

A faunistic study on Braconidae (Hymenoptera: Ichneumonoidea) from Iran

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Abstract: This paper deals with faunistic survey of Braconidae (Hymenoptera: Ichneumonoidea) from some regions of Iran. In total 21 species within 16 genera and 8 subfamilies, Agathidinae (2 genera, 2 species), Alysiinae (4 genera, 5 species), Brachistinae (single species), Braconinae (3 genera, 5 species), Cheloninae (single species), Microgastrinae (3 genera, 3 species), Opiinae (2 genera, 3 species) and Rogadinae (single species) are studied. Distribution data and hosts are given.

Keywords: Hymenoptera, Ichneumonoidea, Braconidae, fauna, distribution, host, Iran

Introduction

Braconid wasps (Hymenoptera: Braconidae) with estimation 50.000 worldwide species, are grouped into about 47 subfamilies, 97 tribes and 1032 genera (BEYARSLAN & AYDAĞDU 2014). These insects are powerful biological control agents whose importance in decreasing of pests' population density has been well proved and are used in biocontrol programs (SHARKEY 1993, SHAW 1995, QUICKE 2015). The aim of this paper is a faunistic survey on some braconid materials obtained from different regions of Iran.

Material and methods

The materials were collected from different regions of Iran by rearing of hosts in optimum condition (25±2 °C, 65±5% RH, 14: 10 L: D) in incubator and also Malaise traps and sweeping net. The collected specimens were killed with ethyl acetate, and mounted on triangular labels and were examined with a stereoscopic binocular microscope. Additionally many specimens of some insect collections and museums were studied too. Classification, nomenclature and distribution of Braconidae suggested by YU et al. (2012) have been followed.

Results

In this faunistic paper, totally 21 braconid species from 16 genera and 8 subfamilies (Agathidinae, Alysinae, Brachistinae, Braconinae, Cheloninae, Microgastrinae, Opiinae and Rogadinae) are given. Two species are new records for the fauna of Iran: *Biosteres* (*Chiloitrichia*) *scabriculus* (Wesmael, 1835) and *Aleiodes* (*Chelonorhogas*) *pallidicornis* (Herrich-Schäffer, 1838). The list of species is given below alphabetically with distribution data and hosts when available.

Subfamily **Agathidinae** Haliday, 1833

Genus ***Agathis*** Latreille, 1805

Agathis lugubris (Förster, 1862)

Material examined: Zanjan province, Abhar (Khalifeh-Hesar), 36°17'N 59°40'E, 2♀♀, 26.viii.2013, ex *Coleophora* sp. (Lepidoptera: Coleophoridae).

Distribution outside Iran: Czech Republic, Finland, Germany, Greece, Hungary, Iran, Ireland, Mongolia, Netherlands, Norway, Poland, Slovakia, Switzerland, Turkey, Ukraine, UK.

Genus ***Bassus*** Fabricius, 1804

Bassus linguarius (Nees, 1812)

Material examined: Guilan province, Lahijan, 37°14'N 50°02'E, 1♀, 2♂♂, July 2014, ex *Coleophora serratella* (LINNAEUS, 1761) (Lepidoptera: Coleophoridae).

Distribution outside Iran: Armenia, Belgium, Bulgaria, Croatia, Finland, France, Germany, Hungary, Iran, Kazakhstan, Mongolia, Montenegro, Netherlands, Poland, Serbia, Slovenia, Spain, Switzerland, Turkey, UK.

Subfamily **Alysiinae** Leach, 1815

Tribe **Alysiini** Leach, 1815

Genus ***Aspilota*** Förster, 1862

Dinotrema concinnum (Haliday, 1838)

Material examined: Chaharmahal & Bakhtiari province, Lordegan (Cheshmeh-Khani), 31°30'N 50°49'E, 1♀, September 2009.

Distribution outside Iran: Afghanistan, Austria, Czech Republic, Germany, Greece, Hungary, Iceland, Iran, Ireland, Italy, Mongolia, Netherlands, Poland, Russia, Slovakia, Sweden, Tunisia, UK.

Genus ***Phaenocarpa*** Förster, 1862

Phaenocarpa ruficeps (Nees, 1812)

Material examined: Razavi Khorasan province, Mashhad, 36°17'N 59°40'E, 1♀, 1♂, April 2012, ex *Pegomya hyoscyamae* (PANZER, 1809) (Diptera: Anthomyiidae) in sugar-beet field.

Distribution outside Iran: Armenia, Austria, Belgium, Bosnia Hercegovina, Bulgaria, Canada, China, Czech Republic, Finland, France, Germany, Greece, Hungary, Iceland, Iran, Ireland, Italy, Kazakhstan, Korea, Madeira Islands, Moldova, Mongolia, Montenegro, Morocco, Netherlands, Poland, Romania, Russia, Serbia, South Africa, Spain, Sweden, Switzerland, Tunis, USA, UK, Uzbekistan.

Tribe **Dacnusiini** Forster, 1862

Genus **Chorebus** Haliday, 1833

Chorebus (Phaenolexis) bathyzonus (Marshall, 1895)

Material examined: Isfahan province, Natanz, 33°33'N 51°52'E, 1♂, 14.iv.2005.

Distribution outside Iran: Austria, Azerbaijan, Bosnia Hercegovina, Croatia, Czech Republic, Finland, France, Germany, Hungary, Ireland, Italy, Kazakhstan, Macedonia, Montenegro, Netherlands, Poland, Portugal, Romania, Russia, Serbia, Spain, Sweden, Switzerland, Ukraine, UK.

Chorebus (Stiphrocera) misellus (Marshall, 1895)

Material examined: Hamadan province, Malayer, 34°20'N 48°45'E, 2♀♀, June 2014, ex *Liriomyza congesta* (Becker, 1903) (Diptera: Agromyzidae) on *Medicago sativa*.

Distribution outside Iran: Afghanistan, Austria, Azerbaijan, Belgium, Czech Republic, Denmark, France, Germany, Greece, Hungary, Iran, Italy, Kazakhstan, Mongolia, Montenegro, Poland, Russia, Serbia, Spain, Sweden, Ukraine, UK, Uzbekistan.

Genus **Coelinidea** Viereck, 1913

Coelinidia nigra (Nees, 1811)

Material examined: Markazi province, Saveh (SHARAFLOO), 35°06'N 49°59'E, 2♀♀, 2♂♂, May 2011, ex *Chlorops pumilionis* (Bjerkander, 1778) (Diptera: Chloropidae) in wheat field.

Distribution outside Iran: Austria, Azerbaijan, Belgium, Bulgaria, Croatia, Czech Republic, Finland, France, Germany, Hungary, Ireland, Italy, Lithuania, Moldova, Mongolia, Montenegro, Netherlands, Norway, Poland, Romania, Russia, Serbia, Spain, Sweden, Switzerland, Ukraine, UK, Uzbekistan, Zambia.

Subfamily **Brachistinae** Förster, 1862

Genus **Schizoprymnus** Förster, 1862

Schizoprymnus pallidipennis (Herrich-Schaeffer, 1838)

Material examined: Isfahan province, Kashan, 34°00'N 51°20'E, 1♀, August 2007, ex *Mordellistena (Mordellistena) parvula* Gyllenhal, 1827 (Coleoptera: Mordellidae).

Distribution outside Iran: Armenia, China, Croatia, Czech Republic, Germany, Hungary, Iran, Kazakhstan, Macedonia, Mongolia, Montenegro, Russia, Serbia, Slovakia, Spain, Switzerland, Tajikistan.

Subfamily **Braconinae** Nees von Esenbeck, 1811

Tribe **Braconini** Nees, 1811

Genus **Atanycolus** Förster, 1862

Atanycolus ivanowi (Kokujev, 1898)

Material examined: Qazvin province, Moallem-Kelāyeh, 36°45'N 50°47'E, 1♀, 1♂, August 2009, ex *Melanophila picta* (Pallas, 1773) (Coleoptera: Buprestidae).

Distribution outside Iran: Armenia, Austria, Azerbaijan, China, Croatia, Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Japan, Kazakhstan, Montenegro, Russia, Serbia, Slovakia, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan.

Genus **Bracon** Fabricius, 1804

Bracon (Glabrobracon) delibator Haliday, 1833

Material examined: Fars province, Abadeh, 31°15'N 52°30'E, 1♀, May 2010; Razavi

Khorasan province, Mashhad, 36°17'N 59°40'E, 1♀, April 2012, ex *Urophora* sp. (Diptera: Tephritidae).

Distribution outside Iran: Austria, Azerbaijan, Belgium, Bosnia Hercegovina, China, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Kazakhstan, Korea, Latvia, Lithuania, Macedonia, Moldova, Mongolia, Montenegro, Poland, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Turkmenistan, Ukraine, UK.

Bracon (Bracon) fulvipes Nees, 1834

Material examined: Isfahan province, Shahreza, 32°00'N 51°52'E, 3♀, August 2006, ex *Mononychus punctumalbum* (HERBST, 1784) (Coleoptera: Curculionidae).

Distribution outside Iran: Afghanistan, Austria, Azerbaijan, Belgium, Croatia, Czech Republic, Finland, France, Germany, Greece, Hungary, Iran, Ireland, Italy, Kazakhstan, Korea, Lithuania, Moldova, Mongolia, Montenegro, Netherlands. Poland, Russia, Serbia, Slovenia, Spain, Sweden, Switzerland, Tunisia, Turkey, Ukraine, UK, Uzbekistan.

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

Material examined: Fars province, Abadeh, 31°15'N 52°30'E, 2♀, May 2010, ex *Sibinia femoralis* Germar, 1824 (Coleoptera: Curculionidae); Southern Khorasan province, Birjand, 32°32'N 58°50'E, 1♀, September 2013, ex *Lixus incanescens* Boheman, 1836 (Coleoptera: Curculionidae); Chaharmahal & Bakhtiari province, Ardal, 31°54'N 50°33'E, 1♀, 5.ix.2014, ex *Archarius crux* (Fabricius, 1776) (Coleoptera: Curculionidae).

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

Genus *Vipio* Latreille, 1804

Vipio humerator (A. Costa, 1884)

Material examined: Qazvin province, Takestan, 36°00'N 49°33'E, 2♀, 14.viii.2013.

Distribution outside Iran: Albania, Algeria, Azerbaijan, Bulgaria, Croatia, France, Georgia, Greece, Hungary, Iran, Italy, Moldova, Montenegro, Romania, Russia, Serbia, Spain, Turkey, Ukraine.

Subfamily **Cheloninae** Förster, 1862

Chelonus scabrator (Fabricius, 1793)

Material examined: Fars province, Kazerun, 29°35'N 51°40'E, 1♀, August 2002; Kuhgiluyeh & Boyerahmad province, Dogonbadan, 30°35'N 50°79'E, 1♀, September 2011.

Distribution outside Iran: Albania, Armenia, Austria, Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Greece, Hungary, Iran, Italy, Kazakhstan, Lithuania, Macedonia, Moldova, Mongolia, Montenegro, Netherlands, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, UK.

Subfamily **Microgastrinae** Förster, 1862Tribe **Apantilini** Viereck, 1918Genus **Apanteles** Förster, 1862*Apanteles corvinus* Reinhard, 1880

Material examined: Kerman province, Sirjan, 29°30'N 55°30'E, 1♀, 2♂♂, April 2010, ex *Coleophora serratella* (Linnaeus, 1761) (Lepidoptera: Coleophoridae); Markazi province, Ashtian (Zarnoosheh), 34°25'N 50°04'E, 3♂♂, August 2012, ex *Lyonetia cler-kella* (Linnaeus, 1758) (Lepidoptera: Lyonetiidae).

Distribution outside Iran: Azerbaijan, Bulgaria, Canada, Czech Republic, Finland, Georgia, Germany, Greece, Hungary, Ireland, Japan, Kazakhstan, Lithuania, Moldova, Mongolia, Netherlands, Poland, Romania, Russia, Sweden, Tajikistan, Turkmenistan, Ukraine, UK, Uzbekistan.

Tribe **Cotesiini** Mason, 1981Genus **Cotesia** Cameron, 1891*Cotesia glomerata* (Linnaeus, 1758)

Material examined: Khuzestan province, Behbahan (Imamzadeh Amir Hazer), 30°36'N 50°15'E, 3♀, April 2003, ex *Agrotis segetum* (Denis & Schiffermüller, 1775) (Lepidoptera: Noctuidae); Fars province, Fasa (Fath-Abad), 28°58'N 53°46'E, 2♀, 1♂, 19.v.2018, ex *Pieris brassicae* (Linnaeus, 1758) (Lepidoptera: Pieridae).

Distribution outside Iran: Austria, Malta, Norway, Palestina, Australia, Azerbaijan, Azores, Barbados, Belarus, Belgium, Brazil, Canada, China, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Fiji, Finland, France, Germany, Hungary, India, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Morocco, Netherlands, New Zealand, Pakistan, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Spain, Sweden, Switzerland, Syria, Turkey, USA, Ukraine, UK, Uruguay, Uzbekistan, Vietnam.

Comments: It has been reported as parasitoid of *Agrotis segetum* (ALIZADEH and MOGHADDAM 2004, KHANJANI 2004, 2006), and *Sesamia nonagrioides botanephaga* (KHANJANI 2004), it was also reported as the parasitoid of Saturniidae (GHAHARI et al. 2010c), and larval parasitoid of *Pieris brassicae* (RAZMI et al. 2011).

Genus **Diolcogaster** Ashmead, 1900*Diolcogaster spreta* (Marshall, 1885)

Material examined: Southern Khorasan province, Birjand (Haji-Abad), 32°32'N 58°50'E, 2♂, October 2001.

Distribution outside Iran: China, Czech Republic, Greece, Hungary, Moldova, Romania, Slovakia, Turkey, UK.

Subfamily **Opiinae** Blanchard, 1845Tribe **Biosterini** Fischer, 1970Genus **Biosteres** Förster, 1862*Biosteres (Chilotrichia) scabriculus* (Wesmael, 1835)

Material examined: Fars province, Fasa (Darakoyeh), 28°58'N 53°46'E, 1♀, 19.v.2013. New record for Iran.

Distribution outside Iran: Belgium, Czech Republic, Finland, France, Germany, Hungary, Ireland, Italy, Poland, Slovakia, Turkey, UK.

Tribe **Opiini** Blanchard, 1845

Genus **Opius** Wesmael, 1835

Opius (Nosopoea) cingulatus Wesmael, 1835

Material examined: Khuzestan province, Izeh, 31°54'N 49°59'E, 2♀, April 2009, ex *Phytomyza plantaginis* Goureau, 1851 (Diptera: Agromyzidae).

Distribution outside Iran: Armenia, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Montenegro, Netherlands, Poland, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK.

Opius (Nosopoea) speciosus Fischer, 1959

Material examined: Fars province, Eghlid, 30°53'N 52°41'E, 1♂, April 2006.

Distribution outside Iran: Armenia, Austria, Czech Republic, Finland, France, Hungary, Italy, Slovakia, Turkey.

Subfamily **Rogadinae** Förster, 1862

Genus **Aleiodes** Wesmael, 1838

Aleiodes (Chelonorhogas) pallidicornis (Herrich-Schäffer, 1838)

Material examined: Zanjan province, Abhar, 36°16'N 49°03'E, 2♀, 26.viii.2013. New record for Iran.

Distribution outside Iran: Bulgaria, Croatia, Czech Republic, Finland, Georgia, Germany, Hungary, Korea, Montenegro, Norway, Poland, Russia, Serbia, Sweden, Switzerland, Ukraine.

Discussion

Finding two new records in this research indicates that the fauna of Iranian Braconidae has not been studied perfectly yet, in despite of several contributions recently (e.g. SAMIN et al. 2016, PERIS-FELIPO et al. 2016, CORTÉS et al. 2016) and also cataloguing of most subfamilies of Iranian Braconidae (GADALLAH & GHAHARI 2013a,b, 2015, 2016, GADALLAH et al. 2015a,b, 2016a,b). Additionally this paper is one of scant investigations which deals with the hosts of braconids in Iran. Totally 17 insect species from 3 orders Coleoptera, Lepidoptera and Diptera were identified as the hosts of braconid species of this research. Most published papers dealt with only introducing of collected species by Malaise traps and sweeping net without determining of hosts. Determining of parasitoid-host relationships will result to establishment of biological control programs step by step.

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