

A Survey of Aphid Parasitoids (Hymenoptera: Braconidae: Aphidiinae) in Diyarbakır, Turkey

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A list is given of aphid parasitoids found in Diyarbakır Province, Turkey. In the survey, performed between 1998 and 2000, 16 species of aphid parasitoids were found on different hosts in Diyarbakır Province. *Monoctonus mali* is reported for the first time in the Turkish aphid parasitoids fauna.

KEY WORDS: Aphid parasitoids; survey; Diyarbakır; Turkey.

INTRODUCTION

Aphids (Homoptera: Aphidoidea) are among the most important agricultural pests worldwide, causing damage directly by plant feeding and indirectly as vectors of plant viruses (4,5,15). Aphid parasitoids play a significant role in reducing aphid populations (9,24). Aphids are known to have many natural enemies from different taxa. Among these, aphidiids (Braconidae: Aphidiinae) are small wasps, with an adult size ranging from approximately one to several mm. They are strictly specific solitary endophagous parasitoids of aphids (14,18,22,24). Approximately 60 genera and subgenera and more than 400 species of Aphidiinae are known from all over the world. Host finding starts with the selection of a suitable habitat, with the food plants of the host aphids playing an important role, because the parasitoids are attracted to odors released from aphid-infested plants (6,20). A few investigations have been conducted on aphid parasitoids in Turkey. The aim of this study was to determine aphid parasitoids in Diyarbakır Province of Turkey.

MATERIALS AND METHODS

Aphid parasitoid samples on various hosts were collected between 1998 and 2000 from different locations (Center, Bismil, Çınar, Çermik, Çüngüş, Dicle, Eğil, Ergani, Hazro, Kocaköy, Lice and Silvan) in cultivated and noncultivated areas in Diyarbakır Province, which is located in the southeast Anatolia region of Turkey. Specimens were collected at random from live and mummified aphids on different host plants. Each sample was placed separately in a plastic bag and then brought to the laboratory, where aphids were identified to species. Dead aphids were preserved in 70% ethyl alcohol. Plant samples with aphids containing parasitoids were placed in plastic boxes to obtain adult parasitoids. The emerging parasitoids were transferred with a fine brush into Eppendorf tubes containing 70% ethyl alcohol.

Received Jan. 7, 2003; received in final form April 23, 2003; <http://www.phytoparasitica.org> posting Oct. 20, 2003.

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RESULTS AND DISCUSSION

Sixteen species of aphid parasitoids were determined in the province. A list of the species is presented below together with their distribution in Turkey. *Monoctonus mali* was recorded for the first time in the Turkish aphid parasitoids fauna.

***Adialytus salicaphis* (Fitch, 1855)**

Material examined: Center, 18.XI.1998, from *Chaitophorus leucomelas* Koch on *Populus* sp. - Ergani, 27.XI.1998, *C. leucomelas* Koch on *Salix* sp. - Hani, 18.V.1999, *C. leucomelas* Koch mixed with *Pemphigus immunis* Buckton on *Populus* sp. - Çınar, 08.VI.1999, *C. niger* Mordvilko on *Salix* sp.

Distribution in Turkey: Ankara (7).

***Aphidius colemani* Viereck, 1912**

Material examined: Center, 07.XII.1998, from *Brachycaudus helichrysi* (Kalt.) on *Prunus domestica*. - Bismil, 04.V.1999, *Aphis craccivora* Koch on *Robinia pseudoacacia*.

Distribution in Turkey: Adana, Hatay, İçel, Izmir (10,27).

***Aphidius eadyi* Stary Gonzalez, Hall, 1980**

Material examined: Çüngüş, 11.VI.1999, from *Acyrtosiphon pisum* (Harr.) on *Medicago sativa*.

Distribution in Turkey: Ankara (7).

***Aphidius matricariae* Haliday, 1834**

Material examined: Center, 03.V.1999, from *Myzus persicae* (Sulz.) on *Duranta repens*. - Center, 14.V.1999, *Dysaphis pyri* (B.D. Fonscolombe) on *Pyrus communis*, *Dysaphis plantaginea* (Pass.) mixed with *Aphis pomi* De Geer on *Malus communis*. - Hani, 18.V.1999, *Brachycaudus cardui* (L.) on *Cirsium* sp.

Distribution in Turkey: Adana, Diyarbakır, Hatay, İçel, Izmir (10,13,26,27).

***Aphidius transcaspicus* Telenga, 1958**

Material examined: Center, 12.V.1999, from *Hyalopterus pruni* (Geoff.) on *Prunus persica* and *Prunus armeniaca*. - Çınar, 06.V.1999, *H. pruni* (Geoff.) on *Phragmites* sp. - Çınar, 08.VI.1999, *H. pruni* (Geoff.) on *P. persica*.

Distribution in Turkey: Muğla (1).

***Aphidius uzbekistanicus* Luzhetskii, 1960**

Material examined: Çüngüş, 11.VI.1999, from *Sitobion avenae* (F.) on *Triticum* sp.

Distribution in Turkey: Ankara, Tekirdağ (7,19).

***Aphidius* sp.**

Material examined: Bismil, 07.VII.1999 from *Brevicoryne brassicae* (L.) on *Brassica oleracea* var. *capitata*.

***Binodoxys acalephae* (Marshall, 1896)**

Material examined: Çüngüş, 11.VI.1999, from *Aphis fabae* Scop. on *Rumex crispus*.

Distribution in Turkey: Ankara, Adana, Hatay, İçel (7,28).

***Binodoxys angelicae* (Haliday, 1833)**

Material examined: Center, 03.V.1999, from *Aphis fabae* Scop. on *Cirsium arvense*. - Center, 05.V.1999, *Aphis craccivora* Koch. on *Glycyrrhiza glabra*. - Center 06.V.1999, *Aphis punicae* Pass. on *Punica granatum*. - Ergani, 05.VI.1999, *A. craccivora* Koch. on *Amaranthus* sp.

Distribution in Turkey: Adana, Antalya, Hatay, İçel, Izmir (10,21,25,27,28).

***Diaeretiella rapae* (M'Intosh, 1855)**

Material examined: Center, 02.XII.1998, from *Brevicoryne brassicae* (L.) on *Brassica oleracea*. - Center, 02.XII.1998, *Lipaphis erysimi* (Kalt.) on *Raphanus sativus*. - Bismil, 07.VI.1999, *B. brassicae* (L.) on *B. oleracea*. - Hazro, 18.VI.99, *B. brassicae* (L.) on *B. oleracea* var. *capitata*.- Lice, 03.VIII.1999, *B. brassicae* (L.) on *B. oleracea*.
Distribution in Turkey: Ankara, Erzurum, İçel, Izmir, Adana, Konya (3,7,8,10,16,21,23,25,28).

***Ephedrus persicae* Froggatt, 1904**

Material examined: Center, 03.VI.1999, from *Hyalopterus amygdali* (Blanchard) mixed with *Brachycaudus amygdalinus* (Sch.) on *Amygdalus communis*.

Distribution in Turkey: Ankara, Diyarbakır, Izmir, Çukurova region, Tekirdağ (7,10,13,19,28).

***Lysiphlebus confusus* Tremblay and Eady, 1978**

Material examined: Çüngüş, 11.VI.1999, from *Aphis fabae* Scop. on *Medicago sativa*. - Çermik, 01.VII.1999, *Aphis gossypii* Glov. on *Capsicum annum*.

Distribution in Turkey: Adana, Hatay, İçel (2,27).

***Lysiphlebus fabarum* (Marshall, 1896)**

Material examined: Center, 04.V.1999, 05.V.1999, from *Aphis craccivora* Koch on *Robinia pseudoacacia*. - Çüngüş, 11.VI.1999, *Aphis fabae* Scop. on *Rumex crispus*. - Çüngüş, 12.VI.1999, *Aphis craccivora* Koch on *Glycyrrhiza glabra*. - Hazro, 18.VI.1999, *Aphis tirucallis* H. R. Lambers on *Euphorbia* sp., *Aphis davletshinae* H.R. Lambers on undetermined weed. - Çermik, 1.VII.1999, *Myzus persicae* (Sulz.) on *Capsicum annum*. - Bismil, 18. VIII. 1999, *Aphis gossypii* Glov. on *Citrullus vulgaris* and *Cucumis melo*.

Distribution in Turkey: Adana, Ankara, Diyarbakır, Hatay, İçel, Izmir, Konya, Mardin, Muğla, Şanlıurfa, Tekirdağ (1,2,7,8,10-12,17,19,26-28).

***Monoctonus mali* van Achterberg, 1989**

Material examined: Center, 06.XII.1998, from *Ovatus insitus* (Walk.) on *Cydonia vulgaris*. There is no reference to this parasitoid from Turkey.

***Praon volucre* (Haliday, 1833)**

Material examined: Center, 03.V.1999, from *Hyalopterus pruni* (Geoff.) on *Prunus persica*. - Çüngüş, 11.VI.1999, *Sitobion avenae* (F.) on *Triticum* sp.

Distribution in Turkey: Adana, Ankara, Hatay, İçel, Tekirdağ (7,16,19,27,28).

***Trioxys pallidus* (Haliday, 1833)**

Material examined: Hazro, 18.VI.1999, from *Chromaphis juglandicola* (Kalt.) on *Juglans regia*.

Distribution in Turkey: Without locality (23).

APHID x PARASITOID LIST

Acyrtosiphon pisum*: *Aphidius eadyi

Aphis craccivora*: *Aphidius colemani*, *Binodoxys angelicae*, *Lysiphlebus fabarum

Aphis davletshinae*: *Lysiphlebus fabarum

Aphis fabae*: *Binodoxys acalephae*, *Binodoxys angelicae*, *Lysiphlebus confusus*, *Lysiphlebus fabarum

Aphis gossypii*: *Lysiphlebus confusus*, *Lysiphlebus fabarum

Aphis pomi*: *Aphidius matricariae

Aphis punicae*: *Binodoxys angelica

Aphis tirucallis*: *Lysiphlebus fabarum

Brachycaudus amygdalinus*: *Ephedrus persicae

Brachycaudus cardui*: *Aphidius matricariae

Brachycaudus helichrysi: *Aphidius colemani*
Brevicoryne brassicae: *Aphidius* sp., *Diaeretiella rapae*
Chaitophorus leucomelas: *Adialytus salicaphis*
Chaitophorus salijapanicus subsp. *niger*: *Adialytus salicaphis*
Chromaphis juglandicola: *Trioxys pallidus*
Dysaphis plantaginea: *Aphidius matricariae*
Dysaphis pyri: *Aphidius matricariae*
Hyalopterus amygdali: *Ephedrus persicae*
Hyalopterus pruni: *Aphidius transcaspicus*, *Praon volucre*
Lipaphis erysimi: *Diaeretiella rapae*
Myzus persicae: *Aphidius matricariae*, *Lysiphlebus fabarum*
Ovatus insitus: *Monoctonus mali*
Sitobion avenae: *Aphidius uzbekistanicus*, *Praon volucre*

In this survey, a total of 16 species of the Aphidiinae parasitoids were recorded in nine genera (*Adialytus*, *Aphidius*, *Binodoxys*, *Diaeretiella*, *Ephedrus*, *Lysiphlebus*, *Monoctonus*, *Praon*, *Trioxys*) in Diyarbakır Province. There was a rich abundance of the fauna of aphids and their parasitoids in Diyarbakır, whose natural balance has not been destroyed. In the genus *Aphidius*, six species were found, more than in the genera *Lysiphlebus* and *Binodoxys*. Most of the collected parasitoids were found on fruit trees, ornamental trees and weeds in the natural ecosystem. Thus, both aphids and their parasitoids as collected species were obtained in non-cultivated areas more than in other areas. Our opinion is that this is probably connected with the absence of pesticide application in these areas. The species and density of parasitoids in pesticide-sprayed areas were found to be less than in the other areas. This survey showed that the natural balance and ecosystem in the studied areas have not yet been destroyed, and that aphids are being controlled by their parasitoids.

We have found a mixture of parasitoid–aphid–plant associations on fruit trees, agricultural crops, ornamental trees and shrub species, as well as weeds and other plants that have been sampled in a variety of habitats in Diyarbakır Province. The analysis of the associations includes both pest and other aphid species as well their indicated interactions (with switching of parasitoids from one host to another) in the area. The results of this survey can be considered as a basis for a more detailed study to be undertaken in the area.

ACKNOWLEDGMENTS

We would like to thank Dr. Petr Starý (Institute of Entomology, Czech Academy of Sciences, Branišovská) for the aphid parasitoid identifications and also for valuable advice that was of great help during the preparation of this manuscript. This work was supported by the Unit of Scientific Research Projects of Çukurova University.

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