

A FAUNISTIC STUDY OF ICHNEUMONID WASPS (HYMENOPTERA: ICHNEUMONIDAE) FROM ILAM AND KERMANSHAH PROVINCES, WESTERN IRAN

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This paper deals with a faunistic survey on ichneumonid wasps (Hymenoptera, Ichneumonidae) from some regions of Ilam and Kermanshah provinces (western Iran). In total 19 species from the nine subfamilies Alomyinae, Cremastinae, Cryptinae, *Diplazontinae*, Ichneumoninae, Metopiinae, Pimplinae, Tersilochinae, and Tryphoninae were collected and identified. Two species *Probles (Microdiaparsis) microcephalus* (Gravenhorst, 1829) and *Tersilochus (Pectinolochus) striola* (Thomson, 1889) are new records for Iran.

Hymenoptera, Ichneumonidae, Ilam, Kermanshah, new record, Iran

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U radu je prikazano faunističko istraživanje parazitskih osica (Hymenoptera, Ichneumonidae) iz nekih područja provincija Ilam i Kermanshah (zapadni Iran). Ukupno je sakupljeno i determinirano 19 vrsta osica iz 9 podporodica (Alomyinae, Cremastinae, Cryptinae, *Diplazontinae*, Ichneumoninae, Metopiinae, Pimplinae, Tersilochinae i Tryphoninae). Dvije vrste, *Probles (Microdiaparsis) microcephalus* (Gravenhorst, 1829) i *Tersilochus (Pectinolochus) striola* (Thomson, 1889) prvi su put zabilježene u Iranu.

Hymenoptera, Ichneumonidae, Ilam, Kermanshah, novinalazi, Iran

Introduction

The Ichneumonidae is the largest family within the Hymenoptera, and one of the largest among insects, with more than 23,000 described species (Yu et al., 2012; Humala & Reshchikov, 2014), and much of its diversity is probably still unknown (Jones et al., 2009). Ichneumonids are parasitoids of immature holometabolous insects such as Lepidoptera, Hymenoptera, Diptera, Coleoptera, Trichoptera, Raphidioptera and also Chelicerata, Araneae, and Pseudoscorpionida (Townes, 1969).

Although the Ichneumonidae fauna of Iran has not been well studied, knowledge of it is nevertheless making progress. Kolarov and Ghahari (2005) listed 144 species from 14 subfamilies and seven years later Barahoei et al., (2012) listed 502 species belonging to 189 genera and 24 subfamilies. More recently, many authors (Ghahari, 2014; Ghahari & Jussila, 2014a, b, 2015; Ghahari et al., 2014a, b; Barahoei et al., 2014a, b, 2015, etc.) have made contributions to the knowledge of the Iranian fauna. The aim of the present research is to survey the ichneumonid fauna of two provinces, Ilam and Kermanshah in western Iran.

Ilam province (33.6384°N 46.4226°E) is located in the south-west of Iran, bordering Iraq, and covering an area of 19,086 square kilometers. It is contiguous with Iraq in the west along 425 kilometers of common border. Ilam province is among the warmest regions of Iran, although the mountainous areas of north and north eastern Ilam are relatively cold. The average annual rainfall of the province is 578 mm.

Kermanshah province (34.3176°N 47.0869°E) is located in the western part of Iran with a moderate and mountainous climate. It receives most precipitation in winter and is moderately warm in summer. The annual rainfall is 500 mm. The average temperature in the hottest months is above 22 °C. It also has diverse forests in different areas.

Material and Methods

The specimens of this research were collected from some regions of Ilam and Kermanshah provinces (western Iran). The material is a part of several specimens of Ichneumonoidea from the mentioned regions, of which the Braconidae from this survey have already been published by Ghahari et al. (2011) and Ghahari & Fischer (2012). The light-weight Malaise trap was the main method of collecting, although sweep nets, yellow pan traps were also used, while the strategy of rearing of hosts in optimum conditions (25±2 °C, 65±5 % RH, 14: 10 L: D) in an incubator was employed as well. The collected materials are either put in ethanol 75 %, pinned or mounted on small cards and are identified with the help of Kasparyan (1973, 1981) and Kasparyan & Tolkhanitz (1999). Distribution data were taken from Yu et al. (2012).

Results and Discussion

In total, 19 ichneumonid species belonging to 18 genera, *Centeterus* Wesmael, 1845 (Alomyiinae), *Pristomerus* Curtis, 1836 (Cremastinae), *Cryptus* Fabricius, 1804, *Sphécophaga* Westwood, 1840 (Cryptinae), *Homotropus* Förster, 1869 (Diplazontinae), *Coelichneumon* Thomson, 1893, *Diphyus* Kriechbaumer, 1890, *Lymantrichneumon* Heinrich, 1968, *Virgichneumon* Heinrich, 1977 (Ichneumoninae), *Colpotrochia* Holmgren, 1856 (Metopiinae), *Endromopoda* Hellén, 1939, *Exeristes* Förster, 1896, *Perithous* Holmgren, 1859, *Pimpla* Fabricius, 1804 (Pimplinae), *Probles* Förster, 1869, *Tersilochus* Holmgren, 1859 (Tersilochinae), and *Kristotomus* Mason, 1962, *Tryphon* Fallén, 1813

(Tryphoninae), were collected and identified from different regions of Iran. *Probles* (*Microdiaparsis*) *microcephalus* (Gravenhorst, 1829) and *Tersilochus* (*Pectinolochus*) *striola* (Thomson, 1889) are new records for Iran.

Ichneumonids have been used successfully as biocontrol agents and given the largely undocumented fauna, there is huge potential for their utilization in managed biocontrol programs (Gupta, 1987). Although faunistic surveys are the first step in biological control programs, but the crucially important topic of the biology and hosts of Ichneumonidae in Iran and most other countries has been poorly studied. All these factors increase the importance of such studies. Several faunistic papers on Iranian Ichneumonidae indicate that the fauna of these insects is very diverse in different regions of Iran with an estimated 1000 species.

Subfamily Alomyinae Förster, 1869

Genus *Centeterus* Wesmael, 1845

***Centeterus major* Wesmael, 1844**

Material examined: Kermanshah province, Ravansar, 34°45'N 46°41'E, 1406 m, 2♀♀, April 2008.

General distribution: Austria, Azerbaijan, Belgium, Bulgaria, Czech Republic, Estonia, Finland, France, Germany, Hungary, Iran, Ireland, Italy, Latvia, Lithuania, Moldova, Norway, Poland, Romania, Russia, Slovakia, Spain, Sweden, Turkey, UK.

Subfamily Cremastinae Förster, 1869

Genus *Pristomerus* Curtis, 1836

***Pristomerus armatus* (Lucas, 1849)**

Material examined: Kermanshah province, Sahneh, 34°30'N 47°35'E, 1365 m, 2♀♀, September 2008.

General distribution: Algeria, Armenia, Belarus, Belgium, Bulgaria, Croatia, Czech Republic, France, Georgia, Germany, Greece, Hungary, Iran, Italy, Kazakhstan, Kyrgyzstan, Lithuania, Moldova, Morocco, Netherlands, Poland, Romania, Russia, Serbia & Montenegro, Sweden, Switzerland, Turkey, Turkmenistan, Ukraine, Uzbekistan.

Subfamily Cryptinae Kirby, 1837

Genus *Cryptus* Fabricius, 1804

***Cryptus triguttatus* Gravenhorst, 1829**

Material examined: Ilam province, Eyvan, 33°53'N 46°11'E, 1168 m, 1♀, 1♂, October 2008.

General distribution: Austria, Azerbaijan, Bulgaria, China, Czech Republic, France, Germany, Hungary, Iran, Italy, Kazakhstan, Poland, Romania, Russia, Spain, Tajikistan, Turkey, Uzbekistan.

Genus *Sphecophaga* Westwood, 1840

***Sphecophaga vesparum* (Curtis, 1828)**

Material examined: Ilam province, Ilam, 33°41'N 46°16'E, 987 m, 2♀♀, October 2007, reared from *Vespa orientalis* Linnaeus, 1771 (Hymenoptera: Vespidae).

General distribution: Austria, Belgium, Bulgaria, Canada, Czech Republic, Finland, France, Germany, Hungary, Iran, Ireland, Israel, Japan, Jordan, Korea, Macedonia, Netherlands, New Zealand (introduced), Norway, Poland, Russia, Sweden, Switzerland, USA, UK, Uzbekistan.

Subfamily Diplazontinae Viereck, 1918

Genus *Homotropus* Förster, 1869

***Homotropus pictus* (Gravenhorst, 1829)**

Material examined: Kermanshah province, Kermanshah, 34°20'N 47°00'E, 1267 m, 2♀♀, 1♂, June 2010.

Distribution outside Iran: Austria, Belgium, Croatia, Czech Republic, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, UK.

Subfamily Ichneumoninae Latreille, 1802

Genus *Coelichneumon* Thomson, 1893

***Coelichneumon afghanicus* Heinrich, 1957**

Material examined: Kermanshah province, Paveh, 35°00'N 46°18'E, 1487 m, 1♀, May 2010.

General distribution: Afghanistan, Iran.

Genus *Diphyus* Kriechbaumer, 1890

***Diphyus ochromelas* (Gmelin, 1790)**

Material examined: Ilam province, Abdanan, 32°53'N 47°30'E, 897 m, 1♀, May 2008.

General distribution: Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Croatia, Finland, France, Germany, Hungary, Iran, Italy, Kazakhstan, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, Switzerland, Turkey, Ukraine, UK.

Genus *Lymantrichneumon* Heinrich, 1968

***Lymantrichneumon disparis* (Poda, 1761)**

Material examined: Kermanshah province, Javanrud, 34°46'N 46°19'E, 1340 m, 1♀, 1♂, unknown date.

General distribution: Andorra, Austria, Azerbaijan, Belgium, Bulgaria, China, Croatia, Czech Republic, Finland, France, Georgia, Germany, Hungary, Iran, Italy, Japan, Korea, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Russia, Slovenia, Spain, Switzerland, Turkey, UK.

Genus *Virgichneumon* Heinrich, 1977

***Virgichneumon monostagon* (Gravenhorst, 1820)**

Material examined: Kermanshah province, Paveh, 35°00'N 46°18'E, 1487 m, 1♀, 1♂, May 2010.

General distribution: Andorra, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Croatia, Czech Republic, Finland, France, Germany, Hungary, Iran, Ireland, Italy, Latvia, Lithuania, Luxembourg, Moldova, Montenegro, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Spain, Sweden, Tunisia, Ukraine, UK.

Subfamily Metopiinae Förster, 1869

Genus *Colpotrochia* Holmgren, 1855

***Colpotrochia triclitor* (Aubert, 1979)**

Material examined: Ilam province, Ilam, 33°41'N 46°16'E, 987 m, 3♀♀, October 2007.

General distribution: Iran, Turkey.

Subfamily Pimplinae Wesmael, 1845

Genus *Endromopoda* Hellén, 1939

***Endromopoda arundinator* (Fabricius, 1804)**

Material examined: Ilam province, Abdanan, 32°53'N 47°30'E, 897 m, 1♀, May 2008.

General distribution: Algeria, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Hungary, Iran, Ireland, Italy, Latvia, Lithuania, Moldova, Mongolia, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, Turkey, Ukraine, UK, Uzbekistan.

Genus *Exeristes* Förster, 1869

***Exeristes roborator* (Fabricius, 1793)**

Material examined: Kermanshah province, Kermanshah, 34°20'N 47°00'E, 1267 m, 1♀, 1♂, June 2010.

General distribution: Albania, Algeria, Austria, Azerbaijan, Belgium, Bosnia-Herzegovina, Bulgaria, Canary Islands, China, Croatia, Cyprus, Czech Republic, Egypt, Finland, France, Georgia, Germany, Greece, Hungary, India, Iran, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Korea, Latvia, Libya, Lithuania, Macedonia, Malta, Moldova, Mongolia, Serbia & Montenegro, Morocco, Norway, Pakistan, Poland, Romania, Russia, Slovakia, Slovenia, Spain, Sri Lanka, Sweden, Switzerland, Tunisia, Turkey, Ukraine, UK.

Genus *Perithous* Holmgren, 1859

***Perithous divinator* (Rossi, 1790)**

Material examined: Kermanshah province, Javanrud, 34°46'N 46°19'E, 1340 m, 2♀♀, 1♂, unknown date.

General distribution: Austria, Azerbaijan, Belgium, Bulgaria, Canada, China, Czech Republic, Finland, France, Germany, Hungary, India, Iran, Ireland, Italy, Kazakhstan, Lithuania, Moldova, Netherlands, Norway, Poland, Romania, Serbia & Montenegro, Spain, Sweden, Turkey, USA, UK.

Genus *Pimpla* Fabricius, 1804

***Pimpla rufipes* (Miller, 1759)**

Material examined: Ilam province, Eyvan, 33°53'N 46°11'E, 1168 m, 2♀♀, 2♂♂, October 2008.

General distribution: Afghanistan, Albania, Algeria, Armenia, Austria, Azerbaijan, Azores, Belarus, Belgium, Bulgaria, Canary Islands, China, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, India, Iran, Ireland, Italy, Japan, Kazakhstan, Korea, Kyrgyzstan, Latvia, Libya, Lithuania, Macedonia, Madeira Islands, Malta, Moldova, Mongolia, Morocco, Netherlands, Norway, Poland, Romania, Russia, Serbia & Montenegro, Slovakia, Spain, Sri Lanka, Sweden, Switzerland, Tajikistan, Tunisia, Turkey, Turkmenistan, Ukraine, UK, Uzbekistan.

Subfamily Tersilochinae Schmiedeknecht, 1910

Genus *Probles* Förster, 1869

***Probles (Microdiaparsis) microcephalus* (Gravenhorst, 1829)**

Material examined: Kermanshah province, Sahneh, 34°30'N 47°35'E, 1365 m, 2♀♀, September 2008. **New record for Iran.**

General distribution: Austria, Belarus, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Russia, Sweden, Switzerland, UK.

Genus *Tersilochus* Holmgren, 1858

***Tersilochus (Pectinolochus) striola* (Thomson, 1889)**

Material examined: Ilam province, Darrehshahr, 33°08'N 47°22'E, 712 m, 1♀, July 2008. **New record for Iran.**

General distribution: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Norway, Poland, Russia, Sweden, USA, UK.

Subfamily Tryphoninae Shuckard, 1840

Genus *Kristotomus* Mason, 1962

***Kristotomus laetus* (Gravenhorst, 1829)**

Material examined: Kermanshah province, Ravansar, 34°45'N 46°41'E, 1406 m, 1♀, April 2008.

General distribution: Armenia, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Georgia, Germany, Greece, Hungary, Iran, Ireland, Italy, Latvia, Lithuania, Mongolia, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine, UK.

Genus *Tryphon* Fallén, 1813

Tryphon (Tryphon) atriceps Stephens, 1835

Material examined: Kermanshah province, Javanrud, 34°46'N 46°19'E, 1340 m, 2♀♀, unknown date. Kermanshah province, Kermanshah, 34°20'N 47°00'E, 1267 m, 2♂♂, June 2010.

General distribution: Afghanistan, Albania, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Czech Republic, France, Georgia, Germany, Hungary, Iran, Ireland, Italy, Latvia, Luxembourg, Moldova, Netherlands, Norway, Poland, Romania, Russia, Serbia & Montenegro, Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine, UK.

Tryphon psilosagator Aubert, 1966

Material examined: Ilam province, Darrehshahr, 33°08'N 47°22'E, 712 m, 2♀♀, 1♂, July 2008.

General distribution: Bulgaria, France, Greece, Iran, Italy, Kazakhstan, Russia, Turkey, Ukraine.

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