoological Institute RAS, 315 (2): 154-166.
- Kolarov, J. and Ghahari, H. 2005. A catalogue of Ichneumonidae (Hymenoptera) from Iran. Linzer Biologische Beiträge, 37: 503-532.
- Kolarov, J. and Ghahari, H. 2006. A study of the Iranian Ichneumonidae (Hymenoptera): I. Pimplinae and Tryphoninae. Zoology in the Middle East, 38: 63-68.
- Kolarov, J. and Ghahari, H. 2008. A study of the Iranian Ichneumonidae (Hymenoptera) III. Ichneumoninae. Acta Entomologica Serbica, 13 (1-2): 61-76.
- Lotfalizadeh, H., Masnadi, A. and Saber, M. 2012. New records of the Grape Berry Moth Hymenopterous parasitoids in Iran. Munis Entomology and Zoology, 7 (1): 284-291.
- Malkeshi, H. and Kheibani, N. 1997. The first record of *Diplazon laetatorius* T. (Hym., Ichneumonidae) in Iran. Applied Entomology and Phytopathology, 64 (1-2): 25, 72.
- Masnadi, A. and Jussila, R. 2008. Contribution to the knowledge of ichneumonid wasps of Iran. Subfamilies Ichneumoninae, Pimplinae and

- Diplazontinae (Hymenoptera, Ichneumonidae). Entomofauna, 29 (22): 293-320.
- Masnadi, A. and Jussila, R. 2009. A contribution to ichneumonid wasps of Iran (Hym.: Ichneumonidae): Anomaloninae, Cremastinae, Ctenopelmatinae, Mesochorinae, Metopiinae and Orthopelmatinae). Applied Entomology and Phytopathology, 76 (2): 11-28.
- Mohammadi-khoramabadi, A. and Talebi, A. A. 2013. A study of the genus *Orthocentrus* (Hymenoptera: Ichneumonidae, Orthocentrinae) in Guilan and Tehran provinces of Iran, with first records of seven species and one subspecies. Applied Entomology and Phytopathology, 80 (2): 29-39.
- Mohammadi-Khoramabadi, A., Talebi, A. A. and Zwakhals, K. 2013a. A study of the subfamily Pimplinae (Hymenoptera: Ichneumonidae) in the north of Iran, with eleven new species records. Entomofauna, 34 (2): 29-56.
- Mohammadi-Khoramabadi, A., Talebi, A. A. and Zwakhals, K. 2013b. Study on Diplazontinae (Hym.: Ichneumonidae) in the north central of Iran. Journal of Crop Protection, 2 (3): 241-261.
- Mohammadi-Khoramabadi, A., Ziaaddini, M. and Asadi, A. 2014. A faunal study on the parasitoid wasps of Pimpliformes (Hym.: Ichneumonidae) in Kerman province, Iran. 3rd Integrated Pest Management Conference (IPMC), Kerman, Iran, pp. 352-359.
- Nikdel, M. and Diller, E. 2011. The first report of *Agrypon canaliculatum* (Hym.: Ichneumonidae) as parasitoid of *Yponomeuta evonymella* (Lep.: Yponomeutidae) from Iran. Journal of Entomological Society of Iran, 31 (1): 93-95.
- Nourbakhsh, S. H., Soleymannejadian, E. and Nemati, A. R. 2008. Biology and population dynamics of *Scaeva albomaculata* (Diptera: Syrphidae) in almond orchards of Shahrekord, Iran. Journal of Entomological Society of Iran, 27 (2): 93-108 (In Persian with English summary).
- Okyar, Z. and Yurtcan, M. 2007. Phytophagous Noctuidae (Lepidoptera) of the western Black Sea region and their ichneumonid parasitoids. Entomofauna, 28 (28): 377-388.
- Pisica, C. and Diaconu, A. 2000. Hyperparasitoid Ichneumonidae (Hymenoptera) from Tortricidae (Lepidoptera) injurious to fruit trees. Analele Stiintifice ale Universitatii "Al. I. Cuza" din Iasi Sectiunea Biologie Animala, 46: 35-44.
- Rudow, F. 1917. Ichneumoniden und ihre Wirte. Entomologische Zeitschrift, 31: 66-67.
- Sarafi, T., Barahoei, H., Madjdzadeh, S. M. and Askari, M. 2014. New record of Diplazontinae (Hym.: Ichneumonidae), parasitoids of Syrphidae (Diptera) from Iran. 3rd Integrated Pest Management Conference (IPMC), Kerman, Iran, p. 627.
- Sedivy, J. 1983. Tersilochinae as parasitoids of insect pests of winter rape (Hymenoptera: Ichneumonidae). Contributions to the American Entomological Institute, 20: 266-276.
- Starke, H. 1956. Ichneumoniden fauna der sächsischen Oberlausitz. NaturaLusatica (Bautzen), 3: 17-92.
- Sugonyaev, E. 2006. Strategies of parasitism in parasitic wasps. Entomological Review, 86 (5): 544-556.
- Townes, H. K. 1971. The genera of Ichneumonidae, Part 4. Memoirs of the American Entomological Institute, 17: 1-372.
- Wahl, D. B. 1993. Family Ichneumonidae, In: Goulet, H. and Huber, J. T. (Eds.), Hymenoptera of the World: An Identification Guide to Families. Research Branch Agriculture Canada Publication, 668 pp.
- Yu, D. S., Van Achterberg, K. and Horstmann, K. 2012. World Ichneumonoidea 2011. Taxonomy, Biology, Morphology and Distribution. Available on: <http://www.taxapad.com> (accessed November 02, 2014).
- Zarepour, A. R., Talebi, A. A. and Ioni, S. 2008. Fauna of Ichneumonid wasps from Yazd, Iran. Journal of Entomological Research, 2 (1): 13-20.
- Zarepour, A. R., Talebi, A. A. and Vafaei Shoushtari, R. 2009. Three new species records of Ichneumonid wasps, (Hym., Ichneumonidae) from Yazd, Iran. Journal of Entomological Research, 1 (1): 67-77.

بررسی زنبورهای خانواده Ichneumonidae در استان اصفهان، مرکز ایران

حسین براهویی^{۱*}، الهام نادر^۲ و احسان رخشانی^۲

۱- پژوهشکده کشاورزی، دانشگاه زابل، ایران.

۲- گروه گیاهپزشکی، دانشکده کشاورزی، دانشگاه زابل، ایران.

* پست الکترونیکی نویسنده مسئول مکاتبه: barahoei@uoz.ac.ir

دریافت: ۷ تیر ۱۳۹۳؛ پذیرش: ۲۱ آبان ۱۳۹۳

چکیده: فون زنبورهای خانواده Ichneumonidae در استان اصفهان در سال ۱۳۹۱ مورد بررسی قرار گرفت. نمونه‌ها به وسیله تور حشره‌گیری و تله مالیز روی گیاهان مختلف از مناطق متفاوت در استان اصفهان جمع‌آوری گردید. در مجموع ۱۸ گونه متعلق به ۱۶ جنس و ۷ زیرخانواده جمع‌آوری و شناسایی شد که عبارتند از: *Anomalon cruentatum* (Geoffroy, 1785) (از زیرخانواده *Diplazon* (Anomaloninae)، *Exetastes syriacus* Schmiedeknecht, 1910 (از زیرخانواده *Banchinae*)، *Diplazon* *Homotropus* *Enizemum ornatum* (Gravenhorst, 1829) *Jaetatorius* (Fabricius, 1781) *Promethes* *Homotropus signatus* (Gravenhorst, 1829) *nigritarsus* (Gravenhorst, 1829) *Syrphophilus bizonarius* (Gravenhorst, 1829) *sulcator* (Gravenhorst, 1829) (از زیرخانواده *Diplazontinae*)، *Diadromus collaris* (Gravenhorst, 1829) *Anisobas cingulatellus* Horstmann, 1997 (از *Diplazontinae*)، *Spilothyrates nuptatorius* (Fabricius, 1829) *Heterischnus filiformis* (Gravenhorst, 1829) (از *Diplazontinae*)، *Exochus castaniventris* Brauns, 1896 (از *Ichneumoninae*)، *Exochus castaniventris* (از زیرخانواده *Metopiinae*)، *Itoplectis tunetana* (Schmiedeknecht, 1829) *Itoplectis alternans* (Gravenhorst, 1829) (از *Metopiinae*)، *Zaglyptus multicolor* (Gravenhorst, 1829) *Pimpla spuria* Gravenhorst, 1829 (از *Pimplinae*)، *Aneuclis incidens* (Thomson, 1889) (از *Tersilochinae*)، همه گونه‌ها به‌غیر از *Exochus castaniventris* گزارش جدید برای استان اصفهان می‌باشند. گونه *Heterischnus filiformis* برای اولین بار از ایران گزارش می‌شود.

واژگان کلیدی: *Heterischnus filiformis*، انتشار، گزارش جدید، اصفهان