

A CONTRIBUTION TO THE STUDY OF ICHNEUMONIDAE (HYMENOPTERA: ICHNEUMONOIDEA) OF GOLESTAN, GUILAN AND MAZANDARAN PROVINCES, NORTHERN IRAN

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A contribution to the study of Ichneumonidae (Hymenoptera: Ichneumonoidea) of Golestan, Guilan and Mazandaran provinces, Northern Iran. – Sakenin H., Jussila R., Tirgari S., Pentead-Dias A.M., Samin N. – This paper deals with faunistic surveys on ichneumonid wasps (Hymenoptera: Ichneumonidae) from three provinces of northern Iran (Golestan, Guilan and Mazandaran). In total, 40 species in 30 genera and 11 subfamilies: Anomaloniinae (one species), Banchinae (four species, two genera), Campopleginae (twelve species, eight genera), Cryptinae (seven species, six genera), Ctenopelmatinae (four species, four genera), Ichneumoninae (five species, four genera), Ophioniinae (one species), Oxytorinae (two species, one genus), Pimplinae (one species), Tersilochinae (one species), and Xoridinae (two species, one genus). Six species, Atractodes obsoletor (Zetterstedt, 1838), Cymodusa declinator (Gravenhorst, 1829), Euryproctus alpinus Holmgren, 1857, Enicospilus unicallosus (Vollenhoven, 1878), Hyposoter virginalis (Gravenhorst, 1829), and Lissonota digestor (Thunberg, 1824) are new records for the fauna of Iran.

Key words: Ichneumonidae, parasitoid, host, new records, Iran

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Внесок до вивчення Ichneumonidae (Hymenoptera: Ichneumonoidea) провінцій Голестан, Гілян і Мазандаран, Північний Іран. – Сакенін Х., Юссіла Р., Тіргарі С., Пентеадо-Діаз А.М., Самін Н. – Метою роботи є фауністичне дослідження іхневмонід з регіонів Північного Ірану. Ichneumonidae — найбільша за кількістю видів родина перетинчастокрилих, світова фауна якої налічує понад 1600 родів і 25285 видів. Більшість представників родини є паразитоїдними. Матеріал для даної роботи був зібраний у різних регіонах провінцій Північного Ірану (Голестан, Гілян, Мазандаран) з використанням пасток Малеза, за допомогою ентомологічних сачків, а також вирошуванням їхніх господарів в інкубаторі. Дані провінції, розташовані на південному узбережжі Каспійського моря, характеризуються вологим кліматом, подібним до клімату Середземноморського регіону. Наявність різноманітних і масштабних за розмірами лісових масивів та національних парків на півночі Ірану дозволяє припустити, що в даному регіоні сформувалася досить різноманітна фауна родини Ichneumonidae. У роботі розглянуто поширення іхневмонідних ос (Hymenoptera: Ichneumonidae) на території регіону. Загалом для фауни дослідженої території наведено 40 видів з 30 родів, 11 підродин: Anomaloniinae (один вид), Banchinae (чотири види, два роди), Campopleginae (дванадцять видів, вісім родів), Cryptinae (сім видів, шість родів), Ctenopelmatinae (чотири види, чотири роди), Ichneumoninae (п'ять видів, чотири роди), Ophioniinae (один вид), Oxytorinae (два види, один рід), Pimplinae (один вид), Tersilochinae (один вид) і Xoridinae (два види, один рід). Шість видів: Atractodes obsoletor (Zetterstedt, 1838), Cymodusa declinator (Gravenhorst, 1829), Euryproctus alpinus Holmgren, 1857, Enicospilus unicallosus (Vollenhoven, 1878), Hyposoter virginberg (Gravenhorst, 1829), Hyposoter livenhoralis (1878) є новими для фауни Ірану.

Ключові слова: Ichneumonidae, паразитоїд, господар, нові знахідки, Іран

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Introduction

The Ichneumonidae is the largest hymenopteran family with over than 1,600 genera and 25,285 described species worldwide (Yu et al. 2016). The family is accepted as one of the most diverse animal group (Grissell 1999). Most of the members of Ichneumonidae are parasitoids of holometabolous insects. A few species or groups of species parasitize spiders (egg sacs, spiderlings, or adults) or egg sacs of pseudoscorpions (Clancy, Pierce 1966; Quicke 2015). Ichneumonids are common and conspicuous in all world terrestrial biomes, from the Arctic tundra, through equatorial rainforests, to sub-Antarctic islands. They are found in suburban gardens and pristine forests, in deserts and on waterside vegetation. Although ichneumonids are abundant in almost every habitat, some authors considered their species-richness to be highest in the northern temperate regions (Owen, Owen 1974; Janzen 1981; Gauld et al. 1992). However, the distribution of Ichneumonidae is one of the most notable exceptions to the common latitudinal gradient in species diversity because it shows greater speciation at high latitudes than at low latitudes (Sime, Brower 1998). The aim of this paper is the faunistic study on the ichneumonids from some regions of northern Iran and introducing of six new country records.

Materials and methods

The materials of this research were collected by Malaise traps and sweeping net, and also rearing of hosts in optimum conditions (25±2 °C, 65±5% RH, 14: 10 L: D) in incubator from different regions of three provinces of northern Iran (Golestan, Guilan and Mazandaran). The collected specimens were put in ethanol 95% or mounted on triangular labels and were examined with a stereoscope. 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. Classification, nomenclature and distributional data of Ichneumonidae suggested by D.S. Yu, K. van Achterberg, K. Horstmann (2016) have been followed.

Results

In this faunistic research, totally 40 ichneumonid species within 11 subfamilies were collected and

identified from different regions of northern provinces (Golestan, Guilan and Mazandaran). Hosts of some ichneumonids are determined in this paper.

Subfamily Anomaloninae

Genus *Habronyx* Förster, 1869

Habronyx heros (Wesmael, 1849)

Material examined: Mazandaran province, Sari (Pahnehkola), 1♀, 1♂, September 2011.

General distribution: Austria, Belarus, Belgium, Bulgaria, China, former Czechoslovakia, Finland, France, Germany, Hungary, Italy, Japan, Korea, Latvia, Netherlands, Poland, Russia, Sweden, Turkey, United Kingdom, former Yugoslavia.

Subfamily Banchinae

Genus *Banchus* Fabricius, 1798

Banchus crefeldensis Ulbricht, 1916

Material examined: Guilan province, Roodsar, 1♀, June 2015.

General distribution: Belgium, Cyprus, France, Germany, Hungary, Italy, Spain, Switzerland, Turkey, United Kingdom, former Yugoslavia.

Banchus hastator (Fabricius, 1793)

Material examined: Mazandaran province, Amol (Darzikola), 2♀, 1♂, August 2007, ex *Lymantria dispar* (Linnaeus, 1758) (Lepidoptera: Erebidae).

General distribution: Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Ireland, Japan, Latvia, Netherlands, Poland, Russia, Sweden, Switzerland, USA, United Kingdom.

Genus *Lissonota* Gravenhorst, 1829

Lissonota carbonaria Holmgren, 1860

Material examined: Golestan province, Golestan National Park, 2♀, May 2017, ex *Lobesia botrana* (Denis & Schiffermüller, 1775) (Lepidoptera: Tortricidae).

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

Lissonota digestor (Thunberg, 1824)

Material examined: Guilan province, Asalem (Gisum Park), 1♀, September 2014.

General distribution: Finland, France, Germany, Hungary, Japan, Norway, Romania, Sweden, Switzerland, United Kingdom.
New record for Iran.

Subfamily Campopleginae

Genus *Bathyplectes* Förster, 1869

Bathyplectes exiguus (Gravenhorst, 1829)

Material examined: Mazandaran province, Sari (Bishehkola), 2♀, 1♂, August 2016, ex *Hypera postica* Gyllenhal, 1813 (Lepidoptera: Curculionidae).

General distribution: Austria, Azerbaijan, Bulgaria, Canada, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Norway, Poland, Romania, Russia, Spain, Sweden, Tunisia, Turkey, Turkmenistan, USA, United Kingdom, Uzbekistan, former Yugoslavia.

Genus *Campoletis* Förster, 1869

Campoletis femoralis (Gravenhorst, 1829)

Material examined: Golestan province, Gorgan (Naharkhoran), 3♀, July 2014, ex *Coleophora serratella* (Linnaeus, 1761) (Lepidoptera: Coleophoridae).

General distribution: Austria, Belarus, Belgium, Bulgaria, Finland, France, Germany, Hungary, Latvia, Norway, Poland, Romania, Russia, Sweden, Switzerland, United Kingdom, former Yugoslavia.

Campoletis viennensis (Gravenhorst, 1829)

Material examined: Mazandaran province, Sari (Bandafrooz), 2♀, June 2005.

General distribution: Austria, Belgium, Bulgaria, Canary Islands, Denmark, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Madeira Islands, Norway, Poland, Romania, Russia, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.

Genus *Cymodusa* Holmgren, 1859

Cymodusa cruentata (Gravenhorst, 1829)

Material examined: Mazandaran province, Ramsar (Dalkhani Forest), 1♀, 1♂, May 2010.

General distribution: Austria, Azerbaijan, Belgium, Bulgaria, Canada, former Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Ireland, Kazakhstan, Moldova, Norway, Poland, Romania, Russia, Spain, Sweden, USA, Ukraine, United Kingdom.

Cymodusa declinator (Gravenhorst, 1829)

Material examined: Guilan province, Talesh (Sohajer), 1♀, September 2011.

General distribution: Austria, Bulgaria, Denmark, Finland, France, Germany, Hungary, Ireland,

Latvia, Netherlands, Norway, Poland, Sweden, United Kingdom.
New record for Iran.

Genus *Diadegma* Förster, 1869

Diadegma micrurum (Thomson, 1887)

Material examined: Guilan province, Masal (Gilehsara), 1♀, September 2014.

General distribution: Azerbaijan, France, Germany, Sweden.

Genus *Dusona* Cameron, 1900

Dusona bicoloripes (Ashmead, 1906)

Material examined: Golestan province, Minudasht (Ahangar-Mahalleh), 2♀, May 2004.

General distribution: Azerbaijan, Belarus, Bulgaria, former Czechoslovakia, Finland, France, Germany, Japan, Kazakhstan, Kyrgyzstan, Moldova, Netherlands, Norway, Poland, Romania, Russia.

Dusona myrtilla (Desvignes, 1856)

Material examined: Guilan province, Lahijan, 1♀, June 2008.

General distribution: Austria, Belgium, Bulgaria, former Czechoslovakia, Finland, France, Germany, Japan, Latvia, Moldova, Netherlands, Poland, Romania, Russia, Sweden, United Kingdom.

Genus *Hyposoter* Förster, 1869

Hyposoter caedator (Gravenhorst, 1829)

Material examined: Guilan province, Asalem (Gisum Park), 1♀, September 2014.

General distribution: Austria, Finland, France, Germany, Hungary, Italy, Netherlands, Norway, Poland, Romania, Russia, United Kingdom.

Hyposoter virginalis (Gravenhorst, 1829)

Material examined: Guilan province, Masal, 1♀, September 2014.

General distribution: Azerbaijan, Bulgaria, former Czechoslovakia, France, Germany, Latvia, Netherlands, Sweden, Ukraine, United Kingdom.
New record for Iran.

Genus *Porizon* Fallén, 1813

Porizon transfuga (Gravenhorst, 1829)

Material examined: Mazandaran province, Noshahr (Sisangan Park), 3♀, August 2012, ex *Caloptilia rufipennella* (Hübner, 1796) (Lepidoptera: Gracillariidae).

General distribution: Austria, Canada, former Czechoslovakia, Estonia, Finland, France, Germany, Hungary, Latvia, Poland, Romania, Russia, Sweden, United Kingdom.

Genus *Tranosemella* Horstmann, 1978

***Tranosemella praerogator* (Linnaeus, 1758)**

Material examined: Guilan province, Roodsar, 4♀, 2♂, June 2015, ex *Archips rosana* (Linnaeus, 1758) (Lepidoptera: Tortricidae).

General distribution: Austria, Belarus, Belgium, Bulgaria, Canada, former Czechoslovakia, Denmark, Egypt, Finland, France, Germany, Hungary, Iceland, India, Ireland, Italy, Japan, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, Switzerland, USA.

Subfamily Cryptinae

Genus *Atractodes* Gravenhorst, 1829

***Atractodes gravidus* Gravenhorst, 1829**

Material examined: Mazandaran province, Behshahr (Chalkadeh), 1♀, October 2003. Golestan province, Gorgan (Naharkhoran), 2♀, July 2014.

General distribution: Austria, Azerbaijan, Belgium, China, former Czechoslovakia, Finland, France, Germany, Hungary, Ireland, Japan, Korea, Latvia, Poland, Romania, Russia, Spain, Sweden, United Kingdom.

***Atractodes obsoletor* (Zetterstedt, 1838)**

Material examined: Mazandaran province, Tonekabon (Jangal-e 3000), 1♀, September 2013.

General distribution: Austria, Bulgaria, Denmark, Finland, France, Germany, Montenegro, Norway, Poland, Russia, Sweden, Ukraine, United Kingdom, former Yugoslavia.

New record for Iran.

Genus *Ceratophygadeuon* Viereck, 1924

***Ceratophygadeuon varicornis* (Thomson, 1885)**

Material examined: Mazandaran province, Noshahr (Sisangan Park), 2♀, August 2012, ex *Cydia pomonella* (Linnaeus, 1758) (Lepidoptera: Tortricidae).

General distribution: Austria, Bulgaria, France, Germany, Italy, Poland, Romania, Russia, Ukraine.

Genus *Echthrus* Gravenhorst, 1829

***Echthrus reluctator* (Linnaeus, 1758)**

Material examined: Mazandaran province, Ramsar (Dalkhani Forest), 2♀, 2♂, May 2010.

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

Genus *Isadelphus* Förster, 1869

***Isadelphus gallicola* (Bridgman, 1880)**

Material examined: Guilan province, Asalem (Gisum Park), 1♀, September 2014.

General distribution: Finland, France, Germany, Hungary, Ireland, Norway, Poland, Romania, Russia, Sweden, Ukraine, United Kingdom.

Genus *Nippocryptus* Uchida, 1936

***Nippocryptus vittatorius* (Jurine, 1807)**

Material examined: Mazandaran province, Amol (Amin-Abad), 3♀, August 2018, ex *Grapholita molesta* (Busck, 1916) (Lepidoptera: Tortricidae).

General distribution: Austria, former Czechoslovakia, France, Germany, Hungary, Italy, Japan, Moldova, Poland, Romania, Spain, former Yugoslavia.

Genus *Xylophrurus* Förster, 1869

***Xylophrurus lancifer* (Gravenhorst, 1829)**

Material examined: Mazandaran province, Amol (Ahangarkola), 1♀, July 2008.

General distribution: Austria, Bulgaria, China, Czech Republic, Finland, France, Germany, Hungary, Latvia, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, Tajikistan, Ukraine, United Kingdom.

Subfamily Ctenopelmatinae

Genus *Alexeter* Foester, 1869

***Alexeter nebulator* (Thunberg, 1824)**

Material examined: Mazandaran province, Sari (Hajikola), 2♀, September 2006.

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

Genus *Euryproctus* Holmgren, 1855

***Euryproctus alpinus* Holmgren, 1857**

Material examined: Guilan province, Talesh (Siahbaran Park), 1♀, October 2016.

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

New record for Iran.

Genus *Sympherta* Förster, 1869

***Sympherta foveolator* (Holmgren, 1856)**

Material examined: Mazandaran province, Tonekabon (Jangal-e 3000), 1♀, September 2013.

General distribution: Austria, Belgium, Finland, France, Germany, Kazakhstan, Netherlands, Norway, Poland, Russia, Spain, Sweden, Switzerland, United Kingdom.

Genus *Xenoschesis* Förster, 1869

***Xenoschesis (Polycinetis) ustulata* (Desvignes, 1856)**

Material examined: Golestan province, Gonbad, 2♀, 1♂, October 2009.

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

Subfamily Ichneumoninae

Genus *Amblyjoppa* Cameron, 1902

***Amblyjoppa proteus* (Christ, 1791)**

Material examined: Mazandaran province, Qaemshahr (Ahangarkola), 3♀, 1♂, September 2008, ex *Hyles euphorbiae* (Linnaeus, 1758) (Lepidoptera: Sphingidae).

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

Genus *Barichneumon* Thomson, 1893

***Barichneumon gemellus* (Gravenhorst, 1829)**

Material examined: Golestan province, Kordkoy, 2♀, August 2008.

General distribution: Austria, Belarus, Belgium, Bulgaria, Croatia, former Czechoslovakia, Finland, France, Germany, Hungary, Ireland, Netherlands, Poland, Romania, Russia, Spain, Sweden, Ukraine, United Kingdom.

***Barichneumon praeceptor* (Thunberg, 1824)**

Material examined: Mazandaran province, Qaemshahr (Sarokola), 1♀, May 2015.

General distribution: Austria, Belarus, Belgium, Bulgaria, Finland, France, Germany, Hungary, Italy, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, United Kingdom.

Genus *Centeterus* Wesmael, 1845

***Centeterus nigricornis* Thomson, 1891**

Material examined: Mazandaran province, Tonekabon (Jangal-e 3000), 1♀, September 2013.

General distribution: Bulgaria, Croatia, former Czechoslovakia, France, Greece, Moldova, Romania, Russia, Spain, Turkey, Ukraine.

Genus *Patrocloides* Heinrich, 1961

***Patrocloides sputator* (Fabricius, 1793)**

Material examined: Golestan province, Kordkoy (Gorji-Mahalleh), 1♀, 1♂, August 2008.

General distribution: Austria, Belgium, Bulgaria, former Czechoslovakia, Finland, France, Germany, Hungary, Italy, Latvia, Mongolia, Netherlands, Poland, Romania, Russia, Spain, Switzerland, Tajikistan, Turkey, Ukraine, United Kingdom.

Subfamily Ophioninae

Genus *Enicospilus* Stephens, 1835

***Enicospilus unicallosus* (Vollenhoven, 1878)**

Material examined: Guilan province, Talesh, 1♀, October 2016.

General distribution: Austria, Canary Islands, France, Germany, Hungary, Israel, Italy, Russia, Spain, Uzbekistan.

New record for Iran.

Subfamily Oxytorinae

Genus *Oxytorus* Förster, 1869

***Oxytorus armatus* Thomson, 1883**

Material examined: Mazandaran province, Neka (Sorek), 2♀, June 2001.

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

***Oxytorus luridator* (Gravenhorst, 1820)**

Material examined: Guilan province, Amlash (Asiabsaran), 2♂, April 2009.

General distribution: Austria, Belarus, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Georgia, Germany, Hungary, Italy, Latvia, Netherlands, Norway, Poland, Russia, Spain, Sweden, Switzerland, Ukraine, United Kingdom.

Subfamily Pimplinae

Genus *Acropimpla* Townes, 1960

***Acropimpla pictipes* (Gravenhorst, 1829)**

Material examined: Golestan province, Minudasht (Dozein), 1♀, 3♂, September 2014, ex *Tortrix viridana* Linnaeus, 1758 (Lepidoptera: Tortricidae).

General distribution: Austria, Azerbaijan, Belarus, Belgium, Bulgaria, China, Czech Republic, Finland, France, Germany, Hungary, Iceland, Italy, Japan, Latvia, Lithuania, Moldova, Mongolia, Netherlands, Poland, Romania, Russia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, former Yugoslavia.

Subfamily Tersilochinae

Genus *Barycnemis* Förster, 1869

***Barycnemis bellator* (Müller, 1776)**

Material examined: Mazandaran province, Ramsar (Dalkhani Forest), 2♂, May 2010.

General distribution: Austria, Azerbaijan, Bulgaria, former Czechoslovakia, Finland, Germany, Greenland, Hungary, Iceland, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Mongolia, Netherlands, Norway, Poland, Russia, Sweden, USA.

Subfamily Xoridinae
Genus *Xorides* Latreille, 1809

***Xorides depressus* (Holmgren, 1860)**

Material examined: Guilan province, Asalem (Gisum Park), 2♀, September 2014, ex *Melanophila acuminata* (De Geer, 1774) (Coleoptera: Buprestidae).

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

***Xorides praecatorius* (Fabricius, 1793)**

Material examined: Mazandaran province, Behshahr (Galesh-Mahalleh), 2♀, 2♂, July 2015, ex *Agrilus viridis* (Linnaeus, 1758) (Coleoptera: Buprestidae).

General distribution: Austria, Belarus, Belgium, Bulgaria, China, Czech Republic, France, Germany, Hungary, Italy, Moldova, Netherlands, Poland, Romania, Russia, Slovakia, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, former Yugoslavia.

Discussion

In this faunistic paper, totally 40 ichneumonid species were collected and identified from three provinces, Golestan, Guilan and Mazandaran. The mentioned provinces which are located south of Caspian Sea, comprise a humid climates nearly same as Mediterranean region. Presence of various and vast forests and national parks in northern Iran, creates this expectation that there is a diverse and unknown fauna of Ichneumonidae in this region. Therefore, continuing of faunistic surveys will result to several new country records and even new species as well as numerous parasitoid-host relationships. Since these provinces are the main regions of agricultural activities in Iran and involve diverse fields and gardens, determining of natural enemies (parasitoids and predators) and especially parasitoid-host relationships can be valuable topics for establishment of biological control and IPM programs.

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