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A contribution to the study on the fauna of Braconidae (Hymenoptera, Ichneumonoidea) from the province of Semnan, Iran.

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Abstract: This paper deals with 18 braconid species (Hymenoptera: Braconidae) belonging to 6 subfamilies (Agathidinae, Blacinae, Braconinae, Cheloninae, Microgastrinae, and Opiniæ) collected in the province of Semnan, Iran.

Key words: Hymenoptera, Braconidae, faunistic study, Semnan, Iran.

Introduction

The members of the family Braconidae (Hymenoptera) are primary parasitoids on other insects, especially the larval stages of Coleoptera, Diptera, and Lepidoptera, but also some hemimetabolous insects like aphids, Heteroptera or Embiidina (Sharkey 1993; Wharton 1993). Since these parasitoids have an important role in biological control of agricultural pests (Quicke & van Achterberg 1990; van Achterberg 1993; Ghahari et al. 2006), this research was conducted in order to determining the fauna of Braconidae in some regions of the province of Semnan. This province covers an area of 96,816 km² and stretches along the Alborz mountain range and borders to Dasht-e Kavir desert in its southern parts. The province is divided into two parts: the mountainous region and the plains at the foot of that mountains. Although the fauna of Braconidae in the province of Semnan was studied by Ghahari & Gadallah (2015), some of the specimens collected were not determined in time for that research, so this paper deals with the materials recently identified.

Material and methods

The specimens were collected by Malaise traps in some regions of the province of Semnan, and also the materials of Garmsar Islamic Azad University were checked too. Classification, nomenclature and distribution data suggested by Yu et al. (2012) have been followed.

Upon the results of this research, 18 braconid species belonging to 8 genera (Agathis Latreille, 1804, Blacus Nees, 1818, Bracon Fabricius, 1804, Chelonus Panzer 1806, Apanteles Förster, 1862,
Cotesia Cameron, 1891, Microgaster Latreille, 1804, and Opius Wesmael, 1835) were collected and identified from the province of Semnan. All the species exception Bracon (Bracon) mariae Dalla Torre, 1898 are new records for the fauna of this province.

**Results**

Subfamily Agathidinae Haliday, 1833

**Genus Agathis Latreille, 1804**

*Agathis fulmeki* Fischer, 1957

**Material examined:** Province of Semnan: Damghan, 35°30′N 54°20′E, (3 ♀♀), August 2011.

**Distribution outside Iran:** Austria, Bulgaria, Croatia, France, Greece, Hungary, Mongolia, Morocco, Portugal, Serbia, Spain, Turkey.

Subfamily Blacinae Förster, 1862

**Genus Blacus Nees, 1818**

*Blacus (Ganychorus) armatulus* (Ruthe, 1861)

**Material examined:** Province of Semnan: Semnan, 35°20′N 53°20′E, (2 ♀♀), June 2011.

**Distribution outside Iran:** Albania, Austria, Azerbaijan, Canada, Czech Republic, Denmark, Finland, France, Georgia, Germany, Hungary, Italy, Kazakhstan, Moldova, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Sweden, Switzerland, Turkey, UK, Ukraine, USA.

Subfamily Braconinae Nees von Esenbeck, 1811

**Genus Bracon Fabricius, 1804**

*Bracon (Bracon) intercessor* (Nees von Esenbeck, 1834)

**Material examined:** Province of Semnan: Garmsar, 35°00′N 52°20′E, (2 ♂♂, 3 ♀♀), April 2011.

**Distribution outside Iran:** Afghanistan, Albania, Austria, Azerbaijan, Bosnia-Herzegovina, Bulgaria, Caucasus, China, Croatia, Cyprus, Czech Republic, France, Georgia, Germany, Greece, Hungary, Israel, Italy, Kazakhstan, Korea, Latvia, Lithuania, Macedonia, Moldova, Mongolia, Netherlands, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Syria, Tajikistan, Turkey, Turkmenistan, UK, Ukraine, Uzbekistan.

*Bracon (Glabrobracon) larvicida* (Wesmael, 1838)

**Material examined:** Province of Semnan: Shahrud, 35°30′N 55°30′E, (1 ♂), September 2011.

**Distribution outside Iran:** Armenia, Austria, Azerbaijan, Belgium, Bulgaria, Croatia, Czech Republic, France, Germany, Greece, Hungary, Italy, Kazakhstan, Moldova, Mongolia, Poland, Romania, Russia, Serbia, Slovenia, Sweden, Turkey, UK, Ukraine.

*Bracon (Bracon) mariae* Dalla Torre, 1898

**Material examined:** Province of Semnan: Shahrizad, 35°42′N 53°21′E, (1 ♂, 2 ♀♀), June 2011.

**Distribution outside Iran:** Armenia, Azerbaijan, Caucasus, Central Asia, Croatia, Germany, Hungary, Israel, Italy, Kazakhstan, Moldova, North Africa, Russia, Serbia, Slovenia, Spain, Sweden, Switzerland, Tunisia, Turkey, Ukraine.
Bracon (Habrobracon) radialis Telenga, 1936

Distribution outside Iran: Austria, Central Asia, Hungary, Italy, Kazakhstan, Macedonia, Mongolia, Russia, Tunisia, Uzbekistan, Turkey, Turkmenistan, former Yugoslavia.

Bracon (Lucobracon) suchorukovi (Telenga, 1936)

Material examined: Province of Semnan: Damghan, 35°30'N 54°20'E, (2♂♂, 2♀♀), August 2011.
Distribution outside Iran: Armenia, Austria, Azerbaijan, Kazakhstan, Lithuania, Moldova, Mongolia, Russia, Ukraine, Turkey.

Bracon (Lucobracon) thuringiacus (Schmideknecht, 1896)

Material examined: Province of Semnan: Garmsar, 35°00'N 52°20'E, (4♀♀), April 2011.
Distribution outside Iran: England, Germany, Italy, Serbia, Turkey.

Subfamily Cheloninae Förster, 1862

Genus Chelonus Panzer, 1806

Chelonus (Microchelonus) incisus (Tobias, 1986)

Distribution outside Iran: Caucasus, Hungary, Mongolia, Russia.

Subfamily Microgastrinae Förster, 1862

Genus Apanteles Förster, 1862

Apanteles candidatus (Haliday, 1834)

Material examined: Province of Semnan: Damghan, 35°30'N 54°20'E, (1♂, 2♀♀), August 2011.
Distribution outside Iran: Azerbaijan, Belgium, Czech Republic, England, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Mongolia, Netherlands, Russia, Slovakia, Sweden, Tajikistan, Turkey, former Yugoslavia.

Genus Cotesia Cameron, 1891

Cotesia cupreus (Lyle, 1925)

Material examined: Province of Semnan: Shahrud, 35°30'N 55°30'E, (1♀), September 2011.
Distribution outside Iran: Azerbaijan, Bulgaria, Czech Republic, England, Finland, France, Germany, Greece, Hungary, Lithuania, Mongolia, Netherlands, Slovakia, Spain, Poland, Romania, Switzerland, Turkey.

Genus Microgaster Latreille, 1804

Microgaster parvistriga Thomson, 1895

Material examined: Province of Semnan: Semnan, 35°20'N 53°20'E, (1♀, 1♂), June 2011.
Distribution outside Iran: Armenia, Bulgaria, Czech Republic, Greece, Hungary, Finland, Germany, Korea, Mongolia, Poland, Romania, Russia, Slovakia, Sweden, Switzerland, UK.
Subfamily Opiinae Blanchard, 1845

Genus Opius Wesmael, 1835

Opius (Opiothorax) abditus Fischer, 1960

Material examined: Province of Semnan: Semnan, 35°20′N 53°20′E, (1♂, 2♀), June 2011.
Distribution outside Iran: Turkey.

Opius (Allophlebus) singularis Wesmael, 1835

Material examined: Province of Semnan: Garmsar, 35°00′N 52°20′E, (2♂), April 2011.
Distribution outside Iran: Armenia, Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Georgia, Germany, Greece, Hungary, Italy, Korea, Lithuania, Mongolia, Montenegro, Netherlands, Poland, Romania, Russia, Serbia, Slovakia, Sweden, Switzerland, Spain, Tunisia, Turkey, UK.

Opius (Opiothorax) filicornis Thomson, 1895

Material examined: Province of Semnan: Shahrud, 35°30′N 55°30′E, (2♂♂, 2♀), September 2011.
Distribution outside Iran: Austria, Bulgaria, Croatia, Czech Republic, Denmark, England, Finland, Germany, Hungary, Italy, Kazakhstan, Montenegro, Poland, Russia, Serbia, Slovakia, Spain, Sweden, Switzerland, Turkey, Uzbekistan.

Opius (Xynobius) decoratus (Stelfox, 1949)

Distribution outside Iran: Armenia, Czech Republic, England, Finland, Hungary, Ireland, Lithuania, Russia, Slovakia, Turkey.

Opius (Phaedrotoma) diversa (Szépligeti, 1898)

Material examined: Province of Semnan: Shahrud, 35°30′N 55°30′E, (2♂♂, 1♀), September 2011.
Distribution outside Iran: Austria, Bulgaria, Czech Republic, Denmark, England, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Israel, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Spain, Sweden, Turkey, Uzbekistan.

Opius (Xynobius) macrocerus (Thomson, 1895)

Material examined: Province of Semnan: Garmsar, 35°00′N 52°20′E, (3♀), April 2011.
Distribution outside Iran: Austria, Bulgaria, Italy, Netherlands, Czech Republic, Finland, France, Germany, Hungary, Japan, Montenegro, Norway, Poland, Romania, Russia, Slovakia, Switzerland, Turkey, UK, USA.

Discussion

This research and also the paper Ghahari & Gadallah (2015) indicate that there is a diverse fauna of Braconidae in the province of Semnan. The fauna of Iranian Braconidae was studied quite well in recent years which some families have been catalogued (e.g. Gadallah & Ghahari 2013a, b, 2015; Khajeh et al. 2014). But many provinces of Iran have not been sampled so far and thus new data on Iranian Braconidae has to be expected. Conducting the faunal surveys in different provinces is necessary for establishing the full species composition of the family. Since the braconid wasps are powerful parasitoids of agricultural pests, and on the other hand one of the best alternative methods
of insect pests control has proved to be the use of efficient parasitoids (Godfray 1994; van Driesche & Bellows 1996), we suggest to researchers to continue with these faunistic surveys on Braconidae in different regions of Iran.

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