

New records of seed-feeding and parasitic chalcid wasps of the family Eurytomidae (Hymenoptera, Chalcidoidea) from Iran

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Abstract

Seventeen species of three genera, *Bruchophagus* Ashmead, 1888; *Eurytoma* Illiger, 1807 and *Systole* Walker, 1832 (Hymenoptera: Eurytomidae) were reared from 25 plant species collected in rangelands of Qom province in Iran during 2011–2017. Their host plants belong to 4 families: Asteraceae, Apiaceae, Fabaceae and Lamiaceae. Six species, *Bruchophagus desertus* Zerova, 1994; *B. hippocrepidis* Zerova, 1969; *B. parvulus* Zerova, 1994; *B. platypterus* (Walker, 1834); *Eurytoma dentate* Mayr, 1878 and *Systole prangicola* Zerova, 1972 are first recorded from Iran. These species were obtained from 25 host plant species among which 6 (i.e. *Bruchophagus desertus* on *Astragalus vanillae*; *B. parvulus* on *Trigonella monantha*; *Systole albipennis* on *Ferula gumosa*, *F. ovina* and *S. prangicola* on *Prangos acaulis*, *P. ferulacea* seeds) are new host plants for these eurytomid species. Results of this study can be served for providing health seeds for plant regeneration in the rangelands of Iran.

Key words: Eurytomidae, fauna, host plant, Iran, Qom, seed-feeder

گزارش‌های جدید از زنبورهای بذرخوار و پارازیتوئید خانواده

Eurytomidae (Hymenoptera: Chalcidoidea) از ایران

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چکیده

۱۷ گونه از ۳ جنس *Bruchophagus* Ashmead, 1888، *Eurytoma* Illiger, 1807 و *Systole* Walker, 1832 (Hym.: Eurytomidae) از بزور ۲۵ گونه گیاه در مراتع استان قم طی سال‌های ۱۳۸۹ تا ۱۳۹۶ پرورش داده شدند. این گیاهان متعلق به تیره‌های Asteraceae، Apiaceae، Fabaceae و Lamiaceae بودند. شش گونه *B. desertus* Zerova, 1994، *B. hippocrepidis* Zerova, 1969، *B. parvulus* Zerova, 1994، *B. platypterus* (Walker, 1834) و *E. dentata* Mayr،

1878 و *S. prangicola* Zerova, 1972 برای اولین بار برای فون ایران گزارش می‌شوند. این نمونه‌ها از بذور ۲۵ گونه گیاهی پرورش داده شدند که ۶ گیاه، میزبان جدیدی برای این زنبورها می‌باشند. نتایج این تحقیق می‌تواند برای تهیه بذور سالم برای احیا گیاهان در مراتع ایران بکار رود.

واژه‌های کلیدی: Eurytomidae، فون، گیاه میزبان، ایران، قم، بذرخوار

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Introduction

Approximately 90 million hectares of Iran (54.8% of its total land area), is covered by rangelands, which has a main role in soil conservation and also in the production of annual dry forage (DOE, 2010). Many biotic and abiotic factors such as pest infestations, grazing, drought, fire and others can affect plant density, as well as efficacy of these rangelands (Pennell *et al.*, 2005). One of the biotic factors is seed-feeders, of which, chalcid wasps of the family Eurytomidae Walker, 1832 with about 1500 species in 88 genera has a special situation (Gómez *et al.*, 2011). It is generally accepted that the members of this family showing a wide range of biology and can be found in all zoogeographical regions (Lotfalizadeh *et al.*, 2007). Some of them are parasitoids or predators of different insects, while, many of them are plant feeders. The first group are parasitoids, which classified as the beneficial agents, those are gall-maker in grass stems or seed-feeder of various agricultural crops are considered as serious pests (DiGiulio, 1997).

This family have been studied by several specialists in the Palaearctic region (Askew & Blasco-Zumeta, 1998; Zerova, 1970, 2011; Zerova & Fursov, 1991, 2015; Stojanova, 2002; Lotfalizadeh *et al.*, 2007; Zerova & Seryogina, 2009, 2013; Delvare *et al.*, 2014, 2019; Fursov *et al.*, 2017; Prázsmári *et al.*, 2017; Zerova *et al.*, 2017; Zerova & Klymenko, 2018; Zerova *et al.*, 2018).

Recently, Saghaei *et al.* (2018) compiled data of 89 species in 8 genera of Eurytomidae in an updated checklist for Iran. Thereafter, Karimpour (2017), Naghizadeh *et al.* (2017), Alizadeh & Lotfalizadeh (2018); Moeinadini *et al.* (2018), Saeidi *et al.* (2018); Zerova *et al.* (2018), Alizadeh *et al.* (2019) and Zerova *et al.* (2019) added some new species and records to Iranian fauna, including host data and biological associations in Iran. Our new collection from the rangelands of Qom province led to identification of Eurytomidae and determination of their host associations.

Materials and methods

Studied specimens were collected from 2011 until 2017 in the rangelands of Qom province. The plant seeds were transferred into the laboratory and then they were reared until emergence of adult wasps. The emerged individuals were conserved in vials containing ethanol 75% and deposited in the collection of the Agricultural and Natural Resources

Research & Education Center of Qom. To preliminary identification of specimens, the keys by Zerova & Seregina (1994), Zerova (1995), Zerova (2010) and Zerova (2017) were used. The final identification specimens and comparison with type specimens was conducted by the seventh author at Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine (Kiev). A series of voucher specimens were deposited in the Arthropod Museum of the Research Institute of Forests and Rangelands of Iran.

Results

Seventeen species of the family Eurytomidae were identified and herein are listed alphabetically. New taxa for Qom province and Iran are marked with * and **, respectively.

Family Eurytomidae Walker, 1832

Subfamily Eurytominae Walker, 1832

Genus *Bruchophagus* Ashmaed, 1888 *

Bruchophagus astragali Fedoseeva, 1954*

Material examined: Iran, Qom province, Varzaneh (34° 30' 50.9" N, 50° 19' 26.7" E, 1745m), 16 May 2010, 2♂; ex *Astragalus compylorrhynchus*, Yeke Bagh (34°31' 13.3" N, 50° 23' 52.4" E, 1517m), 21 May 2011, 1♀; ex *A. compylorrhynchus*; Kohandan (34° 41' 17.0" N, 50°11' 57.7" E, 1996m), 18 May 2012, 1♀; ex *A. oxyglottis*; Dare-Esmail (34° 18' 31.1" N, 50°58' 14.0" E, 1517m), 20 May 2012, 1♀; ex *A. compylorrhynchus*; Veshnave (34° 17' 24.1" N, 50° 58' 39.5" E, 1864m), 7 June 2011, 1♂; ex *A. iranicus*; Dare-Esmail (34° 18' 37.1" N, 50° 58' 11.4" E, 1930m), 8 June 2011, 2♀; ex *A. brachyodontus*; Kohandan (34° 41' 17.0" N, 50° 11' 57.7" E, 1996m), 18 May 2012, 1♀; ex *A. oxyglottis*; Dare-Esmail (34° 18' 31.1" N, 50° 58' 14.0" E, 1911m), 21 May 2012, 1♀; ex *A. compylorrhynchus*, leg.: A. Mohammadpour.

Distribution: Palaearctic region (Noyes, 2018);

In Iran: East-Azerbaijan (Naghizadeh *et al.*, 2017) and Chaharmahal-Bakhtiyari, North Khorasan, Qazvin, West-Azerbaijan (Saghaei *et al.*, 2018) and Qom (present study) provinces.

Bruchophagus dahuricus Zerova, 1992*

Material examined: Iran, Qom province, Aliabade-Neizar (34° 15' 25.7" N, 50° 45' 30.2" E, 2025m), 1 July 2012, 1♀; ex *Dorema ammoniacum*, leg.: A. Mohammadpour.

Distribution: Russia (Noyes, 2018);

In Iran: North Khorasan, Qazvin (Saghaei *et al.*, 2018) and Qom (present study) provinces.

Bruchophagus desertus Zerova, 1994**

Material examined: Iran, Qom province, Varzane (34°32' 43.1" N, 50° 19' 15.5" E, 1646m), 30 May 2011, 1♀; ex *A. vanillae*; Aliabade-Neizar (34°15' 25.7" N, 50° 45' 30.2" E, 2025m), 1 July 2012, 1♀ 1♂; ex *Dorema ammoniacum*, leg.: A. Mohammadpour.

Distribution: Turkmenistan (Noyes, 2018);

In Iran: Qom province (present study).

Bruchophagus gibbus* (Boheman, 1836)

Material examined: Iran, Qom province, Vesf (34°11' 15.2" N, 50°56' 02.7" E, 2467m), 16 July 2012, 1♂; ex *Trifolium pratense*, Aliabade-Neizar (34°15' 24.4" N, 50°45' 34.6" E, 2025m), 1 July 2012, 1♀; ex *Dorema ammoniacum*, leg.: A. Mohammadpour.

Distribution: Holarctic region (Noyes, 2018);

In Iran: East-Azerbaijan (Naghizadeh *et al.*, 2017) and Khuzestan, North Khorasan, Qazvin (Saghaei *et al.*, 2018) and Qom (present study) provinces.

Bruchophagus hippocrepidis* Zerova, 1969*

Material examined: Iran, Qom province, Aliabade-Neizar (34°15' 25.7" N, 50°45' 30.2" E, 2025m), 1 July 2012, 2♀ 3♂; ex *Dorema ammoniacum*, leg.: A. Mohammadpour.

Distribution: Bulgaria, Hungary, Mongolia and Ukraine (Noyes, 2018);

In Iran: Qom province (present study).

Bruchophagus kononovae* Zerova, 1994

Material examined: Iran, Qom province, Varzane (34°30' 50.9" N, 50°19' 26.7" E, 1745m), 16 May 2010, 1♀; ex *A. compylorrhynchus*, Yeke Bagh (34° 31' 08.2" N, 50°23' 54.7" E, 1555m), 1 May 2011, 20♀ 2♂; ex *A. compylorrhynchus*, Dare-Esmail (34° 18' 37.1" N, 50°58' 11.4" E, 1930m), 8 June 2011, 1♂; ex *A. brachyodontus*, Palang-Dare (34° 22' 15.5" N, 50°23' 21.2" E, 1781m), 30 May 2012, 5♀; unidentified host, leg.: A. Mohammadpour.

Distribution: Turkmenistan (Noyes, 2018);

In Iran: East-Azerbaijan (Naghizadeh *et al.*, 2017) and North Khorasan (Saghaei *et al.*, 2018) and Qom (present study) provinces.

Bruchophagus medicaginis* Zerova, 1992

Material examined: Iran, Qom province, Ghahan (34° 41' 14.9" N, 50°11' 46.4" E, 1966m), 22 June 2012, 1♀; ex *Medicago lupulina*, Vesf (34° 11' 15.2" N, 50°56' 02.7" E, 2467m), 16 July 2012, 1♀; ex *M. sativa*, leg.: A. Mohammadpour.

Distribution: Ukraine (Noyes, 2018);

In Iran: North Khorasan (Saghaei *et al.*, 2018) and Qom (present study) provinces.

Bruchophagus mutabilis* Nikolskaja, 1952

Material examined: Iran, Qom province, Kohandan (34° 41' 17.0" N, 50°11' 57.7" E, 1996m), 17 May 2012, 1♀ 1♂; ex *A. oxyglottis*, leg.: A. Mohammadpour.

Distribution: Mostly distributed in the eastern Palaearctic region (Noyes, 2018);

In Iran: East-Azerbaijan (Naghizadeh *et al.*, 2017) and Qazvin, North Khorasan (Saghaei *et al.*, 2018) and Qom (present study) provinces.

Bruchophagus parvulus* Zerova, 1994*

Material examined: Iran, Qom province, Veshnave (34° 17' 22.0" N, 50°58' 41.3" E, 1879m), 7 June 2011, 5♀ 1♂; ex *Trigonella monantha*, leg.: A. Mohammadpour

Distribution: Israel and Romania (Noyes, 2018);

In Iran: Qom province (present study).

Bruchophagus platypterus* (Walker, 1834)*

Material examined: Iran, Qom province, Tinoj (34°34' 20.1" N, 50°06' 50.5" E, 2089m), 25 July 2012, 3♀1♂; ex *Lotus corniculatus*, leg.: A. Mohammadpour.

Distribution: Holarctic region (Noyes, 2018);

In Iran: Qom provinces (present study).

Bruchophagus roddi* Gussakovsky, 1933

Material examined: Iran, Qom province, Aliabde-Neizar (34° 15' 24.4" N, 50° 45' 34.6" E, 2044m), 1 July 2012, 1♀; ex *Medicago sativa*, Vesf (34° 11' 15.2" N, 50°56' 02.7" E, 2467m), 16 July 2012, 1♀2♂; ex *M. sativa*, Tinoj (34° 34' 20.1" N, 50° 06' 50.5" E, 2089m), 25 July 2012, 7♀; ex *M. sativa*, Vesf (34° 11' 48.2" N, 50° 57' 24.9" E, 2373m), 28 July 2012, 1♀; ex *M. sativa*, leg.: A. Mohammadpour.

Distribution: It has worldwide distribution and can be found in all of regions except Afrotropical region (Noyes, 2018).

In Iran: East Azerbaijan, Hamadan, Kermanshah, Kurdistan, Qazvin, Tehran, West-Azerbaijan, Zanjan (Saghaei *et al.*, 2018) and Qom (present study) provinces.

Bruchophagus trigonellae* Zerova, 1970

Material examined: Iran, Qom province, Yeke Bagh (34° 31' 07.9" N, 50° 23' 52.1" E, 146m), 30 May 2011, 1♀; ex *Trigonella monantha*, Veshnave (34° 17' 23.3" N, 50° 58' 40.2" E, 1850m), 7 June 2011, 1♀1♂; ex *T. monantha*, Kohandan (34° 41' 17.1" N, 50° 11' 46.1" E, 1914m), 18 May 2012, 1♀; ex *T. monantha*, leg.: A. Mohammadpour.

Distribution: France and Tadjikistan (Noyes, 2018);

In Iran: East-Azerbaijan (Naghizadeh *et al.*, 2017) and Qazvin, North Khorasan (Saghaei *et al.*, 2018) and Qom (present study) provinces.

Bruchophagus turkestanicus* Zerova, 1994

Material examined: Iran, Qom province, Aliabade-Neizar (34°15' 25.7" N, 50° 45' 30.2" E, 2025m), 1 July 2012, 2♀1♂; ex *Dorema ammoniacum*, leg.: A. Mohammadpour.

Distribution: Turkmenistan (Noyes, 2018);

In Iran: East-Azerbaijan (Naghizadeh *et al.*, 2017) and Qazvin, North Khorasan (Saghaei *et al.*, 2018) and Qom (present study) provinces.

Genus *Eurytoma* Illiger, 1807 *

Eurytoma acroptilae* Zerova, 1986

Material examined: Iran, Qom province, Ghahan (34°43' 49.9" N, 50° 11' 38.2" E, 1800m), 24 July 2011, 1♀; ex *Carthamus tinctorius*, leg.: A. Mohammadpour.

Distribution: Kazakhstan, Tadjikistan, Ukraine, former USSR and Uzbekistan (Noyes, 2018);

In Iran: Chaharmahal-Bakhtiari, East-Azerbaijan, Ilam, Kohkylloie and Boyer Ahmad (Saghaei *et al.*, 2018) and Qom (present study) provinces.

Eurytoma dentata* Mayr, 1878*

Material examined: Iran, Qom province, Ghahan (34°41' 17.0" N, 50°11' 48.1" E, 1932m), 22 June 2012, 1♀; ex *Phlomis olivieri*, leg.: A. Mohammadpour.

Distribution: Europe, North Africa and some Oriental countries (Noyes, 2018);

In Iran: Qom province (present study).

Genus *Systole* Walker, 1832 ****Systole albipennis* Walker, 1832***

Material examined: Iran, Qom province, Palang-Dare (34° 20' 08.3" N, 50° 25' 09.5" E, 1827m), 2 June 2012, 1♀; ex *Ferula ovina*, Senjegan (34° 18' 26.5" N, 50° 19' 55.8" E, 2018m), 17 June 2012, 1♂; ex *F. gumosa*, leg.: A. Mohammadpour.

Distribution: Widely distributed in Europe (Noyes, 2018);

In Iran (Saghaei *et al.*, 2018) and Qom province (present study).

Systole prangicola* Zerova, 1972*

Material examined: Iran, Qom province, Varzaneh (34° 33' 0.2" N, 50° 17' 18.1" E, 1643m), 15 May 2008, 1♂; ex *Prangos acaulis*, Vesf (34° 11' 50.8" N, 50° 56' 22.0" E, 2428m), 13 June 2011, 1♀1♂; ex *P. ferulacea*, leg.: A. Mohammadpour.

Distribution: Tadjikistan (Noyes, 2018);

In Iran: Qom province (present study).

Discussion

Current study was conducted in the rangelands of Qom province, Iran. Overall six species including *Bruchophagus desertus*, *B. hippocrepidis*, *B. parvulus*, *B. platypterus*, *Eurytoma dentata* and *Systole prangicola* are reported for the first time from Iran. While, all other 11 species are new records for Qom province.

The wasps were associated with 25 different host plants species belonging to nine genera and multiple plant families. In this study, the family Fabaceae (Leguminosae) with 15 species and family Apiaceae with eight species are hosting about 60% and 32% of seed wasps, respectively. Zerova (1995) estimated that most species of the genera *Bruchophagus* and *Systole* develop in seeds of two plant families, Fabaceae and Apiaceae, respectively.

Hosts of all species are summarized in Table 1. In the present study, some new host associations (i.e. *Bruchophagus desertus* on *Astragalus vanillae*; *B. parvulus* on *Trigonella monantha*; *Systole albipennis* on *Ferula gumosa*, *F. ovina* and *S. prangicola* on *Prangos acaulis*, *P. ferulacea* seeds) were found for first time for eurytomid species, which are marked by an asterisk (Table 1).

Considering all the recent studies on the family (Karimpour, 2017; Naghizadeh *et al.*, 2017; Alizadeh & Lotfalizadeh, 2018; Moeinadini *et al.*, 2018; Saeidi *et al.*, 2018; Zerova *et al.*, 2018; Alizadeh *et al.*, 2019; Zerova *et al.*, 2019), number of Iranian Eurytomidae reached to 113 species, whereas so far 624 species were recorded in the Palaearctic region (Noyes, 2018). Therefore, it includes about 8% and 17% of the known species in the world and in the Palaearctic region, respectively. Comparing with fauna of the adjacent countries (Saghaei *et al.*, 2018) it reveals that the fauna of Iran is better explored.

Three species *B. astragali*, *B. gibbus* and *B. roddi* are reported as most widely distributed in Iran. It may be resulted from wide distribution of their host plants that the first one was reported on several species of *Astragalus* and two last species are alfalfa seed wasps with most economical importance in Iran. Considering that Iran is located in Palaearctic region and has exchanges with Oriental and Afrotropical regions, it seems the Iranian fauna of Eurytomidae is richer and need more attention. As healthy plant seeds are inevitable need for plant regeneration in rangeland of the country, results of this study can be directly used for collecting health seeds from uninfected zones in the country.

Table 1. Host associations of eurytomid wasps (Hymenoptera: Eurytomidae). New host plants are marked by an asterisk.

Species	Host	References
<i>B. astragali</i>	<i>Astragalus compylorrhynchus</i> , <i>A. brachyodontus</i> , <i>A. iranicus</i> and <i>A. oxyglottis</i>	Present study
	<i>Astragalus</i> spp.	Doğanlar, 1990; Zerova & Seregina, 1994; Zerova, 1995; Popescu, 2009
	<i>Astragalus</i> spp., <i>Coronilla</i> spp., <i>Lotus</i> spp., <i>Medicago</i> spp., <i>Onobrychis</i> spp. and <i>Vicia</i> spp.	Haghighian, 2004
	<i>A. chrysostachys</i>	Zerova <i>et al.</i> , 2008
	<i>A. brachyodontus</i> and <i>Oxytropis immersa</i>	Lotfalizadeh & Zarnegar, 2014
<i>B. dahuricus</i>	<i>A. alyssoides</i> , <i>A. iranicus</i> , <i>A. podocarpus</i> , <i>A. onobrychis</i> and <i>A. onobrychiodes</i>	Naghizadeh <i>et al.</i> , 2017
	<i>D. ammoniacum</i>	Present study
	<i>Caragana microphylla</i>	Zerova & Seregina, 1994; Zerova, 1995
<i>B. desertus</i>	<i>A. brachyodontus</i> and <i>Oxytropis immersa</i>	Lotfalizadeh & Zarnegar, 2014
	<i>A. vanillae</i> * and <i>D. ammoniacum</i>	Present study
<i>B. gibbus</i>	<i>A. albescens</i>	Zerova & Seregina, 1994; Zerova, 1995
	<i>Trifolium pratense</i>	Present study
	<i>T. pratense</i>	Doğanlar, 1990; Mcdaniel & Boe, 1991; Popescu, 2001, 2006; Zerova & Seregina, 1994; Zerova, 1995; Naghizadeh <i>et al.</i> , 2017
	<i>Trifolium</i> sp. and <i>Lotus</i> sp.	Çam, 2011
	<i>Medicago sativa</i>	Eslamizadeh & Ebrahimi, 2002; Eslamizadeh <i>et al.</i> , 2008

	<i>A. brachydontus</i> , <i>A. gutatus</i> and <i>Zosima absinthifolia</i>	Lotfalizadeh & Zarnegar, 2014
	<i>D. ammoniacum</i>	Present study
<i>B. hippocrepidis</i>	<i>Hippocrepis comosa</i>	Zerova & Seregina, 1994; Zerova, 1995
	<i>A. brachydontus</i> and <i>A. compylorrhynchus</i>	Present study
<i>B. kononovae</i>	<i>A. paucijugis</i>	Zerova & Seregina, 1994; Zerova, 1995
	<i>A. iranicus</i>	Kalantary <i>et al.</i> , 2017
	<i>A. refractus</i>	Naghizadeh <i>et al.</i> , 2017
<i>B. medicaginis</i>	<i>Medicago lupulina</i> and <i>M. sativa</i>	Present study
	<i>M. orbicularis</i>	Zerova & Seregina, 1994; Zerova, 1995
	<i>A. oxyglottis</i>	Present study
	<i>Astragalus</i> , <i>Colutea</i> , <i>Glycyrrhiza</i> and <i>Halimodendron</i>	Zerova & Seregina 1994; Zerova, 1995
	<i>Glycyrrhiza glabra</i>	Arbab <i>et al.</i> , 2004
<i>B. mutabilis</i>	<i>Astragalus</i> sp., <i>Colutea arborescence</i>	Çam, 2011
	<i>A. brachydontus</i> and <i>A. avisinus</i>	Lotfalizadeh & Zarnegar, 2014
	<i>A. onobrychioides</i> , <i>A. tricholobus</i> , <i>A. macrorus</i> , <i>A. chrysostachys</i> and <i>Prangosscabra</i>	Naghizadeh <i>et al.</i> , 2017
	<i>A. persicus</i>	Naghizadeh <i>et al.</i> , 2017; Alizadeh <i>et al.</i> , 2019
<i>B. parvulus</i>	<i>Trigonella monantha</i> *	Present study
	Unknown	Zerova & Seregina, 1994; Zerova, 1995; Popescu, 2004, 2006
	<i>Lotus corniculatus</i>	Present study
<i>B. platypterus</i>	<i>L. corniculatus</i>	Batiste, 1967; Grainger, 1975; Mcdaniel & Boe, 1991; Ellis & Nang'ayo, 1992; Peterson <i>et al.</i> , 1992; Zerova & Seregina, 1994; Zerova, 1995; Alzugaray, 2003; Popescu, 2006, 2009
	<i>Medicago sativa</i>	Present study
<i>B. roddi</i>	<i>M. sativa</i>	Doğanlar, 1990; Mcdaniel & Boe, 1991; Zerova & Seregina, 1994; Zerova, 1995; Azmayesh Fard & Esmaili, 1974; Khanjani & Kalafchi, 2003; Popescu, 2001, 2006; Arbab, 2006; Çam, 2011; Mohammadbeigi, 2014; Gözüaçık & İreç, 2016; Gözüaçık <i>et al.</i> , 2018
	<i>T. monantha</i>	Present study
<i>B. trigonellae</i>	<i>Trigonella tenuis</i>	Zerova & Seregina, 1994; Zerova, 1995; Lotfalizadeh <i>et al.</i> , 2007
	<i>Astragalus odoratus</i> and <i>A. avisinus</i>	Lotfalizadeh & Zarnegar, 2014
	<i>A. tricholobus</i>	Naghizadeh <i>et al.</i> , 2017
	<i>D. ammoniacum</i>	Present study
<i>B. turkestanicus</i>	<i>Astragalus skorniakowii</i>	Zerova & Seregina, 1994; Zerova, 1995
	<i>A. brachydontus</i>	Lotfalizadeh & Zarnegar, 2014
	<i>A. macrorus</i> , <i>A. alyssoides</i> , <i>A. chrysostachys</i> , <i>A. podocarpus</i> and <i>A. neo-mobayenii</i>	Naghizadeh <i>et al.</i> , 2017
	<i>Carthamus tinctorius</i>	Present study
<i>Eurytoma acroptilae</i>	In Iran, it was reported from galls of <i>A. helianthi</i> , <i>Chaetorellia carthami</i> , <i>Terellia luteola</i> and <i>U. mauritanica</i> on <i>C. tinctorius</i>	Gharali 2004, Gharali & Zerova 2004, Lotfalizadeh & Gharali 2014
	In safflower fields as a parasitoid of <i>Isocolus tinctorius</i> was reported on <i>Carthamus tinctorius</i>	Saeidi & Adam, 2011, Lotfalizadeh & Gharali, 2014
	Although, it was reared from galls of <i>Urophorakasachstanica</i> , <i>U. xanthippe</i> , <i>Acanthiophilushelianthi</i> and <i>Trupaneastellate</i> (Diptera: Tephritidae) on <i>Acroptilanrepens</i>	Zerova, 2010
<i>E. dentata</i>	<i>Phlomis olivieri</i>	Present study

	A parasitoid of several species of <i>Asphondylia</i> (Diptera: Cecidomyiidae) in galls on many plant species	Zerova & Seryogina, 2006; Zerova, 2010; Gates & Delvare, 2008; Çam, 2011; Dorchin <i>et al.</i> , 2014; Doğanlar & Elsayed, 2015
	<i>Ferulaovina*</i> and <i>F. gumosa*</i>	Present study
	<i>Daucus carota</i> , <i>Carum carvi</i> , <i>Pimpinella anisum</i>	Bouček, 1952
	<i>Torilis japonica</i>	Claridge, 1959
<i>Systole albipennis</i>	<i>Bupleurum rotundifolium</i> , <i>B. fruticosum</i> , <i>Carum carvi</i> , <i>Ferula orientalis</i> , <i>Pastinaca</i> sp., <i>Petroselinum sativum</i> , <i>Torilis</i> sp.	Zerova & Seregina, 1994; Zerova, 1995; Popescu, 2001
	<i>Conium maculatum</i>	De Santis <i>et al.</i> , 1989
	<i>Foeniculum vulgare</i>	Bouček, 1952; Kashyap <i>et al.</i> , 1994; Popescu, 2001
	<i>Coriandrium sativum</i>	Kant <i>et al.</i> , 2013
	<i>Prangos acaulis*</i> and <i>P. ferulacea*</i>	Present study
<i>S. prangicola</i>	<i>Prangos pabularia</i>	Zerova & Seregina, 1994; Zerova, 1995

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