

A FAUNISTIC STUDY ON THE FAMILY BRACONIDAE (HYMENOPTERA: ICHNEUMONOIDEA) FROM IRAN

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A faunistic study on the family Braconidae (Hymenoptera: Ichneumonoidea) from Iran. – Samin N., Sakenin Chelav H., Ahmad Z., Pentead-Dias A.M., Samiuddin A. – In this research, totally 26 species of Braconidae (Hymenoptera) were collected and identified from some regions of Iran: Agathidinae (one species), Alysiinae (four species, three genera), Brachistinae (one species), Cheloninae (four species, single genus), Dirrhopinae (one species), Doryctinae (two species, two genera), Hormiinae (one species), Microgastrinae (six species, three genera), Opiinae (two species, two genera), Rhysipolinae (one species), Rhyssalinae (one species), and Rogadinae (two species, single genus). Five species, *Apanteles kubensis* Abdinbekova, 1969 (Microgastrinae), *Dirrhope rufa* Förster, 1851 (Dirrhopinae), *Heterospilus (Heterospilus) austriacus* (Szépligeti, 1906) (Doryctinae), *Microchelonus (Microchelonus) luzhetzkji* (Tobias, 1966) (Cheloninae), and *Opiostomus (Jucundopius) impatientis* (Fischer, 1957) (Opiinae) are new records for the fauna of Iran.

Keywords: Braconidae, fauna, species diversity, new records, Iran.

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Фауністичне дослідження родини Braconidae (Hymenoptera: Ichneumonoidea) Ірану. – Самін Н., Сакенін Челав Г., Ахмад З., Пентеадо-Діас А.М., Саміуддін А. – В роботі представлені результати дослідження фауни Braconidae (Hymenoptera) деяких регіонів Ірану. Матеріал був зібраний з використанням пасток Малеза, а також за допомогою косіння ентомологічним сачком. Певна кількість матеріалу була опрацьована з ентомологічних колекцій місцевих університетів та природничих музеїв. Загалом зібрано та ідентифіковано 26 видів Braconidae: Agathidinae (1 вид), Alysiinae (4 види, 3 роду), Brachistinae (1 вид), Cheloninae (4 види, 1 рід), Dirrhopinae (1 вид), Doryctinae (2 види, 2 роду), Hormiinae (1 вид), Microgastrinae (6 видів, 3 роду), Opiinae (2 види, 2 роду), Rhysipolinae (1 вид), Rhyssalinae (1 вид) та Rogadinae (2 види, 1 рід). П'ять видів, а саме – *Apanteles kubensis* Abdinbekova, 1969 (Microgastrinae), *Dirrhope rufa* Förster, 1851 (Dirrhopinae), *Heterospilus (Heterospilus) austriacus* (Szépligeti, 1906) (Doryctinae), *Microchelonus (Microchelonus) luzhetzkji* (Tobias, 1966) (Cheloninae) і *Opiostomus (Jucundopius) impatientis* (Fischer, 1957) (Opiinae) – є новими знахідками для фауни Ірану. Результати цього дослідження вказують на те, що фауна іранських родини Braconidae Ірану є дуже різноманітною і в той же час маловідомою для широкого кола дослідників. Фауністичні дослідження іранських браконід проводились не в усіх районах. залишається кілька регіонів, де не проводився систематичний, регулярний збір матеріалу, особливо це стосується східної та південної частини країни. Слід відмітити, що представники родини мають певне практичне значення для використання в біологічному методі контролю деяких видів сільськогосподарських та лісових шкідників. Охорона популяцій цих видів-паразитів має неабияке практичне значення в контексті зменшення чисельності популяцій комах-шкідників.

Ключові слова: Braconidae, фауна, видове різноманіття, нові знахідки, Іран.

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Introduction

Braconidae is a large cosmopolitan family with 21,223 described species in 1071 genera, which represent nearly 20% of the total hymenopteran diversity worldwide (Yu et al. 2016). It is one of the major families of insect parasitoids which includes a large number of species that are effective enough to exert a definite regulatory impact on the increase of numerous important plant pests (Wharton 1993; Shaw 1995; Quicke 2015).

The fauna of Iranian Braconidae has been studied rather well (e.g., Gadallah, Ghahari 2013a; 2013b; 2015; 2016; Barahoei et al. 2014; Gadallah et al. 2015a; 2015b; 2016a; 2016b; Farahani et al. 2016; Ghahari 2016; Beyarslan et al. 2017; Samin et al. 2018a; 2018b), with more than eight hundred species spread over to 151 genera of 28 subfamilies of Braconidae are recognized in Iran (Samin et al. 2018a; 2018b; Yu et al. 2016). Since Iran is a large country comprises various agro-ecosystems, new

data (new country records, new species, and new distributional data) are likely to be discovered in future by heavy samplings in all regions of Iran. The purpose of this paper is to record the species of Braconidae collected from some regions of Iran as part of ongoing faunistic studies of Braconidae in Iran.

Material and methods

The specimens of this faunistic research were collected by Malaise traps and sweeping net from different regions of Iran, and also many specimens were obtained from insect collections of some universities and museums. Here we follow Yu et al. (2016) for nomenclature, classification and distributional data. For the subfamilies Microgastrinae and Rogadinae we followed the classification of Fernandez-Triana et al. (2020) and van Achterberg and Shaw (2016) respectively. Provinces of Iran are shown in figure 1.



Fig. 1. Map of Iran with boundaries of provinces.

Species list

In total, 26 species of Braconidae within 12 subfamilies, Agathidinae, Alysiinae, Brachistinae, Cheloninae, Dirrhopinae, Doryctinae, Hormiinae, Microgastrinae, Opiinae, Rhysipolinae, Rhysalinae, and Rogadinae were collected from different regions of Iran. Among them, five species are newly recorded from Iran. The list of species is given alphabetically under subfamily.

Subfamily Agathidinae Haliday, 1833

Therophilus nugax (Reinhard, 1867)

Material examined: East Azarbayjan province, Maraqeh, 1494 m, 1♀, July 2009.

Distribution outside Iran: Azerbaijan, Bulgaria, former Czechoslovakia, France, Germany, Hungary, Italy, Poland, Russia, Switzerland, Turkey, Ukraine, United Kingdom.

Subfamily Alysiinae Leach, 1815

Chorebus (Stiphrocera) avesta (Nixon, 1944)

Material examined: East Azarbayjan province, Horand, 1113 m, 2♀, July 2009.

Distribution outside Iran: Austria, Azerbaijan, Germany, Russia, Spain, Sweden, Turkey, Ukraine, United Kingdom.

Chorebus (Stiphrocera) perkinsi (Nixon, 1944)

Material examined: Kurdistan province, Qorveh, 1323 m, 1♀, September 2013.

Distribution outside Iran: Austria, Azerbaijan, Germany, Hungary, Poland, Russia, Sweden, Switzerland, Turkey, United Kingdom.

Cratospila circe (Haliday, 1838)

Material examined: Qazvin province, Moalem Kelayeh, 1517, 2♀, September 2011.

Distribution outside Iran: Austria, China, former Czechoslovakia, France, Germany, Hungary, Ireland, Italy, Korea, Malaysia, Mongolia, Poland, Russia, Serbia, Slovenia, Spain, Switzerland, Turkey, United Kingdom, former Yugoslavia.

Idiasta subannellata (Thomson, 1895)

Material examined: West Azarbayjan province, Naqadeh, 1327 m, 1♂, July 2015.

Distribution outside Iran: Austria, China, Finland, Hungary, Poland, Russia, Sweden, Ukraine.

Subfamily Brachistinae Förster, 1863

Schizoprymnus ambiguus (Nees, 1816)

Material examined: Razavi Khorasan province, Chenaran, 1170 m, 1♂, 1♀, April 2010.

Distribution outside Iran: Azerbaijan, Belgium, former Czechoslovakia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Kazakhstan,

Latvia, Lithuania, Macedonia, Moldova, Netherlands, Poland, Russia, Serbia, Slovakia, Sweden, Tajikistan, Ukraine, United Kingdom, former Yugoslavia.

Subfamily Cheloninae Förster, 1863

Microchelonus (Microchelonus) erosus (Herrich-Schäffer, 1838)

Material examined: Kermanshah province, Sonqor, 1632, 2♀, June 2004.

Distribution outside Iran: Albania, Algeria, Austria, Azerbaijan, Belarus, Bulgaria, Finland, Georgia, Germany, Hungary, Kazakhstan, Macedonia, Mongolia, Romania, Russia, Serbia, Turkey, former Yugoslavia.

Microchelonus (Microchelonus) fenestratus (Nees, 1816)

Material examined: Northern Khorasan province, Jajarm, 993 m, 3♀, June 2011.

Distribution outside Iran: Azerbaijan, Belgium, Czech Republic, Finland, France, Germany, Hungary, Ireland, Italy, Kazakhstan, Korea, Moldova, Mongolia, Poland, Romania, Russia, Slovakia, Slovenia, Ukraine, United Kingdom, former Yugoslavia.

Microchelonus (Microchelonus) luzhetzkji (Tobias, 1966)

Material examined: Mazandaran province, Behshahr, 57 m, 1♀, September 2014. New record for Iran.

Distribution outside Iran: Armenia, Hungary, Kazakhstan, Mongolia, Turkmenistan, Uzbekistan.

Microchelonus (Microchelonus) scabrosus (Szépligeti, 1896)

Material examined: Kermanshah province, Javanrood, 1340 m, 1♀, April 2009.

Distribution outside Iran: Algeria, Bulgaria, former Czechoslovakia, Greece, Hungary, Kyrgyzstan, Moldova, Mongolia, Poland, Romania, Russia, Serbia, Slovakia, Spain, Uzbekistan, former Yugoslavia.

Subfamily Dirrhopinae van Achterberg, 1984

Dirrhope rufa Förster, 1851

Material examined: East Azarbayjan province, Arasbaran forest, 1♂, September 2008. New record for Iran.

Distribution outside Iran: Germany, Hungary, Japan, Korea, Moldova, Russia.

Subfamily Doryctinae Foerster, 1863

Heterospilus (Heterospilus) austriacus (Szépligeti, 1906)

Material examined: Zanjan province, Abhar, 1540 m, 1 ♀, June 2011. New record for Iran.
Distribution outside Iran: Austria, China, Germany, Kazakhstan, Latvia, Moldova, Russia.

***Spathiomorpha varinervis* Tobias, 1976**

Material examined: Ardebil province, Sarein, 1674 m, 1 ♀, June 2012.
Distribution outside Iran: Azerbaijan, Georgia, Russia.

Subfamily Hormiinae Foerster, 1863

***Hormius extimus* Tobias, 1964**

Material examined: Northern Khorasan province, Jajarm, 993 m, 2 ♀, 1 ♂, June 2011.
Distribution outside Iran: Azerbaijan, Spain, Tajikistan, Turkmenistan.

Subfamily Microgastrinae Foerster, 1862

***Apanteles firmus* Telenga, 1949**

Material examined: Semnan province, Shahrood, 1311 m, 2 ♀, June 2011.
Distribution outside Iran: Armenia, Azerbaijan, France, Hungary, Kazakhstan, Korea, Mongolia, Romania, Russia, Tajikistan, Ukraine, former Yugoslavia.

***Apanteles kubensis* Abdinbekova, 1969**

Material examined: Guilan province, Masal, 70 m, 1 ♀, August 2012. New record for Iran.
Distribution outside Iran: Azerbaijan, Hungary, Moldova, Turkey.

***Dolichogenidea princeps* (Wilkinson, 1941)**

Material examined: Kurdistan province, Bijar, 1746 m, 1 ♀, June 2016.
Distribution outside Iran: Former Czechoslovakia, Hungary, Italy, Korea, Romania, Spain, Turkey, Ukraine, United Kingdom.

***Microplitis strenuus* Reinhard, 1880**

Material examined: Chaharmahal & Bakhtiari province, Lordegan, 1609 m, 1 ♂, 2 ♀, August 2015.
Distribution outside Iran: Afghanistan, Armenia, Azerbaijan, China, Croatia, Germany, Hungary, Kazakhstan, Moldova, Mongolia, Netherlands, Poland, Russia, Serbia, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, Uzbekistan, former Yugoslavia.

***Microplitis tuberculatus* (Bouché, 1834)**

Material examined: Hamadan province, Malayer, 1776 m, 1 ♂, 1 ♀, September 2014.
Distribution outside Iran: Armenia, Azerbaijan, Finland, Georgia, Germany, Hungary, Ireland, Italy, Moldova, Mongolia, Poland, Romania,

Russia, Slovakia, Sweden, Switzerland, United Kingdom.

***Microplitis varipes* (Ruthe, 1860)**

Material examined: Hamedan province, Asad-Abad, 1647, 2 ♀, May, 2008.
Distribution outside Iran: Austria, Azerbaijan, China, former Czechoslovakia, Finland, Germany, Hungary, Italy, Kazakhstan, Moldova, Mongolia, Montenegro, Netherlands, Poland, Russia, Switzerland, Turkey, Ukraine, former Yugoslavia.

Subfamily Opiinae Blanchard, 1845

***Opiostomus (Jucundopius) impatientis* (Fischer, 1957)**

Material examined: Markazi province, Ashtiyan, 2082 m, 1 ♀, May 2010. New record for Iran.
Distribution outside Iran: Armenia, Austria, Canary Islands, Czech Republic, Finland, Germany, Hungary, Italy, Kazakhstan, Kyrgyzstan, Mongolia, Poland.

***Psytalia (Psytalia) carinata* (Thomson, 1895)**

Material examined: Zanjan province, Abhar, 1540 m, 1 ♂, 1 ♀, June 2011.
Distribution outside Iran: Armenia, Austria, Bulgaria, former Czechoslovakia, Finland, France, Germany, Hungary, Italy, Kazakhstan, Kyrgyzstan, Lithuania, Moldova, Poland, Sweden, Switzerland, former Yugoslavia.

Subfamily Rhysipolinae Belokobylskij, 1984

***Rhysipolis enukidzei* Tobias, 1976**

Material examined: West Azarbayjan province, Khoy, 1153 m, 2 ♀, July 2013.
Distribution outside Iran: Azerbaijan, Georgia, Japan, Kazakhstan, Korea, Poland, Russia, Ukraine.

Subfamily Rhyssalinae Foerster, 1863

***Oncophanes lanceolator* (Nees, 1834)**

Material examined: Lorestan province, Azna, 1875 m, 1 ♂, 2 ♀, September 2014.
Distribution outside Iran: Armenia, Austria, Azerbaijan, Belarus, Belgium, Czech Republic, Finland, France, Georgia, Germany, Hungary, Ireland, Kazakhstan, Lithuania, Moldova, Poland, Romania, Russia, Slovakia, Sweden, Switzerland, Ukraine, United Kingdom.

Subfamily Rogadinae Foerster, 1863 s.l.

***Aleiodes (Aleiodes) modestus* (Reinhard, 1863)**

Material examined: East Azarbayjan province, Arasbaran forest, 1 ♀, September 2008.
Distribution outside Iran: Armenia, Bulgaria, former Czechoslovakia, Finland, Georgia, Germany, Hungary, Italy, Korea, Mongolia,

Norway, Poland, Russia, Sweden, Switzerland, United Kingdom.

***Aleiodes (Neorhogas) quadrum* Tobias, 1976**

Material examined: West Azarbayjan province, Salmas, 1561 m, 1♂, August 2015.

Distribution outside Iran: Azerbaijan, Croatia, Hungary, former Yugoslavia.

Discussion

The results of the present research indicate that the fauna of Iranian Braconidae is very diverse and nearly unknown. Faunistic surveys on Iranian Braconidae have not been conducted in all areas and there are several regions where have not been sampled systematically, especially Eastern and

Southern parts. Regarding to braconids' importance in biological control of several agricultural and forest pests (Wharton 1993, Quicke 2015), conservation of these powerful parasitoids will result to pests' populations suppression.

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