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Catalogue of the Iranian Microgastrinae (Hymenoptera: Braconidae)

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Table of contents

Abstract

In the present study, the Iranian Microgastrinae (Hymenoptera: Braconidae) fauna is summarized. It is based on a detailed study of all available published data and new material collected. In total 99 species belonging to 8 genera are from Iran: *Apanteles* Förster, 1862 (36 species), *Cotesia* Cameron, 1891 (34 species), *Deuterixys* Mason, 1981 (1 species), *Diolcogaster* Ashmead, 1900 (4 species), *Microgaster* Latreille, 1804 (4 species), *Microplitis* Förster, 1862 (11 species), *Pholesetor* Mason, 1981 (4 species) and *Protapanteles* Ashmead, 1898 (5 species) in 4 tribes (Apantilini, Cotesiini, Microgastrini and Microplitini). A faunistic list with distribution data, and host records are given. Four species are new records for the fauna of Iran: *Apanteles brunnistigma* Abdinbekova, 1969, *A. ingenuoides* Papp, 1971, *Microplitis decipiens* Prell, 1925 and *M. marshallii* Kokujev, 1898.

Key words: Hymenoptera, Braconidae, Microgastrinae, new records, catalogue, Iran

Introduction

Microgastrinae are cosmopolitan braconid wasps, comprising solitary or gregarious koinobiont larval endoparasitoids which attack a wide range of Lepidoptera (Gauld and Bolton 1988; Whitfield 1995, 1997; Inanç and Beyarslan 1990; Ruohomäki *et al.* 2013), with the possible exception of Hepialidae and a few other primitive lineages of Lepidoptera (Güçlü and Özbek 2011). Microgastrine wasps are considered one of the most important groups in the biological control of lepidopteran caterpillar pests of forestry and agriculture (Whitfield 1997; Rousse and Gupta 2013). Microgastinae ranks as the second most diverse and largest subfamily of Braconidae, with more than 2,230 described species (Yu *et al.* 2012; Fernández-Triana *et al.* 2014) and many thousands more awaiting description (Mason 1981; Rodriguez *et al.* 2012). There are 757 species of Microgastrinae currently known in the Palaearctic region of which 529 are recorded from the western Palaearctic region and 496 from eastern Palaearctic region (Yu *et al.* 2012; Fernández-Triana *et al.* 2014).

Because of the large numbers of species and the worldwide distribution of Microgastrinae, as well as the incidence of morphological convergence and reduction in characters, many problems have been faced in its generic classification (Shaw and Huddleston 1991).

Only a few studies have been conducted on the Microgastrinae of Iran (Karimpour *et al.* 2001; Golizadeh *et al.* 2007; Norouzi *et al.* 2009; Farahani *et al.* 2014; Khajeh *et al.* 2014). Their results were largely restricted to the addition of one or two new microgastrine records and have never completely covered all of Iran. In some cases the records were partly included in larger studies of Braconidae; the most recent examples are Rastegar *et al.* (2012), Sadeghi *et al.* (2012) and Farahani *et al.* (2014). Fallahzadeh and Saghaei (2010) listed 102 braconid species from Iran, which included 30 microgastrine species from 6 genera. The present work represents a faunistic catalogue of Microgastrinae recorded from different regions of Iran.

Materials and methods

The published data on the subfamily Microgastrinae from Iran are summarized. Classification follows Yu *et al.* (2012). Names of valid genera are listed alphabetically within tribes, and valid species names are listed alphabetically within genera. The following data are included: valid taxon names, Iranian localities (published records with provincial distribution) (Fig. 1), or when this information is not available - "Iran (no locality cited)" is given), worldwide distribution and host records. Host species information is recorded in Appendix 1.

Results

A total of 99 species of the subfamily Microgastrinae in four tribes (Apantilini, Cotesiini, Microgastrini and Microplitini), and comprising eight genera (*Apanteles* Förster, 1862, *Cotesia* Cameron, 1891, *Deuterixys* Mason, 1981, *Diolcogaster* Ashmead, 1898, *Microgaster* Latreille, 1804, *Microplitis* Förster, 1862, *Pholesetor* Mason, 1981 and *Protapanteles* Ashmead, 1898) are listed from the Iranian fauna, of which four are newly recorded:

Coleoptera, Diptera, Hemiptera and Hymenoptera. Morover, the family analysis shows that within Lepidoptera, Noctuidae and Tortricidae families are the most abundant Microgastrinae host.

Therefore determining of the species diversity in different regions of Iran and conservation of them is necessary. On the other hand identification of hosts of Microgastrinae is another important issue that may result in applied biological control programs. More than 100 species in this group have been used in the biological control of lepidopteran pests, and this total is likely to rise (Whitfield 1997; Whitfield *et al.* 2002). Conservation biological control involves manipulation of the environment to enhance the survival, fecundity, longevity, and behavior of natural enemies to increase their effectiveness (Landis *et al.* 2000).

In general, the limited number of the known Microgastinae from Iran reflecting the paucity of the researches on this group, as well as their relative rarity. Further investigations both on the fauna and host association of the Iranian Micorgastinae are necessary to provide the basis for biological control of the dipterous pests in agricultural and urban landscapes.

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APPENDIX 1. List of host species of Microgastrinae with information of Order and Family.

Species	Order	Family
Abraxas grossulariata (L. 1758)	Lepidoptera	Geometridae
Abraxas pantaria (L. 1767)	Lepidoptera	Geometridae
Abrostola triplasia (L. 1758)	Lepidoptera	Noctuidae
Acanthopsyche atra (L. 1767)	Lepidoptera	Psychidae
Achaea catella Guenée 1852	Lepidoptera	Erebidae
Achroia grisella (Fabricius 1794)	Lepidoptera	Pyralidae
Achroia innotata (Walker 1864)	Lepidoptera	Pyralidae
Aclastus etorofuensis (Uchida 1936)	Hymenoptera	Ichneumonidae
Acleris comariana (Lienig and Zeller 1846)	Lepidoptera	Tortricidae
Acleris ferrugana (Denis & Schiffermüller 1775)	Lepidoptera	Tortricidae
Acleris fimbriana (Thunberg & Becklin 1791)	Lepidoptera	Tortricidae
Acleris forsskaleana (L. 1758)	Lepidoptera	Tortricidae
Acleris hastiana (L. 1758)	Lepidoptera	Tortricidae
Acleris kochiella (Goeze 1783)	Lepidoptera	Tortricidae
Acleris variegana (Denis & Schiffermüller 1775)	Lepidoptera	Tortricidae
Acrobasis advenella Zincken, 1818	Lepidoptera	Pyralidae
Acrobasis caryivorella Ragopnot 1887	Lepidoptera	Pyralidae
Acrobasis consociella (Hübner 1813)	Lepidoptera	Pyralidae
Acrobasis pirivorella (Matsumura, 1900)	Lepidoptera	Pyralidae
Acrobasis repandana (Fabricius, 1798)	Lepidoptera	Pyralidae
Acrobasis tumidana (Denis & Schiffermüller, 1775)	Lepidoptera	Pyralidae
Acrolepia autumnitella Curtis 1838	Lepidoptera	Acrolepiidae
Acrolepia pygmaeana (Haworth, 1811)	Lepidoptera	Plutellidae
Acrolepiopsis assectella (Zeller 1839)	Lepidoptera	Acrolepiidae
Acrolyta marginata (Bridgman 1883)	Hymenoptera	Ichneumonidae

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