

Full Length Research Paper

Aphid (Hemiptera: Aphididae) species determined on herbaceous and shrub plants in Bartın Province in Western Blacksea Region of Turkey

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This study aimed to find out the Aphidoidea species feeding on herbaceous and shrub plants of Bartın province. As a result, total of 28 aphid species belonging to 14 genus and 4 tribes of the super family Aphidoidea were determined. Of these determined species, *Aphis fabae* Scopoli, *Aphis farinosa* J. F. Gmelin, *Aphis gossypii* Glover, *Aphis nerii* Boyer de Fonscolombe, *Macrosiphum rosae* (Linnaeus), *Myzus (Nectarosiphon) persicae* (Sulzer) were previously recorded from study area while remaining of the identified species were new records for Bartın province in Turkey.

Key words: Bartın, Aphid, herbaceous and shrub plants, Turkey.

INTRODUCTION

Aphid species are an economically important group of insects in all over the world as they are an important disease vectors and direct plant-sucking pests. The species of Aphidoidea family attack various plants, infesting leaves, stems, fruits and roots (Blackman and Eastop, 2000; Bodenheimer and Swirski, 1957) and they cause damage directly and indirectly diseases as well (Erkin, 1983). Aphids are also one of the most variable insects having interesting and complicated life cycles (Canakcioglu, 1975; Dixon, 1998). Although economic importances of aphids are clear, there are some detailed studies organized in Turkey. During last decades a lot of knowledge has been accumulated about Turkish aphid fauna despite the fact that most of them are regional studies (Giray, 1974; Duzgunes and Toros, 1978; Canakcioglu and Kaygin, 1999; Toros et al., 2002; Olmez and Ulusoy, 2003; Kaygin and Canakcioglu, 2003; Gorur, 2004a, b; Aslan and Karaca, 2005; Aslan and Uygun, 2005; Unal and Ozcan, 2005; Kaygin et al., 2008a,b; Uysal et al., 2006; Geneci and Gorur, 2007). In this aspects, the aim of this study was an investigation of aphid (Homoptera: Aphididae) species on herbaceous

and shrub plants in Bartın, Turkey. These herbaceous and shrub plants are forest and ornamental plants.

MATERIALS AND METHODS

Aphid samples on various herbaceous and shrub plants were collected from various locations in study area between 2005 and 2006.

Aphids were collected from their host plants with a fine brush and put in to a tube which contained 70% alcohol. The collecting and preserving technique was based mainly on Hille Ris Lambers (1950) method. The aphids were systematically classified from the catalog of Remaudière and Remaudière (1997). Botanica (Burnie et al., 1999), The Most Beautiful Wild Flowers of Turkey (Tekin, 2005) were principally referred for the identification of some plants.

RESULTS

Aphid species on herbaceous and shrub plants in bartın

As a result of the study conducted between 2005 and 2006, 28 aphid species feeding on different herbaceous and shrub plants from various localities were determined from study area. Taxonomic status, host plants, locality and collection date were mentioned for each determined species.

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Subfamily Aphidinae

Tribe Aphidini

Genus *Aphis* (Linnaeus, 1758)*Aphis affinis* (del Guercio, 1911)Recorded on *Mentha* sp.: Ağdacı, 25.05.2006.*Aphis craccivora* (Koch, 1854)Recorded on *Cardaria draba* L.: Zeybekler street, 01.IX.2005; Compositae: Göcük Burnu (Ulus Forestry District) 31.IV.2006; *Onopordum davisii* Rech. Fil.: Hendekyanı, 22.V.2006; *Hedera helix* L.: Kutlubey-Demirci, 03.VIII.2006.*Aphis fabae* (Scopoli, 1763)Recorded on *Philadelphus* sp.: Devrek Nursery, 09.05.2005; *Verbascum* sp.: Ağdacı, 25.05.2006; *Genista* sp.: Amasra, 05.08.2006.*Aphis fabae* subsp. *solanella* (Theobald, 1914)Recorded on *Euonymus japonicus* Thunb.: Kırtepe street, 07.05.2006.*Aphis farinosa* J. F. (Gmelin, 1790)Recorded on *Rosa canina* L.: Karaköy, 28.07.2005.*Aphis gossypii* (Glover, 1877)Recorded on *Hibiscus mutabilis* L.: Devrek Nursery, 09.05.2005; *Hibiscus syriacus* L. cv. "blue bird": Social Facility of Bartın Municipality, 11.05.2005; *Chrysanthemum* sp.: Zeybekler street, 01.05.2005; *Cydonia vulgaris* Pers.: Hendekyanı, 04.05.2006; *Urtica dioica* L.: Hendekyanı, 22.05.2006; *Matricaria* sp.: Ağdacı village, 26.05.2006; *Petroselinum* sp.: Aktom, 06.06.2006; *Genista* sp.: Amasra, 05.08.2006.*Aphis nasturtii* (Kaltenbach, 1843)Recorded on *Hibiscus esculantus* L., *Cerianthus cheiri* L.: Okul street, 05.10.2005; *Pyracantha coccinea* M. Roemer: Inkum, 04.08.2006.*Aphis nerii* (Boyer de Fonscolombe, 1841)Recorded on *Nerium oleander* L.: Karaköy, 28.07.2005; Social Facility of Bartın Municipality, 11.05.2005, 07.05.2006; Hendekyanı, 25.05.2006; Inkum, 04.08.2006.*Aphis pomi* (de Geer, 1773)Recorded on *Campis radicans* (L.) Bureau: Zeybekler street, 01.09.2005.*Aphis punicae* (Passerini, 1863)Recorded on *Punica granatum* L.: Bartın Faculty of Forestry Campus, 04.08.2007.*Aphis ruborum* (Börner, 1932)Recorded on *Rubus fruticosus* L.: Karaköy, 28.07.2005; Halatçıyaması, 06.08.2005; Ulus Forestry District, Kestane Street, 600 m., 31.04.2006; Hendekyanı, 22.05.2006.*Aphis spiraecola* (Patch, 1914)Recorded on *Onopordum davisii* Rech. Fil.: Karaköy, 28.07.2005; *Viburnum opulus* L.: Social Facility of Bartın Municipality, 07.05.2006; *Hydrangea* sp.: Kırtepe, 20.05.2006; *Taraxacum officinale* Weber: near Aktom, 06.06.2006; *Spiraea bumalda* G.H. Weber ex Wiggers, *Cotanaster franchatii* Boiss., *Cotoneaster salicifolia* Franch.: Inkum, 04.08.2006.

Aphidinae, Macrosiphini

Aulacorthum Mordvilko, 1914*Aulacorthum magnoliae* (Essig and Kuwana, 1918)Recorded on *Taraxacum officinale* Weber: Karaköy, 24.05.2006.*Brachycaudus van der Goot*, 1913*Brachycaudus helichrysi* (Kaltenbach, 1843)Recorded on *Verbascum* sp.: Ağdacı Village, 24.05.2006.*Brachycaudus (=Acaudus) cardui* (Linnaeus, 1758)Recorded on *Onopordum davisii* Rech. Fil.: Karaköy, 28.07.2005; Hendekyanı, 04.05.2006; near Aktom, 06.06.2006; Bartın Faculty of Forestry Campus, 15.07.2006.*Cavariella* del Guercio, 1911*Cavariella aegopodii* (Scopoli, 1763)Recorded on *Berberis thunbergii* DC.: Bartın Faculty of Forestry Campus, 27.05.2006; Inkum, 04.08.2006.*Ceruraphis Börner*, 1926*Ceruraphis viburnicola* (Gillette, 1909)

Recorded on *Viburnum* sp., Garden of Bartın İstiklal School, 29.07.2005.

Dysaphis Börner, 1931

Dysaphis apiifolia (Theobald, 1923)

Recorded on *Petrosalinum* sp.: Hendekyanı, 22.05.2006.

Hyadaphis Kirkaldy, 1904

Hyadaphis foeniculi (Passerini, 1860)

Recorded on *Petrosalinum* sp.: Bartın Faculty of Forestry Campus, 15.02.2006.

Macrosiphoniella del Guercio, 1911

Macrosiphoniella sanborni (Gillette, 1908)

Recorded on *Crysanthemum* sp.: Yalı, 25.07.2005; Kemer, 29.07.2005; Karaköy, 09.10.2005; Kutlubey-Demirci Village, 03.08.2006.

Macrosiphum Passerini, 1860

Macrosiphum euphorbiae (Thomas, 1878)

Recorded on *Rosa* sp.: Yalı, 25.07.2005; Hendekyanı, 22.05.2006.

Macrosiphum mordvilko Miyazaki, 1968

Recorded on *Rosa* sp.: Gardens of Ulus and Bartın Forest Enterprise, 31.04.2006.

Macrosiphum rosae (Linnaeus, 1758)

Recorded on *Rosa* sp.: Social Facility of Bartın Municipality, 02.03.2005, Gazhane Park, 27.04.2005; *Rubus fruticosus* L.: Ulus Forest Enterprise, Kestane street, 600m., 31.04.2005; *Rosa* sp., *Taraxacum officinale* Weber: Karaköy, 28.07.2005; *Rosa canina* L.: Asmaköprü, Kemerköprü, 29.07.2005; *Rosa* sp., *Rosa canina* L.: Hendekyanı, Bartın Faculty of Forestry Campus, 27.05.2006; *Taraxacum officinale* Weber: Bartın Faculty of Forestry Campus, 15.07.2006.

Metopolophium Mordvilko, 1914

Metopolophium dirhodum (Walker, 1849)

Recorded on *Convolvulus arvensis* L., *Hordeum bulbosum* L.: Karaköy, 26.05.2006.

Myzus Passerini, 1860

Myzus (= *Nectarosiphon*) *persicae* (Sulzer, 1776)

Recorded on *Cyclamen* sp.: Kirtepe street, 06.01.2005; *Freesia* (Hybrid): Bartın Faculty of Forestry Greenhouse, 15.04.2005.

Wahlgreniella Hille Ris Lambers, 1949

Wahlgreniella nervata (Gillette, 1908)

Recorded on *Berberis thunbergii* DC.: Inkum, 04.08.2006.

Aphidinae, Aphidini, Rhopalossiphina.

Rhopalosiphum Koch, 1854

Rhopalosiphum padi (Linnaeus, 1758)

Recorded on *Zea mays* L.: Kutlubey-Demirci Village, 03.08.2006.

Chaitophorinae, Chaitophorini.

Chaitophorus Koch, 1854

Chaitophorus melanosiphon Pintera, 1987

Recorded on *Viburnum opulus* L.: Social Facility of Bartın Municipality, 09.08.2006.

Aphid species and their host plants

The aphid species on host plants are listed in Table 1. Totally 28 harmful aphid species and 38 host plants were determined.

DISCUSSION

The Aphidoidea is predominantly a northern temperate group, richest in species in North America, Europe, and Central and East Asia (Blackman and Eastop, 2000). They are one of the largest and most important groups of pest insects, generally worldwide but most abundant in north temperate regions. The number of their species is approximately 4500 or more in the world (Hill, 1997). Studies conducted so far showed that Turkey aphid fauna consists of more than 420 species (Gorur, 2004a, b; Ozdemir et al., 2005; Remaudière et al., 2006, Uysal et al., 2006; Akyurek, 2006; Canakcioglu and Topper, 1999; Kaygin et al., 2008a, Kaygin et al., 2009). Despite that there are general consensuses that due to geographical, agricultural, floristic and climatic variability and richness of Turkey, this number does not reflect sufficiently Turkish aphid fauna.

In the present research, the highest number of species belongs to Aphidinae-Macrosiphini (14 species, 50%) and followed by Aphidinae-Aphidini (12 species, 42.8%), Aphidinae-Aphidini-Rhopalossiphina (1 species, 3.6%), and 1 (3.6%) species families belongs to Chaitophorinae-

Table 1. Determined aphid species and host plants in Bartın province.

Host plants	<i>Aphis affinis</i>
<i>Mentha</i> sp.	<i>Aphis affinis</i>
<i>Cardaria draba</i> , Compositae, <i>Onopordum davisii</i> , <i>Hedera helix</i>	<i>Aphis craccivora</i>
<i>Philadelphus</i> sp., <i>Verbascum</i> sp., <i>Genista</i> sp.	<i>Aphis fabae</i>
<i>Euonymus japonicus</i>	<i>Aphis fabae</i> subsp. <i>solanella</i>
<i>Rosa canina</i>	<i>Aphis farinosa</i>
<i>Hibiscus mutabilis</i> , <i>Hibiscus syriacus</i> cv. "blue bird", <i>Chrysanthemum</i> sp., <i>Cydonia vulgaris</i> , <i>Urtica dioica</i> , <i>Matricaria</i> sp., <i>Petroselinum</i> sp., <i>Genista</i> sp.	<i>Aphis gossypii</i>
<i>Hibiscus esculantus</i> , <i>Cerianthus cheiri</i> , <i>Pyracantha coccinea</i>	<i>Aphis nasturti</i>
<i>Nerium oleander</i>	<i>Aphis nerii</i>
<i>Campis radicans</i>	<i>Aphis pom</i>
<i>Punica granatum</i>	<i>Aphis punicae</i>
<i>Rubus fruticosus</i>	<i>Aphis ruborum</i>
<i>Onopordum davisii</i> , <i>Viburnum opulus</i> , <i>Hydrangea</i> sp., <i>Taraxacum officinale</i> , <i>Spiraea bumalda</i> , <i>Cotanaster franchatii</i> , <i>Cotanaster salicifolia</i>	<i>Aphis spiraecola</i>
<i>Taraxacum officinale</i>	<i>Aulacorthum magnoliae</i>
<i>Folium eriobotryae</i> , <i>Verbascum</i> sp.	<i>Brachycaudus helichrysi</i>
<i>Onopordum davisii</i>	<i>Brachycaudus (Acaudus) cardui</i>
<i>Berberis thunbergii</i>	<i>Cavariella aegopodii</i>
<i>Viburnum</i> sp.	<i>Ceruraphis viburnicola</i>
<i>Petroselinum</i> sp.	<i>Dysaphis apiifolia</i> , <i>Hyadaphis foeniculi</i>
<i>Crysanthemum</i> sp.	<i>Macrosiphoniella sanborni</i>
<i>Rosa</i> sp.	<i>Macrosiphum euphorbiae</i> , <i>Macrosiphum mordvilkoii</i>
<i>Rosa</i> sp., <i>Rubus fruticosus</i> , <i>Taraxacum officinale</i> , <i>Rosa canina</i>	<i>Macrosiphum rosae</i>
<i>Convolvulus arvensis</i> , <i>Hordeum bulbosum</i>	<i>Metopolophium dirhodum</i>
<i>Cyclamen</i> sp., <i>Freesia</i> (Hybrid)	<i>Myzus (Nectarosiphon) persicae</i>
<i>Berberis thunbergii</i>	<i>Wahlgreniella nervata</i>
<i>Zea mays</i>	<i>Rhopalosiphum padi</i>
<i>Viburnum opulus</i>	<i>Chaitophorus melanosiphon</i>

Chaitophorini respectively. *A. fabae*, *Aphis farinose*, *Aphis gossypii*, *Aphis nerii*, *Macrosiphum rosa*, *Myzus (Nectarosiphon) persicae* were recorded previously (Kaygin et al., 2008b) while other species were also new records for Bartın. It was shown that recorded aphid species mostly infected *Nerium oleander* L. (by *Aphis nerii*), *Viburnum opulus* L. (*Aphis spiraecola*, *Chaitophorus melanosiphon*), *Viburnum* sp. (*Ceruraphis viburnicola*), *Euonymus japonicus* Thunb. (*Aphis fabae* subsp. *solanella*), *Rosa* sp., *Rubus fruticosus* L., *Rosa canina* L. (*Macrosiphum rosae*) in study area.

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REFERENCES

- Akyurek B (2006). Determination of aphid species of Ondokuz Mayıs University Campuse area. Master Thesis (with English Summary), p. 98.
- Aslan B, Karaca I (2005). Fruit Tree Aphids and Their Natural Enemies in Isparta Region, Turkey J. Pest Sci. 78: 227-229.
- Aslan MM, Uygun N (2005). The Aphids (Homoptera: Aphididae) of Kahramanmaraş Province, Turkey, Turk. J. Zool. 29: 201-209.
- Blackman RL, Eastop VF (2000). Aphids on the World's Crops: An Identification Information Guide. Second Edition. John Wiley, Chichester, p. 466.
- Bodenheimer FS, Swirski E (1957). The Aphidoidea of the Middle East. The Weigmann science press of Isral, Jarusalem, p. 378.
- Burnie G, Forrester S, Greig D, Guest S, Harmony M, Hopley S, Jackson G, Lavarack P, Ledgett M, McDonald R, Macoboy S, Molyneux B, Moodie D, Moore J, Newman D, North T, Pienaar K, Purdy G, Silk J, Ryan S, Schien G (1999). Botanica, ISBN 3-8331-

- 1253-0, KÖNEMANN, printed in Italy p. 1019.
- Canakcioglu H (1975). The Aphidoidea of Turkey. Istanbul Univ. Forestry Faculty Publications IU. Pub. No: 1751, FF. Pub. No: 189, p. 309.
- Canakcioglu H, Topper A (1999). Insects of Poplar Trees in Bartın Area, Review of the Faculty of Forestry, University of Istanbul, A Series, Vol. 49, No. 2.
- Dixon AFG (1998). Aphid Ecology. Second Edition. Chapman & Hall, NY.
- Duzgunes Z, Toros S (1978). The Aphid Species Damaging on Apple Trees and Short Biology's in Ankara Province and Around Turkish. J. Plant Protection 7(1): 29-49.
- Erkin E (1983). Investigations on the Host Distribution Efficiency on the Natural Enemies of the Family Aphididae (Homoptera) Harmful to Pomes and Stone Fruit Trees in Izmir Province of Aegean Region. Turkish J. Plant Protection 7(1): 29-49.
- Geneci E, Gorur G (2007). Aphid (Homoptera: Aphididae) Species of the Central Aksaray. Int. J. Natural Eng. Sci. 1: 19-21.
- Giray H (1974). Preliminary List of the Species of Aphididae (Homoptera) Collected in the Vicinity of İzmir Province, with Notes on Host Plants and Types of Damage. Review of the Faculty of Agriculture, Ege University 11(1): 39-69.
- Gorur G (2004a). Aphid (Homoptera: Aphididae) Species on Pome Fruit Trees in Niğde Province of Turkey. J. Turk. Entomol. 28(1): 21-26.
- Gorur G (2004b). Aphid Species of Niğde Region (Insecta: Homoptera:Aphidoidea). Nigde University Press, No. 17, (Turkish, with English summary).
- Hill DS (1997). The Economic Importance of Insects, ISBN: 0 412 49800 6, Published by Chapman & Hall, 2-6 Boundary Row, London, p. 395.
- Hille Ris Lambers D (1950). On Mounting Aphids and Other Soft-skinned Insects. *Entomologische Berlin*. 13: 55-58.
- Kaygin AT, Gorur G, Cota F (2008a). Contribution to the Aphid (Homoptera: Aphididae) species Damaging on Woody Plants in Bartın, Türkiye. IJNES Int. J. Natural Eng. Sci. 2(1): 83-86, ISSN: 1307-1149.
- Kaygin AT, Sonmez yildiz H, Ulgenturk S, Ozdemir I (2008b). Insect Species Damage on Ornamental Plants and Saplings of Bartın Province and Its Vicinity in the Western Black Sea Region of Turkey. Int. J. Mol. Sci. 9: 526-541, ISSN: 1422-0067. <http://www.mdpi.org/ijms>.
- Kaygin AT, Canakcioglu H (2003). Contributions to the knowledge of conifer aphid fauna in Turkey and their zoogeographical distribution. *Anzeiger für Schadlingskunde. J. Pest Sci. Band 76(2)*: 50-56.
- Kaygin AT, Gorur G, Cota F (2009). New records of aphid fauna in Turkey. *Journal of insect science*. ISSN: 1536-2442 (accepted in press).
- Olmez S, Ulusoy MR (2003). A Survey of Aphid Parasitoids (Hymenoptera: Braconidae: Aphidiinae) in Diyarbakır, Turkey. *Phytoparasitica*, 31(5): 524-528.
- Ozdemir I, Remaudière G, Toros S, Kılınçer N (2005). New Aphid Records from Turkey Including the Description of a New Lachnus Species (Hemiptera: Aphididae). *Revue Francaise d'Entomologie*, 27(3): 97-102.
- Remaudière G, Remaudière M (1997). Catalogue des Aphididae du monde (Catalogue of the World's Aphididae). ISBN: 2-7380-0714-7, ISSN:1150-3912. Inra, Paris, p. 466.
- Remaudière G, Toros S, Ozdemir I (2006). New Contribution to the Aphid Fauna of Turkey (Hemiptera, Aphidoidea), *Revue française d'Entomologie (NS.)*, 28(2): 75-96.
- Tekin E (2005). Türkiye'nin En Güzel Yaban Çiçekleri (The Most Beautiful Wild Flowers of Turkey). Türkiye İş Bankası Kültür Yayınları, ISBN: 975-458-628-4, p. 652.
- Toros S, Uygun N, Ulusoy R, Satar S, Ozdemir I (2002). Aphid species of Eastern Mediterranean Region. Agricultural Ministry Publication, Ankara, p. 108.
- Unal S, Ozcan E (2005). Aphididae (Homoptera) Species in Kastamonu Province, Süleyman Demirel University, Review of the Faculty of Forestry, ISSN: 1302-7085, Series A1: 76-83.
- Uysal M, Sahbaz A, Ozdemir I (2006). Aphid species (Homoptera:Aphididae) on Poplar Trees in Konya Region. Selçuk University, Rev. Agric. Faculty, 20(38): 143-149.