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A FAUNISTIC STUDY ON SOME FAMILIES OF CHALCIDOIDEA (HYMENOPTERA) FROM GOLESTAN PROVINCE AND VICINITY, NORTHERN IRAN

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A FAUNISTIC STUDY ON SOME FAMILIES OF CHALCIDOIDEA (HYMENOPTERA) FROM GOLESTAN PROVINCE AND VICINITY, NORTHERN IRAN

Estudio Faunístico de algunas familias de CHALCIDOIDEA (HYMENOPTERA) de la provincia de Golestán y sus alrededores, al norte de Irán

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ABSTRACT. The fauna of seven families of Chalcidoidea from Golestan Province and vicinity in northern Iran was studied. The families determined were: Chalcididae (2 species), Eucharitidae (1), Eulophidae (2), Eurytomidae (8), Ormyridae (1), Perilampidae (2), and Torymidae (3). Twelve species are new records for the fauna of Iran.

Key words: Fauna, new records, parasitoids.

RESUMEN. Se estudió la fauna de siete familias de Chalcidoidea de la Provincia de Golestán y sus alrededores, en el norte de Irán. Las familias determinadas fueron: Chalcididae (2 especies), Eucharitidae (1), Eulophidae (2), Eurytomidae (8), Ormyridae (1), Perilampidae (2) y Torymidae (3). Doce especies son nuevos registros de la fauna de Irán.

Palabras clave: Fauna, nuevos registros, parasitoides.

INTRODUCTION

Chalcidoidea includes 19 families of parasitic hymenopterans that range in size from 0.1 mm to 45 mm. These wasps parasitize a wide variety of immature arthropods: 13 orders of Insecta, two orders of Arachnida, and one family of Nematoda (Grissel and Schauff, 1997). Members of this superfamily are cosmopolitan in distribution and habitat utilization (Noyes and Hayat, 1984; LaSalle y Gauld, 1991). Chalcidoids have a greater range of biological diversity than the species of other parasitoids. Most species are parasitoids, but more than 80 species in some families especially Eurytomidae and Torymidae are phytophagous (Gauld and Bolton, 1988; Noyes y Valentine, 1989). Chalcidoidea is the most important successful group used in applied biological control. They have been used widely in successful biological control programs of insect pests, four of the six most successful hymenopteran families utilized belong to Chalcidoidea (Noyes and Hayat, 1994; Godfray, 1994).

Golestan province (36.8393° N 54.4444° W) is located in the north of Iran and south of the Caspian Sea, geographically it is divided into two sections, the plains and the mountains of the Alborz range, in the eastern Alborz section. The mountains have a northeasterly aspect and gradually decrease in height; the highest point of the province is Shavar with 3945 m above sea level; climate of Golestan is temperate most of the year (Hassan *et al*., 1993). The aim of this research was a faunistic survey on the families Chalcididae, Eucharitidae, Eulophidae, Eurytomidae, Ormyridae, Perilampidae, and Torymidae from Golestan province, Northern Iran.

MATERIAL AND METHODS

The fauna of some families of Iranian Chalcidoidea was studied in some regions of Golestan province and vicinity (Northern Iran). The specimens were collected by means of sweeping nets and Malaise traps. In addition, some parasitoids were obtained through the rearing of their hosts in optimum condition (27 ± 1º C, 70 ± 5 % RH, 16: 8 L: D) in an incubator for emergence of parasitoids. Taxonomical determinations were done using identification keys (e.g. Peck *et al*., 1964; Boucek, 1988; Sharma, 1988; Grissell and Schauff, 1997). In this paper, classification, nomenclature and distribution data were taken from Noyes (2014).

RESULTS

In this research, a total of 19 species belong to seven families of Chalcidoidea were collected and identified from Golestan province and vicinity, northern Iran. Twelve species, *Brachymeria moerens* (Ruschka) (Chalcididae), *Eucharis adscendens* (Fabricius) (Eucharitidae), *Elasmus flabellatus* (Fonscolombe) (Eulophidae), *Bruchophagus coluteae* Boucek, *Eurytoma infracta* Mayr, *E. oophaga* Silvestri, *Tetramesa agrostidis* (Howard), *T. fumipennis* Walker (Eurytomidae), *Chrysolampus prominens* (Ruschka), *C. rufitarsis* (Förster) (Perilampidae), *Pseudotorymus sapphyrinus* (Fonscolombe), and *Torymus nitidulus* (Walker) (Torymidae) are new records for the fauna of Iran. The list of species with distributional data is given below alphabetically.

Family Chalcididae Latreille, 1817
Genus *Brachymeria* Westwood, 1829

Brachymeria moerens (Ruschka, 1922)

Material examined: Golestan province, Minudasht, 37° 10′ N 55° 30′ E, 1♀, October 2012. **New record for Iran**.

Distribution outside Iran: Austria, Bosnia-Herzegovina, Bulgaria, Caucasus, Czech Republic, France, Germany, Hungary, Italy, Macedonia, Moldova, Slovakia, Transcaucasus, Turkey, Ukraine, and former Yugoslavia.

Brachymeria obtusata (Förster, 1859)

Material examined: Golestan province, Kordkoy, 36° 41′ N 54° 12′ E, 3♀, 1♂, August 2009; Golestan National Park, Yakhtikalan (1887 m), 2♀, June 2012; Mazandaran province, Babol, 36°30′N 52°35′E, 2♀, June 2014.

Distribution outside Iran: Albania, Austria, Croatia, Cyprus, Czech Republic, Egypt, France, Germany, Greece, Hungary, Iraq, Israel, Italy, Japan, Moldova, Netherlands, North Africa, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Transcaucasus, Turkey, Turkmenistan, Ukraine, former USSR, and former Yugoslavia.

Family Eucharitidae Walker, 1846
Genus *Eucharis* Latreille, 1804

Eucharis adscendens (Fabricius, 1787)

Material examined: Golestan province, Kordkoy, 36° 41′ N 54° 12′ E, 3♀, 1♂, August 2009. **New record for Iran.**

Distribution outside Iran: Austria, Belarus, Bosnia-Herzegovina, Croatia, Czech Republic, Germany, Hungary, Italy, Kazakhstan, Lithuania, Moldova, Poland, Romania, Russia, Serbia, Siberia, Slovakia, Transcaucasus, Turkey, Ukraine, United Kingdom (UK), and former USSR.

Family Eulophidae Westwood, 1829
Genus *Elachertus* Spinola, 1811

Elachertus charondas (Walker, 1839)

Material examined: Golestan province, Gorgan, 36° 50′ N 54° 30′ E, 3♀, July 2011; Mazandaran province, Sari, 36° 30′ N 53° 30′ E, 1♀, April 2013.

Distribution outside Iran: Brazil, China, Czech Republic, Germany, Hungary, Italy, Japan, Moldova, Russia, Slovakia, Spain, Sweden, Taiwan, Turkmenistan, UK, and Yemen.

Genus *Elasmus* Westwood, 1833

Elasmus flabellatus (Fonscolombe, 1832)

Material examined: Golestan province, Gonbad, 37° 30′ N 55° 00′ E, 2♀, September 2013. **New record for Iran.**

Distribution outside Iran: Austria, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, France, Germany, Greece, Hungary, Italy, Lebanon, Moldova, Morocco, Netherlands, Portugal, Romania, Russia, Serbia, Slovakia, Spain, Sweden, Turkey, UK, former USSR, and former Yugoslavia.

Family Eurytomidae Walker, 1832
Genus *Bruchophagus* Ashmead, 1888

Bruchophagus coluteae Boucek, 1954

Material examined: Golestan province, Minudasht, 37° 10′ N 55° 30′ E, 1♀, October 2012. **New record for Iran.**

Distribution outside Iran: Bulgaria, Central Asia, Czech Republic, Moldova, Slovakia, Turkey, former USSR, and Uzbekistan.

Genus *Eurytoma* Illiger, 1807

Eurytoma collaris Walker, 1832

Material examined: Golestan province, Kalaleh, 37° 43′ N 55° 49′ E, 1♀, 1♂, October 2012; Northern Khorasan province, Bojnord, 37° 35′ N 57° 20′ E, 1♀, May 2011.

Distribution outside Iran: Bulgaria, Czech Republic, France, Germany, Hungary, Kazakhstan, Slovakia, Sweden, Turkey, and UK.

Eurytoma infracta Mayr, 1904

Material examined: Golestan National Park, Dasht-e-Mirza-Bayloo (1589 m), 2♀, 1♂, June 2012. New record for Iran.

Distribution outside Iran: Caucasus, Croatia, France, Jordan, Romania, Spain, Turkey, Ukraine, Central Asia, and former Yugoslavia.

Eurytoma oophaga Silvestri, 1920

Material examined: Golestan province, Gorgan, 36° 50′ N 54° 30′ E, 1♀, 1♂, July 2011. **New record for Iran**.

Distribution outside Iran: Caucasus, France, Germany, Italy, Romania, Serbia, Transcaucasus, and Turkey.

Genus *Macrorileya* Ashmead, 1900

Macrorileya inopinata Silvestri, 1920

Material examined: Northern Khorasan province, Bojnord, 37° 35′ N 57° 20 ′E, 1♀, May 2011; Golestan province, Gonbad, 37° 30′ N 55° 00′ E, 1♀, September 2013.

Distribution outside Iran: Bulgaria, Caucasus, Central Asia, Croatia, Czech Republic, Georgia, Hungary, Italy, Kazakhstan, Mexico, Moldova, North Africa, Romania, Serbia, Slovakia, Spain, Transcaucasus, Tunisia, Turkey, and United States of America (USA).

Genus *Tetramesa* Walker, 1848

Tetramesa agrostidis (Howard, 1896)

Material examined: Golestan province, Kordkoy, 36° 41′ N 54° 12′ E, 1♀, August 2009; Northern Khorasan province, Bojnord, 37° 35′ N 57° 20′ E, 1♀, May 2011. New record for Iran.

Distribution outside Iran: Bulgaria, Germany, Kazakhstan, Turkey, USA, and former USSR.

Tetramesa fulvicollis Walker, 1832

Material examined: Golestan province, Minudasht, 37° 10′ N 55° 30′ E, 1♀, October 2012.

Distribution outside Iran: Bulgaria, Croatia, Czech Republic, France, Germany, Hungary, Montenegro, Netherlands, Romania, Slovakia, Sweden, Turkey, UK, and former USSR.

Tetramesa fumipennis Walker, 1832

Material examined: Golestan National Park, Yakhtikalan (1887 m), 2♀, June 2012. **New record for Iran.**

Distribution outside Iran: Caucasus, Germany, Hungary, Romania, Sweden, Turkey, UK, and former USSR.

Family Ormyridae Förster, 1856
Genus *Ormyrus* Westwood, 1832

Ormyrus diffinis (Fonscolombe, 1832)

Material examined: Northern Khorasan province, Bojnord, 37° 35′ N 57° 20′ E, 2♀, May 2011. Golestan province, Kalaleh, 37° 43′ N 55° 49′ E, 2♀, 1♂, October 2012. Mazandaran province, Babol, 36° 30′ N 52° 35′ E, 1♀, June 2014.

Distribution outside Iran: Bulgaria, Caucasus, Croatia, Czech Republic, France, Germany, Hungary, Israel, Kazakhstan, Macedonia, Moldova, Montenegro, Russia, Serbia, Slovakia, Spain, Tadzhikistan, Transcaucasus, Turkey, Turkmenistan, Ukraine, former USSR, and former Yugoslavia.

Family Perilampidae Förster, 1856
Genus *Chrysolampus* Spinola, 1811

*Chrysolampus promine*ns (Ruschka, 1924)

Material examined: Golestan province, Gorgan, 36° 50′ N 54° 30′ E, 1♀, July 2011. New record for Iran.

Distribution outside Iran: Hungary, Italy, Kazakhstan, Romania, Slovenia, Spain, and Turkmenistan.

Chrysolampus rufitarsis (Förster, 1859)

Material examined: Golestan National Park, Dasht-e-Mirza-Bayloo (1589 m), 1♀, 1♂, June 2012. New record for Iran.

Distribution outside Iran: Austria, Belgium, Canary Islands, Czech Republic, Germany, Hungary, Kazakhstan, Netherlands, Slovakia, Spain, and UK.

Family Torymidae Walker, 1833
Genus *Pseudotorymus* Masi, 1921

Pseudotorymus sapphyrinus (Fonscolombe, 1832)

Material examined: Golestan province, Gorgan, 36° 50′ N 54° 30′ E, 2♀, July 2011. **New record for Iran.**

Distribution outside Iran: Azerbaijan, Croatia, Czech Republic, France, Germany, Hungary, Moldova, Mongolia, Romania, Serbia, Slovakia, Sweden, Turkey, and Ukraine.

Genus *Torymoides* Walker, 1871

Torymoides dispar (Masi, 1916)

Material examined: Golestan National Park, Yakhtikalan (1887 m), 2♀, June 2012; Mazandaran province, Sari, 36° 30′ N 53° 30′ E, 1♀, April 2013.

Distribution outside Iran: Albania, Bulgaria, Croatia, former Czechoslovakia, Hungary, Italy, Macedonia, Moldova, Montenegro, Slovakia, Syria, Transcaucasus, and Turkey.

Genus *Torymus* Dalman, 1820

Torymus nitidulus (Walker, 1833)

Material examined: Golestan National Park, Dasht-e-Mirza-Bayloo (1589 m), 1♀, June 2012. **New record for Iran.**

Distribution outside Iran: China, Czech Republic, Germany, Hungary, Mongolia, Netherlands, Romania, Russia, Sweden, Turkey, UK, Ukraine, USA, and former USSR.

DISCUSSION

In this research, 19 species of Chalcidoidea (including 12 new records) were collected and determined from some regions of the Golestan province, Iran. Golestan province includes a wide spectrum of flora and fauna, the fauna of most insect families have not been studied so far. Therefore, surveys must be continued in order to

determine the fauna of different insect taxa, particularly to find new data on Chalcidoidea. The fauna of Iranian Chalcidoidea is poorly studied and only a few families have been catalogued (e.g. Agaonidae: Ghahari and van Noort, 2011; Aphelinidae: Abd-Rabou *et al*., 2013; Encyrtidae: Fallahzadeh y Japoshvili, 2010; Eulophidae: Hesami *et al*., 2011, Talebi *et al*., 2011; Eurytomidae: Stojanova y Ghahari, 2009). Iran forms a large part of the Iranian plateau, and covers an area of 1,623,779 km², with various geographical regions and climates, so we expect a high diversity of Chalcidoidea in this area of the Palaearctic region.

Many species of Chalcidoidea are efficient and excellent parasitoids of agricultural pests, over 800 species have been associated with biological control programs (Godfray, 1994). Conservation of these natural enemies is necessary in different agroecosystems in order to increase their efficiency for pest control. The inadequate use of pesticides may lead to diminish the chalcidoid population with a consequent explosion of pest populations; beneficial effects of chalcidoids are revealed when the equilibrium is restored (Huffaker and Messenger, 1976; Barbosa, 1998; Bellows and Fisher, 1999).

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