

A contribution to the knowledge of Braconidae (Hym., Ichneumonoidea) of Iran

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Abstract. The present study is based on the material collected from Fars province (central part of Iran) during 2006–2008. A total of 31 braconid species have been recorded, from which 11 species are new to the fauna of Iran. The identified species belong to 10 subfamilies, including Agathidinae, Alysiinae, Blacinae, Braconinae, Cheloninae, Euphorinae, Microgastrinae, Opiinae, Orgilinae and Rogadinae. The small cosmopolitan subfamily Blacinae is newly recorded in Iran.

Key words: Braconidae, Fars province, Blacinae, new records, distribution.

Introduction

The family Braconidae constitutes one of the largest groups of Hymenoptera with a probably highly conservative estimate of 40–50,000 species worldwide from the current described number of about 17, 605 species (Yu et al. 2005), including more than 45 subfamilies with a diverse habitat and biology (Achterberg 1990, 1993, Shaw & Huddleston 1991). The vast majority of braconids are primary parasitoids of other insects, especially upon the larval stages of Coleoptera, Diptera, and Lepidoptera (Achterberg 1993, Shaw & Huddleston 1991, Wharton 1993), but also including some hemimetabolous insects like aphids (Starý 1970), plant-bugs (Varis & Achterberg 2001, Wharton 1993) and the web spinners (Shaw & Edgerly 1986). The braconids are amongst the well-explored groups of Hymenoptera throughout the world, however they have mainly remained taxonomically overlooked in Iran (Telenga 1936, Hedwig 1957, Fischer 1963, 1972), except the recent faunistic and taxonomic researches (Fallahzadeh & Saghaei 2010, Fischer et al. 2011, Ghahari et al. 2009a,b,c, 2010, 2011, Ghahari & Fischer 2011, Lashkari Bod et al. 2011) that revealed many new records from Iran. Additionally, the small subfamily Aphidiinae has also recently been investigated at different parts of the country (Barahoei et al. 2010, Rakhshani et al. 2005, 2007a,b, 2008, Starý et al. 2000, Tomanović et al. 2007). The scattered faunistic records, as well as biological investigations have been summarized by Fallahzadeh & Saghaei (2010) who recorded 202 species of Braconidae from Iran. The present contribution has been initiated in order to make a primary step to understand the situation of this large and diverse group of insects in Iran as a cross-road between the Eastern Mediterranean area and the Oriental region.

Materials and Methods

The collection of specimens was done during 2006–2008 in Fars province as a representative of the central part of Iran, comprising a desertic and sub-montaine area surrounded by the high mountains to the West and the sea (Persian Gulf) to the South. The major portion of the sampling area consisted of the refugees, neighboring the farmlands and orchards, as well as natural habitats at foothills cov-

ered sparsely with different herbaceous plants and oak trees. Three Malaise traps were used during 2007–2008 at the areas in which we did the samplings by sweeping net, at the same time. Samples were collected from March until July and the specimens were weekly extracted from the malaise traps, being subsequently pinned and mounted on cards in laboratory. Further samplings have been irregularly done using sweeping net during 2006. Identifications were made using reliable keys and the original descriptions. Specimens from different subfamilies were deposited in the Insect Collection of the fourth author (A.L.). Specimens of Alysiinae were deposited in Naturhistorisches Museum Wien, International Research Institute for Entomology.

Results

In total, 31 species belonging to 10 subfamilies have been recorded, from these 11 species, marked in the text by asterisk, are new to the fauna of Iran (Table 1).

Subfamily: Agathidinae Haliday, 1833

* *Disophrys inculcatrix* (Kriechbaumer, 1895)

Material examined: 1♂, Fars - Neyriz, 10.VII.2007, Grape yard, Leg. ALB. – Distribution: Southern Palaearctic, Central Asia.

Subfamily: Alysiinae Leach, 1815

Chorebus affinis (Nees, 1814)

Material examined: 1♀, Fars - Maharlu, 31.III.2008, Almond orchard on weeds, Leg. ALB. – Distribution: Entire Europe and Madeira to Russian Far East.

Chorebus groschkei Griffiths, 1966

Material examined: 1♂, Fars - Shiraz, 01.V.2007, Weeds in the wheat field; 1♂, Fars - Takhterost, 03.VI.2008, Field with weeds; 1♂, Fars - Neyriz 13.III.2008, Wheat field; 1♂ Fars - Bidzard, 30.IV.2006, untidy orchard on weeds, Leg. ALB. – Distribution: Europe, from Germany to Russia.

Chorebus stilifer Griffiths, 1968

Material examined: 1♀, Fars - Zarghan, 02.V.2007, Alfalfa field; 1♂, Fars - Marvdasht, 09.V.2008, Alfalfa field, Leg. ALB. – Distribution: Germany.

Table 1. Comparison of the number of recorded species belonging to different subfamilies of Braconidae in the present study with previous records.

Subfamilies	Previously recorded species	Number of collected species from Fars Province	Newly recorded species in this study	Total number of recorded species in Iran
Agathidinae	19	1	1	20
Alysiinae	22	8	0	22
Aphidiinae	65	0	0	65
Blacinae	0	1	1	1
Brachistinae	6	0	0	6
Braconinae	55	6	3	58
Cardiochilinae	4	0	0	4
Cheloninae	32	2	0	32
Doryctinae	13	0	0	13
Euphorinae	21	1	1	22
Gnaptodontinae	1	0	0	1
Helconinae	5	0	0	5
Homolobinae	2	0	0	2
Hormiinae	4	0	0	4
Macrocentrinae	4	0	0	4
Microgastrinae	45	4	0	45
Microtypinae	1	0	0	1
Miracinae	1	0	0	1
Opiinae	10	5	4	14
Orgilinae	7	1	1	8
Pambolinae	1	0	0	1
Rogadinae	16	2	0	16
Sigalphinae	1	0	0	1
Total	335	31	11	346

Chorebus tamsi (Nixon, 1944)

Material examined: 1♀, Fars - Zarghan, 21.IV.2007, Alfalfa field, Leg. ALB. - Distribution: from Western Europe (United Kingdom, Austria) to Russian Far East.

Dacnusa hospita (Förster, 1862)

Material examined: 1♀, Fars - Neyriz, 21.IV.2007, Wheat field, Leg. ALB. - Distribution: from Western Europe (many countries) to China.

Lepton gracilis (Curtis, 1829)

Material examined: 3♂, Fars - Abadeh, 21.IV.2007, Alfalfa field, Leg. ALB. - Distribution: from Western Europe (many countries) to Russian Far East and Korea.

Orthostigma beyarsalani Fischer, 1995

Material examined: 2♀, Fars - Marvdasht, 09.V.2008, Alfalfa field, Leg. ALB. - Distribution: Turkey

Synaldis concolor (Nees, 1812)

Material examined: 1♀, Fars - Neyriz, 13.III.2008, Wheat field, Leg. ALB. - Distribution: Entire Europe to Korea and Russian Sakhalin.

*** Subfamily: Blacinae Förster, 1862***** *Blacus* sp.**

Material examined: 1♂, Fars - Shiraz, 21.IV.2006, untidy orchard on weeds, Leg. ALB. - Distribution: cosmopolitan genus.

Subfamily: Braconinae Nees, 1812***Atanycolus sculpturatus*** (Thomson, 1892)

Material examined: 1♀, Fars - Shiraz, 10.VI.2005, Apple orchard, Leg. ALB. - Distribution: Europe, Russia (Central, Far East), Central Asia, Japan.

*** *Bracon epitriptus*** Marshall, 1885

Material examined: 1♀, Fars - Shiraz, 10.VI.2006, untidy orchard on weeds, Leg. ALB. - Distribution: Europe; Western and Eastern Palaearctic.

*** *Bracon praetermissus*** Marshall, 1885

Material examined: 1♂; Fars - Shiraz, 17.IV.2005, untidy garden, Leg. ALB. - Distribution: Europe, Western and Eastern Palaearctic.

Habrobracon hebetor (Say, 1836)

Material examined: 1♂, Fars - Shiraz, 17.IV.2005, untidy garden, Leg. ALB. - Distribution: Ethiopia, Western and Eastern Palaearctic, Introduced into USA, Canada, China, Fiji Islands, India and Mexico.

Habrobracon nigricans (Szépligeti, 1901)

Material examined: 1♂, Fars - Shiraz, 10.VI.2006, untidy garden, Leg. ALB. - Distribution: Western and Eastern Palaearctic including North Africa.

*** *Vipio illusor*** (Klug, 1817)

Material examined: 1♀, Fars - Shiraz, 28.V.2006, Peach Orchard, Leg. ALB. - Distribution: Western and Eastern Palaearctic including Europe and Central Asia.

Subfamily: Cheloninae Förster, 1862***Chelonus (Microchelonus) contractus*** (Nees, 1816)

Material examined: 1♀, Fars - Zarghan, 18.VII. 2008, untidy garden on weeds, Leg. ALB. - Distribution: Widely distributed in Palaearctic.

Chelonus (Microchelonus) erythrogaster Lucas, 1849

Material examined: 1♀, Fars - Zarghan, 18.VII. 2008, untidy garden on weeds, Leg. ALB. - Distribution: South Europe (Croatia, Italy, Russia), North Africa (Algeria, Tunisia).

Subfamily: Euphorinae Förster, 1862*** *Peristenus picipes* (Curtis, 1833)**

Material examined: 1♂, Fars - Shiraz, 18.VI. 2007, Alfalfa field, Leg. ALB. – Distribution: Western and Eastern Palaearctic including Central Asia.

Subfamily: Microgastrinae Nees, 1814***Microgaster australis* Thomson, 1895**

Material examined: 1♂, Fars - Sadra, 18.VI.2007, Almond orchard on weeds, Leg. ALB. – Distribution: cosmopolitan.

***Apanteles obscurus* (Nees, 1834)**

Material examined: 1♀, Fars - Sadra, 22.IV.2007, untidy garden on weeds, Leg. ALB. – Distribution: Western and Eastern Palaearctic including Central Asia.

***Cotesia glomerata* (Linnaeus, 1758)**

Material examined: 1♀, Fars - Sadra, 22.IV.2007, untidy garden on weeds, Leg. ALB. – Distribution: widely distributed in Palaearctic, introduced into USA, South America, New Zealand.

***Cotesia ruficrus* (Haliday, 1834)**

Material examined: 1♀, Fars - Shiraz, 28.V.2007, Peach orchard on weeds, Leg. ALB. – Distribution: Western and Eastern Palaearctic, Ethiopia, Introduced into USA, New Zealand and Australia.

Subfamily: Opiinae Förster, 1862***Eurytenes scutellatus* (Fischer, 1962)**

Material examined: 1♀, Fars - Zarghan, 10.IV. 2008, Alfalfa field, Leg. ALB. – Distribution: Tunisia, Iran.

*** *Opius levis* Wesmael, 1835**

Material examined: 1♂, Fars - Zarghan, 10.IV. 2008, Alfalfa field, Leg. ALB. – Distribution: Europe including Canary Islands, widely in Palaearctic, Ethiopia.

*** *Opius pumilio* Wesmael, 1835**

Material examined: 1♀, Fars - Zarghan, 10.IV.2008, Alfalfa field, Leg. ALB. – Distribution: Europe, Palaearctic (Russia mainland, Far East).

*** *Opius pygmaeus* Fischer, 1962**

Material examined: 1♀, Fars - Zarghan, 10.IV.2008, Alfalfa field, Leg. ALB. – Distribution: Canada and Alaska to Argentina.

*** *Opius robustus* Telenga, 1950**

Material examined: 1♀, Fars - Zarghan, 10.IV.2008, Alfalfa field, Leg. ALB. – Distribution: Europe (Ukraine), Central Asia (Kazakhstan).

Subfamily: Orgilinae Ashmead, 1900*** *Orgilus kazakhstanicus* Tobias, 1986**

Material examined: 1♀, Fars - Shiraz, 10.V.2006, untidy garden on weed, Leg. ALB. – Distribution: Kazakhstan.

Subfamily: Rogadinae Ashmead, 1900***Aleiodes circumscriptus* (Nees, 1834)**

Material examined: 1♂, Fars - Shiraz, 20.VI.2007, vegetable garden, Leg. ALB. – Distribution: Trans-palaearctic (Europe, Western and Eastern Palaearctic).

***Aleiodes bicolor* (Spinola, 1808)**

Material examined: 1♂, Fars - Shiraz, 20.VI.2007, vegetable garden, Leg. ALB. – Distribution: Western Europe and Eastern Palaearctic (Russia, Iran, Mongolia, China), North Africa.

Discussion

Our primary results indicated a high diversity of the braconids at the studied area. The small cosmopolitan subfamily Blacinae has been newly recorded in Iran. They are endoparasitoids of larval Coleoptera and Mecoptera (Achterberg 1988a, Haeselbarth 1973) and Diptera (Achterberg 1988a). The genus *Blacus* Nees is assumed to have a Holarctic distribution (Achterberg 1976) with some species that have been recorded from the adjacent countries in Central Asia (Haeselbarth 1973) including Turkey (Erdoğan & Beyarslan 2005, Guclu 2011) and Russia (Achterberg 1988a). The occurrence of many *Blacus* species in Asia Minor (Guclu 2011) suggests the existence and wide distribution of the respective group in Iran, as well. The subfamily Alysiinae is a rather common group of koinobiont endoparasitoids of cyclorrhaphous Diptera (Griffiths 1964, Wharton 1993), simply ignored from previous investigations until recent years (Ghahari et al. 2009b, 2010, 2011, Fischer et al. 2011). They are more evenly distributed with numerous species in many biogeographic regions (Wharton 1997b). Species of the tribe Dacnusiini are primary parasitoids of Agromyzidae, leaf-mining Drosophilidae with one group of species diversifying onto *Hydrellia* (Ephydriidae) and at least one species on Psilidae (Griffiths 1964; Marsh 1979). From tribe Alysiini three genera *Aspilota* Förster, *Orthostigma* Ratzeburg and *Synaldis* Förster were collected from alfalfa and wheat fields. They are all parasitoids of Phoridae, often associated with fungi (Achterberg 1988b). Another important group of dipterous parasitoids are members of the subfamily Opiinae that mostly attack the larvae of Agromyzidae (Minkenbergh & van Lenteren 1986, Fischer 1977) and almost exclusively reared from Tephritidae (Wharton 1997a). Four newly recorded species on the genus *Opius* together with seven previously recorded species comprising a very small number of species of this large genus that may occur in different parts of Iran. Few other species of subfamily Rhogadinae have been recorded from Iran, all of them belonging to genera *Aleiodes* Wesmael and *Yelicones* Cameron. This subfamily contains about 800 described species and 54 valid genera (Yu et al. 2005) indicating the absence of enough information from Iran.

There is no host record for *Peristenus picipes* but it would be probably in association with bugs in alfalfa field, where it is collected frequently. Some other species of the genus *Peristenus* have been recorded as parasitoids of *Lygus* spp. (Hemiptera: Miridae) and sometimes as important biocontrol agents (Day et al. 2003, Varis & Achterberg 2001).

In a broader sense, the collected species include important parasitoids of a wide range of insect pests including wood boring Coleoptera (*Atanycolus*, *Vipio*), larvae of Diptera in concealed places (*Opius*), Lepidoptera (*Chelonus*, *Apanteles*, *Cotesia*, *Disophrys*, *Habrobracon*, *Orgilus*), Plant bugs – Miridae (*Peristenus*) that are distributed in different types of habitats in agricultural landscapes, including fruit orchards,

agrocoenoses and sparse forests of Fars province that extended from Central to southern part of Iran. Further investigations together with host associations are necessary to find a more clear knowledge about diversity and distribution of the braconids at different parts of the country.

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