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A contribution to the Braconidae (Hymenoptera: Ichneumonoidea) from north-western Iran

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Abstract: The fauna of Braconidae (Hymenoptera) from north-western Iran and vicinity is studied in this paper. A total of 22 species from 15 genera (including, *Agathis* Latreille, *Bassus* Fabricius, *Earinus* Wesmael, *Chorebus* Haliday, *Foersteria* Szépligeti, *Schizoprymnus* Foerster, *Bracon* Fabricius, *Chelonus* Panzer, *Phanerotoma* Wesmael, *Gildoria* Hedqvist, *Centistes* Haliday, *Apanteles* Foerster, *Cotesia* Cameron, *Diolcogaster* Ashmead, *Orgilus* Haliday) and 7 subfamilies (Agathidinae, Brachistinae, Braconinae, Cheloninae, Euphorinae, Microgastrinae, Orgilinae) were collected and identified.

Keywords: Braconidae, fauna of north-western Iran

Introduction

The Braconidae (Hymenoptera: Ichneumonoidea) is a large cosmopolitan family with an important role in biological pest control and have been used extensively in biological control with much success (Sharkey, 1993; Ghahari *et al.*, 2006). The family is cosmopolitan and diverse in all areas, with no strong preference for tropical or temperate regions nor for wet or dry habitats (Matthews, 1974; Shaw & Huddleston, 1991). Most braconids are primary endoparasitoids of Lepidoptera larvae, although most holometabolous groups may be attacked, e.g. Diptera, Coleoptera and other Hymenoptera. Some species attack spiders, while some are hyperparasitic. There are both solitary and gregarious species in the family, and some are ectoparasitic (Shaw, 1995; Wharton, 1993).

Since braconids are powerful parasitoids and have efficient role in biological pest control, faunistic surveys in different regions are necessary and the first step in biological control or IPM programs. The aim of this paper was to determine the braconid fauna of north-western Iran as part of our aim of determining the complete fauna of Iranian Braconidae. The braconid fauna of Iran has been poorly studied so far (Modarres Awal, 1997; Ghahari *et al.*, 2009a, b, c, d) and therefore these researches, which deal with some regions of Iran, are necessary for more complete knowledge of the Iranian fauna.

Materials and Methods

Specimens were collected by sweeping net and malaise traps from different regions of north-western Iran. The samplings were conducted between 2000 and 2007 in the three provinces including Ardabil, East Azarbayjan and West Azarbayjan. The collected specimens were killed with ethyl acetate and mounted on triangular labels and were examined with a stereoscopic binocular microscope. All the materials were determined by the second author and preserved in his collection. In addition to the mentioned collecting methods, some preserved specimens in the collections of many Iranian universities were checked and used in this paper. Classification,

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nomenclature and distributional data of Braconidae suggested by Yu *et al.* (2006) have been followed.

Annotated List of Species

In a total of 22 species from 15 genera and 7 subfamilies were collected from north-western Iran and vicinity. An annotated list of species is given below.

Subfamily Agathidinae Haliday, 1833

Genus *Agathis* Latreille, 1805

Agathis fulmeki Fischer, 1957

Material: West Azarbayjan province: Ourmieh, 1 female, 1 male, June 2001, East Azarbayjan province: Arasbaran, 2 females, September 2001.

Distribution outside Iran: Palaearctic (Austria, Bulgaria, France, Greece, Hungary, Morocco, Spain, Turkey).

Agathis glaucoptera Nees von Esenbeck, 1834

Material: West Azarbayjan province: Maco, 1 female, June 2000, Ardabil province: Ardabil, 1 female, July 2000.

Distribution outside Iran: Palaearctic (Azerbaijan, France, Germany, Hungary, Italy, Kazakhstan, Macedonia, Russia, Spain, Turkey, Ukraine, former Yugoslavia).

Agathis montana Shestakov, 1932

Material: Ardabil province: Ardabil, 1 male, 1 female, June 2004.

Distribution outside Iran: Palaearctic (Andorra, Armenia, Azerbaijan, Bulgaria, China, France, Greece, Hungary, Greece, Kazakhstan, Korea, Kyrgyzstan, Macedonia, Moldova, Mongolia, Poland, Russia, Switzerland, Turkey, Ukraine, United Kingdom, Uzbekistan, former Yugoslavia).

Genus *Bassus* Fabricius, 1804

Bassus dimidiator (Nees von Esenbeck, 1834)

Material: East Azarbayjan province: Arasbaran, 2 females, June 2005.

Distribution outside Iran: Nearctic, Palaearctic (Armenia, Azerbaijan, Belarus, Bulgaria, Canada, China, former Czechoslovakia, Finland, France, Germany, Greece, Hungary, Italy, Kazakhstan, Latvia, Lithuania, Moldova, Netherlands, Poland, Portugal, Russia, Slovakia, Switzerland, Turkey, U.S.A, Ukraine, United Kingdom, former Yugoslavia).

Genus *Earinus* Wesmael, 1837

Earinus elator (Fabricius, 1804)

Material: East Azarbayjan province: Tabriz, 1 female, June 2003.

Distribution outside Iran: Palaearctic (Austria, Azerbaijan, Belgium, former Czechoslovakia,

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Finland, France, Germany, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Moldova, Netherlands, Norway, Poland, Russia, Slovakia, Sweden, Switzerland, Turkey, United Kingdom, former Yugoslavia).

Genus *Chorebus* Haliday, 1833

Chorebus (Chorebus) nixonii Burghele, 1959

Material: East Azarbayjan province: Jolfa, 2 females, August 2000.

Distribution outside Iran: Palaeartic (Azerbaijan, Romania, Russia, Spain).

Chorebus (Phaenolexis) compressiventris (Telenga, 1935)

Material: Ardabil province: Pars-Abad, and Germe, 2 females, 2 males, August 2002.

Distribution outside Iran: Palaeartic (Azerbaijan, Ukraine).

Chorebus (Stiphrocera) diremtus (Nees von Esenbeck, 1834)

Material: East Azarbayjan province: Arasbaran, 1 male, 2 females, September 2007.

Distribution outside Iran: Palaeartic (Austria, Azerbaijan, Germany, Hungary, Ireland, Lithuania, Netherlands, Poland, Russia, Sweden, Switzerland, Turkey, United Kingdom).

Subfamily Brachistinae Foerster, 1862

Genus *Foersteria* Szépligeti, 1896

Foersteria longicauda Achterberg, 1990

Material: West Azarbayjan province: Salmas, 1 male, July 2000.

Distribution outside Iran: Palaeartic.

Genus *Schizoprymnus* Foerster, 1862

Schizoprymnus elongatus (Szépligeti, 1898)

Material: Ardabil province: Ardabil, 1 female, 1 male, July 2001.

Distribution outside Iran: Palaeartic (Afghanistan, Armenia, Azerbaijan, Belarus, Czech Republic, Georgia, Hungary, Kazakhstan, Lithuania, Moldova).

Subfamily Braconinae Nees von Esenbeck, 1811

Genus *Bracon* Fabricius, 1804

Bracon (Glabrobracon) helleni Telenga, 1936

Material: West Azarbayjan province: Piranshahr, 1 female, May 2000.

Distribution outside Iran: Palaeartic (Cyprus, Israel, Kazakhstan, Switzerland, Turkey).

Bracon (Glabrobracon) lividus Telenga, 1936

Material: East Azarbayjan province: Tabriz, 1 female, June 2004.

Distribution outside Iran: Palaeartic (Cyprus, Israel, Kazakhstan, Switzerland, Turkey).

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Bracon (Glabrobracon) osculator Nees von Esenbeck, 1811

Material: East Azarbayjan province: Tabriz, 2 females, 1 male, June 2004.

Distribution outside Iran: Palaearctic (Afghanistan, Austria, Azerbaijan, Belgium, Bosnia Hercegovina, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Georgia, Germany, Greece, Hungary, Iraq, Ireland, Israel, Italy, Kazakhstan, Korea, Latvia, Lithuania, Macedonia, Moldova, Mongolia, Netherlands, Norway, Poland, Romania, Russia, Serbia, Slovenia, Spain, Sweden, Switzerland, Turkey, Turkmenistan, Ukraine, United Kingdom, former Yugoslavia).

Bracon (Glabrobracon) tschitscherini Kokujev, 1904

Material: West Azarbayjan province: Piranshahr, 1 female, July 2000.

Distribution outside Iran: Palaearctic (Azerbaijan, Cyprus, Greece, Hungary, Israel, Italy, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkey, Turkmenistan, Uzbekistan).

Subfamily Cheloninae Foerster, 1862

Genus *Chelonus* Panzer, 1806

Chelonus (Parachelonus) pellucens (Nees von Esenbeck, 1816)

Material: West Azarbayjan province: Maco, 1 female, September 2006.

Distribution outside Iran: Palaearctic (Armenia, Azerbaijan, Bosnia Hercegovina, Bulgaria, Croatia, Czech Republic, France, Germany, Hungary, Italy, Kazakhstan, Kyrgyzstan, Lithuania, Macedonia, Moldova, Mongolia, Poland, Romania, Russia, Serbia, Spain, Switzerland, Turkey, Ukraine, United Kingdom, Uzbekistan, former Yugoslavia).

Genus *Phanerotoma* Wesmael, 1838

Phanerotoma (Bracotritoma) permixtella Fischer, 1968

Material: West Azarbayjan province: Maco, 1 male, September 2001.

Distribution outside Iran: Palaearctic.

Genus *Gildoria* Hedqvist, 1974

Gildoria titubata (Papp, 1985)

Material: West Azarbayjan province: Maco, 3 males, September 2001.

Distribution outside Iran: Palaearctic (France, Greece, Israel, Italy, Spain).

Subfamily Euphorinae Foerster, 1862

Genus *Centistes* Haliday, 1835

Centistes (Centistes) fuscipes (Nees von Esenbeck, 1834)

Material: Ardabil province: Ardabil, 2 males, July 2002.

Distribution outside Iran: Palaearctic.

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Subfamily Microgastrinae Foerster, 1862

Genus *Apanteles* Foerster, 1862

Apanteles (Apanteles) scutellaris Muesebeck, 1921

Material: West Azarbayjan province: Ourmieh, 1 male, June 2000.

Distribution outside Iran: Nearctic, Neotropical, Oceanic, Palaearctic (Bulgaria, Cyprus, Hungary, Mexico, U.S.A.).

Genus *Cotesia* Cameron, 1891

Cotesia risilis (Nixon, 1974)

Material: West Azarbayjan province: Siah-Cheshmeh, 2 females, June 2003.

Distribution outside Iran: Palaearctic (Czech Republic, Hungary, Italy, Netherlands, Romania, Slovakia, Turkey, United Kingdom, former Yugoslavia).

Genus *Diolcogaster* Ashmead, 1900

Diolcogaster spreta (Marshall, 1885)

Material: East Azarbayjan province: Jolfa, 3 females, August 2003.

Distribution outside Iran: Palaearctic (China, Czech Republic, Hungary, Moldova, Turkey, United Kingdom).

Subfamily Orgilinae Ashmead, 1900

Genus *Orgilus* Haliday, 1833

Orgilus (Orgilus) ponticus Tobias, 1986

Material: West Azarbayjan province: Maco, 1 female, September 2005.

Distribution outside Iran: Palaearctic (Albania, Greece, Hungary, Italy, Russia, Slovenia, Turkey).

Discussion

The results of this research indicate that the braconid fauna of north-western Iran is diverse and comprises some very interesting species. The mentioned region is very vast and includes diverse flora and fauna, and also has boundaries with Turkey, Armenia and Azerbaijan. Therefore, this small research paper, which is restricted to some areas, is not an extensive work, and the conducting of other surveys is necessary for determining many other species in this region. Since Iran is a large country with various geographical regions and climates, faunistic surveys in different regions of Iran is necessary for determining the extent of Iranian Braconidae step by step. A checklist of Iranian Braconidae was published by Fallahzadeh & Saghaei (2009) without perfect attention to all the resources available on Iranian Braconidae, e.g. Ghahari *et al.* (2009a, b, c, d) and many others. A checklist is a type of informational aid used to reduce failure by compensating for potential limits of human memory and attention.

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Therefore, it is expected that a checklist would contain all the data on the subject and a checklist with deficiencies is not usable and helpful for researchers. This is main reason that all the systematic checklists must be prepared by the authorized specialists or at least edited and/or refereed by them carefully.

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