

A New Host [*Parthenolecanium persicae* (Homoptera: Coccidae)] Record for *Eupeodes corollae* (Fabricius) (Diptera: Syrphidae) from Turkey

Halil BOLU^{1*}, Rüstem HAYAT²

¹Dicle University, Faculty of Agriculture, Department of Plant Protection, 21280 Diyarbakır - TURKEY

²Atatürk University, Faculty of Agriculture, Department of Plant Protection, 25240 Erzurum - TURKEY

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Abstract: This study was carried out in 2005. The larvae, virgin, and adult females of *Parthenolecanium persicae*, and larvae of *Eupeodes corollae* were collected from almond tree plantations in the province of Diyarbakır, Turkey, during May and June, and brought to the laboratory for rearing. *P. persicae* was determined as a new host of *E. corollae*.

Key Words: *Parthenolecanium persicae*, *Eupeodes corollae*, Syrphidae, predator, Turkey

Türkiye'den *Eupeodes corollae* (Fabricius) (Diptera: Syrphidae) İçin Yeni Bir Konukçu [*Parthenolecanium persicae* (Homoptera: Coccidae)] Kaydı

Özet: Bu çalışma 2005 yılında yapılmıştır. Diyarbakır'daki badem bahçelerinden mayıs ve haziran aylarında *Parthenolecanium persicae*'nin larva, genç dişi ve erginleri ile *Eupeodes corollae*'nin larva dönemleri toplanarak laboratuvara getirilmiştir. *P. persicae*, *E. corollae*'nin yeni bir konukçusu olarak belirlenmiştir.

Anahtar Sözcükler: *Parthenolecanium persicae*, *Eupeodes corollae*, Syrphidae, avcı, Türkiye

Introduction

Syrphidae, known as hover flies or flower flies, are one of the largest families of Diptera with almost 6000 species (Sommaggio, 1999). The family has nearly worldwide distribution, and is only absent from Antarctica, remote oceanic islands, and many sub-Antarctic islands. However, many species have been transported by human agency to Easter Island, and Hawaii now has 16 resident species. Approximately 1800 species in 107 genera and 32 atypical subgenera are Palearctic (Thompson and Rotheray, 1998).

Their size ranges from medium to large. The adults are black and yellow. Many of them resemble bees, bumble bees, and wasps. They can be distinguished by the special venation of the wing (spurious vein).

In contrast to the homogeneous alimentary habits of adult syrphids, almost all of which feed on pollen or nectar, the larvae show a huge spectrum of feeding habits. Four taxa are predominantly zoophagous: the subfamily Syrphinae, the tribe Pipizini, and the genera *Volucella* and *Microdon* (Sommaggio, 1999). Roder (1990) reported that 26% of all Syrphidae larvae are phytophagous or microphagous, 30% are saprophagous, and 39% are zoophagous.

The adult habitats of *Eupeodes corollae* (Fabricius) were reported as hedgerows, grassy woodland clearings, crops, gardens, railroad track sides, road verges, etc. They fly around and over low-growing vegetation, settle on low-growing vegetation, visit the margins of streams, ponds (including garden ponds), and pools to drink in hot

* E-mail: besni@dicle.edu.tr

weather, and visit umbellifers (*Achillea millefolium*, *Campanula rapunculoides*, *Chrysanthemum*, *Cirsium*, *Eschscholzia californica*, *Galeopsis*, *Hypericum*, *Leontodon*, *Origanum vulgare*, *Potentilla erecta*, *Ranunculus*, *Rubus fruticosus*, *Salix*, *Senecio*, *Tripleurospermum inodorum*, and *Tussilago*). The larvae of *E. corollae* feed on aphids on various low-growing plants, particularly Leguminosae and various crop plants (e.g., *Avena*, *Beta*, *Cucurbita*, *Lactuca*, *Triticum*, and *Zea*) (Speight, 2006).

During investigations on pest and useful insect species in almond orchards of southeastern Anatolia, *Parthenolecanium persicae*, which damages almond trees, was determined as a new host of *E. corollae*. Among the hosts of *E. corollae*, especially those that feed on aphids, this is the first record belonging to the family Coccidae (Homoptera).

Materials and Methods

This study was undertaken in 2005. Surveys were performed by collecting the branches of almond trees with larvae, virgin, and adult females of *P. persicae*, and syrphid larvae during May and June in Diyarbakir province. Samples were brought to the laboratory for rearing and kept until adult syrphids emerged. During the course of the study 10 syrphid larvae were collected. The larvae were reared in boxes (30 × 30 × 40 cm; 26 ± 1 °C, 65% ± 5 relative humidity, and illumination of 3500 lux for 16 h per day) containing branches from the same field. The boxes were checked daily. Adult flies were killed and pinned for identification.

P. persicae was identified by associate professor Lerzan Erkiliç (Plant Protection Research Institute, Adana, Turkey). *Eupeodes corollae* was determined by

the second author and checked by Dr. Claus Claussen (Flensburg, Germany).

Results and Discussion

Subfamily: Syrphinae

Tribe: Syrphini

Eupeodes corollae (Fabricius)

Rearred material: Diyarbakir (lat 37°53'N, long 40°16'E at an altitude of about 669 m, 15.05.2005, leg. H. BOLU).

P. persicae, an important pest on almond trees, was recorded as a new host of *Eupeodes corollae*.

Parthenolecanium persicae (Fabricius)
(Homoptera: Coccidae)

The larvae, virgin, and adult females feed on branches of the host (Figure 1).

Information related to the description and distribution of the species follows.

Material examined: Diyarbakir (lat 37°53'N, long 40°16'E at an altitude of about 669 m, 15.05.2005, leg. H. BOLU).

Biology: The biological information on European peach scale/grapevine scale, *P. persicae*, is limited in the present literature. The scale has a life cycle of 1 year with 3 nymphal instars. Lifespans are as follows: the first instar nymph's is from January to March, the second instar's is from April to July, and the third instar's is from August to November. Fecundity was 2449.5 ± 323.46 eggs/female with a viability of 87.5%. Viability of first, second, and third instars was 93.3%, 82.1%, and 86.9%, respectively, and 58.2% from egg to adult. Males of the species were not observed (Afonso et al., 2006).



Figure 1. *Parthenolecanium persicae* on the branches of almond trees.

Distribution: Algeria, America, Argentina, Austria, Bulgaria, Corsica, Cyprus, Czech Republic, Denmark, Egypt, England, France, Greece, India, Iran, Italy, Korea, Morocco, New Zealand, Portugal, Romania, Russia, Sicily, Spain, Sweden, Switzerland, Turkey, and Yugoslavia (Lindinger, 1912; Aysu, 1950; Boratynski and Williams, 1964; Georghiou, 1977; Hamon and Williams, 1984; Kozar, 1985; Hodgson and Henderson, 2000; Bolu et al., 2005).

***Eupeodes corollae* (Fabricius) (Diptera: Syrphidae)**

E. corollae is a very common syrphid species. It is distributed widely from Iceland, Fennoscandia, and the

Faroe Islands south to Iberia, the Mediterranean, Madeira, the Canary Isles, and N Africa, as well as coastal Africa down to and including South Africa, Mauritius, from Ireland eastwards through most of Europe into the European parts of Russia, through Siberia from the Urals to the Pacific coast, Japan, China, and Formosa (Speight, 2006).

This species is also very common in Turkey. Concerning its host species, there are many studies in Turkey (Table).

Distribution in Turkey: Adana, Ankara, Antalya, Bartın, Bolu, Çankırı, Diyarbakır, Elazığ, Hatay, Erzurum, İçel,

Table. Hosts and localities of *Eupeodes corollae* in Turkey.

Host Species	Plant Species	Locality	Literature
<i>Acrythosiphon pisum</i> (Harr.)	<i>Medicago sativa</i> L.	Ankara, İçel	Düzgüneş et al. (1982), Zeren and Düzgüneş (1983)
<i>Aphis affinis</i> (Del Guer.)	Plant host not reported	İçel	Zeren and Düzgüneş (1983)
<i>Aphis craccivora</i> Koch.	<i>Chenopodium album</i> L., <i>Lens esculenta</i> Moenc., <i>Lycopersicon esculentum</i> Mill., <i>Melilotus</i> sp., <i>Robinia</i> sp., <i>Vicia</i> sp.,	Ankara, İçel	Düzgüneş et al. (1982), Zeren and Düzgüneş (1983)
<i>Aphis fabae</i> Scop.	<i>Beta vulgaris</i> L., <i>Helianthus annuus</i> L., <i>Phaseolus vulgaris</i> L., <i>Zea mays</i> L., <i>Urtica</i> sp.	Ankara, Diyarbakır, İçel	Düzgüneş et al. (1982), Zeren and Düzgüneş (1983), Ölmez and Ulusoy (2002)
<i>Aphis fabae solanella</i> Theobald	<i>Solanum nigrum</i> L.,	Ankara	Düzgüneş et al. (1982)
<i>Aphis gossypii</i> Glov.	apple	Diyarbakır, İçel	Zeren and Düzgüneş (1983), Ölmez and Ulusoy (2002)
<i>Aphis pomi</i>	<i>Malus communis</i> L.	Van	Erol and Yaşar (1996)
<i>Aphis ruborum</i> (Börn)	<i>Rubus fruticosus</i> L.	Ankara	Düzgüneş et al. (1982)
<i>Aphis solanella</i> (Theob.)	<i>Solanum nigrum</i> L.	Ankara	Düzgüneş et al. (1982)
<i>Aphis</i> sp.	<i>Prunus domestica</i> (L.)	Ankara, İzmir	Soydanbay-Tunçyürek (1976), Düzgüneş et al. (1982)
<i>Aphis urticata</i> Gmelin	<i>Urtica</i> sp.	Diyarbakır	Ölmez and Ulusoy (2002)
<i>Brachycaudus amygdalinus</i> (Sch.)	almond	Diyarbakır	Ölmez and Ulusoy (2002)
<i>Brachycaudus cardui</i> (L.)	<i>Prunus armeniaca</i> L., <i>P. avium</i> L., <i>P. domestica</i> (L.), <i>P. persica</i> (L.)	Ankara, Artvin, Erzincan, Erzurum, Iğdır, Kars	Düzgüneş et al. (1982), Özbek et al. (1996)
<i>Brachycaudus helichrysi</i> (Kalt.)	Stone and pome fruit trees, <i>Prunus</i> spp., <i>Prunus armeniaca</i> L., <i>P. avium</i> L., <i>P. domestica</i> (L.), <i>P. persica</i> (L.), almond	Artvin, İçel, İzmir, Diyarbakır, Erzincan, Erzurum, Iğdır, Kars	Erkin (1983), Zeren and Düzgüneş (1983), Özbek et al. (1996), Ölmez and Ulusoy (2002)

Table. (Continued).

<i>Brevicoryne brassicae</i> (L.)	<i>Brassica</i> sp., <i>Brassica oleracea</i> L., <i>Raphanus sativus</i> H.	Ankara, İçel, Erzurum	Düzgüneş et al. (1982), Zeren and Düzgüneş (1983), Avcı and Özbek (1991), Tozlu et al. (2002)
<i>Callaphis juglandis</i> (Goeze)	<i>Juglans regia</i> L.	Ankara, Erzincan, Erzurum	Düzgüneş et al. (1982); Güçlü et al. (1994)
<i>Capitophorus elaeagni</i> (Del Guer)	Weed	Ankara	Düzgüneş et al. (1982)
<i>Cavariella aegopodii</i> (Scop.)	<i>Salix</i> sp.	Ankara, İçel	Düzgüneş et al. (1982), Zeren and Düzgüneş (1983)
<i>Cavariella theobaldi</i> (G.-B.)	<i>Daucus</i> sp., <i>Salix</i> sp.	Ankara	Düzgüneş et al. (1982)
<i>Chaitophorus leucomelas</i> Koch.	<i>Populus</i> sp.	Ankara	Düzgüneş et al. (1982)
<i>Crytomyzus ribis</i> (L.)	<i>Ribes aureum</i> L.	Erzurum	Alaoğlu (1994)
<i>Dysaphis devectora</i> (Walk.)	<i>Malus floribunda</i> Sieb., apple	Ankara, Diyarbakır	Düzgüneş et al. (1982), Ölmez and Ulusoy (2002)
<i>Dysaphis plantaginea</i> (Pass.)	<i>Malus communis</i> L., apple	Ankara, Diyarbakır	Düzgüneş et al. (1982), Ölmez and Ulusoy (2002)
<i>Dysaphis pyri</i> (B. de F.)	<i>Pyrus</i> sp., <i>Pyrus communis</i> L.	Ankara, İzmir	Düzgüneş et al. (1982), Erkin (1983)
<i>Eulachnus rileyi tauricus</i> Bozhko	<i>Pinus</i> sp.	Ankara	Düzgüneş et al. (1982)
<i>Hyadaphis foeniculi</i> (Pass.)	<i>Daucus</i> sp.	Ankara	Düzgüneş et al. (1982)
<i>Hyadaphis tataricae</i> (Aizenb.)	<i>Lonicera tatarica</i> L.	Diyarbakır	Ölmez and Ulusoy (2002), Toros (1986)
<i>Hyalopterus amygdali</i> (Blanch.)	<i>Prunus persicae</i> S. et Z.	Ankara	Düzgüneş et al. (1982)
<i>Hyalopterus pruni</i> (Geoffr.)	<i>Prunus armeniaca</i> L., <i>P. avium</i> L., <i>P. domestica</i> (L.), <i>P. persica</i> (L.)	Ankara, Artvin, Erzincan, Erzurum, Iğdır, Kars	Düzgüneş et al. (1982), Özbek et al. (1996)
<i>Hyperomyzus lactucae</i> (L.)	<i>Sonchus oleraceus</i> L.	Ankara	Düzgüneş et al. (1982)
<i>Macrosiphum euphorbiae</i> Thos.	<i>Prunus domestica</i> L.	İzmir	Erkin (1983)
<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	Ankara, Diyarbakır	Düzgüneş et al. (1982), Ölmez and Ulusoy (2002)
<i>Myzus lythri</i> (Schrank)	<i>Prunus mahaleb</i> L.	İzmir	Erkin (1983)
<i>Myzus persicae</i> (Sulz.)	<i>Spinacia oleracea</i> L., Stone and pome fruit trees, tobacco	İçel, İzmir, Diyarbakır	Erkin (1983), Zeren and Düzgüneş (1983), Ölmez and Ulusoy (2002)
<i>Paczoskia</i> sp.	<i>Echinops</i> sp.	Ankara	Düzgüneş et al. (1982)
<i>Rhopalosiphum maidis</i> (Fitch.)	<i>Zea mays</i> L.	Ankara, Ordu	Düzgüneş et al. (1982), Tozlu and Alaoğlu (1994)
<i>Uroleucon</i> sp.	Weed	Ankara	Düzgüneş et al. (1982)
<i>Uroleucon sonchi</i> (L.)	<i>Sonchus oleraceus</i> L., Weed	Ankara	Düzgüneş et al. (1982)

Kahramanmaraş, Karabük, Kastamonu, Kayseri, Mardin, Niğde, Ordu, Sinop, Şanlıurfa, Tokat, and Zonguldak (Tuatay et al., 1972; Yiğit and Uygun, 1982; Özgür, 1986; Alaoğlu and Özbek, 1987; Hayat and Alaoğlu, 1990; Tozlu and Alaoğlu, 1994; Yumruktepe and Uygun, 1994; Sarıbiyik and Aktaş, 1996; Sarıbiyik, 1999, 2000; Ulusoy et al., 1999; Candemir and Kara, 2003; Çinar et al., 2004; Bolu et al., 2005; Karabiyik, 2005; Yetkin, 2006).

Figure 2 shows the larvae of *E. corollae* intensely feeding on a *P. persicae* colony.

E. corollae, known especially as an aphid predator on different plants in the present literature (Rojo et al., 2003), was first recorded on *P. persicae*. From the superfamily Coccoidea only *Lepidosaphes tapleyi* is known

as a host of *E. corollae* on *Ficus* from Egypt (Swaillem and Awadallah, 1973). Furthermore, there is no record of the host belonging to Coccoidea of *E. corollae* in the comprehensive list of predatory hoverflies reviewed by Rojo et al. (2003).

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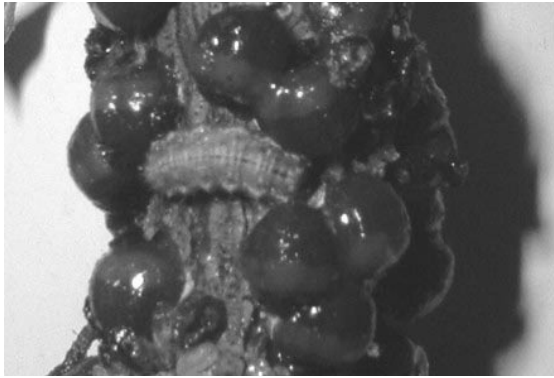


Figure 2. Larvae of *Eupeodes corollae* feeding on larvae of *Parthenolecanium persicae*.

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