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New records of Encyrtidae, Eulophidae, Eurytomidae, Mymaridae, Pteromalidae and Torymidae (Hymenoptera: Chalcidoidea) from Iran

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Abstract:

In this faunistic paper, totally 18 species of Chalcidoidea (Hymenoptera) within 6 families, Encyrtidae (4 species, 4 genera), Eulophidae (3 species, 3 genera), Eurytomidae (one species), Mymaridae (2 species, 2 genera), Pteromalidae (6 species, 6 genera), and Torymidae (2 species, 2 genera) are given as new records for the fauna of Iran.

Introduction

Chalcidoid wasps (Hymenoptera: Chalcidoidea) are a fascinating group of insects, which show exquisite life histories and diverse types of host relationships (Narendran *et al*., 2007 and Heraty, 2009). Chalcidoid wasps are extremely diverse with over than 23,000 valid species (Noyes, 2019) and an estimated diversity of up to 500,000 distinct species (Heraty and Gates, 2003 and Munro *et al*., 2011). Most species of this superfamily are powerfull parasitoids of agricultural pests and have efficient role in biological control programs (Godfray, 1994; Bellows and Fisher, 1999 and Noyes, 2000).

The fauna of Iranian Chalcidoidea was studied rather well and several contributions have been published recently which most of the families were catalogued: Aphelinidae:146 species in 12 genera, Azotidae: 11 species in one genus, Eriaporidae: 2 species in 2 genera (Abd-Rabou *et al*., 2019), Chalcididae: 68 species in 18 genera (Falahatpisheh *et al*., 2018), Encyrtidae (Fallahzadeh and Japoshvili, 2017: 159 species within 48 genera and Guerrieri and Ghahari, 2018: 180 species), Eulophidae: 176 species in 44 genera (Hesami *et al*., 2018), Eucharitidae:5 species in 2 genera and Ormyridae:13 species in one

genus (Ghahari and Gençer, 2017), Eurytomidae:89 species in 8 genera (Saghaei *et al*., 2018), Leucospidae:6 species in one genusand Tetracampidae:4 species in 4 genera (Ghahari, 2019), Pteromalidae:227 species in 114 genera(Ghahari *et al*., 2015), Signiphoridae:11 species in 3 genera (Ghahari *et al*., 2014) and Torymidae:80 species in 18 genera (Ghahari and Doğanlar, 2017). The aim of this paper is a faunistic study on chalcidoid wasps of Iran.

Materials and methods

Chalcidoid wasps of Iranwere collected from some regions of Iran by Malaise traps and sweeping net, additionally some specimens deposited in insect collections of Islamic Azad University and private collections of colleagues were studied. Here we follow Noyes (2019) for classification, nomenclature and distribution.

Results and discussion

List of collected species

1.Family Encyrtidae Walker

1.1. *Anagyrus vladimiri* Triapitsyn

Material examined: Khorasan-e Shomali province, Farooj, 37°22′N 58°28′E, 2♀, May 2017.

General distribution: Israel, Italy, Russia, Spain, Tunisia, Turkmenistan, United States of America **(Noyes, 2019)** and Iran (this study).

3.2. ***Arrhenophagus chionaspidis* Aurivillius**

Material examined: Sistan and Baluchestan province, Qasr-e Qand, 26°24′N 60°73′E, 2♀, October 1998.

General distribution: Afrotropical, Argentina, Australia, Azerbaijan, Barbados, Bermuda, Brazil, British Virgin Islands, Canary Islands, Cape Verde Islands, China, Czech Republic, France, Georgia, Guyana, Hungary, India, Jamaica, Japan, Korea, South, Madeira, Mauritius, Mexico, New Zealand, Peru, Poland, Puerto Rico, Réunion, Russia, Senegal, Slovakia, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Uganda, United Kingdom, United States of America, former USSR **(Noyes, 2019)** and Iran (this study).

1.3.*Choreia inepta* (Dalman)

Material examined: Gilan province, Lahijan, 37°13′N 50°01′E, 2♀, April 2012. Zanjan province, Khorram-Darreh (Eslam-Abad), 1♀, July 2014.

General distribution: Armenia, Austria, Azerbaijan, Bosnia Hercegovina, Bulgaria, Croatia, Czech Republic, Denmark, France, Germany, Hungary, Italy, Moldova, Mongolia, Montenegro, Netherlands, Poland, Romania, Russia, Slovakia, Spain, Sweden, Ukraine, United Kingdom, former Yugoslavia (Noyes, 2019) and Iran (this study).

1.4. *Diversinervus elegans* Silvestri

Material examined: Ardebil province, Aslandooz, 39°45′N 47°41′E, 2♀, 1♂, 26 July 2010.

General distribution: Afrotropical, Angola, Argentina, Australia, Brazil, China, Colombia, Cuba, Egypt, Eritrea, Ethiopia, France, Greece, Hawaii, India, Israel, Italy, Kenya, Mexico, Morocco, New Caledonia, Peru, South Africa, Spain, United States of America+, former Yugoslavia (Noyes, 2019) and Iran (this study).

2. Family Eulophidae Westwood

2.1.*Aprostocetus elongatus* (Foerster)

Material examined: Luristan province, Nur-Abad, 34°06′N 47°95′E, 1♀, 1♂, 8 June 2013.

General distribution: Austria, Bulgaria, Croatia, Czech Republic, Denmark, France, Georgia, Germany, Hungary, Italy, Montenegro, Netherlands, Poland, Slovakia, Spain, Sweden, Switzerland, United Kingdom (Noyes, 2019) and Iran (this study).

2.2.*Baryscapus daira* (Walker)

Material examined: Azarbaijan-e Sharghi province, Horand, 38°84′N 47°35′E, 1♀, August 2013.

General distribution: Argentina, Austria, Bulgaria, Canada, Chile, Czech Republic, France, Germany, Greece, Hungary, Italy, Moldova, Netherlands, Russia, Slovakia,

Spain, Sweden, Switzerland, Turkey, United Kingdom, United States of America, former USSR (Noyes, 2019) and Iran (this study).

2.3. *Pediobius foliorum* (Geoffroy)

Material examined: Kuhgiloyeh and Boyerahmad province, Kakan, 30.65′N 51.82'E, 2♀, 1♂, September 2012.

General distribution: Austria, Canada, Czech Republic, Finland, France, Germany, Hungary, Israel, Italy, Japan, Moldova, Netherlands, Romania, Russia, Serbia, Slovakia, Slovenia, Sweden, United Kingdom, United States of America (Noyes, 2019) and Iran (this study).

3.Family Eurytomidae Walker

3.1. *Eurytoma aethiops* Boheman

Material examined: Qazvin province, Rostam-Abad, 35°66′N 49°85′E, 1♀, 1♂, August 2012. Mazandaran province, Behshahr,36°44′N 53°46′E, 2♀, April 2016.

General distribution: Bulgaria, Caucasus, Hungary, Italy, Sweden, Transcaucasus, United Kingdom (Noyes, 2019) and Iran (this study).

4. Family Mymaridae Haliday

4.1.*Polynema ovulorum* (Linnaeus)

Material examined: Kerman province, Jiroft, 28°51′N 57°33′E, 1♀, 1♂, October 2014.

General distribution: Austria, Belgium, Bulgaria, France, Germany, Greece, Romania, Sweden, Turkey (Noyes, 2019) and Iran (this study).

4.2.*Ooctonus insignis* Haliday

Material examined: Azarbaijan-e Gharbi province, Mahabad, 36°47′N 45°43′E, 2♀, 9-11.viii.2014.

General distribution: Austria, Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Romania, Russia, Slovakia, Sweden, Switzerland, United Kingdom, United States of America (Noyes, 2019) and Iran (this study).

5. Family Pteromalidae Dalman

5.1. *Anogmus hohenheimensis* (Ratzeburg)

Material examined: Zanjan province, Zanjan,36°33′N 48°12′E, 1♀, 1♂, July 2014.

General distribution: Austria, Belgium, Czech Republic, Finland, Germany, Hungary, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Ukraine, former USSR (Noyes, 2019) and Iran (this study).

5.2.*Eunotus areolatus* (Ratzeburg)

Material examined: Chaharmahal & Bakhtiary province, Borujen,31°54′N 51°12′E, 3♀, May 2015.

General distribution: China, Czech Republic, Denmark, France, Germany, Hungary, Italy, Kazakhstan, Netherlands, Romania, Spain, Sweden, Turkey (Noyes, 2019) and Iran (this study).

5.3.*Homoporus luniger* (Nees, 1834)

Material examined: Fars province, Abadeh, 31°16′N 52°32′E, 1♀, 2♂, April 2010.

General distribution: Belgium, Bulgaria, Croatia, Czech Republic, France, Germany, Hungary, Italy, Kazakhstan, Moldova, Netherlands, Romania, Russia, Slovakia, Spain, Sweden, Transcaucasus, Ukraine, United Kingdom (Noyes, 2019) and Iran (this study).

5.4. *Psilonotus achaeus* Walker

Material examined: Khuzestan province, Dezful, 32°31′N 48°42′E, 3♀, 2♂, October 2013.

General distribution: Belgium, Bulgaria, Canada, Czech Republic, Germany, Hungary, Kazakhstan, Netherlands, Sweden, Turkey, Ukraine, United Kingdom, United States of America (Noyes, 2019) and Iran (this study).

5.5.*Stenomalina favorinus* (Walker)

Material examined: Mazandaran province, Tonekabon, Jangal-e 3000, 36°37′N 50°48′E, 2♀, September 2009.

General distribution: Belgium, Bulgaria, Croatia, Czech Republic, Germany, Ireland (north and south), Netherlands, Romania, Sweden, Turkey, United Kingdom (Noyes, 2019) and Iran (this study).

5.6.*Tritneptis affinis* (Nees)

Material examined: Tehran province, Shahreyar (Zarrindeh), 1♂, September 2015.

General distribution: Austria, Belgium, Canada, China, Czech Republic, Germany,

Kazakhstan, Lithuania, Montenegro, Netherlands, Sweden, United States of America, former USSR (Noyes, 2019) and Iran (this study).

6. Family Torymidae Walker

6.1.*Eridontomerus isosomatis* (Riley)

Material examined: Zanjan province, Abhar,36°16′N 49°03′E, 2♀, June 2014.

General distribution: Bulgaria, Czech Republic, Hungary, Kazakhstan, Mongolia, Slovakia, Tadzhikistan, Ukraine, United States of America, former USSR (Noyes, 2019) and Iran (this study).

6.2.*Torymus caudatus* Boheman

Material examined: Qazvin province, Taleghan, 35.46°N 50.57°E, 1♀, 2♂, August 2012.

General distribution: Croatia, Czech Republic, Finland, France, Georgia, Germany, Hungary, Japan, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Sweden, Switzerland, Ukraine, United Kingdom, United States of America, former Yugoslavia (Noyes, 2019) and Iran (this study).

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