APHIDS SPECIES IN CITRUS ORCHARDS OF ANTALYA PROVINCE

Işıl Saraç*, Işıl Özdemir and İsmail Karaca***

* Süleyman Demirel University, Faculty of Agriculture, Department of Plant Protection, 32260 Isparta, TURKEY.
** Plant Protection Central Research Institute Gayret Mahallesi, Fatih Sultan Mehmet Bulvari, No.: 66, P.K.49 06172 Yenimahalle/Ankara TURKEY. E-mail: isilozdemir70@gmail.com

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ABSTRACT: This study was carried out in 2012-2013 at citrus orchards in Antalya province. The aim of this study was to determine aphid species in citrus orchards. *Aphis craccivora* Koch, 1854; *Aphis fabae* Scopoli, 1763; *Aphis gossypii* Glover, 1877; *Aphis spiraecola* Patch, 1914; *Aphis (Toxoptera) aurantii* Boyer de Fonscolombe, 1841; *Brachycaudus (Acaudus) cardui* (Linnaeus, 1758); *Rhopalosiphum maidis* (Fitch, 1856); *Myzus (Nectarosiphon) persicae* (Sulzer, 1776) species were identified. While *Aphis craccivora* was found widespread, *Brachycaudus (Acaudus) cardui* was found rarely.

KEY WORDS: Aphids, citrus, Antalya, host plant

Citrus is widely produced in Mediterranean, Aegean and Black Sea regions in Turkey. World citrus production was 123.755.750 tons in 2010. 56% of this production is oranges (FAO, 2010). The main species of citrus genus include citrus (*Citrus aurantium*), orange (*C. sinensis*), mandarin (*C. reticulata*), grapefruit (*C. paradisi*), bergamot (*C. bergamia*) and lemon (*C. limon*) which is an economical important. Fruits of citrus plant are used as food. Both their fruits are used as nutrition and their fruit shells, leaves and flowers are used for perfumery industry.

Some citrus pests are restrictive factors in citrus production. Aphids are one of the important pests of citrus. They are especially pest in nurseries. Their mouthparts are sucking and they cause a curling of the plant leaves. Aphids may also transmit viruses from plant to plant.

The aim of this study was to determine aphid species in citrus orchards of Antalya province in Turkey.

MATERIAL AND METHODS

In this study, samples were based on apterous viviparous female, alate viviparous female and sexual form of Aphidoidea species which were collected from citrus orchards of Antalya province in Turkey. Samplings were made on citrus branchs, leaves and flowers between 2011-2013. Surveys were done two times in spring and summer months and a time in autumn and winter months. Samples were more frequently collected in shoot periods in different areas and orchards. Preparation procedures of aphids were made according to Hille Ris Lambers (1950).

RESULTS

Annotated list of the aphid species collected in Antalya

Tribe: Aphidini

Subtribe: Aphidina

Genus: *Aphis* Linnaeus, 1758
Species: *Aphis craccivora* Koch, 1854

Diagnostic notes: Apterous viviparous female; body broadly pear-shaped, plump, and black in colour. There is a reticulated plate on the shiny dorsal surface of body. Eyes are blackish red, proboscis is pale greenish yellow at base and dusky colored at apex. First and 2nd antennal segments are black, 3rd and 4th segments are cream colored and 5th segment blacky and 6th segment is black. Distal of tarsus and tibia in the legs are close to dark in blackish colour and another parts are with creamy beige colour. Siphunculi, cauda and genital plate are black. Body length is about 1.88 (±0.31) mm. Proboscis is long and a little longer than second coxa. Average length of antenna is about 1.27 (±0.04) mm and shorter than body length. First antennal segment is wide and its length is almost as long as second segment. Other segments are thin and long. There is a primer rhinaria on 5th and 6th segments. There is not seconder rhinaria at 3rd segment. Tarsus has two segments like another aphid species and apex segment has one pair claw and there are 2-3 hairs on segments. The spinculi is cylindirical, thinning towards to apex and it makes a lip-shaped convolution. Cauda s long and with spinal structure. There are 5-8 bristle on cauda. Genital plate are also with 11-18 bristle.

Alate viviparous female; body is longly oval shaped and completely dark brownish black in colour. Eyes are close to blackish red colour, proboscis is pale greenish at basement and dusky colored at apex. Firts two segments of antenna and distal of other segments are with dark colour and other parts are with creamy beige colour. Except the distal of coxa and tibia, legs are light brown beige in colour. Tarsus, siphunculi, cauda and genital plate are black. Wing veins are blackish brown, stigma is more light brown in colour. Body length is about 1.79 (±0.262) mm. Proboscis is long and extends to second coxa. First two segments of antenna are short, others are thin and long. Average length of antenna is about 1.19 (±0.088) mm. The inner face of second segment of antenna is rough. Second segment of antenna is roughy appearance on inner surface. There is a primer rhinaria on 5th and 6th segments and there are 5-11 seconder rhinaria on 3rd segment. Generally, fourth segment has not seconder rhinaria but rarely it has a rhinaria. The siphunculi is cylindirical shaped and initially it thins till to middle part, then continues in same wide. Its tip is with curled. Cauda is thornlike appearance and has 4-7 bristle. Genital plate is with dark colour and 8-14 bristle (Blackman & Eastop, 1984; Stroyan, 1984) (Figs. 1a,b).

Host plants: *Acacia* sp., *Alchemilla vulgaris*, *Alhagi pseudalhagi*, *A. camelorum*, *Alhagi* sp., *Amaranthus retroflexus*, *Anagallis* sp., *Anchusa* sp., *Anthemis* sp., *Arachis hypogaea*, *Astragalus verus*, *Begonville* sp., *Brassica oleracea*, *Bromus japonicus*, *B. sterilis*, *Calendula* sp., *Calluna vulgaris*, *Camellia japonica*, *Capsicum annuum*, *Capsella bursa pastoris*, *Cardaria draba*, *Catalpa* sp., *Centaurae* sp., *Chenopodium album*, *Cichorium intybus*, *Cicer arientinum*, *Cirsium* sp., *Citrus aurantium*, *Citrus nobilis*, *Colutea arborescens*, *Convolvulus arvensis*, *Crepis foetida*, *Cucumis melo*, *Cucurbita pepo*, *Cydonia vulgaris*, *Dipsacus laciniatus*, *Euphorbia* sp., *Galium aparine*, *Glycyrrhiza glabra*, *Gossypium herbaceum*, *G. hirsitum*, *Heracleum* sp., *Hibiscus esculentus*, *Lactuca sativa* var. *crispa*, *Lathyrus ochrus*, *Lens esculentum*, *Lycopersicum esculentum*, *Malus domestica*, *Malva* sp., *Medicago sativa*, *Medicago* sp., *Melilotus indicus*, *Mentha* sp., *Mespilus germenica*, *Onobrychis viciaefolia*, *Phaseolus vulgaris*, *Portulaca oleraceae*, *Prunus amgydalus*, *P. armeniaca*, *P. avium*, *P. persicae*, *P. spinosa*, *Pyrus communis*, *P. malus*, *Ranunculus glacialis*, *Ribes rubrum*, *Robinia pseudoacacia*, *Robinia* sp., *Rosa* sp., *Rumex alpinus*, *R. patientia*, *Rumex* sp., *Sanguisorba minor*, *Senecio vulgaris*, *Solanum*

lycopersicum, *S. melongena*, *S. nigrum*, *Spartium junceum*, *Syringa* sp., *Taraxacum officinale*, *Tripleurospermum decipiens*, *Tribulus terrestris*, *Trifolium* sp., *Urtica urens*, *Verbascum* sp., *Vibirnum opulus sterile*, *Vicia angustifolia*, *Vigna sinensis*, *Viscaria* sp. and *Vitex agnus castus* were determined as hosts (Düzgüneş & Toros, 1978; Tuatay, 1993; Ölmez, 2000; Toros et al., 2002; Atalay & Uysal, 2005; Ayyıldız & Atlıhan, 2006; Kocadal, 2006; Kaygın et al., 2008).

Material examined: Samples were collected from *Citrus sinensis*, *Citrus paradisi*, *Citrus limon* trees.

Species: *Aphis fabae* Scopoli, 1763

Diagnostic notes: Apterous viviparous female; body is brown–greenish in colour, abdomen un-uniformly pigmented.

Alate viviparous female; body colour changes from brown to black. There are irreguler dark green blackish patches on the abdomen. Alive individuals of *Aphis fabae* are matte black or very dark brown. While wingless individuals always have white pleural wax secretions, young individuals have rarely punctations. Alate individuals have sclerits on 4th and 5th segment of abdomen and cauda is dark (Blackman & Eastop, 1984; Stroyan, 1984) (Figs. 2a,b).

Aphis fabae Scopoli is a polyphagous pest and widespread all over the world. It was recorded first time on *Robinia pseudoacacia* at Florya/İstanbul in 1938 year in Turkey (Schmitschek, 1944).

Host plants: *Pimpinella anisum*, *Vitis vinifera*, *Solanum* sp., *Euonymus* sp., *Vibirnum* sp. (Bodenheimer & Swirski, 1957), *Solanum dulcamara* (Tuatay & Remaudiere, 1964), *Arbitus verachne*, *A. unedo* (Çanakçıoğlu, 1967), *Solanum lycopersicum*, *Cucurbita pepo*, *Ranunculus* sp., *Zea mais* (Çanakçıoğlu, 1966, 1975), *Papaver* sp., *Nicotiana tabacum*, *Vicia fabae*, *Philadelphus coronarius*, *Matricaria* sp., *Amaranthus* sp., *Lactuca sativa* (Giray, 1974), *Foeniculum vulgare* and *Ferula* sp. (Tuatay et al., 1972; Düzgüneş et al., 1982).

In the Europe conditions, *Euonymus europaeus, Viburnum opulus* and *Philadelphus coronarius* are its primer hosts and they moved to seconder herbaceous hosts (Stroyan, 1984).

Material examined: Samples collected from *Citrus sinensis*, *Citrus paradisi*, *Citrus limon* in this study.

Species: *Aphis gossypii* Glover, 1877

Diagnostic notes: Apterous viviparous female; body is longish and oval, grayish black in colour. Head is small and dark, eyes are dark red and blackish red, proboscis is pale greenish yellow at base and dusky colored at apex. Antennae; light tones greenish yellow in color and last segment is dark. Thorax is grayish, greenish black. Siphunculi and cauda are black. Legs are light yellowish-grey, tarsus and end portion of the tibia black. Genital plate is usually dark brunette. Body length is about 1.64 (±0.347. Proboscis is long and longer than second coxa. Antenna length is 1.11 (±0.099) mm and it is shorter then body lenght. Antenna are 6 segments and have several short bristles. First antennal segment is wide and length almost as long as second segment. Other segments are thin and long. There is not seconder rhinaria on 3rd segment and there is one primer rhinaria on 5th and 6th segments. Tarsus have two segments and these segments has one pair claw at apex. The siphunculi is cylindirical and has patterns like tile, broaded at basement and gradually slimmed after its half and curled towards to outside at the apex part. Cauda with spinal structure and a little narrowed at midle part. Generally there are 5-6 seta on cauda and every side has 3 seta. There are 8-14

hairs on genital plate.

Alate viviparous female; head and thorax is black, eyes are blackish dark red. Proboscis is pale greenish at base and dusky colored at apex. Antenna is greyish-brown in colour. Except the distal of tibia, legs are light brownish beige and tarsi is black in colour. Abdomen is greyish, greenish black, siphunculi is black, cauda and genital plates are dusky colored. Body length is about 1.63 (±0.277) mm. Proboscis is long and longer than second coxa and there are seconder hairs on last segment. Antenna is shorter than body, with 6 segments and short thin bristles. Its lenght is about 1.14 (±0.144) mm. Antenna have patterns like tile, there are 5-10 seconder rhinaria on 3rd antennal segment. There is not any seconder rhinaria on 4rd antennal segment or there are 1-2 rhinaria. There is one primer rhinaria on 5th and 6th antenal segments. Tarsus has two segments and first tarsus segment has irregular bristles on. There is a pair of clav at top of last tarsus segment. The siphinculi is cylindirical and broaded at the basement. After basement, it is slimmed till its half. It continues till its apex at the same width and slightly curl up towards at apex. The siphinculi has patterns like tile Cauda has with spinal structure and a little narrowed at midle part, with 4-6 hairs. There are 8-19 seta on genital plate (Blackman & Eastop, 1984; Stroyan, 1984) (Figs. 3a,b).

Host plants: *Abutilon* sp., *Acacia* sp., *Allium cepa*, *Aquilegia vulgaris*, *Asparagus* sp., *Ageratum* sp., *Alliaria* sp., *Borago officinalis*, *Begonia* sp., *Bideus* sp., *Bromus japonicus*, *Callendula* sp., *Canna* sp., *Capsella bursa-pastoris*, *Capsicum annuum*, *C. annuum* var. *longum*, *Cardaria draba*, *Carduus* sp., *Carthamus tinctorius*, *Catalpa bignonioides*, *Chrysanthemum leucanthemum*, *Cineraria* sp., *Citrus bigardia*, *C. nobilis*, *C. sinensis*, *Citrus* sp., *Citrullus lanatus*, *C. vulgaris*, *Colocasia* sp., *Convolvulus arvensis*, *Crepis foetida*, *Cryptostegia* sp., *Cucumis flexunsus*, *C. melo*, *C. melo* var. *chate*, *C. sativus*, *Cucurbito pepo*, *Crategus* sp., *Daucus carota*, *Dipcadi* sp., *Eucaliptus camaldulensis*, *Eriobotrya japonica*, *Erodium cicutarium*, *Euphorbia* sp., *Erythaea* sp., *Ficus carica*, *Ficus sycomorus*, *Gaillardia pulchella*, *Gossypium herbaceum*, *G. hirsitum*, *Hibiscus esculentus*, *H. syriacus*, *H. japonica*, *Hypericum canariense*, *Lactuca sativa*, *Lilium* sp., *Lycopersicon esculentus*, *Mangifera indica*, *Malus communis*, *Malva* sp., *Mentha piperita*, *M. viridis*, *Musa* sp., *Nicotiana tabaccum*, *Nigella* sp., *Ocimum basilicum*, *Passiflora* sp., *Phaseolus vulgaris*, *Phoenix dactylifera*, *Pistacia palaestina*, *Portulaca oleracea*, *P. solanacae*, *Psidium guajava*, *Pyracantha coccinea*, *Punica granatum*, *Polygonum* sp., *Preunia* sp., *Prunus amygdalus*, *P. domestica*, *Pyrus communis*, *P. malus*, *Punica granatum*, *Rhamnus* sp., *Raphanus sativus*, *Robinia pseudoacacia*, *Rosa polyantha*, *Rumex* sp., *Russelia juncea*, *Salvia splendes*, *Salix alba*, *Salix* sp., *Scorzonera cana*, *Sesamum indicum*, *Sonchus oleraceus*, *Solanum lycopersicum*, *S. melongena*, *S. tuberosum*, *Spathodea* sp., *Teucrium polium*, *Tribulus terrestris*, *Tulipa* sp., *Vicia fabae*, *Vitis vinifera*, *Vitex agnes-castus*, *Viola* sp. and *Zinnia* sp. were determined as hosts (Düzgüneş & Tuatay 1956; Bodenheimer & Swirski, 1957; Tuatay & Remaudiere, 1964; Giray, 1974; Çanakçıoğlu, 1975; Düzgüneş et al., 1982; Zeren, 1989; Tuatay, 1993; Yumruktepe & Uygun, 1994; Özdemir & Toros, 1997; Blackman & Eastop 2000; Ölmez, 2000; Toros et al., 2002; Görür, 2004; Atalay & Uysal, 2005; Kaygın et al., 2008).

It was reported first time on *Euphorbia* sp., *Hibiscus esculentus*, *Rhamnus* sp., *Citrus sinensis* in Turkey (Aegean region) at 1937 (İyriboz, 1937).

Material examined: Samples were collected on *Citrus sinensis*, *Citrus paradisi*, *Citrus limon* in this study.

Species: *Aphis spiraecola* Patch, 1914

Diagnostic notes: Apterous viviparous female; body is plump and oval shaped, lemon yellow or apple green in color. Head is grey, compound eyes are black, proboscis is grey at base, dark at apical, antennae are usually dark. Thorax is grey. Except distal part of tibia in legs, other parts are light color, whole tarsi is dark, abdomen is yellowish green, siphunculi and cauda are black, anal plate is grey in color. Body lenght is 1.75 (±0.24) mm. Proboscis is long but not reaching to second coxa. Antennae is shorter then body, 1.19 (±0.11) mm lenght, with 6 segments and thin hairly on. First segment of antennae is wide and its lenght as long as second antennal segment, others are thin and long. There is a primer rhinaria on 5th and 6th antenal segments. Third antennal segment of apterous viviparous females is without seconder rhinaria. Fourth antennal segment has 0-5 seconder rhinaria. Tarsus is with two segments, apical segment is longer than basal segment and with two hairs and two claws. Siphunculi is pointed and tapers towards tip. Siphunculi is longer than cauda. Cauda is constricted in the middle and has 9 hairs. Anal plate is covered by hairs.

Alate viviparous female; body is longish and oval, head is dark colored, compound eyes are black, proboscis is grey at base, dark at apical, antennae are usually grey. Thorax is grey. Except distal part of tibia in legs, other parts are grey, whole tarsi is black, abdomen is yellowish with laterally dark patches, siphunculi is dark and cauda is black, anal plate is dark in color. Body lenght is 1.67 (±0.23) mm. Proboscis is long but not reaching to second coxa. There are seconder hairs on last segment of proboscis. Antennae are shorter then body, with 6 segments and thin hairly on and length is about 1.16 (±0.07) mm. First segment of antennae is wide and its lenght is as long as second antennal segment, others are thin and long. Antenna has two primer rhinaria, one of them is on the anterior of 5th segment, other is on apical of the basal of 6th segment. Small group of rhinaria is on lateral parts of last antenna segment. There are 4-10 sekonder rhinaria on the 3 rd antennal segment. There is not any seconder rhinaria on 4 rd antennal segment or there are 1-3. Seconder rhinaria with rounded shape, Tarsus is with two segment. Second segment is longer than first segment and it has two hair and two claws. Siphunculi is with distal section thicker than basal section. It is longer than cauda. Cauda is constricted in the middle and has 8-9 hairs, anal plate have 8-12 hairs (Blackman & Eastop, 1984; Stroyan, 1984) (Figs. 4a,b).

Host plants: *Cotoneaster franchatii*, *C. salicifolia*, *Citrus aurantium*, *C. limonum, C.limon, C. grveis, C. nobilis, C. sinensis*, *C. paradisi*, *C. reticulata*, *Cydonia oblonga*, *Eriobotrya japonica, Hibiscus esculentus, H. rosa chinensis, Hoya carnosa, Hydrangea hortensia, Hydrangea* sp., *Lavandula* sp., *Malus* spp., *Mespilus germenica*, *Onopordum davisii*, *Paliurus spinachristi, Pyracantha coccinea, Pyrus communis, Prunus domestica, Spiraea bumalda*, *S. vanhouetti, Spiraea* sp., *Viburnum opulus, V. tinus, Taraxacum officinale* were determined as hosts (Tuatay & Remaudiere, 1964; Düzgüneş et al., 1982; Tuatay, 1993; Ölmez, 2000; Toros et al., 2002; Görür, 2004; Satar & Uygun, 2007; Çota, 2007).

The species was reported on *Citrus limonum* in Adana, Turkey at 1955 for the first time (Tuatay & Remaudiere, 1964).

Material examined: Samples was collected on *Citrus sinensis*, *Citrus paradisi*, *Citrus limon* in this study.

Genus: *Aphis* Linnaeus, 1758

Species: *Aphis (Toxoptera) aurantii* Boyer de Fonscolombe, 1841

Diagnostic notes: Apterous viviparous female; body is widely, oval shaped,

body colour changes from blackish-green to dark brown. Head is dark brown, compound eyes are wide and black. Proboscis is light color at basal and darker towards the tip. First two segment and apex parts of other segments of antenna are dark, remainders pale brown. Thorax is greenish-black. Legs are beige, tips of tibia and femure dark, tarsus is with brownish-black. Siphunculi, cauda and genital plate are usually black. Body length is about 1.82 (±0.04) mm. Proboscis is very long and extends to third coxa. Antenna is a little short than body, with 6 segments and thin sparse hairs. First antennal segment is wide but as long as second segmend. Others are thin and long. There is a primer rhinaria on 5th and 6th antenal segments and without seconder rhinaria. Tarsus has two segments and segment at apex has one pair claw. There are sparse hairs on tarsus segments. The siphunculi are cylindrical and longish. There is a very distinct areas at back of siphunculi on latero-ventral part of abdomen. This area contains a conspicuous pattern of ridges and they scleroted. There is a row of peg-like, very short, thick and conical hairs on dorsal of each hind tibia. Saw like edge and conical hairs modified acts as a sonorous organ. This is an audible scraping sound by human ear. Cauda knobbed with 8-16 hairs. Genital plate has 10-14 hairs.

Alate viviparous female: body is longish, oval shaped. Head, thorax and abdomen are dark brown. Compound eyes are wide and black. First two segment and apex parts of other segments of antenna are dark, remainders light brown, beige in color. Distal of tibia except legs are pale brown and tarsi black. Siphunculi and cauda are black. Genital plate is dark. Body lenght is almost 1.82 (±0.104) mm. Proboscis is long and extends to third coxa. Antenna is a little long than body and with thin short hairs. First two antennal segment is short, others are thin and long. There is one primer rhinaria on 5th and 6th antenal segments and 5-8 seconder rhinaria on 3th antenal segment. Tarsus has two segments and last segment at apex has one pair claw. The siphunculi are cylindrical and tapering. Alate viviparous female have a sonorous organ like apterous viviparous female but it is not developped as apterous. Cauda knobbed with 8-14 hairs. Genital plate has 13-18 hairs (Figs. 5a,b).

It was reported on *Citrus sinensis* in Içel, 1939 in Turkey for the first time (Bodenheimer & Swirski, 1957). Bodenheimer & Swirski (1957) reported that it was determined on apple and pear and it was also recorded before on *Citrus* sp. (Alkan, 1946; Yumruktepe & Uygun, 1994) and *Thea* sp. (Düzgüneş & Tuatay, 1956).

Material examined: Samples were collected on *Citrus sinensis*, *Citrus paradisi*, *Citrus limon* in this study.

Genus: *Brachycaudus* Van Der Goot, 1913
Subgenus: *Acaudus* Van Der Goot, 1913
Species: *Brachycaudus (Acaudus) cardui* (Linnaeus, 1758)

Diagnostic notes: Aptereus individuals of *A. cardui* is connected with *A. caudus* which is one of the largest subgenus in *Brachycaudus* genus are green, yellow or reddish and summer generations on seconder hosts have a shiny, black and broad sclerotic stain on dorsal of abdomen. Color of spring generations on primer host is more mate. There is not this dark stain at *Prunus*. Sometimes, it lives under soil and on roots. Body lenght in aptereus individuals is 1.9-2.6 mm and in alate individuals 1.6- 2.3 mm (Blackman & Eastop, 2000) (Figs. 6a,b).

Host plants: *Achillea* sp., *Amygdalus communis*, *Anchusa leptophylla*, *Anchusa* sp., *Artemisia* sp., *Carlina crymbosa, C. vulgaris*, *Carlina* sp., *Carduus acanthoides C. crispus*, *C. pycnocephalus*, *Carduus* sp., *Carthamus laracus, Centaurea* sp., *Cirsium acarna, C. arvense, C. arvense* var. *inconium*, *C.*

cephalotes, *C. spinasissinum, Cirsium* sp., *Circus benedicus, Cistus crveicus, Convolvulus* sp., *Cynara scolymus*, *Cynoglossum creticum*, *Echinops* sp., *Eryngium compestre, Eryngium* sp., *Gundelia tournefortü, Heliotropium* sp., *Isatis glauca*, *Notobasis syriaca, Onapordium illyricum,* Onopordium sp., *Picris* sp., *Prunus armeniaca*, *P. domestica, P. mahalep, P. spinosa, Salix* sp., *Silybum marianum, Sisymbrium altissimum*, *Sonchus asper* were determined as hosts (Bodenheimer & Swirski, 1957; Tuatay & Remaudiere, 1964; Çanakçıoğlu, 1967, 1975; Giray, 1974; Düzgüneş et al., 1982; Tuatay, 1988; Ölmez, 2000; Toros et al., 2002).

The species was reported on *Prunus domestica* and *Carduus* sp. in Ankara, Turkey at 1939 for the first time (Bodenheimer & Swirski, 1957).

Material examined: Samples were collected on *Citrus sinensis*, *Citrus paradisi*, *Citrus limon* in this study.

Genus: *Myzus* Passerini, 1860
Subgenus: *Nectarosiphon* Schouteden, 1901
Species: *Myzus (Nectarosiphon) persicae* (Sulzer, 1776)

Diagnostic notes: Body is shuttle shape, pale yellow, yellowish green, light green, pinky or greyish green in color. Eyes are blackish dark red. Proboscis is light color and midle of proxima is with pale greenish. Antennae are pale grey in color, 4th antennal segment is more dark. Siphunculi is pale beige and more dark at apex. Cauda is yellowish green in color or colorless.. Genital plate is yellowish-green, sometimes more dark in color. Legs are colorless, pale greenish and tarsus is black. Body length is about 2.23 (±0.24) mm. There is an antennal tubercless well-devolopped on the head. Also there are numerous denticles on dorsal and ventral head surface. Proboscis is extends to second coxa. Antennae are shorter than body and average 2.12 (±0.01) mm in length. First segment of antennae is short and widely and its lenght more than second antennal segment, others are thin and long. There is a primer rhinaria on 5th and 6th antenal segments. 3rd antennal segment is without seconder rhinaria. Antenal segments are with hair. Tarsus has two segments and the segments at apex have one pair claw. Siphunculi is cylindrical structure and it appearance as swollen because of the flange at the tip. It is curled as collar. But, generally siphunculi are long and thin. Cauda is a spiny structure and it has total 6 hairs including 3 hairs in each side. Distal section of cauda is pointy. There are 10-17 setae on genital plate.

Alate viviparous female; body is longish, yellowish green. Head is black, eyes are blackish dark red. Proboscis is pale in color with dark in apical. Antennae are generally greyish, basal section of 3rd antennal segment is more or less lihgt color. Prothorax is black, wings are colorless or pale greenish and with very dark wing veins. Tibia and tarsus in legs are grenish, other parts are more pale in color. But there is a dark part at the base of femur. Siphunculi is dark grey, cauda is pale green, yellowish-green in color. Body lenght is 2.19 (±0.09) mm in average. Proboscis is reaching to second coxa. Antenna is shorter than body lenght and 2.05 (±0.028) mm lenght. Antenna segments have very short hairs. There is a primer rhinaria on 5th and 6th antenal segments. Third antennal segment has 11-15 seconder rhinaria. There are indistinc numerous denticles like aptereus on dorsal head surface and short hairs. Siphunculi is thin, long, cylindrical structer and the flange at the tip. Cauda is with spinal structure and towards the distal end. it has total 6 hairs including 3 hairs in each side. There are 10-14 setae on genital plate (Düzgüneş & Tuatay, 1956; Blackman & Eastop, 1984) (Figs. 7a,b).

Host plants: *Allium sativum*, *Althea rosa*, *Amygdalus* sp., *Antirrhinum majus*, *Antirrhinum* sp., *Asparagus* sp., *Atropa belladona, Begonia sp., Beta*

vulgaris, B. vulgaris altissima, B. vulgaris var. *cicla, Boreava orientalis, Bougainvillea* sp., *Brassica oleraceae, B. napus, B. rapa, B. campestris, Capsella bursa-pastoris, Capsicum annuum, C. annuum* var. *longum, Cardaria draba, Carduus pycnocephalus, Carthamus tinctorus, Chrysanthemum* sp., *Cirsium arvense*, *Cirsium* sp., *Citrus nobilis*, *Citrus* sp. *Coleus* sp., *Convolvulus* sp., *Crataegus* sp., *Cucurbita pepo*, *Cucumis melo, C. sativus, Cydonia vulgaris, Cynara scolymus, Daucus carota, Dianthus* sp., *Duranta repens, Foeniculum vulgare, Fuchsia* sp., *Gazania* sp., *Gossypium* sp., *Hedera* sp., *Helianthus annus, Hibiscus* sp., *Hordeum vulgare, Hordeum sp., Lactuca sativa, Linaria genistifolia, Lycopersicum esculentum, Maclura pomifera, Malus communis, Malva neglacta, M. slyvestris,* malva sp., *Mentha* sp., *Mercurialis annua*, *Nicandra physaloides, Nicotiana tabacum, Onopordos armenum, Petroselinum hortense, Petunia hybrida, Phaseolus vulgaris, Portulago oleraceae*, *Prunus avium, P. amygdali, P. domestica, P. persicae, Pyrus communis, Ranunculus chius, R. marginatus* var. *trachycarpus, Rhaphanus raphanistrum, R. sativus, Rubus* sp., *Rumex obtusifolius, Scorzonera sp., Senecio vulgaris, Senecio* sp., *Sesamum indicum, Sisymbrium* sp., *Solanum melongena, S. tuberosum, Sonchus oleraceae, Spinacia oleracea, Triticum* sp., *Tulipa* sp., *Verbana* sp., *Veronica* sp., *Vicia* sp., *Viola tritocolar* and *Zea mays* were recorded as host plants (Düzgüneş & Tuatay, 1956; Bodenheimer & Swirski, 1957; Tuatay & Remaudiere, 1964; Giray, 1974; Çanakçıoğlu, 1975; Düzgüneş & Toros 1978; Düzgüneş et al., 1982; Karaat & Göven, 1986; Zeren, 1989; Tuatay, 1991; Önuçar & Ulu, 1992; Kıran, 1994; Akkaya & Uygun, 1996; Toros et al., 1996; Özdemir & Toros, 1997; Ölmez, 2000; Çobanoğlu, 2000; Toros et.al., 2002; Ayyıldız & Atlıhan, 2006; Kocadal, 2006).

Myzus (Nectarosiphon) persicae was reported on *Spinacia oleracae* in Ankara, Turkey at 1938 for the first time (Bodenheimer & Swirski 1957).

Material examined: Samples were collected on *Citrus sinensis*, *Citrus paradisi* in this study.

Genus: *Rhopalosiphum* Koch, 1854
Species: *Rhopalosiphum maidis* (Fitch, 1856)

Diagnostic notes: Antenna of aptereus viviparous individuals is short, body is long, ist color is change from yellowish-green to dark olive green or bluish-grey. Sometimes it is covered by a thin dusty material. Basal of cornicle is shadow by a dusky sircle stain. Abdomen of alate viviparous is dirty yellowish-green. There is a lateral dusky stain on 2nd, 3rd and 4th abdomen segments and a widely dusky stain at basal of cornicle, a transversal dusky band on apical segments. Width of aptereus viviparous is 1.23± 0.16 (1-1.6) mm and height is 2.47± 0.08 (2.35-2.60) mm. Width and lenght of alate viviparous are 1.01± 0.04 (0.9-1.1) mm and 2.32± 0.09 (2.05-2.45) respectively. Antennal tubercles are at aptereus and alate viviparous both small. There are 6 segment on antenna and its lenght is as half of body. Processus terminal smooth and twice as long as base of last antenal segment. There is not second sensoria at 3rd antennal segment of aptereus viviparous but there are 14-18, 0-8 and 0-3 second sensoria at 3rd, 4th and 6th antennal segments of alate viviparous respectively. Cornicles are slindirical and rude pattern. Cauda is spinal structure and finger shape and slightly constricted at proximal half. There are two pairs dorso-lateral setae and midle part slightly constricted at alate (Figs. 8a,b).

Blackman & Eastop (1984) reported that *R. maidis* is a cosmopolitan species and fed on more than 30 genus of gramineae. As first record in Turkey reported by İyriboz (1937) that it is important pest of corn and wheat.

Host plants: *Zea mays* L., *Triticum* sp., *Hordeum* sp., *Secale cereale* L.,

Avena sativa L., *Lolium* sp., *Hordeum murinum* L.

Material examined: Samples were collected on *Citrus sinensis, Citrus paradisi*, *Citrus limon* in this study.

DISCUSSION

8 aphids species on citrus orchards in Antalya province, *Aphis craccivora* Koch, 1854; *Aphis fabae* Scopoli, 1763; *Aphis gossypii* Glover, 1877; *Aphis spiraecola* Patch, 1914; *Aphis (Toxoptera) aurantii* Boyer de Fonscolombe, 1841; *Brachycaudus (Acaudus) cardui* (Linnaeus, 1758); *Myzus (Nectarosiphon) persicae* (Sulzer, 1776); *Rhopalosiphum maidis* (Fitch, 1856) were found. Within these species, it was observed that *Aphis craccivora* is most widespread and *Brachycaudus (Acaudus) cardui* is rare species.

Note: This study is part of a master thesis at Suleyman Demirel University, Plant Protection Department, Institute of Natural and Applied Science.

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Figure 1. *Aphis craccivora* Koch a: Aptereus and b: Alate

Figure 2. *Aphis fabae* Scopoli a: Aptereus and b: Alate

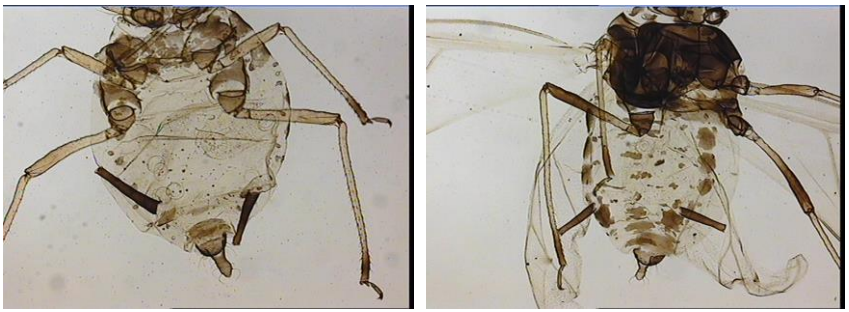

Figure 3. *Aphis gossypii* Glover a: Aptereus and b: Alate

Figure 4. *Aphis spiraecola* Patch a: Aptereus and b: Alate

Figure 5. *Aphis (Toxoptera) aurantii* (Boyer de Fonscolombe) a: Aptereus and b: Alate

Figure 6. *Brachycaudus (Acaudus) cardui* (Linnaeus) a: Aptereus and b: Alate

Figure 7. *Myzus (Nectarosiphon) persicae* (Sulzer) a: Aptereus and b: Alate

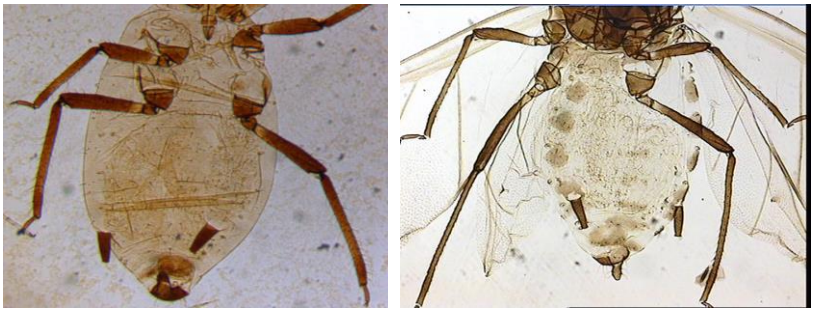

Figure 8. *Rhopalosiphum maidis* (Fitch) a: Aptereus and b: Alate