

A FAUNISTIC STUDY ON ICHNEUMONIDAE (HYMENOPTERA) OF IRAN

N. Samin¹, A.M. Pentead-Dias², R. Jussila³, H. Sakenin⁴, I. Bodlah⁵

A faunistic study on Ichneumonidae (Hymenoptera) of Iran. – Samin N., Pentead-Dias A.M., Jussila R., Sakenin H., Bodlah I. – In this faunistic paper, totally 85 species of Ichneumonidae (Hymenoptera) within 18 subfamilies: Acaenitinae (one species), Adelognathinae (one species), Anomaloniinae (two species, one genus), Banchinae (five species, two genera), Campopleginae (fourteen species, eleven genera), Cremastinae (one species), Cryptinae (fifteen species, ten genera), Stenopelmatinae (ten species, seven genera), Diplazontinae (one species), Eucerotinae (one species), Ichneumoninae (fifteen species, twelve genera), Metopiinae (three species, two genera), Orthocentrinae (four species, three genera), Pimplinae (four species, three genera), Poemeniinae (one species), Tersilochinae (three species, three genera), Tryphoninae (one species), Xoridinae (three species, one genus) were collected from different regions of Iran. Ten species are newly recorded for Iran.

Key words: Ichneumonid wasps, parasitoid, fauna, new records, Iran

Addresses: 1- Young Researchers and Elites Club, Science and Research Branch, Islamic Azad University, Tehran, Iran; email: n_samin63@yahoo.com

2- Departamento de Ecologia e Biologia Evolutiva, Universidade Federal de São Carlos – UFSCar, Rodovia Washington Luís, São Carlos, SP, Brasil; email: angelica@power.ufscar.br

3- Zoological Museum, Section of Biodiversity and Environmental Sciences, Department of Biology, FI-20014 University of Turku, Finland; email: reijo.jussila@utu.fi

4- Department of Plant Protection, Qaemshahr Branch, Islamic Azad University, Qaemshahr, Iran; email: hchelave@yahoo.com

5- Insect Biodiversity and Conservation Group, Department of Entomology, Faculty of Crop and Food Sciences, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan; email: imranbodlah@gmail.com

Фауністичне дослідження Ichneumonidae (Hymenoptera) Ірану. – Самін Н., Пентеадо-Діаз А.М., Юссіла Р., Сакенін Г., Бодлах І. – Ichneumonidae — найбільша родина перетинчастокрилих з 1601 родом і 25285 описаними видами. Представники родини зустрічаються в різноманітних кліматичних зонах, хоча вологий клімат для них є найбільш сприятливим. Іздіці-іхневмоніди є паразитами личинок та лялечок твердокрилих, перетинчастокрилих та лускокрилих, тому відіграють значну роль у біологічному методі регуляції чисельності комах-шкідників. Фауна Ichneumonidae Ірану різноманітна, однак, це її до цих пір вивчена недостатньо. У даній публікації представлені результати дослідження іздіців-іхневмонід іранської фауни. Матеріал був зібраний за допомогою пасток Малеза та ентомологічним сачком, а також шляхом вирошування в інкубаторі комах-господарів, зібраних у різних регіонах Ірану. Загалом всього 85 видів родини Ichneumonidae (Hymenoptera), які належать до 18 підродин: Acaenitinae (один вид), Adelognathinae (один вид), Anomaloniinae (два види, один рід), Banchinae (п'ять видів, два роду), Campopleginae (14) видів, 11 пологів), Cremastinae (один вид), Cryptinae (15 видів, 10 родів), Stenopelmatinae (10 видів, сім родів), Diplazontinae (один вид), Eucerotinae (один вид), Ichneumoninae (15 видів, 12 родів), Metopiinae (три види, два роду), Orthocentrinae (чотири види, три роду), Pimplinae (чотири види, три роду), Poemeniinae (один вид), Tersilochinae (три види, три роду), Tryphoninae (один вид), Xoridinae (три види, один рід) були зібрані з різних регіонів Ірану. Десять видів нещодавно зареєстровані для Ірану. У роботі наведено відомості щодо видової назви, автора та дати опису, локалітету та дати збору, кількості особин та загального поширення окремих видів. Класифікація, номенклатура та дані щодо поширення Ichneumonidae подано за D.S. Yu, K. van Achterberg, K. Horstmann (2016).

Ключові слова: іздіці-іхневмоніди, паразити, фауна, нові знахідки, Іран

Адреси: 1- Клуб молодих дослідників та еліти, відділення науки і досліджень, Ісламський університет Азад, Тегеран, Іран; email: n_samin63@yahoo.com

2- Кафедра екології і еволюційної біології, Федеральний університет Сан-Карлос, шосе Вашингтон Луїс, Сан-Карлос, Сан-Паулу, Бразилія; e-mail: angelica@power.ufscar.br

3- Зоологічний музей, відділення біорізноманіття та наук про навколишнє середовище, кафедра біології, університет Турку, Фінляндія; email: reijo.jussila@utu.fi

4- кафедра захисту рослин, філія Каєміагр, Ісламський університет Азад, Каєміагр, Іран; email: hchelave@yahoo.com

5- Група з дослідження біорізноманіття та збереження комах, кафедра ентомології, факультет рослинництва та наук про продовольство, Пір Мегр Алі Шах Аридний аграрний університет, Равалпінді, Пакистан; email: imranbodlah@gmail.com

Introduction

The Ichneumonidae is the largest hymenopteran family with 1,601 genera and 25,285 described species (Yu et al. 2016). This cosmopolitan family usually occurs in all kinds of climates, though humid habitats are more favourable for them (Wahl 1993; Broad et al. 2018). Ichneumonids are important parasitoids of other insects, especially several agricultural pests. Common hosts are larvae and pupae of Coleoptera, Hymenoptera and Lepidoptera and therefore these parasitoids have efficient roles in biological control of pests (Gupta 1987; Quicke 2015).

The catalogue of Iranian Ichneumonidae has been published by Kolarov and Ghahari (2005), they recorded 144 species belonging to 65 genera and 14 subfamilies. After that H. Barahoei, E. Rakhshani, and M. Riedel (2012) published the checklist comprises 502 species belonging to 189 genera and 24 subfamilies. Latter, other authors (Mohammadi-Khoramabadi et al. 2013; Ghahari, Jussila 2014a; 2014b; 2015a; 2015b; 2016a; 2016b; Barahoei et al. 2014a; 2014b; 2015; Ghahari 2015; 2016; Ghahari, Gadallah 2017; Riedel, Aghadokht 2017; Mohammadi-Khoramabadi, Talebi 2018, etc.) have made contributions to the Iranian fauna.

Iran forms a large part of the Iranian plateau covering an area of 1,623,779 km². Climatologically, Iran is a predominantly arid and semi-arid country, but the northern slopes of the Alburz ranges and the Caspian lowland receive 800 to 2000 mm annual rainfall, making them the most humid parts of the country. The Dasht-e Kavir and Dasht-e Lut deserts are the driest areas with an annual precipitation of less than 150 mm. The highlands receive between 250 and 800 mm (Zehzad et al. 2002; Hakimzadeh Khoei et al. 2011). The aim of this paper is the faunistic study on the ichneumonids from some regions of Iran and introducing of ten new country records.

Materials and methods

The specimens of this research were collected by Malaise traps and sweeping net, and also rearing of hosts under optimum conditions (25±2 °C, 65±5% RH, 14: 10 L: D) in incubator from different regions of Iran. The collected materials were put in ethanol 95% or mounted on triangular labels and were examined with a stereoscope (SZM-680). Additionally the materials of insect collections

from different branches of Islamic Azad University were checked too. In this paper, the information concerning specific name, author and description date, locality, date of collection, and number of species are given. Resources used to identify the specimens included Townes (1969; 1970a, 1970b; 1971), Kasparyan (1981), Broad (2011), Rouse, Villemant (2012), and Bennett (2015). Classification, nomenclature and distributional data of Ichneumonidae suggested by D.S. Yu, K. van Achterberg, K. Horstmann (2016) have been followed.

Results

In total, 85 ichneumonid species in 62 genera and 18 subfamilies have been collected from different regions of Iran. Ten species are new records for the fauna of Iran: *Adelognathus chrysopygus* (Gravenhorst, 1829), *Exetastes inquisitor* Gravenhorst, 1829, *Diadegma gracile* (Gravenhorst, 1829), *Tranosema exoletum* (Thomson, 1887), *Mesoleptus marginatus* (Thomson, 1884), *Phthorima compressa* (Desvignes, 1856), *Euceros serricornis* (Haliday, 1838), *Aoplus rubricosus* (Holmgren, 1864), *Catadelphus arrogator* (Fabricius, 1781) and *Metopius laeviusculus* Dominique, 1898.

Subfamily Acaenitinae

Genus *Coleocentrus* Gravenhorst, 1829

Coleocentrus excitator (Poda, 1761)

Material examined: Mazandaran province, Babol (Nakhkola), 2♀, 2♂, June 2013, ex *Archips rosana* (Linnaeus, 1758) (Lepidoptera: Tortricidae).

General distribution: Austria, Belarus, Belgium, Bulgaria, China, former Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Italy, Japan, Korea, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, former Yugoslavia.

Subfamily Adelognathinae

Genus *Adelognathus* Holmgren, 1855

Adelognathus chrysopygus (Gravenhorst, 1829)

Material examined: Mazandaran province, Tonekabon (Jangal-e 2000), 1♀, August 2017.

General distribution: Bulgaria, Czech Republic, Finland, France, Germany, Isle of Man, Italy,

Kyrgyzstan, Latvia, Netherlands, Poland, Russia, Spain, Sweden, Ukraine, United Kingdom.
New record for Iran.

Subfamily Anomaloniinae

Genus *Agrypon* Förster, 1860

***Agrypon anxium* (Wesmael, 1849)**

Material examined: Golestan province, Salikandeh, 3♀, September 2009.

General distribution: Belgium, Bulgaria, China, Czech Republic, Finland, France, Germany, Hungary, Italy, Japan, Kazakhstan, Korea, Latvia, Lithuania, Moldova, Netherlands, Norway, Poland, Romania, Serbia, Sweden, Turkmenistan, United Kingdom, former Yugoslavia.

***Agrypon batis* (Ratzeburg, 1855)**

Material examined: Mazandaran province, Behshahr, km 4 Behshar-Neka, 1♀, April 2009.

General distribution: Algeria, Azerbaijan, Finland, France, Germany, Hungary, Latvia, Moldova, Netherlands, Poland, Russia, Sweden, Ukraine.

Subfamily Banchinae

Genus *Exetastes* Gravenhorst, 1829

***Exetastes inquisitor* Gravenhorst, 1829**

Material examined: West Azarbaijan province, Oshnavieh, 2♀, June 2015.

General distribution: Austria, China, France, Germany, Hungary, Latvia, Lithuania, Mongolia, Poland, Romania, Russia, Spain, Ukraine, former Yugoslavia.

New record for Iran.

***Exetastes laevigator* (Villers, 1789)**

Material examined: Southern Khorasan province, 2♀, May 2009. Chaharmahal & Bakhtiari province, Dorahan, 1♀, 2♂, 19.viii.2011, ex *Agrotis segetum* (Denis & Schiffermüller, 1775) (Lepidoptera: Noctuidae).

General distribution: Afghanistan, Austria, Belarus, Belgium, Bulgaria, China, former Czechoslovakia, Denmark, Finland, France, Georgia, Germany, Greece, Hungary, Italy, Kyrgyzstan, Latvia, Lithuania, Mongolia, Netherlands, Norway, Poland, Portugal, Romania, Russia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.

Genus *Lissonota* Gravenhorst, 1829

***Lissonota accusator* (Fabricius, 1793)**

Material examined: Khuzestan province, Izeh, 1♀, 1♂, October 2014.

General distribution: Austria, Belgium, Bulgaria, Canada, former Czechoslovakia, Finland, France, Germany, Hungary, Italy, Latvia, Moldova, Norway, Poland, Romania, Russia, Sweden, Switzerland, Turkey, USA, United Kingdom.

***Lissonota conflagrata* Gravenhorst, 1829**

Material examined: Ardabil province, Germe (Husainkhanlu), 1♀, September 2009.

General distribution: Armenia, Austria, Azerbaijan, Belgium, China, former Czechoslovakia, France, Germany, Hungary, Poland, Romania, Russia.

***Lissonota cruentator* (Panzer, 1809)**

Material examined: Fars province, Abadeh, 1♀, October 2016.

General distribution: Albania, Austria, Azerbaijan, Belgium, Bulgaria, former Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Italy, Lithuania, Luxembourg, Moldova, Morocco, Netherlands, Poland, Portugal, Romania, Russia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, former Yugoslavia.

Subfamily Campopleginae

Genus *Bathyplectes* Förster, 1869

***Bathyplectes carthaginiensis* (Smits van Burgst, 1913)**

Material examined: Guilan province, Siyahkal, 1♀, June 2010.

General distribution: Bulgaria, Egypt, Germany, Italy, Tunisia, Turkey, former Yugoslavia.

Genus *Campoletis* Förster, 1869

***Campoletis annulata* (Gravenhorst, 1829)**

Material examined: Khorasan-e Shomali province, Chaman-Bid, 1♀, 1♂, 11.v.2008.

General distribution: Afghanistan, Austria, Belgium, Bulgaria, China, former Czechoslovakia, Denmark, Faeroe Islands, Finland, France, Germany, Hungary, India, Ireland, Israel, Italy, Latvia, Netherlands, Poland, Romania, Russia, (Tambov oblast), Spain, Sweden, Tunisia, United Kingdom.

Genus *Campoplex* Gravenhorst, 1829

***Campoplex rufipes* Gravenhorst, 1829**

Material examined: Khuzestan province, Shush, 2♀, April 2007.

General distribution: Austria, Belgium, Bulgaria, Canary Islands, former Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, Switzerland, Tunisia, United Kingdom.

Genus *Diadegma* Förster, 1869

***Diadegma gracile* (Gravenhorst, 1829)**

Material examined: East Azarbaijan province, Marand (Darandash), 1♀, September 2016.

General distribution: France, Germany, Hungary,

Italy, Latvia, Netherlands, Poland, Romania, Russia, Tajikistan, United Kingdom.
New record for Iran.

***Diadegma nanus* (Gravenhorst, 1829)**

Material examined: Hamadan province, Gol Tappeh, 1♀, September 2008.
General distribution: Austria, Belgium, Canada, former Czechoslovakia, Finland, France, Germany, Hungary, Lithuania, Poland, Romania, Sweden, Ukraine, United Kingdom.

Genus *Dusona* Cameron, 1900

***Dusona aversa* (Förster, 1868)**

Material examined: Ardabil province, Bilehsavar, 1♀, August 2009.
General distribution: Belgium, Bulgaria, France, Germany, Netherlands, Romania, Russia, Spain, Sweden, United Kingdom.

***Dusona juvenilis* (Förster, 1868)**

Material examined: Golestan province, Kalaleh (Qareh-Shoor), 2♀, May 2010.
General distribution: Austria, Belarus, Belgium, Bulgaria, Finland, France, Germany, Hungary, Ireland, Kazakhstan, Latvia, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, United Kingdom.

Genus *Hyposoter* Förster, 1869

***Hyposoter brischkei* (Bridgman, 1882)**

Material examined: Kordestan province, Bijar, 1♀, July 2015.
General distribution: Austria, Finland, France, Germany, Hungary, Latvia, Norway, Poland, Romania, Russia, Slovakia, United Kingdom.

Genus *Olesicampe* Förster, 1869

***Olesicampe argentata* (Gravenhorst, 1829)**

Material examined: Guilan province, Siahkal, 1♀, September 2014.
General distribution: Austria, Belgium, Finland, France, Germany, Hungary, Italy, Latvia, Netherlands, Norway, Poland, Russia, Spain, Sweden, United Kingdom.

Genus *Phobocampe* Förster, 1869

***Phobocampe bicingulata* (Gravenhorst, 1829)**

Material examined: Mazandaran province, Savadkuh (Alasht), 1♀, 1♂, July 2005.
General distribution: Austria, Belarus, Belgium, Bulgaria, Canada, Czech Republic, Denmark, Finland, France, Germany, Hungary, Isle of Man, Italy, Japan, Latvia, Netherlands, Norway, Poland, Romania, Russia, Sweden, Switzerland, USA, United Kingdom.

Genus *Sinophorus* Förster, 1869

***Sinophorus albidus* (Gmelin, 1790)**

Material examined: West Azarbaijan province, Naqadeh (Damirchi), 2♀, 2♂, September 2013, ex *Yponomeuta padella* (Linnaeus, 1758) (Lepidopter: Yponomeutidae).
General distribution: Austria, Belgium, former Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Kazakhstan, Latvia, Moldova, Poland, Romania, Russia, Spain, Sweden, Switzerland, Tunisia, Ukraine, United Kingdom, Uzbekistan.

***Sinophorus geniculatus* (Gravenhorst, 1829)**

Material examined: Chaharmahal & Bakhtiari province, Farsan, 2♀, 1♂, August 2013.
General distribution: Austria, Azerbaijan, Belgium, Bulgaria, China, former Czechoslovakia, Finland, France, Germany, Hungary, Iceland, Israel, Italy, Latvia, Lithuania, Moldova, Mongolia, Netherlands, Poland, Romania, Russia, Spain, Sweden, Taiwan, Tajikistan, Turkey, Ukraine, United Kingdom.

Genus *Tranosema* Förster, 1869

***Tranosema exoletum* (Thomson, 1887)**

Material examined: East Azarbaijan province, Bonab, 1♀, July 2010.
General distribution: former Czechoslovakia, Finland, Germany, Latvia, Norway, Poland, Romania, Russia, Sweden, Ukraine.
New record for Iran.

Genus *Rhimphoctona* Förster, 1869

***Rhimphoctona* (*Xylophylax*) *obscuripes* (Holmgren, 1860)**

Material examined: Qazvin province, Moalem Kelayeh, 1♀, September 2011.
General distribution: Austria, Belgium, former Czechoslovakia, Finland, Germany, Hungary, Ireland, Isle of Man, Italy, Latvia, Norway, Poland, Romania, Russia, Sweden, Switzerland, United Kingdom.

Subfamily Cremastinae

Genus *Dimophora* Förster, 1869

***Dimophora nitens* (Gravenhorst, 1829)**

Material examined: Kuhgiloyeh and Boyer-Ahmad province, Dogonbadan, 2♀, July 2009.
General distribution: Austria, Belarus, Bulgaria, Croatia, former Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Italy, Mongolia, Norway, Poland, Romania, Serbia, Spain, Sweden, Switzerland, Turkey, United Kingdom, former Yugoslavia.

Subfamily Cryptinae

Genus *Aptesis* Förster, 1850

Aptesis assimilis (Gravenhorst, 1829)

Material examined: West Azarbaijan province, Ourmieh (Nazlu), 2♀, August 2010.

General distribution: Austria, Bulgaria, Denmark, Finland, France, Germany, Hungary, Isle of Man, Lithuania, Norway, Poland, Russia, Spain, Sweden, Switzerland, United Kingdom.

Genus *Caenocryptus* Thomson, 1873

Caenocryptus rufiventris (Gravenhorst, 1829)

Material examined: Isfahan province, Natanz, 1♀, 1♂, July 2008.

General distribution: Afghanistan, Austria, Belarus, former Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Lithuania, Moldova, Poland, Romania, Russia, Sweden, Turkey, United Kingdom.

Caenocryptus rufiventris (Gravenhorst, 1829)

Material examined: Golestan province, Golestan National Park, 1♀, September 2007.

General distribution: Afghanistan, Austria, Belarus, former Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Lithuania, Moldova, Poland, Romania, Russia, Sweden, Turkey, United Kingdom.

Genus *Cubocephalus* Ratzeburg, 1848

Cubocephalus anatorius (Gravenhorst, 1829)

Material examined: Fars province, Kazerun, 1♂, April 2012.

General distribution: Austria, Belgium, Bulgaria, former Czechoslovakia, Denmark, Finland, France, Georgia, Germany, Hungary, Italy, Japan, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, United Kingdom.

Cubocephalus lacteator (Gravenhorst, 1829)

Material examined: Semnan province, Shahrud, 1♀, April 2011.

General distribution: Austria, Belgium, Bulgaria, former Czechoslovakia, Finland, France, Germany, Hungary, Latvia, Lithuania, Moldova, Netherlands, Norway, Poland, Russia, Spain, Sweden, United Kingdom.

Genus *Eudelus* Förster, 1869

Eudelus scabriculus (Thomson, 1884)

Material examined: Guilan province, Langrood (Liseh Rud), 3♀, May 2014, ex *Coleophora serratella* (Linnaeus, 1761) (Lepidoptera: Coleophoridae).

General distribution: Austria, Azerbaijan, Bulgaria, former Czechoslovakia, Finland, France, Germany, Hungary, Italy, Lithuania, Norway, Poland, Romania, Serbia, Sweden, United Kingdom, former Yugoslavia.

Genus *Gnotus* Förster, 1869

Gnotus chionops (Gravenhorst, 1829)

Material examined: Ardabil province, Germe, 1♂, July 2014.

General distribution: Austria, Belgium, Bulgaria, former Czechoslovakia, Finland, France, Germany, Hungary, Japan, Latvia, Netherlands, Norway, Poland, Spain, Sweden, Switzerland, USA, United Kingdom.

Genus *Isadelphus* Förster, 1869

Isadelphus armatus (Gravenhorst, 1829)

Material examined: Mazandaran province, Amol (Larijan), 1♀, June 2008.

General distribution: Belgium, Bulgaria, former Czechoslovakia, Finland, France, Germany, Hungary, Ireland, Latvia, Poland, Sweden, United Kingdom.

Isadelphus inimicus (Gravenhorst, 1829)

Material examined: West Azarbaijan province, Maku (Mirzadulmaz), 2♀, 1♂, June 2006, ex *Cydia pomonella* (Linnaeus, 1758) (Lepidoptera: Tortricidae).

General distribution: Austria, Azerbaijan, Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Hungary, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Russia, Sweden, Switzerland, United Kingdom.

Genus *Lochetica* Kriechbaumer, 1892

Lochetica westoni (Bridgman, 1880)

Material examined: Mazandaran province, Marzan-Abad, 1♀, 14.vii.2013.

General distribution: Algeria, Austria, Bulgaria, Finland, France, Germany, Hungary, Israel, Japan, Latvia, Norway, Poland, Spain, Sweden, Switzerland, United Kingdom.

Genus *Mesoleptus* Gravenhorst, 1829

Mesoleptus laevigatus (Gravenhorst, 1820)

Material examined: Kuhgiloyeh & Boyerahmad province, Pataveh, 1♀, 9.v.2013.

General distribution: Austria, Azerbaijan, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Isle of Man, Italy, Japan, Latvia, Luxembourg, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russia, Spain, Sweden, Switzerland, Turkey, United Kingdom.

***Mesoleptus marginatus* (Thomson, 1884)**

Material examined: Guilan province, Amlash (Miansara), 1♀, September 2012.

General distribution: Austria, Belgium, Bulgaria, former Czechoslovakia, Finland, France, Germany, Hungary, Italy, Moldova, Poland, Romania, Spain, Sweden, Turkey, United Kingdom.

New record for Iran.

***Pleolophus basizonus* (Gravenhorst, 1829)**

Material examined: Chaharmahal & Bakhtiari province, Borujen (Morchegan), 2♀, 2♂, June 2013.

General distribution: Austria, Belgium, Bulgaria, Canada, Czech Republic, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Netherlands, Norway, Poland, Russia, Slovakia, Spain, Sweden, USA, Ukraine, United Kingdom.

Genus *Xiphulcus* Townes, 1970

***Xiphulcus floricolator* (Gravenhorst, 1807)**

Material examined: Kermanshah province, Ravansar (Samangan), 2♀, May 2011.

General distribution: Austria, Belgium, Canada, former Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Italy, Mongolia, Netherlands, Poland, Russia, Spain, Sweden, Switzerland, USA, United Kingdom.

Genus *Zoophthorus* Förster, 1869

***Zoophthorus punctiventris* (Thomson, 1884)**

Material examined: Guilan province, Talesh (Subatan), 1♀, June 2013.

General distribution: Azerbaijan, Bulgaria, former Czechoslovakia, Finland, Hungary, Sweden.

Subfamily Ctenopelmatinae

Genus *Barytarbes* Förster, 1869

***Barytarbes flavoscutellatus* (Thomson, 1892)**

Material examined: East Azerbaijan province, Maraqeh (Badamlu), 2♀, September 2011.

General distribution: Austria, Bulgaria, former Czechoslovakia, France, Germany, Hungary, Romania, Spain, Switzerland, United Kingdom.

***Barytarbes laeviusculus* (Thomson, 1883)**

Material examined: Guilan province, Astara (Giladeh), 1♀, September 2012.

General distribution: former Czechoslovakia, France, Germany, Hungary, Italy, Poland, Russia, Sweden, United Kingdom.

Genus *Campodorus* Förster, 1869

***Campodorus caligatus* (Gravenhorst, 1829)**

Material examined: Mazandaran province, Tonekabon (Asal Mahalleh), 1♀, August 2011.

General distribution: Belgium, former Czechoslovakia, Finland, France, Germany, Hungary, Latvia, Lithuania, Netherlands, Norway, Poland, Russia, Sweden, United Kingdom.

***Campodorus dorsalis* (Gravenhorst, 1829)**

Material examined: Mazandaran province, Babol (Nakhkola), 2♂, June 2012.

General distribution: Austria, Belgium, former Czechoslovakia, Finland, France, Georgia, Germany, Hungary, Ireland, Isle of Man, Lithuania, Luxembourg, Netherlands, Poland, Russia, Spain, Sweden, United Kingdom.

Genus *Ctenopelma* Holmgren, 1855

***Ctenopelma luciferum* (Gravenhorst, 1829)**

Material examined: Golestan province, Kordkoy, 1♀, August 2009.

General distribution: Austria, Belgium, Czech Republic, Finland, France, Germany, Hungary, Italy, Japan, Latvia, Lithuania, Netherlands, Poland, Russia, Spain, Sweden, Switzerland.

Genus *Hypamblys* Förster, 1869

***Hypamblys albopictus* (Gravenhorst, 1829)**

Material examined: Fars province, Fasa (Mahmood-Abad Olya), 1♀, May 2010.

General distribution: Austria, Belgium, Bulgaria, Canada, former Czechoslovakia, Finland, France, Germany, Greenland, Hungary, Iceland, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Sweden, Switzerland, USA, United Kingdom.

Genus *Lagarotis* Förster, 1869

***Lagarotis semicaligata* (Gravenhorst, 1820)**

Material examined: Golestan province, Salikandeh, 1♂, September 2009.

General distribution: Austria, Azerbaijan, Belgium, Bulgaria, former Czechoslovakia, Finland, France, Georgia, Germany, Hungary, Ireland, Isle of Man, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Romania, Russia, Sweden, Switzerland, United Kingdom.

***Lagarotis ustulata* (Holmgren, 1857)**

Material examined: Azarbayjan-e Sharghi province, Varzaqan, 1♀, 10.viii.2011.

General distribution: Austria, Bulgaria, Finland, France, Germany, Hungary, Norway, Poland, Romania, Russia, Sweden.

Genus *Trematopygus* Holmgren, 1855

***Trematopygus vellicans* (Gravenhorst, 1829)**

Material examined: Tehran province, Fasham, 2♂, 11.viii.2015.

General distribution: Austria, Azerbaijan, Belgium, former Czechoslovakia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Sweden, Switzerland, Turkey, United Kingdom.

Genus *Zaplethocornia* Schmiedeknecht, 1912

***Zaplethocornia procurator* (Gravenhorst, 1820)**

Material examined: Lorestan province, Shool-Abad, 1♀, 1♂, August 2009.

General distribution: Austria, Belarus, Belgium, former Czechoslovakia, Denmark, Finland, France, Germany, Italy, Lithuania, Netherlands, Poland, Romania, Russia, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, former Yugoslavia.

Subfamily Diplazontinae

Genus *Phthorima* Förster, 1869

***Phthorima compressa* (Desvignes, 1856)**

Material examined: Golestan province: Bandar-Torkman, 1♀, April 2012.

General distribution: Austria, Belgium, Canada, former Czechoslovakia, Finland, France, Germany, Hungary, Isle of Man, Italy, Latvia, Moldova, Poland, Romania, Russia, Spain, Sweden, Switzerland, USA, United Kingdom.

New record for Iran.

Subfamily Eucerotinae

Genus *Euceros* Gravenhorst, 1829

***Euceros serricornis* (Haliday, 1838)**

Material examined: Razavi Khorasan province, Fariman (Kalateh-Khosh), 2♀, April 2006.

General distribution: Austria, Belgium, Bulgaria, former Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Ireland, Japan, Kazakhstan, Korea, Latvia, Moldova, Mongolia, Netherlands, Norway, Poland, Romania, Russia, Sweden, Ukraine, United Kingdom, former Yugoslavia.

New record for Iran.

Subfamily Ichneumoninae

Genus *Aethcerus* Wesmael, 1845

***Aethcerus dispar* Wesmael, 1845**

Material examined: Mazandaran province, Behshahr (Abbas-Abad), 1♀, April 2010.

General distribution: Austria, Belgium, Bulgaria, former Czechoslovakia, Estonia, Finland, France, Germany, Hungary, Latvia, Netherlands, Norway, Poland, Romania, Russia, Sweden, Ukraine, United Kingdom.

Genus *Anisopygus* Kriechbaumer, 1888

***Anisopygus pseudonymus* (Wesmael, 1845)**

Material examined: Hamadan province, Razan (Nodeh), 2♀, July 2015.

General distribution: Austria, Belarus, Belgium, Canada, former Czechoslovakia, Finland, France, Germany, Hungary, Netherlands, Poland, Romania, Russia, Sweden, USA.

Genus *Aoplus* Tischbein, 1874

***Aoplus castaneus* (Gravenhorst, 1820)**

Material examined: Kuhgiloyeh & Boyerahmad province, Pataveh, 1♀, 1♂, 9.v.2013.

General distribution: Austria, Belarus, Belgium, Bulgaria, former Czechoslovakia, Finland, France, Germany, Hungary, Iceland, Italy, Latvia, Netherlands, Norway, Poland, Romania, Russia, Sweden, Switzerland, Tunisia, Ukraine, United Kingdom.

***Aoplus rubricosus* (Holmgren, 1864)**

Material examined: East Azarbaijan province, Maragheh (Sheykh-Jan), 2♀, July 2010.

General distribution: Bulgaria, Croatia, Finland, France, Germany, Italy, Latvia, Romania, Russia, Sweden, Ukraine, United Kingdom.

New record for Iran.

***Aoplus ochropis* (Gmelin, 1790)**

Material examined: Khuzestan province, Shoosh (Sheykh Hatam), 2♀, 2♂, May 2008.

General distribution: Alps, Austria, Belarus, Belgium, Canada, China, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Latvia, Luxembourg, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, USA, Ukraine, United Kingdom, former Yugoslavia.

Genus *Baeosemus* Förster, 1869

***Baeosemus mitigosus* (Gravenhorst, 1829)**

Material examined: Ardabil province, Givi, 1♀, July 2008.

General distribution: Austria, Belarus, Belgium, Bulgaria, former Czechoslovakia, Finland, France, Germany, Italy, Mongolia, Poland, Romania, Russia, Spain, Sweden, Ukraine, United Kingdom.

Genus *Cratichneumon* Thomson, 1893

***Cratichneumon infidus* (Wesmael, 1848)**

Material examined: Gilan province, Amlash (Rankooh), 1♀, June 2010.

General distribution: Belarus, Belgium, former Czechoslovakia, Finland, France, Germany, Ireland, Italy, Norway, Poland, Romania, Russia, Sweden, United Kingdom.

***Cratichneumon luteiventris* (Gravenhorst, 1820)**

Material examined: Golestan province, 30 km NE Minu-Dasht, 1♂, June 2006.

General distribution: Austria, Belarus, Belgium, former Czechoslovakia, Denmark, France, Germany, Hungary, Italy, Japan, Latvia, Luxembourg, Netherlands, Poland, Romania, Russia, Spain, Sweden, Switzerland, United Kingdom.

Genus *Catadelphus* Wesmael, 1854

***Catadelphus arrogator* (Fabricius, 1781)**

Material examined: Ardebil province, Gergy (Allah-Yarlu), 1♀, August 2016.

General distribution: former Czechoslovakia, France, Germany, Hungary, Italy, Latvia, Romania, Turkey, United Kingdom.

New record for Iran.

Genus *Coelichneumon* Thomson, 1893

***Coelichneumon sugillatorius* (Linnaeus, 1758)**

Material examined: Kuhgiloyeh & Boyerahmad province, Baba-Kalan, 2♀, 1♂, 8.v.2013, ex *Ennomos quercinaria* (Hufnagel, 1767) (Lepidoptera: Geometridae).

General distribution: Austria, Belarus, Belgium, former Czechoslovakia, Finland, France, Germany, Hungary, Italy, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, former Yugoslavia.

Genus *Cratichneumon* Thomson, 1893

***Cratichneumon dissimilis* (Gravenhorst, 1829)**

Material examined: Isfahan province, Najaf-Abad (Goldarreh), 1♀, 1♂, October 2009.

General distribution: Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Canada, former Czechoslovakia, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Latvia, Netherlands, Poland, Romania, Russia, Sweden, Switzerland, USA, United Kingdom.

Genus *Fileanta* Cameron, 1901

***Fileanta radoszkowskii* (Berthoumieu, 1892)**

Material examined: Khorasan-e Shomali province, Chaman-Bid, 4♀, 11.v.2008.

General distribution: Afghanistan, Armenia, India, Kyrgyzstan, Pakistan, Turkey, Turkmenistan, Uzbekistan.

Genus *Probolus* Wesmael, 1845

***Probolus culpatorius* (Linnaeus, 1758)**

Material examined: Golestan province, Ali-Abad, 1♀, 2♂, August 2010.

General distribution: Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Croatia, former Czechoslovakia, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Latvia, Mongolia, Netherlands,

Norway, Poland, Romania, Russia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.

Genus *Stenobarichneumon* Heinrich, 1962

***Stenobarichneumon basiglyptus* (Kriechbaumer, 1890)**

Material examined: Markazi province, Komijan (Emamzadeh Abbas), 2♀, October 2009.

General distribution: Austria, Azerbaijan, Belarus, Belgium, Bulgaria, former Czechoslovakia, Finland, France, Germany, Hungary, Italy, Japan, Moldova, Mongolia, Netherlands, Norway, Poland, Romania, Russia, Sweden, Switzerland, Turkey, United Kingdom.

Genus *Virgichneumon* Heinrich, 1977

***Virgichneumon tergenus* (Gravenhorst, 1820)**

Material examined: Mazandaran province, Tonekabon (Asal-Mahalleh), 3♀, April 2013.

General distribution: Austria, Belgium, Bulgaria, former Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Spain, Sweden, Ukraine, United Kingdom, former Yugoslavia.

Subfamily Metopiinae

Genus *Metopius* Panzer, 1806

***Metopius (Ceratopius) dissectorius* (Panzer, 1805)**

Material examined: Northern Khorasan province, Shirvan (Ulashloo), 2♀, April 2011.

General distribution: Austria, Belgium, China, former Czechoslovakia, Finland, France, Germany, Hungary, India, Israel, Japan, Korea, Nepal, Netherlands, Poland, Russia, Spain, Switzerland, Turkey, Ukraine, United Kingdom, former Yugoslavia.

***Metopius (Ceratopius) fuscipennis* Wesmael, 1849**

Material examined: Qazvin province, Takestan (Jafar-Abad), 1♀, May 2010.

General distribution: Belgium, former Czechoslovakia, Finland, France, Germany, Hungary, Italy, Japan, Latvia, Lithuania, Moldova, Netherlands, Norway, Poland, Romania, Russia, Ukraine, United Kingdom, former Yugoslavia.

***Metopius laeviusculus* Dominique, 1898**

Material examined: West Azarbaijan province, Miandoab (Hesarlu), 1♀, April 2013.

General distribution: Greece, Kazakhstan, Russia, Spain.

New record for Iran.

Subfamily Orthocentrinae

Genus *Gnathochorisis* Förster, 1869

Gnathochorisis flavipes Förster, 1871

Material examined: Hamadan province, Gol Tappeh, 1♀, September 2015.

General distribution: Austria, Bulgaria, Finland, France, Germany, Italy, Kazakhstan, Lithuania, Netherlands, Norway, Russia, Ukraine.

Genus *Orthocentrus* Gravenhorst, 1829

Orthocentrus fulvipes Gravenhorst, 1829

Material examined: Kurdistan province, Qorveh (Shoorab-Haji), 2♀, September 2011.

General distribution: Austria, Belgium, Bulgaria, Canary Islands, China, former Czechoslovakia, Finland, France, Germany, Hungary, Ireland, Japan, Lithuania, Madeira Islands, Netherlands, Norway, Poland, Russia, Spain, Sweden, Switzerland, Taiwan, Ukraine, United Kingdom, former Yugoslavia.

Orthocentrus spurius Gravenhorst, 1829

Material examined: West Azarbaijan province, Khoy (Bilehvar), 1♀, May 2012.

General distribution: Austria, Belgium, Bulgaria, Canada, former Czechoslovakia, Denmark, Faeroe Islands, Finland, France, Germany, Hungary, Iceland, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Sweden, Switzerland, USA, United Kingdom.

Genus *Stenomacrus* Förster, 1869

Stenomacrus merula (Gravenhorst, 1829)

Material examined: Isfahan province, Shahin-Shahr, 1♀, 1♂, May 2004.

General distribution: Austria, Belarus, Belgium, Bulgaria, Canada, Denmark, Finland, France, Germany, Greece, Lithuania, Netherlands, Norway, Poland, Russia, Spain, Sweden, USA, United Kingdom.

Subfamily Pimplinae

Genus *Acrodactyla* Haliday, 1838

Acrodactyla quadrisculpta (Gravenhorst, 1820)

Material examined: Chaharmahal & Bakhtiari province, Dorahan, 1♀, 19.viii.2011.

General distribution: Australasian, Eastern Palaearctic, Europe, Nearctic, Oriental, Western Palaearctic.

Genus *Sinarachna* Townes, 1960

Sinarachna pallipes (Holmgren, 1860)

Material examined: Golestan province, Golestan National Park, 2♀, September 2011.

General distribution: Austria, Belarus, Belgium, Bulgaria, Canada, former Czechoslovakia, Finland,

France, Georgia, Germany, Ireland, Latvia, Lithuania, Poland, Romania, Russia, Switzerland, USA, United Kingdom.

Genus *Xanthopimpla* Saussure, 1892

Xanthopimpla flavolineata Cameron, 1907

Material examined: Golestan province, Azadshahr, 2♀, 1♂, June 2014, ex *Chilo suppressalis* (Walker, 1863) (Lepidoptera: Crambidae).

General distribution: Australia, Bangladesh, China, India, Indonesia, Japan, Laos, Malaysia, Nepal, New Caledonia, Pakistan, Palau, Papua New Guinea, Philippines, Solomon Islands, Sri Lanka, Truk Islands, Vanuatu, Vietnam.

Xanthopimpla stemmator (Thunberg, 1824)

Material examined: Razavi Khorasan, Mashhad, 4♀, August 2017, ex *Chilo partellus* (C. Swinhoe, 1885) (Lepidoptera: Crambidae).

General distribution: China, India, Indonesia, Japan, Laos, Malaysia, Mauritius, Pakistan, Philippines, Singapore, South Africa, Sri Lanka, Thailand.

Subfamily Poemeniinae

Genus *Podoschistus* Townes, 1957

Podoschistus scutellaris (Desvignes, 1856)

Material examined: Mazandaran province, Qaemshahr (Ghadikola), 1♀, September 2008.

General distribution: Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Hungary, India, Poland, Romania, Russia, Sweden, United Kingdom.

Subfamily Tersilochinae

Genus *Aneuclis* Förster, 1869

Aneuclis brevicauda (Thomson, 1889)

Material examined: Khorasan-e Shomali province, Jajarm, 2♀, 7.v.2013.

General distribution: Belarus, former Czechoslovakia, Finland, France, Germany, Kazakhstan, Lithuania, Norway, Poland, Russia, Sweden, Turkmenistan, Ukraine.

Genus *Barycnemis* Förster, 1869

Barycnemis angustipennis (Holmgren, 1860)

Material examined: Guilan province, Lahijan (Nobijar), 1♀, May 2014.

General distribution: Austria, Bulgaria, former Czechoslovakia, Finland, France, Germany, Hungary, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Russia, Sweden, Switzerland, Ukraine, United Kingdom.

Genus *Phradis* Förster, 1869

Phradis brevicornis Horstmann, 1971

Material examined: Mazandaran province, Marzan-

Abad, 1♀, July 2011.

General distribution: Austria, Bulgaria, Czech Republic, Germany, Hungary, Italy, Kazakhstan, Lithuania, Russia, Spain, Sweden, Ukraine.

Subfamily Tryphoninae

Genus *Kristotomus* Mason, 1962

Kristotomus ridibundus (Gravenhorst, 1829)

Material examined: Lorestan province, Shool-Abad, 2♀, August 2009.

General distribution: Austria, Belarus, Belgium, China, former Czechoslovakia, Finland, France, Germany, Japan, Kazakhstan, Korea, Lithuania, Netherlands, Poland, Romania, Russia, Switzerland, Taiwan, United Kingdom.

Subfamily Xoridinae

Genus *Xorides* Latreille, 1809

Xorides ater (Gravenhorst, 1829)

Material examined: Semnan province, Shahrud (Jangal-e Abr), 3♀, June 2011.

General distribution: Austria, Belarus, Belgium, Czech Republic, Finland, France, Germany, Hungary, Italy, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Sweden, Switzerland, Ukraine, United Kingdom.

Xorides indicatorius (Latreille, 1806)

Material examined: East Azarbaijan province, Azarshahr, 20 km E Nadilu, 1♀, July 2004.

General distribution: Austria, former Czechoslovakia, Finland, France, Germany, Hungary, Italy, Poland, Romania, Russia, Spain, Sweden, United Kingdom.

Xorides irrigator (Fabricius, 1793)

Material examined: Guilan province, Masal, 2♀, 1♂, August 2004, ex *Lymantria dispar* (Linnaeus, 1758) (Lepidoptera: Erebidae).

General distribution: Austria, Belarus, Belgium, Bulgaria, Czech Republic, Finland, France,

Germany, Hungary, Italy, Moldova, Norway, Poland, Romania, Russia, Spain, Sweden, Switzerland, United Kingdom, former Yugoslavia.

Discussion

The fauna of Iranian Ichneumonidae is diverse and on the other hand has poorly been studied so far. In this research, totally 85 species were obtained and examined which among them, 10 species are new records for the fauna of Iran. The hosts of most Iranian ichneumonids are unknown because of collecting by Malaise traps and sweeping net, not hosts rearing. Conducting of the researches on the parasitoid-host relationships can be the most important topics for the researchers who will work on the Ichneumonidae fauna in Iran. In this case, collecting and rearing the various hosts in different taxa especially Coleoptera, Diptera and Lepidoptera which are the main hosts of ichneumonids, is necessary. Faunistic investigations on the natural enemies of various agroecosystems can be very important for determining of the efficient biocontrol agents, and establishment of biological control and IPM programs (Hoy, Herzog 1985; Peshin, Dhawan 2009). Surely, releasing the natural enemies in ecosystems is an important process in pest management which must be done with high accuracy and studies (Flint, van den Bosch 1981; Pimentel, Peshin 2014).

Acknowledgements

The authors thank to M.R. Shaw (UK), J.-K. Choi (South Korea), E. Diller (Germany), and D.R. Kasparyan (Russia) for scientific cooperation in this project. We are also grateful to the late M. Shojai and S. Tirgari (Iran) for providing some materials. This research was supported by Islamic Azad University and University of Turku.

BARAHOEI, H., RAKHSHANI, E., RIEDEL, M. (2012) A checklist of Ichneumonidae (Hymenoptera: Ichneumonoidea) from Iran. *Iranian Journal of Animal Biosystematics*, 8(2): 83–132.

BARAHOEI, H., RAKHSHANI, E., FATHABADI, K., MORADPOUR, H. (2014a) A survey on the fauna of Ichneumonidae (Hymenoptera) of Khorasan-e-Razavi province. *Iranian Journal of Animal Biosystematics*, 10(2): 145–160.

BARAHOEI, H., NADER, E., RAKHSHANI, E. (2014b) Cryptinae (Hymenoptera: Ichneumonidae) of Isfahan province, central Iran. *Turkish Journal of Zoology*, 39: 279–284.

BARAHOEI, H., NADER, E., RAKHSHANI, E. (2015) A survey on Ichneumonidae of Isfahan province, central Iran. *Journal of Crop Protection*, 4(2): 157–166.

BENNETT, A.M.R. (2015) Revision of the world genera of Tryphoninae (Hymenoptera: Ichneumonidae). *Memoirs of the American Entomological Institute*, 86: 1–395.

BROAD, G. (2011) Identification key to the subfamilies of Ichneumonidae (Hymenoptera). Available at: http://www.nhm.ac.uk/resources-rx/files/ich_subfamily_key_2_11_compressed-95113.pdf

- BROAD, G.R., SHAW, M.R., FITTON, M.G. (2018) *Ichneumonid wasps (Hymenoptera: Ichneumonidae): their classification and biology*. Royal Entomological Society and Field Studies Council, London.
- FLINT, M.L., van DEN BOSCH, R. (1981) *Introduction to integrated pest management*. Plenum Press, New York.
- GHAHARI, H. (2015) A faunistic study on Ichneumonidae (Hymenoptera) from Semnan province, Iran. *Wuyi Science Journal*, 31: 34–42.
- GHAHARI, H. (2016) A study on the fauna of Ichneumonidae (Hymenoptera) in the province of Tehran, Iran. *Arquivos Entomoloxicos*, 16: 125–132.
- GHAHARI, H., JUSSILA, R. (2014a) A faunistic study on the Ichneumonidae (Hymenoptera: Ichneumonoidea) from the west of Iran. *Linzer biologische Beiträge*, 46(2): 1373–1377.
- GHAHARI, H., JUSSILA, R. (2014b) A study on the subfamily Ichneumoninae (Hymenoptera: Ichneumonidae) from Khorasan province, Iran. *Linzer biologische Beiträge*, 46(2): 1367–1371.
- GHAHARI, H., JUSSILA, R. (2015a) An additional contribution to the fauna of ichneumonid wasps (Hymenoptera: Ichneumonidae) from Iran. *Far Eastern Entomologist*, 299: 18–24.
- GHAHARI, H., JUSSILA, R. (2015b) Faunistic notes on the ichneumonid wasps (Hymenoptera: Ichneumonidae) in alfalfa fields in some regions of Iran. *Entomofauna*, 36(12): 185–192.
- GHAHARI, H., JUSSILA, R. (2016a) Contribution to the knowledge of the fauna of Ichneumonidae (Hymenoptera: Ichneumonoidea) from Iran. *Contributions to Entomology (Beiträge zur Entomologie)*, 66(1): 119–124.
- GHAHARI, H., JUSSILA, R. (2016b) The Ichneumonidae (Hymenoptera) of northern Iran: a faunistic study. *Acta Musei Moraviae, Scientiae biologicae (Brno)*, 101(1): 55–62.
- GHAHARI, H., YU, D.S., van ACHTERBERG, C. (2006) World bibliography of the family Baraconidae (Hymenoptera: Ichneumonoidea) (1964–2003). *NNM Technical Bulletin*, 8: 1–293.
- GHAHARI, H., GADALLAH, N.S. (2017) Species diversity of Ichneumonidae (Hymenoptera: Ichneumonoidea) in Tehran province, Iran. *Egyptian Journal of Biological Pest Control*, 27(1): 1–5.
- GUPTA, V.K. (1987) The Ichneumonidae of the Indo-Australian area (Hymenoptera). *Memoirs of the American Entomological Institute*, 41(1-2): 1–1210.
- HAKIMZADEH KHOEI, M., KAYA, M., ALTINDAG, A. (2011) New records of Rotifers from Iran with biogeographic considerations. *Turkish Journal of Zoology*, 35: 395–402.
- HOY, M.A., HERZOG, D.C. (1985) *Biological control in agricultural IPM systems*. Academic Press, Orlando.
- KASPARYAN, D.R. (1981) *Key of insects of European part of USSR*. Vol. III, Part III. Nauka, Leningrad. (in Russian).
- KOLAROV, J., GHAHARI, H. (2005) A catalogue of Ichneumonidae (Hymenoptera) from Iran. *Linzer biologische Beiträge*, 37: 503–532.
- MOHAMMADI-KHORAMABADI, A., TALEBI, A.A., ZWAKHALAS, K. (2013) A study of the subfamily Pimplinae (Hymenoptera: Ichneumonidae) in the north of Iran, with eleven new species records. *Entomofauna*, 34: 29–56.
- MOHAMMADI-KHORAMABADI, A., TALEBI, A.A. (2018) Study of three genera of the *Orthocentrus* genus-group (Hymenoptera: Ichneumonidae, Orthocentrinae) in northern Iran. *Journal of Entomological Society of Iran*, 37(4): 441–460.
- PESHIN, R., DHAWAN, A.K. (2009) *Integrated pest management: Dissemination and impact*. Vol. 2. Springer Science+Business Media.
- PIMENTEL, D., PESHIN, R. (2014) *Integrated pest management. Pesticide problems*. Volume 3. Springer, New York.
- QUICKE, D.L.J. (2015) *The braconid and ichneumonid parasitic wasps: Biology, systematics, evolution and ecology*. Wiley Blackwell, Chichester.
- RIEDEL, M., AGHADOKHT, P. (2017) Contribution to the Ichneumoninae (Hymenoptera: Ichneumonidae) of Iran, with descriptions of three new species. *Zoology in the Middle East*, 63(4): 1–8.
- ROUSSE, P., VILLEMANT, C. (2012) Ichneumons in Reunion Island: a catalogue of the local Ichneumonidae (Hymenoptera) species, including 15 new taxa and a key to species. *Zootaxa*, 3278: 1–57.
- TOWNES, H. (1969) The genera of Ichneumonidae. Part 1. *Memoirs of American Entomological Institute*, 11: 1–300.
- TOWNES, H. (1970a) The genera of Ichneumonidae. Part 2. *Memoirs of the American Entomological Institute*, 12 (1969): 1–537.
- TOWNES, H. (1970b) The genera of Ichneumonidae. Part 3. *Memoirs of the American Entomological Institute*, 13 (1969): 1–307.
- TOWNES, H. (1971) The genera of Ichneumonidae. Part 4. *Memoirs of the American Entomological Institute*, 17: 1–372.
- WAHL, D.B. (1993) Family Ichneumonidae. In: Goulet, H., Huber, J.T. (eds.), *Hymenoptera of the world: An identification guide to families*. Canada Communications Group, Ottawa.
- YU, D.S., van ACHTERBERG, K., HORSTMANN, K. (2016) World Ichneumonoidea 2011. Taxonomy, Biology, Morphology and Distribution. Taxapad.com. Canada.
- ZEHZAD, B., KIABI, B.H., MADJNOONIAN, H. (2002) The natural areas and landscape of Iran: An overview. *Zoology in the Middle East*, 26: 7–10.