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Faunistic notes on the Ichneumonid wasps (Hymenoptera: Ichneumonidae) in alfalfa fields in some regions of Iran

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Abstract

The fauna of Ichneumonidae (Hymenoptera) from alfalfa fields and surrounding grasslands in some regions of Iran is studied in this paper. In total 20 species from 17 genera and 6 subfamilies, Brachycyrtinae (1 species), Campopleginae (2 species), Cryptinae (3 species), Ichneumoninae (6 species), Pimplinae (6 species) and Tryphoninae (2 species) were collected and identified.

Key words: Hymenoptera, Ichneumonidae, parasitoid, fauna, alfalfa field, Iran.

Zusammenfassung

Vorliegende Arbeit behandelt die Fauna der Ichneumonidae (Hymenoptera) von Luzernefeldern und umliegendem Grünland einiger iranischer Gebiete. Insgesamt gelang der Nachweis von 20 Arten aus 17 Gattungen aus den 6 Unterfamilien Brachycyrtinae (1 Art), Campopleginae (2 Arten), Cryptinae (3 Arten), Ichneumoninae (6 Arten), Pimplinae (6 Arten) und Tryphoninae (2 Arten).

Introduction

Family Ichneumonidae (Hymenoptera) is one of the largest taxon included beneficial species which parasitize several pests (TOWNES 1969; GUPTA 1987). Although the fauna of Iranian Ichneumonidae was studied rather well (e.g. KOLAROV & GHAHARI 2005, 2006, 2007, 2008; GHAHARI & JUSSILA 2010a,b,c; GHAHARI et al. 2010a,b; BARAHOEI et al. 2012), but the fauna of these powerful parasitoids is not studied in Iranian alfalfa fields so far. In this paper we present the result of a faunistic survey in this agroecosystem which included many important agricultural pests in Iran (KHANJANI 2003).

Alfalfa is one of the most important legumes used in agriculture and is widely grown throughout the world as forage for cattle, and is most often harvested as hay, but can also be made into silage, grazed, or fed. Alfalfa has the highest feeding value of all common hay crops, being used less frequently as pasture (HANSON et al. 1988; PARKER & PARKER 2003). There are several insect pests in alfalfa fields which damage this crop in different seasons. These pests are attacked by many natural enemies including predators and parasitoids. The ichneumonid wasps are one of these beneficial insects which have effective role in biological control of alfalfa's pests. The aim of this work is to detect dominant species of ichneumonid wasps in Iranian alfalfa fields.

Materials and Methods

Specimens were colleted by sweeping net from some regions of Iran. During the faunistic survey, in addition to the collecting of adult Ichneumonidae, some insect larvae were collected and reared in optimum condition (26±2 ºC, 65±5 %RH, 14: 10 L: D) in incubator for emergence of inside parasitoids. The collected specimens were killed with ethyl acetate and mounted on triangular labels and were examined with a stereomicroscope. Classification, nomenclature and distribution data of Ichneumonidae listed by KASPARYAN (1981), YU & HORSTMANN (1997) and YU et al. (2005) have been followed.

Results

In a total of 20 species from 17 genera and 6 subfamilies of Ichneumonidae were collected from alfalfa fields and surrounding grasslands in different regions of Iran. The list of species is given below with distributions and host data.

Subfamily B r a c h y c y r t i n a e

Genus *B r a c h y c y r t u s* KRIECHBAUMER, 1880

***Brachycyrtus ornatus* KRIECHBAUMER, 1880**

M a t e r i a l e x a m i n e d : West Azarbaijan province: Ourmieh, 3♀♀, 18.IX.2006.

D i s t r i b u t i o n : Holarctic region.

Subfamily C a m p o p l e g i n a e

Genus *B a t h y p l e c t e s* FÖRSTER, 1869

***Bathyplectes anurus* (THOMSON, 1887)**

M a t e r i a l e x a m i n e d : Hamadan province: Hamadan, 2♀♀, 1♂, 13.VII.2006.

D i s t r i b u t i o n : Europe, North America.

***Bathyplectes curculionis* (THOMSON, 1887)**

M a t e r i a l e x a m i n e d : Golestan province: Gonbad, 4♀♀, 7.IV.2005. West Azarbaijan province: Salmas, 3♀♀, 2♂♂, 18.IX.2006.

D i s t r i b u t i o n : Western Europe, Bulgaria, Turkey, North America.

Subfamily C r y p t i n a e

Genus *D i c h r o g a s t e r* DOUMERC, 1855

***Dichrogaster longicaudata* (THOMSON, 1884)**

M a t e r i a l e x a m i n e d : East Azarbaijan province: Maragheh, 1♀, 9.VI.2006.

D i s t r i b u t i o n : Holarctic region.

***Dichrogaster saharator* (AUBERT, 1964)**

M a t e r i a l e x a m i n e d : Hamadan province: Hamadan, 1♀, 13.VII.2006.

D i s t r i b u t i o n : Algeria, Israel, Turkey.

Genus *L y s i b i a* FÖRSTER, 1869

***Lysibia nanus* (GRAVENHORST, 1829)**

M a t e r i a l e x a m i n e d : Golestan province: Gonbad, 3♂♂, 7.IV.2005, hyperparasitoid of *Cotesia glomerata* (LINNAEUS) (Hymenoptera: Braconidae) via *Aporia* sp. (Lepidoptera: Pieridae).

D i s t r i b u t i o n : Holarctic region, and also Afghanistan, Pakistan.

Subfamily I c h n e u m o n i n a e

Genus *C e n t e t e r u s* WESMAEL, 1845

***Centeterus rubiginosus* (GMELIN, 1790)**

M a t e r i a l e x a m i n e d : East Azarbaijan province: Arasbaran, 1♂, 19.V.2007.

D i s t r i b u t i o n : Western Europe, and also Azerbaijan.

Genus *C r a t i c h n e u m o n* THOMSON, 1893

***Cratichneumon flavifrons* (SCHRANK, 1781)**

M a t e r i a l e x a m i n e d : Isfahan province: Najaf-Abad, 1♀, 21.X.2003, parasitoid of *Panolis flammea* (DENIS et SCHIFFERMÜLLER) (Lepidoptera: Noctuidae).

D i s t r i b u t i o n : Azerbaijan, Caucasus, Siberia as far as Primorie, Western Europe.

Genus *I c h n e u m o n* LINNEAUS, 1758

***Ichneumon melanosomus* WESMAEL, 1855**

M a t e r i a l e x a m i n e d : West Azarbaijan province: Salmas, 2♀♀, 26.IX.2006.

D i s t r i b u t i o n : Azerbaijan, Caucasus, Northern Siberia, Western Europe.

Genus *P h a e o g e n e s* WESMAEL, 1845

***Dirophanes invisor* (THUNBERG, 1824)**

M a t e r i a l e x a m i n e d : West Azarbaijan province: Salmas, 1♀, 26.IX.2006.

D i s t r i b u t i o n : The whole of the European part of the former USSR, Armenia, Azerbaijan, Northern and Central Europe, Romania.

Genus *R h e x i d e r m u s* FÖRSTER, 1869

***Heterischnus nigricollis* (WESMAEL, 1845)**

M a t e r i a l e x a m i n e d : Golestan province: Gorgan, 1♀, 7.IV.2005.

D i s t r i b u t i o n : The whole of the European part of the former USSR, Southwest of Siberia, North and Central Europe, Azerbaijan, Romania.

Genus *S y s p a s i s* TOWNES, 1965

***Syspasis rufina* (GRAVENHORST, 1820)**

M a t e r i a l e x a m i n e d : East Azarbaijan province: Arasbaran, 1♀, 1♂, 19.V.2007.

D i s t r i b u t i o n : Azerbaijan, Kazakhstan, Central Asia, Western Europe.

Subfamily P i m p l i n a e

Genus *C l i s t o p y g a* GRAVENHORST, 1829

***Clistopyga rufator* HOLMGREN, 1856**

M a t e r i a l e x a m i n e d : West Azarbaijan province: Ourmieh, 2♀♀, 18.IX.2006.

D i s t r i b u t i o n : Europe and Caucasus.

Genus *D o l i c h o m i t u s* SMITH, 1877

***Dolichomitus kriechbaumeri* (SCHULZ, 1906)**

M a t e r i a l e x a m i n e d : Golestan province: Gonbad, 1♀, 7.IV.2005.

D i s t r i b u t i o n : Europe, Cyprus, Egypt, Israel, Tajikistan, Turkey.

Genus *E n d r o m o p o d a* HELLÉN, 1939

***Endromopoda arundinator* (FABRICIUS, 1804)**

M a t e r i a l e x a m i n e d : Isfahan province: Najaf-Abad, 3♀♀, 21.X.2003.

D i s t r i b u t i o n : Europe, Algeria, Azerbaijan, Mongolia, Turkey.

Genus *I t o p l e c t i s* FÖRSTER, 1869

***Itoplectis melanocephala* (GRAVENHORST, 1829)**

M a t e r i a l e x a m i n e d : Khorasan province: Bojnord, 1♀, 9.X.2003.

D i s t r i b u t i o n : Europe, Azerbaijan, Kazakhstan, Tajikistan, Uzbekistan, Tschitinsk region of Russia, Mongolia, China, Egypt, Kenya.

Genus *P i m p l a* FABRICIUS, 1804

***Pimpla rufipes* (MILLER, 1759)**

M a t e r i a l e x a m i n e d : Ardabil province: Ardabil, 3♀♀, 22.VIII.2004.

D i s t r i b u t i o n : Palaearctic, Oriental and Oceanic regions, introduced in USA.

Genus *Z a g l y p t u s* FÖRSTER, 1869

***Zaglyptus multicolor* (GRAVENHORST, 1829)**

M a t e r i a l e x a m i n e d : Khorasan province: Mashhad, 2♀♀, 11.X.2003.

D i s t r i b u t i o n : Europe, Turkey, Caucasus, Kazakhstan, Uzbekistan, Middle Asia, Mongolia, China and Chabarovsk region of Russia.

Subfamily T r y p h o n i n a e

Genus *N e t e l i a* GRAY, 1860

***Netelia* (*Besobates*) *cristata* (THOMSON, 1888)**

M a t e r i a l e x a m i n e d : Ardabil province: Ardabil, 1♂, 22.VIII.2004.

D i s t r i b u t i o n : Palaearctic and Oriental (China) regions.

***Netelia* (*Besobates*) *latungula* (THOMSON, 1888)**

M a t e r i a l e x a m i n e d : Hamadan province: Hamadan, 2♂♂, 13.VII.2006, parasitoid of *Operophtera* sp. (Lepidoptera: Geometridae).

D i s t r i b u t i o n : Holarctic region.

Discussion

This research conducted in a few regions of Iran included alfalfa fields, while there are many other provinces with alfalfa fields which have not been studied so far; so we suggest to carry on these faunistic researches for exact determining the fauna of these

parasitoids in alfalfa fields of Iran perfectly. Additionally this faunistic work focused only on the six subfamilies, Brachycyrtinae, Campopleginae, Cryptinae, Ichneumoninae, Pimplinae and Tryphoninae, while many species from other subfamilies have been collected too, which have not been identified so far. Also among the six studied subfamilies, Ichneumoninae and Pimplinae both with six species are more diverse than the others. Since the ichneumonid wasps have efficient and powerful role in biological control program in almost all agroecosystems, so conservation of these beneficial insects will result to increase their efficiency in pest control. The practice of biological control includes methods that reunite pests with their natural enemies, or recommend modifications of the environment (or the natural enemy itself) to favor natural enemy population growth and impact on pest dynamics (DE BACH & ROSEN 1991; BELLOWS & FISHER 1999). The case histories also illustrate that the keys to success lie not so much in the ecological or economic constraints of the particular crop-pest system, but in the effort expended to institute biological control as a pest management option. The methods of biological control require different levels of technical and farmer input, ranging from high levels of technical input in importation biological control to high levels of farmer input in conservation programs (STOLL 2000; KOUL et al. 2004). The future of biological control therefore rests on foundations of basic sciences such as systematics, population ecology and predator-prey theory, and applied efforts in pest management, sampling and other quantitative methods. The opportunities that biological control offers as an environmentally sound, safe and cost-effective control technology are therefore limitless (MAREDIA et al. 2003). Although the biological control programs in Iran are limited to a few natural enemies, but there is so much hopefulness about the progress of these programs in future. Surely, facilitate application of pesticides forces the farmers to prefer chemical control method to others. Therefore, a powerful goal must be presented for advancement of safe control methods, e.g. biological control towards IPM.

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