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A contribution to the knowledge of Ichneumon wasps (Hymenoptera: Ichneumonoidea: Ichneumonidae) from West Azarbaijan Province, Northwestern Iran

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A b s t r a c t : The fauna of ichneumonid wasps (Hymenoptera: Ichneumonidae) from West Azarbaijan Province, Northwestern Iran is studied in this paper. In total 28 species from 24 genera and 6 subfamilies (Cremastinae, Cryptinae, Ichneumoninae, Pimplinae, Rhyssinae and Tryphoninae) were collected.

K e y w o r d s : Ichneumonidae, Fauna, West Azarbaijan, Northwestern Iran.

Introduction

The parasitoid wasp family Ichneumonidae is the most species rich family of the order Hymenoptera. There are approximately 24.000 described species of ichneumonids worldwide, but the true global species richness of the family may well exceed 100.000 (WAHL & SHARKEY 1993; YU & HORSTMANN 1997; YU et al. 2005). Almost the ichneumonid species are parasitoids of other arthropods which have efficient role in biological control of various agricultural and forest pests (BELLOWS & FISHER 1999; RODRIGUEZ-BERRIO et al. 2009; MAYHEW et al. 2009).

The province of West Azarbaijan is located to the northwest of Iran covering an area of 39.487 km^2. This province has a mountainous terrain in which the relief varies. It has common borders with two countries: Turkey and Iraq. Climatically the province is influenced by humid air currents of the Atlantic Ocean and in the winter months the Mediterranean air currents have an effect here, bringing down the temperature. Generally the climate is variable such as being approximately 34 ºC in hot summer months and dropping to –16 ºC in the winter season.

Since Iranian Ichneumonidae were poorly studied so far (KOLAROV & GHAHARI 2005, 2006, 2007, 2008; GHAHARI & JUSSILA 2010a, b; GHAHARI et al. 2010a, b), the fauna of these beneficial insects from some regions of northwestern Iran is studied in this paper.

Materials and Methods

The materials were collected through 2006-2008 by Malaise traps and sweep netting from different regions of northwestern Iran. The sampled regions were included Bookan,

Khoy, Maco, Mahabad, Miandoab, Oshnavieh, Ourmieh, Piranshahr, Salmas and Sardasht. Classification, nomenclature and distribution data of Ichneumonidae listed by KASPARYAN (1981), YU & HORSTMANN (1997) and YU et al. (2005) have been followed.

Results

A total of 28 species from 24 genera and 6 subfamilies were collected from the West Azarbaijan province. The list of species is given below including the general distribution of the species.

Family I c h n e u m o n i d a e

Subfamily C r e m a s t i n a e

Genus *Pristomerus* CURTIS 1836

***Pristomerus horribilis* NAROLSKY 1987**

M a t e r i a l : West Azarbaijan province: Bookan, 2♂♂, June 2007.

D i s t r i b u t i o n o u t s i d e I r a n : Germany, Switzerland, Bulgaria and Ukraine.

Genus *Temelucha* FÖRSTER 1869

***Temelucha lucida* (SZÉPLIGETI 1899)**

M a t e r i a l : West Azarbaijan province: Maco, 1♀, 11 September 2007.

D i s t r i b u t i o n o u t s i d e I r a n : Czech Republic, Hungary, Bulgaria and Moldavia.

Subfamily C r y p t i n a e

Genus *Acroricnus* RATZEBURG 1852

***Acroricnus seductor syriacus* (MOCSARY 1883)**

M a t e r i a l : West Azarbaijan province: Ourmieh, 1♀, 25 August 2006.

D i s t r i b u t i o n o u t s i d e I r a n : Greece, Turkey, Cyprus, Syria, Lebanon and Palestine.

Genus *Agrothereutes* FÖRSTER 1850

***Agrothereutes parvulus* (HABERMEHL 1926)**

M a t e r i a l : West Azarbaijan province: Salmas, 1♂, 14 September 2007.

D i s t r i b u t i o n o u t s i d e I r a n : France and Bulgaria.

Genus *Aritranis* FÖRSTER 1869

***Aritranis occisor* (GRAVENHORST 1829)**

M a t e r i a l : West Azarbaijan province: Khoy, 1♂, 26 September 2006.
D i s t r i b u t i o n o u t s i d e I r a n : Palaearctic region.

Genus *Cryptus* FABRICIUS 1804

***Cryptus dianae* GRAVENHORST 1829**

M a t e r i a l : West Azarbaijan province: Piranshahr, 1♀, 30 August 2007.
D i s t r i b u t i o n o u t s i d e I r a n : Palaearctic region.

***Cryptus subspinosus* SMITS VAN BURGST 1913**

M a t e r i a l : West Azarbaijan province: Khoy, 1♀, 26 September 2006.
D i s t r i b u t i o n o u t s i d e I r a n : Tunisia, Algeria, Spain, France, Italia, Bulgaria, Israel.

Genus *Hidryta* FÖRSTER 1869

***Hidryta sordida* (TSCHEK 1871)**

M a t e r i a l : West Azarbaijan province: Ourmieh, 2♂♂, 25 August 2006.
D i s t r i b u t i o n o u t s i d e I r a n : Europe.

Genus *Hoplocryptus* THOMSON 1873

***Hoplocryptus murarius* (BÖRNER 1782)**

M a t e r i a l : West Azarbaijan province: Miandoab, 2♀♀, 22 July 2007.
D i s t r i b u t i o n o u t s i d e I r a n : Europe, Turkey, Kazakhstan, Kyrgyzstan, Mongolia.

Genus *Idiolispa* FÖRSTER 1869

***Idiolispa analis* (GRAVENHORST 1807)**

M a t e r i a l : West Azarbaijan province: Salmas, 2♂♂, 14 September 2007.
D i s t r i b u t i o n o u t s i d e I r a n : Holarctic and Oriental regions.

Genus *Mesoleptus* GRAVENHORST 1829

***Mesoleptus scrutator* (HALIDAY 1839)**

M a t e r i a l : West Azarbaijan province: Piranshahr, 1♀, 1♂, 30 August 2007.
D i s t r i b u t i o n o u t s i d e I r a n : western Palaearctic region.

Genus *Pycnocryptodes* AUBERT 1971

***Pycnocryptodes reticulator* AUBERT 1971**

M a t e r i a l : West Azarbaijan province: Miandoab, 1♀, 25 July 2007.
D i s t r i b u t i o n o u t s i d e I r a n : Cyprus.

Genus *Trychosis* FÖRSTER 1869

***Trychosis pauper* (TSCHEK 1871)**

M a t e r i a l : West Azarbaijan province: Mahabad, 2♀♀, 29 April 2008.
D i s t r i b u t i o n o u t s i d e I r a n : Europe and Turkey.

***Trychosis tristator* (TSCHEK 1871)**

M a t e r i a l : West Azarbaijan province: Salmas, 2♂♂, 17 September 2007.
D i s t r i b u t i o n o u t s i d e I r a n : Europe and Turkey.

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

Genus *Ichneumon* LINNEAUS 1758

***Ichneumon rogenhoferi* KRIECHBAUMER 1888**

M a t e r i a l : West Azarbaijan province: Oshnavieh, 1♀, 3 October 2007.
D i s t r i b u t i o n o u t s i d e I r a n : Western Europe, Iran.

Genus *Hemichneumon* WESMAEL 1857

***Hemichneumon subdolus* WESMAEL 1857**

M a t e r i a l : West Azarbaijan province: Ourmieh, 1♀, 1♂, 26 August 2006, ex *Taleporia tubulosa* (RETZIUS) (Lep.: Psychidae).
D i s t r i b u t i o n o u t s i d e I r a n : Central Europe, Italy, Romania, Azerbaijan.

Genus *Virgichneumon* HEINRICH 1977

***Virgichneumon albosignatus* (GRAVENHORST 1893)**

M a t e r i a l : West Azarbaijan province: Khoy, 2♀♀, 28 September 2006, ex *Abraxas grossulariata* (LINNAEUS) (Lep.: Geometridae).
D i s t r i b u t i o n o u t s i d e I r a n : Caucasus, Central Asia, Western Europe, Kazakhstan.

Subfamily P i m p l i n a e

Genus *Scambus* HARTIG 1838

***Scambus foliae* (CUSHMAN 1938)**

M a t e r i a l : West Azarbaijan province: Salmas, 1♂, 19 September 2007.

D i s t r i b u t i o n o u t s i d e I r a n : Austria, Romania, Bulgaria and Russia (Komi and Sakhalin Island).

Subfamily R h y s s i n a e

Genus *Rhyssa* GRAVENHORST 1829

***Rhyssa persuasoria* (LINNAEUS 1758)**

M a t e r i a l : West Azarbaijan province: Ourmieh, 1♂, 1♀, 28 August 2006.

D i s t r i b u t i o n o u t s i d e I r a n : widely distributed in the Holarctic and Oriental regions and introduced into Australia and New Zealand.

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

Genus *Aderaeon* TOWNES 1949

***Aderaeon hamatum* KASPARYAN 1971**

M a t e r i a l : West Azarbaijan province: Mahabad, 1♂, 29 April 2008.

D i s t r i b u t i o n o u t s i d e I r a n : Ukraine, southern part of European Russia, Azerbaijan, Georgia, Turkey and Armenia.

Genus *Ctenochira* FÖRSTER 1869

***Ctenochira arcuata* (HOLMGREN 1855)**

M a t e r i a l : West Azarbaijan province: Sardasht, 1♂, 8 July 2006.

D i s t r i b u t i o n o u t s i d e I r a n : Holarctic region.

***Ctenochira sphaerocephala* (GRAVENHORST 1829)**

M a t e r i a l : West Azarbaijan province: Ourmieh, 1♀, 28 August 2006.

Distribution outside Iran: Palaearctic region.

Genus *Dyspetes* FÖRSTER 1869

***Dyspetes arrogator* HEINRICH 1949**

M a t e r i a l : West Azarbaijan province: Maco, 1♀, 13 April 2007.

D i s t r i b u t i o n o u t s i d e I r a n : Palaearctic and Oriental regions.

C o m m e n t : HORSTMANN (2006) dealt with the taxonomy of European *Dyspetes*. He distinguishes two species, a species occurring in spring and early summer (*D. arrogator*) and a species flying in midsummer to autumn, *D. luteomarginatus* (HABERMEHL 1925).

Genus *Erromenus* HOLMGREN 1855

***Erromenus plebejus* (WOLDSTEDT 1877)**

M a t e r i a l : West Azarbaijan province: Piranshahr, 4♂♂, 30 August 2007.

D i s t r i b u t i o n o u t s i d e I r a n : Palaearctic region.

Genus *Grypocentrus* RUTHE 1855

***Grypocentrus cinctellus* RUTHE 1855**

M a t e r i a l : West Azarbaijan province: Bookan, 1♀, June 2007.

D i s t r i b u t i o n o u t s i d e I r a n : Europe and Caucasus.

Genus *Thibetoides* DAVIS 1897

***Thibetoides acerbus* VICTOROV 1964**

M a t e r i a l : West Azarbaijan province: Khoy, 1♂, 27 September 2006.

D i s t r i b u t i o n o u t s i d e I r a n : Ukraine, Azerbaijan, Georgia and Armenia.

Genus *Tryphon* FALLÉN 1813

***Tryphon* (*Tryphon*) *psilosagator* AUBERT 1966**

M a t e r i a l : West Azarbaijan province: Sardasht, 2♂♂, 8 July 2006.

D i s t r i b u t i o n o u t s i d e I r a n : France, Italy, Greece, Ukraine, southern part of European Russia, Turkey and Kazakhstan.

***Tryphon* (*Tryphon*) *trochanteratus* HOLMGREN 1857**

M a t e r i a l : West Azarbaijan province: Ourmieh, 4♂♂, 3♀♀, 28 August 2006. Mahabad, 2♀♀, 2♂♂, 28 April 2008.

D i s t r i b u t i o n o u t s i d e I r a n : Europe, Georgia, Turkey, Kazakhstan and Siberia.

Discussion

Although only a few specimens were collected from some regions of West Azarbaijan, the result of this research indicates that there is a diverse fauna of Ichneumonidae in this region. West Azarbaijan province includes vast and diverse agricultural crops and fruit orchards and also several agricultural key pests. Determining and conservation of natural enemies of agricultural pests in these agricultural regions is necessary for pest control

and increasing of crop yields. This research is a part of a huge project on Iranian Ichneumonidae which was established by the first author in 2002. Although faunistic surveys of natural enemies are very important in entomological studies especially in biological control methods, we must recognise that the results of these surveys do not mean the end of work. The best approach to preserving effective biological control by natural enemies is a combination of management tactics. By conserving and protecting natural enemies, we provide an opportunity for them to operate at their full potential as naturally occurring sources of biological control in the agricultural environment. Challenges for the future in biological control include additional studies to identify the complex of natural enemies in cultivated crops, understand the biology and population dynamics of the natural enemies associated with the major pest species, and determine how the different IPM practices can best be used to ensure their compatibility with the natural enemies. Also needed are studies to evaluate the impact of predators, parasites, and diseases to find ways to improve biological control through conservation, augmentation, and importation. Biological control fits well in combination with other IPM strategies. There are many factors (crop, pest complex, environment) that can influence the success of beneficial organisms in reducing pest densities to manageable levels. In many situations the biological control method will need to be utilized in concert with other tactics. Selecting the least disruptive management tactic is recommended by IPM and should help conserve natural enemies (RYAN et al. 1993; FLINT & DREISTADT 1998; BELLOWS & FISHER 1999; MAREDIA et al. 2003).

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Zusammenfassung

Vorliegende Arbeit behandelt die Schlupfwespenfauna (Hymenoptera: Ichneumonidae) der Provinz West-Aserbaidschan im Nordwesten des Irans. 28 Arten aus 24 Gattungen und 6 Unterfamilien (Cremastinae, Cryptinae, Ichneumoninae, Pimplinae, Rhyssinae and Tryphoninae) konnten nachgewiesen werden.

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