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## **A faunistic study on the Braconidae (Hymenoptera) from some regions of Semnan, Iran**

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### **Abstract**

In this paper some materials of the subfamilies Agathidinae, Brachistinae, Braconinae, and Cheloninae (Hymenoptera, Braconidae) which were collected from some regions of Semnan province are studied. In total 15 species from 9 genera are given with distribution data.

Key words: Hymenoptera, Ichneumonoidea, Braconidae, fauna, Semnan, Iran.

### **Zusammenfassung**

Vorliegende Arbeit behandelt das Vorkommen der Braconiden-Unterfamilien Agathidinae, Brachistinae, Braconinae, and Cheloninae (Hymenoptera, Braconidae) aus verschiedenen Gebieten der iranischen Provinz Semnan. Insgesamt gelang der Nachweis von 15 Arten aus 9 Gattungen, die mit Verbreitungsdaten wiedergegeben werden.

## Introduction

The Braconidae constitute one of the most species-rich families of insects with estimation 50,000 worldwide species which are grouped into about 47 subfamilies, 97 tribes and 1032 genera. Among extant groups, the sister group of the Braconidae is the Ichneumonidae, an equally enormous group (SHARKEY & WAHL 1992; QUICKE et al. 1999; BEYARSLAN & AYDOĞDU 2014). The species of this family have long and thin body, long antenna and some members with very long ovipositor. They are from small to medium in size and have narrow waist (MATTHEWS 1974). Braconid wasps attack to wide range of host species (Coleoptera, Diptera, Hemiptera, Hymenoptera, Lepidoptera, Neuroptera, Orthoptera, Psocoptera) (YU et al. 2012). Some species attack spiders, while some are hyperparasitic. There are both solitary and gregarious species in the family (SHAW 1995; WHARTON 1993). Braconids represent two biological groups substantially differing in mode of life and morphology of larvae. All ectoparasites have been combined in the subfamilies Braconinae, Doryctinae and Microgastrinae, and the endoparasites in the remaining subfamilies (SHARKEY 1993; TOBIAS 1986). Semnan is in the north of the country and covers an area of 96,816 square kilometers 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: a mountainous region, and the plains at the foot of the mountains. The forest of this province lies in the central parts, near its border with Golestan Province. It is one of the oldest forests in Iran which is a remnant of the third geological age. Since the fauna of Braconidae was not studied in Semnan province so far, the aim of this investigation is faunistic survey on these parasitoid wasps in some regions of Semnan province.

## Materials and Methods

Specimens were collected by sweeping net and Malaise traps from different regions of Semnan province during spring and summer 2011. The collected specimens were killed with ethyl acetate and mounted on triangular labels and were examined with a stereomicroscope. Classification and nomenclature of Braconidae suggested by YU et al. (2012), and for distribution data PAPP (2011, 2012), YU et al. (2012), and GADALLAH & GHAHARI (2013a, b) have been followed.

## Results

In this research totally 15 braconid species from 9 genera and 4 subfamilies Agathidinae, Brachistinae, Braconinae, and Cheloninae were collected and identified from some regions of Semnan province. The list of species is given below with distribution data.

**Family Braconidae NEES 1811**

**Subfamily Agathidinae HALIDAY 1833**

**Tribe Agathidini HALIDAY 1833**

**Genus *Agathis* LATREILLE 1805**

***Agathis tibialis* NEES 1814**

Material examined: Semnan province, Mahdi-Shahr, 1♀, 2♂♂, 15 June 2011.

Distribution outside Iran: Austria, Azerbaijan, Czech Republic, Denmark, Finland, France, Italy, Kazakhstan, Kyrgyzstan, Lithuania, Moldova, Montenegro, Poland, Russia, Slovenia, Sweden, Switzerland, Turkey, Ukraine, Uzbekistan, former Yugoslavia, Croatia, Macedonia, Serbia, Europe, Germany, Hungary, Greece, Mongolia, the Netherlands, Siberia, UK.

**Genus *Bassus* FABRICIUS 1804**

***Bassus linguarius* (NEES VON ESENBECK 1814)**

Material examined: Semnan province, Semnan, 1♀, 17-21 June 2011.

Distribution outside Iran: Armenia, Kazakhstan, Poland, Slovenia, Spain, Switzerland, Austria, Russia, Belgium, Finland, former Yugoslavia, Bulgaria, France, Italy, Croatia, Germany, Greece, Hungary, Mongolia, the Netherlands, UK, Turkey.

**Subfamily Brachistinae FÖRSTER 1862**

**Genus *Eubazus* NEES VON ESENBECK 1812**

***Eubazus (Brachistes) tibialis* (HALIDAY 1835)**

Material examined: Semnan province, Garmsar, 1♂, 27-29 April 2011.

Distribution outside Iran: Belgium, Bulgaria, Croatia, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Moldova, the Netherlands, Norway, Poland, Russia, Slovakia, Sweden, Switzerland, Ukraine, United Kingdom, former Yugoslavia, Caucasus, Eastern Siberia, Western Europe, Europe, Finland, Macedonia, Montenegro, Mongolia, Serbia, Turkey.

**Subfamily Braconinae NEES VON ESENBECK 1811**

**Genus *Bracon* FABRICIUS 1804**

***Bracon (Glabrobracon) abbreviator* NEES 1834**

Material examined: Semnan province, Shahrood, Jangal-e Abr, 1♀, 1♂, 22-24 May 2011.

Distribution outside Iran: Albania, The Netherlands, Algeria, Armenia, Austria, Azerbaijan, Croatia, Cyprus, Czech Republic, Finland, France, Georgia, Italy, Japan, Jordan, Kazakhstan, Lithuania, Macedonia, Morocco, Norway,

Romania, Slovakia, Slovenia, Spain, Balears, Tajikistan, Turkmenistan, Belgium, Greece, Germany, Poland, Hungary, Israel, Russia, Ukraine, former Yugoslavia, Serbia, Switzerland, Turkey, UK.

***Bracon (Palpibracon) delibator* HALIDAY 1833**

Material examined: Semnan province, Mahdi-shahr, 1 ♀, 15 June 2011.

Distribution outside Iran: Algeria, Armenia, Bulgaria, Canada, Czech Republic, Greece, Romania, Slovakia, Syria, USA, Austria, Azerbaijan, China, Cyprus, Denmark, Finland, Ireland, Kazakhstan, Latvia, Lithuania, Moldova, Poland, Russia, Slovenia, Turkmenistan, Ukraine, former Yugoslavia, Belgium, Bosnia Herzegovina, Croatia, Macedonia, France, Italy, Korea, Mongolia, Sweden, Turkey, Ukraine, Greece, Israel, Serbia, Spain, Germany, Hungary, Switzerland UK.

***Bracon (Bracon) fulvipes* NEES 1834**

Material examined: Semnan province, Semnan, 2 ♀ ♀, 1 ♂, 17-21 June 2011.

Distribution outside Iran: Albania, Korea, Algeria, Bohemia, Bulgaria, Denmark, Georgia, Macedonia, Slovakia, Tunisia, Austria, Belgium, Caucasus, Central Asia, Far East, Finland, France, Kazakhstan, Mongolia, Spain, Croatia, Germany, Greece, Hungary, Iberian Peninsula, Italy, the Netherlands, Poland, Spain, Norway, Romania, Russia, Serbia, Slovenia, Sweden, Switzerland, Turkey, UK, Ukraine, former Yugoslavia.

***Bracon (Bracon) mariae* DALLA TORRE 1898**

Material examined: Semnan province, Garmsar, 1 ♀, 27-29 April 2011.

Distribution outside Iran: Armenia, Azerbaijan, Croatia, Germany, Israel, Italy, Moldova, Russia, Slovenia, Spain, Tunisia, Ukraine, former Yugoslavia, Caucasus, Central Asia, North Africa, Western Europe, Hungary, Kazakhstan, Serbia, South Europe, Sweden, Switzerland, Turkey.

***Bracon (Osculobracon) osculator* NEES VON ESENBECK 1811**

Material examined: Semnan province, Damghan, 2 ♂ ♂, 6-8 August 2011.

Distribution outside Iran: Afghanistan, Azerbaijan, Bosnia Hercegovina, Cyprus, Czech Republic, Georgia, Iraq, Ireland, Israel, Kazakhstan, Latvia, Lithuania, Moldova, Norway, Poland, Slovenia, Turkmenistan, Ukraine, former Yugoslavia, Armenia, Bulgaria, England, Liechtenstein, Portugal, Slovakia, Turkey, Austria, Denmark, Finland, France, Greece, Italy, Korea, Mongolia, the Netherlands, Romania, Russia, Belgium, Germany, Sweden, Croatia, Macedonia, Hungary, Serbia, Spain, Switzerland, Turkey, UK.

***Bracon (Habrobracon) variegator* (SPINOLA 1808)**

Material examined: Semnan province, Ivankey, 1 ♀, 21 April 2011.

Distribution outside Iran: Afghanistan, Azerbaijan, Bulgaria, China, Cyprus, Czech Republic, France, Ireland, Italy, Korea, Latvia, Moldova, Mongolia, Poland, Romania, Slovakia, Slovenia, Switzerland, former Yugoslavia, Armenia, Georgia, Kazakhstan, Lithuania, Russia, Tajikistan, Turkmenistan, Ukraine, Austria,

Tunisia, Belgium, Germany, Greece, Hungary, Israel, Lebanon, Macedonia, Serbia, Spain, Turkey, UK, Uzbekistan, entire Palaearctic species, introduced in New Zealand.

**Genus *Habrobracon* ASHMEAD 1895**

***Habrobracon hebetor* (SAY 1836)**

**Material examined:** Semnan province, Ivankey, 2♀♀, 2♂♂, 21 April 2011; Semnan, 3♀♀, 1♂, 17-21 June 2011.

**Distribution outside Iran:** Cosmopolitan species. Ethiopia, Western and Eastern Palaearctic, Introduced into USA, Canada, China, Fiji Islands, Mexico, Belgium, China, Japan, Korea, Greece, Hungary, India, Vietnam, Italy, Mongolia, Romania, Mozambique, Hawaii, Serbia, Spain, Tajikistan, Turkmenistan, Uzbekistan, UK, USA.

**Genus *Vipio* LATREILLE 1804**

***Vipio intermedius* SZEPLIGETI 1896**

**Material examined:** Semnan province, Shahrood, Jangal-e Abr, 2♀♀, 22-24 May 2011.

**Distribution outside Iran:** Caucasus, Central Asia, southern part of Western Europe (Tobias 1986 as *Zavipio intermedius* SZÉPLIGETI). Albania, Algeria, Armenia, Azerbaijan, Bulgaria, China, Croatia, Czech Republic, Egypt, Georgia, Italy, Moldova, Morocco, Russia, Slovakia, Tajikistan, Ukraine, Uzbekistan, former Yugoslavia, Hungary, Kazakhstan, Mongolia, Romania, Turkmenistan, Spain.

***Vipio mlokoszewiczi* KOKUJEV 1898**

**Material examined:** Semnan province, Garmsar, 1♀, 27-29 April 2011.

**Distribution outside Iran:** Afghanistan, Cyprus, Romania, Tajikistan, Turkmenistan, Uzbekistan, Azerbaijan, Georgia, Central Asia, Israel, Transcaucasica, Europe meridionale, Turkey.

**Subfamily *Cheloniinae* FOERSTER 1862**

**Tribe *Chelonini* FOERSTER 1862**

**Genus *Ascogaster* WESMAEL 1835**

***Ascogaster bicarinata* (HERRICH-SCHÄFFER 1838)**

**Material examined:** Semnan province, Shahrood, 1♀, 1♂, 9 September 2011.

**Distribution outside Iran:** Azerbaijan, Croatia, Georgia, Germany, Greece, Hungary, Italy, Moldova, Romania, Russia, Serbia, Slovakia, Spain, Turkey, Ukraine, United Kingdom, former Yugoslavia, England, Germany, Siberia, Transcaucasica, Greece, southern half of Europe, Turkey.

## **Genus *Phanerotoma* WESMAEL 1838**

### ***Phanerotoma (Phanerotoma) fracta* KOKUJEV 1903**

Material examined: Semnan province, Damghan, 1♂, 6-8 August 2011.

Distribution outside Iran: Austria, Czech Republic, Slovakia, France, Greece, Hungary, Italy, Spain, USA (introduced in California), Mongolia, Siberia.

## **Genus *Chelonus* PANZER 1806**

### ***Chelonus (Chelonus) annulipes* WESMAEL 1835**

Material examined: Semnan province, Shahrood, Jangal-e Abr, 3♀, 2♂, 22-24 May 2011.

Distribution outside Iran: Afghanistan, Armenia, Azerbaijan, Belgium, Bulgaria, Canada, China, Croatia, Czech Republic, France, Georgia, Germany, Greece, Hungary, Iran, Italy, Kazakhstan, Latvia, Lithuania, Moldova, The Netherlands, Poland, Romania, Russia, Switzerland, Tajikistan, Turkmenistan, U.S.A., Ukraine, United Kingdom, Uzbekistan, former Yugoslavia, Puerto Rico (introduced), Guam (introduced), Turkey.

## **Discussion**

This paper includes 15 interesting braconid species from four subfamilies while Semnan province is an arid and semi-arid area. Of course the faunistic works must be continued on other Braconidae subfamilies and also in other regions of this province especially in Jangal-e Abr (GHAHARI 2012) with diverse shrubs and trees, which in this case several new records and also new species will be discovered. Although in this short paper neither new record are reported, but however these short faunistic works are valuable for completing the lists of Iranian Braconidae (e.g. GADALLAH & GHAHARI 2013a, b; FARAHANI et al. 2014; KHAJEH et al. 2014). Since Braconidae with few exceptions are all primary parasitoids, this family in particular has attracted increasing interest as emphasis in pest control has shifted toward biotic agents (Sharkey 1993; Tobias 1986). These beneficial insects are one of the powerful parasitoids with efficient role in biological control in almost agroecosystems, so conservation of them will result to their successful in pest control. Decreasing of pesticides application in fields and gardens is one of the effective strategies for supporting the natural enemies.

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