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Fruit tree Aphids and their natural enemies in Isparta region, Turkey

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Abstract Fourteen aphid species belonging to eight genera and three families of the superfamily Aphidoidea were presented from Isparta region in fruit tree orchards. Among these, *Dysaphis plantaginea*, *Aphis pomi* and *Dysaphis devectora*, which cause harm to apples, are the most common species in the area because of the high amount of apple production. In addition, eight species from the family Coccinellidae (Coleoptera), three from Syrphidae (Diptera) and one species from Forficulidae (Dermaptera) were found as predator. Totally, eight species were determined as parasitoids from the families Aphidiidae, Aphelinidae and Pteromalidae (Hymenoptera).

Keywords Aphidoidea · Fruit trees · Isparta · Natural enemies

Introduction

As it is with the other agricultural products, there are several pests causing harm, both quantitatively and qualitatively, to the fruit trees. The members of the superfamily of Aphidoidea are an economically important group of insects in Turkey, as in other countries of the world (Kaygın and Çanakçıoğlu 2003). The species of this superfamily cause damage directly and indirectly, carrying diseases as well (Erkin 1983). They attack many plants, infesting leaves, stems, fruits and roots (Bodenheimer and Swirski 1957).

Apple production of Turkey was 2,500,000 Mt in 2003. Also, Isparta has a huge potential for fruit production. Likewise, one of every 20 apples produced in the world is produced in this region (Anonymous 2004).

Fruit production is becoming more important day by day due to suitable ecological conditions and geographical status of this region. Very few investigations of aphids and their natural enemies have been conducted in Turkey (Düzgüneş and Tuatay 1956; Giray 1974; Çanakçıoğlu 1975; Düzgüneş and Toros 1978; Toros et al. 2002; Ölmez and Ulusoy 2003; Aslan et al. 2004).

The aim of this study is to present aphid fauna of Isparta that are harmful to fruit trees together with determined natural enemies.

Materials and methods

The study was conducted in fruit tree orchards of the Isparta region and adjacent areas between 2002 and 2004, in order to determine harmful aphid species and their natural enemies.

Plant samples were transferred to plastic bags and brought to the laboratory. Some of the collected aphids were preserved in 70% ethanol for subsequent identification. Collecting and preserving techniques used were based mainly on the method of Hille Ris Lambers (1950). Pieces of plants with aphid colonies were gently cut with scissors and placed in plastic cages to obtain parasitoid and predator adults in the laboratory. The emerging parasitoids were transferred with a fine brush into Eppendorf tubes containing 70% ethanol. Collected predator species were killed by ethyl acetate in a killing bottle. Small species were stuck to a triangular piece of cardboard. Big species were pinned on a standard insect pin.

Results

List of Aphidoidea species on fruit trees in the Isparta region

Family: Callaphididae
Myzocallis coryli (Goetze 1778)

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Recorded on *Corylus avellana*: Keçiborlu, 958 m, 01.vii.2003

Family: Aphididae

Aphis pomi (De Geer 1773)

Recorded on *Malus communis*: Uluborlu, 958 m, 01.vii.2003; Gelendost, 950 m, 11.ix.2002; Kuleönü, 925 m, 27.viii.2002; Eğirdir (Çayköy), 909 m, 27.viii.2002; Eğirdir (Bedre), 31.v.2004, Senirkent (Büyükkabaca), 958 m, 01.vii.2003

Brachycaudus cardui (Linneus 1758)

Recorded on *Amygdalus communis*: Eğirdir (Mahmatlar), 920 m, 31.v.2004

Brachycaudus helichrysi (Kaltenbach 1843)

Recorded on *Prunus domestica*: Kuleönü, 925 m, 09.v.2003; Aksu, 1683 m, 04.vi.2003

Dysaphis devectora (Walker 1849)

Recorded on *Malus communis*: Gönen, 945 m, 12.v.2004; Merkez (Gölcük), 1050 m, 30.v.2004; Atabey, 963 m, 04.vi.2003; Uluborlu, 1052 m, 01.vii.2003; Senirkent, (Büyükkabaca), 958 m, 01.vii.2003; Aksu, 1683 m, 04.vi.2003

Dysaphis (Pomaphis) plantaginea (Passerini 1860)

Recorded on *Malus communis*: Eğirdir, 920 m, 31.v.2004; Gönen, 939 m, 07.vi.2004; Keçiborlu, 932 m, 07.vi.2004; Aksu, 1683 m, 04.vi.2003; Merkez (Çünür), 950 m, 30.v.2004

Dysaphis (Pomaphis) pyri (Boyer de Fonscolombe 1841)

Recorded on *Pyrus communis*: Merkez (Moderneveler), 958 m, 23.v.2004

Dysaphis sp.

Recorded on *Malus communis*: Kuleönü, 09.v.2003; Keçiborlu (Özbahçe), 12.v.2004

Hyalopterus pruni (Geoffroy 1762)

Recorded on *Prunus armeniaca*: Merkez (Milas), 25.vii.2003; Keçiborlu, 932 m, 01.vii.2003; Merkez (Mehmet Tönge), 956 m, 27.v.2003. On *Prunus domestica*: Eğirdir (Hacıramazanlar), 915 m, 04.vi.2003; Keçiborlu, 932 m, 07.vi.2004. On *Prunus persicae*: Merkez (Kuleönü), 925 m, 26.vi.2003; Merkez (Mehmet Tönge), 956 m, 19.v.2003. On *Amygdalus communis*: Eğirdir (Mahmatlar), 920 m, 31.v.2004; Gönen, 1032 m, 12.v.2004

Corylobium avellanae (Schrank)

Recorded on *Corylus avellana*: Keçiborlu, 958 m, 01.vii.2003

Myzus cerasi Fabricius, 1775

Recorded on *Prunus avium*: Eğirdir, 932 m, 31.v.2004; Keçiborlu, 920 m, 07.vi.2004; Merkez (Gölcük), 1050 m, 12.vi.2003; Merkez (Milas), 25.vii.2003; Merkez (Kirazlıdere), 09.vii.2003.

Myzus persicae (Sulzer 1776)

Recorded on *Prunus persicae*: Merkez (Mehmet Tönge), 956 m, 19.v.2003; Aksu, 1683 m, 19.v.2003; Eğirdir (Hacıramazanlar), 915 m, 04.vi.2003; Eğirdir (Eyüpler), 04.vi.2003; Gelendost (Akmezlit), 31.v.2004

Family: Pemphigidae

Eriosoma lanigerum (Hausmann 1802)

Recorded on *Malus communis*: Yalvaç, 1601 m, 11.ix.2003

List of parasitoids of fruit tree aphids in the Isparta region

Hymenoptera

Family: Aphidiidae

Aphidius matricariae Haliday

Recorded on *Dysaphis devectora* from Gölcük ; on *Dysaphis plantaginea* from Gönen, Gelendost/ Akmezlit. *Ephedrus* sp.

Recorded on *Dysaphis devectora* from Aksu.

Ephedrus persicae Froggatt

Recorded on *Brachycaudus cardui* from Eğirdir/ Mahmatlar ; on *Dysaphis devectora* from Atabey/ Harmanören, Aksu, Gölcük, Gönen; on *Dysaphis plantaginea* from Gönen, Gelendost, Keçiborlu; on *Dysaphis* sp. from Keçiborlu/ Özbahçe; on *Hyalopterus pruni* from Eğirdir/ Mahmatlar, Gönen.

Praon volucre (Haliday)

Recorded on *Brachycaudus cardui* from Eğirdir/ Mahmatlar ; on *Hyalopterus pruni* from Gönen, Eğirdir/ Mahmatlar, Keçiborlu.

Binodoxys angelicae (Haliday)

Recorded on *Hyalopterus pruni* from Gönen.

Lipolexis gracilis Foerster

Recorded on *Aphis pomi* from Gelendost.

Family: Aphelinidae

Aphelinus mali (Haldeman)

Recorded on *Eriosoma lanigerum* from Yalvaç.

Family: Pteromalidae

Pachyneuron aphidis Bouché

Recorded on *Aphis pomi* from Eğirdir/ Çayköy.

List of predators of fruit tree aphids in the Isparta region

Dermaptera

Family: Forficulidae

Forficula auricularia L.

Recorded on *Dysaphis plantaginea* from Gönen, Kuleönü.

Coleoptera

Family: Coccinellidae

Adalia bipunctata (L.)

Recorded on *Aphis pomi* from Eğirdir road; on *Dysaphis devectora* from Gölcük.

Adalia decempunctata (L.)

Recorded on *Dysaphis devectora* from Gölcük.

Adalia fasciatopunctata revelieri Muls

Recorded on *Dysaphis devectora* from Gölcük.

Coccinella septempunctata (L.)

Recorded on *Aphis pomi* from Kuleönü; Eğirdir; Eğirdir road; on *Brachycaudus cardui* from Eğirdir, Mahmatlar; on *Dysaphis plantaginea* from Eğirdir/ Akdoğan village, Gelendost/ Akmezlit; on *Hyalopterus*

pruni from Eğirdir/ Mahmatlar. On *Myzus cerasi* from Eğirdir.

Harmonia quadripunctata Puntop.

Recorded on *Dysaphis devectora* from Gölcük.

Propylae quatuordecimpunctata (L.)

Recorded on *Dysaphis devectora* from Gölcük.

Oenopia (Synharmonia) coglobata (L.)

Recorded on *Dysaphis devectora* from Gölcük

Scymnus bivulnerus Capra.

Recorded on *Dysaphis devectora* from Gölcük

Diptera

Family: Syrphidae

Episyrphus balteatus (De Geer)

Recorded on *Aphis pomi* from Kuleönü; on *Dysaphis plantaginea* from Gelendost, Gönen, Keçiborlu; on *Hyalopecterus pruni* from Gönen.

Metasyrphus corollae (Fabricius)

Recorded on *Dysaphis devectora* from Gölcük.

Scaeva albomaculata (Macquart)

Recorded on *Dysaphis plantaginea* from Keçiborlu.

Discussion

The Aphidoidea has 14 species in 3 families (Callaphididae, Aphididae, Pemphigidae) which attack fruit trees in Isparta, Turkey. Among the species *Dysaphis plantaginea*, *Aphis pomi* and *Dysaphis devectora*, which are harmful to apple trees, are the most common species in the area because of the high amount of apple production. The uncommon species are *Myzocallis coryli* (Goetze), *Corylobium avellanae* (Schrank) and *Eriosoma lanigerum* (Hausmann).

A total of 20 species were detected as natural enemies of aphids. Eight species from the family Coccinellidae (Coleoptera), three from Syrphidae (Diptera), and one species from Forficulidae (Dermaptera) were found as predators. In addition, *Pachyneuron aphidis* Bouché (Pteromalidae), *Aphelinus mali* (Haldeman) (Aphelinidae), *Lipolexis gracilis* Foerster, *Ephedrus* sp., *Ephedrus persicae* Froggatt, *Aphidius matricariae* Haliday, *Praon volucre* (Haliday) and *Binodoxys angelicae* (Haliday) (Braconidae; Aphidiidae) were determined as parasitoids belonging to the order Hymenoptera.

We regard this study as only a preliminary step in the description of the aphid-natural enemy complex of Isparta.

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