New and rare mealybugs (Hemiptera: Coccoidea: Pseudococcidae, Putoidae) from Eastern Anatolia (Turkey)

Новые и редкие виды червецов (Hemiptera: Coccoidea: Pseudococcidae, Putoidae) из Восточной Анатолии (Турция)

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This study aimed to determine the species of mealybugs (Pseudococcidae and Putoidae) found in five provinces ( Ağrı, Bitlis, Hakkari, İğdir and Van) in Eastern Anatolia, (Turkey). Species of the families Pseudococcidae and Putoidae were collected from natural and cultivated plants between 2005 and 2008. New locality and host plant data are given for all species. In total, 60 species of Pseudococcidae in 16 genera and two species of the genus Puto Signoret, 1875 were found, including 25 new species records for the Turkish fauna, namely: Atrococcus arakelianae (Ter-Grigorian, 1964), A. cracens Williams, 1962, Coccura circumscripta (Kiritchenko, 1963), Dysmicoccus brevipes (Cockerell), Fonscolombia europaea (Newstead, 1897), Heliococcus glacialis (Newstead, 1900), Metadenopus festucae Šulc, 1931, Mirococcopsis ammphila Bazarov & Nurmanatov, 1975, M. acetianae Ter-Grigorian, 1964, M. subalpina (Danzig, 1985), M. teberdae (Danzig, 1975), P. incertus (Kiritchenko, 1940), P. kokandicus Nurmanatov, 1986, P. persimplex Borchesniius, 1949, P. prope schmelevi Bazarov, 1980, P. strigosus Borchesniius, 1949, Pseudococcus comstocki (Kuwana, 1902), Puto megriensis (Borchsenius, 1948), Ripersiella parva (Danzig, 1985), R. petiti (Goux, 1941), R. poltavae (Laing, 1929) and Spilococcus vashlovanicus Danzig, 1998. A new mealybug species, Phenacoccus chatakicus sp. nov., is described and illustrated based on adult females.

Key words: Pseudococcidae, Putoidae, fauna, mealybugs, host plants, distribution

Ключевые слова: Pseudococcidae, Putoidae, фауна, червецы, кормовые растения, распространение
INTRODUCTION

Mealybugs (Hemiptera: Coccoidea: Pseudococcidae) form the second largest family of scale insects (Ben-Dov, 1994; Ben-Dov et al., 2011), and the putoids (Hemiptera: Coccoidea: Putoidae) a small family containing a single genus Puto Signoret, 1875 (Ben-Dov, 1994; Ben-Dov et al., 2010). Both mealybugs and putoids have typically white, powdery or mealy wax secretions that cover their body.

The scale insect database, ScaleNet (last updated 9 January 2011) (Ben-Dov et al., 2011) reported 2274 mealybug and putoid species all over the world, with 717 species in 115 genera recorded for the Palearctic region. In a previous study, Kozár (1998) recorded 708 species in 115 genera of mealybug species in the Palearctic region. It is uncertain how many Putoidae species occur in the world and the Palaearctic region because all Puto species have been treated as Pseudococcidae until now and some true mealybugs have been placed in Puto. More recently Williams et al. (2011) discussed the morphological features that are diagnostic for Putoidae and determined the family placement. As a result of their study they recognised 47 extant and two fossil species of Puto, and six species of Ceroputo.

The scale insect fauna of Turkey was studied first in detail by Bodenheimer (1953), who recorded ten species of Pseudococcidae. Later Çanakçıoğlu (1977) recorded three species in forest areas and Düzgün (1982) recorded 13 species from different areas and habitats. More recently, more than 50 mealybug species (including putoids) have been added to the Turkish fauna, as new records (Kaydan et al., 2001a, b, 2004, 2005). In the most recent list of scale insects of Turkey (Kaydan et al., 2007), among the 267 scale insect species recorded, 73 pseudococcid and putoid species in seventeen genera were included. Later, Ph. solani (Kaydan et al., 2008) and Puto borealis (Ben-Dov et al., 2010) were added to the list. However, the latter, i.e., P. borealis, listed in ScaleNet (Ben-Dov et al., 2010) is likely an erroneous record, because this species was not recorded in the paper mentioned (Kaydan et al., 2004) in ScaleNet. As a result, there are currently 74 species of pseudococcids and putoids reliably recorded for Turkey. This paper deals with new mealybug records in Turkey, their hosts and geographical distribution.

MATERIALS AND METHODS

Pseudococcid samples were collected from five provinces in the Eastern Part of Turkey ( Ağrı, Bitlis, Hakkari, İdil, and Van) between 2005 and 2008. Specimens were taken from both wild and cultivated plants twice a week during the spring and summer seasons of the three-year study. Collecting data, including host locality (name of the province, GIS coordinates, etc.), date of collection, collector, and data on the phenological stages of the host plant and the first author’s personal CCVT collection numbers are given. Samples consisted of plant material that harboured scale insects and were collected mostly by the first author. Each sample was put into a plastic bag and taken to the laboratory for examination. Specimens were prepared for light microscopy using the slide-mounting method discussed by Kosztarab and Kozár (1988). Morphological terminology follows that of Kosztarab and Kozár (1988) and Williams (2005). Measurements and counts of the new species were taken from all available holotype and paratype specimens.

Earlier distribution and host plant data are given according to information taken from ScaleNet (Ben-Dov et al., 2010).

Both dry and mounted material is deposited in the Plant Protection Department, Faculty of Agriculture, Yüzüncü Yıl University, Van, Turkey (CCVT).

The species marked below with an asterisk (*) are recorded for Turkey for the first time.
RESULTS AND DISCUSSION

In this study a total of 623 samples were collected from eastern Anatolia. Among these samples, 60 species were identified, of which 25 species are new records for the Turkish scale insect fauna. Among these species, the collection data belongs to ten very common well known species (*Mirococcus inermis* (Hall, 1925), *Peliococcus chersonensis* (Kiritshenko, 1936), *P. kimmericus* (Kiritshenko, 1940), *P. turanicus* (Kiritshenko, 1932), *Phenacoccus aceris* (Signoret, 1875), *Ph. pumilus* Kiritshenko, 1936, *Ph. tergrigori anae* Borchsenius, 1956, *Puto superbus* (Leonardi, 1907), *Trionymus aberrans* Goux, 1938 and *T. multivor us* (Kiritchenko, 1936)) which had been earlier recorded many times in Turkey and neighboring countries were not represented here. Besides this, a new species, *Phenacoccus chatakicus* Kaydan & Kozár sp. nov. is described and illustrated.

As a result of this study, the mealybug and putoid species number in Turkey is increased to 100 species.

*Phenacoccus chatakicus* sp. nov. (Fig. 1)

**Holotype.** Adult female; **Turkey**, Van Province, Çatak-Narlı, 37°55.258′N, 42°59.138′E, on undetermined herbaceous plant, 3 July 2007; coll. M.B. Kaydan; CCVT 3903.

**Paratypes.** 5 adult females; same data as for holotype; CCVT collection and one paratype to be sent to Zoological Institute of Russian Academy of Science, St. Petersburg.

**Description of holotype (mounted adult female).** Body elongate oval, 1.32–2.27 mm long, 0.66–1.47 mm wide. Eye marginal, 45–65 μm wide. Antenna 9 segmented, 320–370 μm long; apical segment 52.5–60.0 μm long, 22.5–25.0 μm wide. Clypeolabral shield 145.0–162.5 μm long, 135–155 μm wide. Labium 130–145 μm long, 70–85 μm wide. Anterior spiracles 52.5–57.5 μm long, 25–30 μm wide across atrium; posterior spiracles 50–65 μm long, 30–40 μm wide across atrium. Circulus small, oval, 20–45 μm wide. Legs well developed; coxa 125–135 μm long hind trochanter + femur 215.0–242.5 μm long, hind tibia + tarsus 260–275 μm long, hind claw 25–28 μm long. Ratio of lengths of hind tibia + tarsus to hind trochanter + femur 1.13–1.21, ratio of lengths of hind tibia to tarsus 2.17–2.48, ratio of length of hind trochanter + femur to greatest width of femur 3.90–5.10. Hind femur with 9–16 transculent pores and hind tibia with 5–14 transculent pores. Tarsal digitules subequal, each 27–35 μm long, hairlike. Claw digitules subequal, each 25–28 μm long, and knobbled. Both pairs of ostioles present; each anterior ostiole, with 9–18 trilocular pores and 2–5 setae; each posterior ostiole with 18–26 trilocular pores and 2–4 setae. Anal ring 67–78 μm wide, with 6 anal-ring setae, each seta 65–78 μm long. Cerarii numbering 4–5 pairs situated on last two abdominal segments, and on head (C1, C2 and sometimes C3); C2 with 3 conical setae and 3 or 4 trilocular pores; anal lobe cerarii, each with 2 slender conical setae, 15–18 μm long, with 9–13 trilocular pores and 2 or 3 spine like auxiliary setae.

**Dorsum.** Body setae spine like, each 5–11 μm long. Multilocular disc pores present on metathorax (3–5 pores) and abdominal segments (except VIII + IX): 5–7 pores on segment I, 7–13 pores on segment II, 14–34 pores on segment III, 36–51 pores on segment IV, 44–54 pores on segment V, 19–36 pores on segment VI, 24–41 on segment VII; each pore 8–11 μm in diameter and with 12 loculi. Trilocular pores each 3–4 μm in diameter, scattered over entire body. Minute discodial pores scattered, each 2.5 μm in diameter. Oral collar tubular ducts of one size totaling 138–175 on dorsum, each duct 12–15 μm long, 4.0–6.0 μm wide at mid-width, 5.0–7.0 μm wide at distal-width; ducts on head, thorax, and all abdominal segments, forming transverse rows on abdomen: 13–19 ducts on segment I, 14–17 ducts on segment II, 14–21 ducts on segment III, 14–17 ducts on segment IV, 11–18 ducts on segment V, 10–13 ducts on segment VI, 6–13 ducts on segment VII.
Fig. 1. *Phenacoccus chatakicus* sp. nov., holotype
4–7 ducts on segment VIII, and 50–63 ducts on head + thorax.

Venter. Body setae of two types: (i) hair-like setae slender, each 12–80 μm long, longest setae medially on head; (ii) spine-like setae each 7–8 μm long, situated submarginally in two or three rows. Apical setae of anal lobe 130–155 μm long. Multilocular disc pores present on posterior (IV – VIII + IX) abdominal segments: 2–9 pores on segment I, 9–21 pores on segment II, 34–46 pores on segment III, 44–71 pores on segment IV, 47–73 pores on segment V, 51–67 pores on segment VI, 56–63 on segment VII, 31–41 on segments VIII + IX; each pore 7–11 μm in diameter and with 12 loculi. Trilocular pores each 2–3 μm in diameter scattered over entire body. Minute discodial pores scattered, each 2.5 μm in diameter. Oral-collar tubular ducts of two sizes: (i) larger oral collar tubular ducts each 12–15 μm long, 4.0–6.0 μm wide at mid-width, 5.0–7.0 μm wide at distal-width, totaling 126–167, ducts on head, thorax and abdominal segments, with 9–26 ducts on segment I, 9–17 ducts on segment II, 11–17 ducts on segment III, 12–21 ducts on segment IV, 10–15 ducts on segment V, 7–10 ducts on segment VII, 5–6 ducts on segment VIII + IX, and 40–64 ducts on head and thorax; (ii) small oral collar tubular ducts each 10–13 μm long, 2.0–3.0 μm wide at mid-width, 3 μm wide at distal-width, totaling 134–186, ducts on last abdominal segments (III– VIII + IX), with 9–29 ducts on segment III, 21–37 ducts on segment IV, 21–36 ducts on segment V, 23–37 ducts on segment VI, 14–24 ducts on segment VII, and 25–30 ducts on segment VIII + IX.

Diagnosis. Phenacoccus chatakicus sp. nov. (adult female) can be diagnosed by the following combination of characters: one size of oral collar tubular duct (larger) on dorsum and two sizes of oral collar tubular ducts on venter (larger tubular ducts two times wider than smaller oral collar tubular ducts); multilocular pores on both venter and dorsum; 4–5 pairs of cerarii present (two on the last two abdominal segments and 2–3 pairs on head; circulus present; anal lobe cerarii each with 2 conical setae; abdominal and thoracic ostioles present; antennae 9 segmented, 320–370 μm long (apical segment 52.5–60.0 μm long).

Phenacoccus chatakicus sp. nov. is most similar to Phenacoccus hordei (Lindeman, 1886) as both species have a high number of multilocular pores on the dorsum. Phenacoccus chatakicus can be readily distinguished from P. hordei by having only 4–5 pairs of cerarii (vs. 18 pairs), a small rounded circulus (vs. no circuli), and by the absence of quinquelocular pores on the venter (vs. present at least around the mouth plate). Phenacoccus chatakicus is also similar to Phenacoccus madeirensis Green, 1923 by having a circulus on the venter and multilocular pores on the dorsum of abdominal segments, but differs from the latter species by the absence of quinquelocular pores (vs. present), and by a small number of cerarii (4–5 vs. 18).

Etymology. The species name refers to Çatak (Turkey, Van Province), a collecting site of the new species.

Antonina graminis (Maskell, 1897)


This cosmopolitan species was recorded on Poaceae. Antonina graminis has been recorded previously in Turkey, in Van lake basin on Lolium multiflorum (Kaydan et al., 2001a).

*Atrococcus arakelianae* (Ter-Grigorian, 1964)

Material examined. Ağrı, Center, 39° 40.743’N 43°01.383’E, 1666 m, 29 Sept. 2005, 6 females (CCVT 2476a) on Salvia sp. İgdir, Digor road, 40°07.034’N 43°37.068’E, 978 m, 13 June 2007, 1 female (CCVT 3577) Matricaria sp.
*Atroccoccus cracens* Williams, 1962

**Material examined.** Ağrı, Center, 39°40.743’N 43°01.383’E, 1657 m, 29 Sept. 2005, 1 female (CCVT 2477) on Fabaceae; Patnos road, 39°17.641’N 42°46.827’E, 1640 m, 29 Sept. 2005, 2 females (CCVT 2460) on Centaurea sp. Iğdır, Araklı road, 39°58.082’N 44°18.379’E, 838 m, 1 Sept. 2005, 1 female (CCVT 2257) on Chenopodiaceae; Tuzluca-A.Ş. Taşı, 39°55.838’N 43°37.381’E, 1734 m, 30 Aug. 2005, 1 female (CCVT 2259) on Medicago sativa.

*Atroccoccus saxatilis* (Ter-Grigorian, 1964)

**Material examined.** Ağrı, Diyadin-Taşıçay road, 39°37.950’N, 43°24.978’E, 1805 m, 8 June 2006, 2 females (CCVT 2854) on Asteraceae; Doğubeyazıt-Çaldırın, 39°25.973’N 43°59.11’E, 1975 m, 11 July 2007, 1 female (CCVT 4149) on Pholmis sp.; Erzurum-road-Saq, 39°53.221’N 42°22.974’E, 2136 m, 8 June 2006, 2 females (CCVT 2858) on Salvia sp.; Hamur road, 39°35.849’N 42°55.851’E, 1561 m, 10 July 2007, 1 female (CCVT 4120) on Caryophyllaceae; Patnos-Gökceli, 39°06.44’N 42°54.812’E, 1793 m, 10 July 2007, 2 females (CCVT 4079) on undetermined plant.

The species was recorded previously in Turkey (Van) on Salvia sp. (Kaydan et al., 2001a).

*Ceroputo pilosellae* Šulc, 1898

**Material examined.** Bitlis, Hizan road, 38°14.260’N 42°19.479’E, 1909 m, 22 June 2006, 7 females (CCVT 2985) on Euphorbia sp. Hakkari, Beyköy road, 37°33.184’N 43°43.625’E, 1832 m, 14 Sept. 2005, 7 females (CCVT 2338) on Heliotropium europaeum; Beyköy road, 37°33.184’N 43°43.525’E, 1832 m, 14 Sept. 2005, 2 females (CCVT 2321) on Euphorbia sp.; Beyköy road, 37°33.184’N 43°43.525’E, 1832 m, 14 Sept. 2005, 3 females (CCVT 2322) on E. sequieriana; Van, Çatak, 37°55.950’N 42°59.971’E, 1535 m, 3 July 2007, 3 females (CCVT 3900) on Euphorbia sp.

The species was recorded previously in Turkey on Salvia sp. and Sanguisorba minor in Ankara and Isparta (Kaydan et al., 2004, 2005).

*Chaetococcus phragmitis* (Marchal, 1909)

**Material examined.** Hakkari, Esendere road, 37°42.405’N 44°32.040’E, 1785 m, 23 May 2008, 3 females (CCVT 4239) on Phragmites sp.

The species was recorded previously in Turkey on Phragmites sp. in Ankara (Kaydan et al., 2004).

*Coccura circumscripta* (Kiritchenko, 1936)

**Material examined.** Iğdır, Gaziler, 40°06.332’N 43°29.423’E, 1014 m, 3 May 2005, 5 females (CCVT 1402) on undetermined plant.

*Dysmicoccus brevipes* (Cockerell, 1875)

**Material examined.** Van, Center, 1720 m, 18 June 2006, 3 females (CCVT 3120) on Ananas comosus.

*Euripersia amnicola* Borchsenius, 1948

**Material examined.** Ağrı, Center, 39°39.99’N 43°01.032’E, 1643 m, 1 June 2005, 1 female (CCVT 1641) on undetermined plant; Doğubeyazıt, 39°35.420’N 43°46.092’E, 1822 m, 11 July 2007, 1 female (CCVT 4150) on Poaceae; Doğubeyazıt-Telçeker, 39°29.251’N 44°15.345’E, 1544 m, 7 June 2006, 3 females (CCVT 2925) on Poaceae; Nuh’s Ark, 39°26.561’N 44°14.018’E, 1978 m, 7 June 2006, 2 females (CCVT 2914) on Poaceae. Bitlis, Adilcevaz-Aygr lake, 38°50.174’N 42°48.824’E, 1950 m, 14 June 2005, 1 female (CCVT 1777) on Poaceae; Hizan road, 38°17.425’N 42°16.572’E, 1550 m, 22 June 2006, 1 female (CCVT 3014) on Hordeum sp. Iğdır, İğdir road, 34°46.438’N 44°08.495’E, 1515 m, 12 June 2007, 1 female (CCVT 3559) on Poaceae; Tuzluca-Gaziler, 40°06.198’N 43°27.931’E, 1037 m, 28 June 2005, 1 female (CCVT 1965) on Stipa sp. Van, Bahçesaray, 38°09.232’N 42°58.240’E, 2450 m, 25 June 2007, 1 female (CCVT 3785) on undetermined plant; Başkale road, 39°06.188’N 45°06.494’E, 2074 m, 25 May 2007, 1 female (CCVT 3385) on Juncus sp.; Başkale-Hasap road, 37°53.236’N 44°05.585’E, 1883 m, 14 June 2006, 1 female (CCVT 2967) on Juncaceae; Çaldırın, 39°07.467’N 43°53.153’E, 2053 m, 20 July 2005, 1 female (CCVT 2216) on Festuca sp.; Gürpınar-Kirkçeit, 38°09.423’N 43°30.572’E, 2092 m, 29 June 2007, 5 females (CCVT 3880) on Bromus sp.; Hoşap- Başkale, 38°13.542’N 43°53.222’E, 2322 m, 14 June 2006, 3 females (CCVT 2946) on Poaceae; Hoşap road, 38°20.727’N 43°45.230’E, 1854 m, 9 June 2005, 5 females (CCVT 1733) on Stipa sp.; Özlâp-Dönerdere road, 38°41.414’N
44°07.910′E, 2091 m, 5 July 2005, 4 females (CCVT 2015) on Stipa sp.

The species was collected previously on Stipa holosenica in Van (Kaydan et al., 2005).

*Fonscolombia europaea* (Newstead, 1897)

_Material examined._ İğdir, Tuzluca-Gaziler road, 40°06.198′N 43°27.931′E, 1037 m, 28 June 2005, 1 female (CCVT 1947) on undetermined plant.

*Heliococcus radicicola* Goux, 1931

_Material examined._ Bitlis, Hizan, 38°14.696′N 42°27.373′E, 1420 m, 22 June 2006, 1 female (CCVT 2991) on Asteraceae; Hizan, 38°15.153′N 42°27.447′E, 1404 m, 22 June 2006, 1 female (CCVT 2992) on Asteraceae; Hizan road, 38°13.619′N 42°21.607′E, 1672 m, 22 June 2006, 1 female (CCVT 2999) on Eryngium campestre. Hakkari, Kirkakçağan, 37°36.133′N 45°48.684′E, 1332 m, 4 July 2007, 3 females (CCVT 4042) on undetermined plant, Çukurca-Beytüşlembap road, 37°29.205′N 43°28.689′E, 1098 m, 5 May 2007, 1 female (CCVT 3223) on _Poa_ sp; Hakkari road, 37°41.673′N 42°52.296′E, 1539 m, 4 July 2007, 1 female (CCVT 4027) on undetermined plant. Van, Albayrak, 38°06.373′N 44°06.599′E, 2095 m, 25 May 2007, 1 female (CCVT 3348) on Aethionema arabicum.

The species was previously recorded in Turkey on Dianthus sp. (Güzyürelt-Neveshir) (Kaydan et al., 2001b) and on a plant of the family Brassicaceae (Bala-Ankara) (Kaydan et al., 2004).

*Heterococcus opertus* Borchsenius, 1949

_Material examined._ Bitlis, Hizan-Gayda-Köprüağzi, 38°08.051′N 42°26.224′E, 1113 m, 10 Aug. 2005, 5 females (CCVT 2212) on Agropyron repens; Van, Çatak-Pervari road, 37°57.57′N 43°00.496′E, 1364 m, 19 July 2005, 7 females (CCVT 2054) on Cynodon dactylon; Özalp road, 38°36.285′N 43°34.146′E, 1820 m, 5 July 2005, 2 females (CCVT 2012) on Cynodon dactylon.

The species was recorded earlier in Turkey (Ankara) on Cynodon dactylon (Kaydan et al., 2005).

*Heterococcus nudus* (Green, 1926)

_Material examined._ Hakkari, Yüksekove-Büyük Çiftlik, 37°35.596′N 44°05.243′E, 1913 m, 4 Aug. 2005, 4 females (CCVT 2188) on Poaceae. İğdir, Aralik, 39°52.246′N 44°36.748′E, 870 m, 2 May 2005, 2 females (CCVT 1394) on Poaceae.

This Holarctic species was recorded previously in Turkey on different host plants (Ankara) (Kaydan et al., 2005).

*Longicoccus affinis* (Ter-Grigorian, 1967)

_Material examined._ İğdir, Tuzluca-Uç kaya, 39°56.484′N 43°38.985′E, 1652 m, 31 Aug. 2005, 3 females (CCVT 2273) on Agropyron repens.

The species was recorded previously in Turkey (Ankara) on Hordeum bulbosum (Kaydan et al., 2005).

*Longicoccus clarus* (Borchsenius, 1949)

_Material examined._ İğdir, Doğubeyazıt Road, 39°46.438′N 44°08.481′E, 1515 m, 12 June 2007, 1 female (CCVT 3604) on Poaceae.

The species was recorded previously in Turkey (Ankara) on Cynodon dactylon (Kaydan et al., 2005).

*Metadenopus festucae* Šulc, 1933


This species has a Palearctic distribution and is here recorded in Turkey for the first time.

*Mirococcopsis avetianae* Ter-Grigorian, 1964

_Material examined._ Van, Gürpinar-Taşçene, 38°01.87′N 43°31.654′E, 2408 m, 1 June 2006, 1 female (CCVT 2800) on Poaceae.
*Mirococcopsis ammonila* Bazarov & Nurmamatov, 1975

Material examined. İşdir, İpsiz, 40°02’967’N 43°24’769’E, 2001 m, 13 June 2007, 2 females (CCVT 3548) on Brassicaceae. Vann, Gürpınar, 38°21’071’N 43°25’084’E, 1855 m, 29 June 2007, 1 female (CCVT 3815) on undetermined plant; Gürpınar-Kırkçeşit, 38°08’988’N 43°30’217’E, 2079 m, 9 June 2005, 3 females (CCVT 1728) on Thymus sp.; Çaldıran, 39°07’467’N 43°53’153’E, 2053 m, 21 July 2005, 2 females (CCVT 2082) on undetermined plant; Özalp-Dönerdere road, 38°41’414’N 44°07’91’E, 2091 m, 5 July 2005, 5 females (CCVT 1988) on Papaver sp.

*Mirococcopsis subalpina* (Danzig, 1985)

Material examined. Vann, Hoşap- Başkale road, 38°13’542’N 43°53’222’E, 2322 m, 14 June 2006, 2 females (CCVT 2974) on Poaceae.

*Mirococcopsis teberdae* (Danzig, 1985)

Material examined. Vann, Bahçeşaray road, 38°08’765’N 42°51’506’E, 2605 m, 25 June 2007, 4 females (CCVT 3798) on Poaceae.

*Neotrionymus monstatus* (Ter-Grigorian 1973)

Material examined. Hakkari, Başkale road, 37°48’480’N 44°05’146’E, 1835 m, 22 May 2008, 3 females (CCVT 4243) on Phragmites sp.

The species was recorded previously in Turkey (Ankara) on Phragmites communis (Kaydan et al., 2005).

*Peliococcus priesneri* (Laing, 1936)

Material examined. İşdir, Tuzluca-Asağı Sutasi, 39°55’838’N 43°37’351’E, 1734 m, 31 July 2005, 3 females (CCVT 2276) on Cynodon dactylon.

The species was recorded previously in Turkey (Ankara) on C. dactylon (Kaydan et al., 2005).

*Peliococcus manifectus* Borchsenius, 1949

Material examined. İşdir, Aralık-Tigem, 39°44’295’N 44°29’998’E, 1196 m, 10 May 2006, 1 female (CCVT 2633) on Artemisia vulgaris.

Van, Bahçeşaray-Gayda road, 28 June 2006, 38°07’371’N 42°36’893’E, 1807 m, undetermined plant, 2 female (CCVT 3084).

The species was recorded previously in Turkey (Ankara and Van) on different plants (Kaydan et al., 2001a, 2005).

*Peliococcus salviae* Hadzibejli, 1963

Material examined. Ağrı, Eleşkirt-Süzgeçli, 39°46’536’N 42°39’626’E, 1810 m, 30 May 2005, 1 female (CCVT 1609) on Carduus sp.; Doğubeyazıt-İşdır road, 39°56’836’N 43°37’38’E, 1734 m, 31 Aug. 2005, 2 females (CCVT 2248) on Boraginaceae; Doğubeyazıt-Çaldıran, 39°25’973’N 43°59’11’E, 1975 m, 11 July 2007, 1 female (CCVT 4149) on Phlomis sp.

The species was recorded previously in Turkey (Ankara) on a plant of the family Brassicaceae (Kaydan et al., 2005).

*Peliococcus tritubulatus* Kiritshenko, 1940

Material examined. Ağrı, Doğubeyazıt-İşhakpasa, 39°31’255’N 44°07’915’E, 1940 m, 29 Sept. 2005, 2 females (CCVT 2478) on Euphorbia sequieriana; Doğubeyazıt-İşdir road, 39°37’662’N 44°02’333’E, 1551 m, 12 June 2007, 3 females (CCVT 3589) on E. sequieriana; Doğubeyazıt, 39°26’847’N 44°14’405’E, 1865 m, 27 Sept 2005, 4 females (CCVT 2434) on E. sequieriana; Doğubeyazıt, 39°35’42’N 43°46’092’E, 1822 m, 11 July 2007, 1 female (CCVT 4138) on E. sequieriana; Doğubeyazıt-Gürbulak, 39°25’853’N 44°20’218’E, 1510 m, 27 Sept. 2005, 2 females (CCVT 2417) on E. sequieriana. Vann, Çaldıran-Yanktas, 39°13’856’N 43°52’863’E, 2218 m, 21 July 2005, 2 females (CCVT 2096) on E. sequieriana.

The species was recorded previously in Turkey (Ankara) on a plant of the family Asteraceae (Kaydan et al., 2005).

*Phenacoccus angustatus* Borchsenius, 1949

Material examined. Vann, Başkale-Hoşap, 38°15’268’N 43°52’669’E, 2180 m, 25 May 2007, 2 females (CCVT 3376) on Poa sp.

*Phenacoccus avenae* Borchsenius, 1949

Material examined. Bitlis, Hızan Road, 38°14’26’N 42°19’479’E, 1906 m, 22 June 2006,
Phenacoccus emansor Williams & Kozarzhevskaya, 1988

Material examined. İçdir, Aralık road, 39°58.864’N 44°11.909’E, 846 m, 27 June 2005, 9 females (CCVT 1917) on Asteraceae.

The species was recorded on plant stock of the families Poaceae, Amaranthaceae, Iridaceae and Liliaceae, which were exported from Turkey to USA, England and Holland (Williams and Miller, 1985). Since then, this species has been collected in Turkey (Ankara) on different plants (Kaydan et al., 2005).

Phenacoccus eurotiae Danzig, 1975

Material examined. Ağrı, Doğubeyazıt-Içdir road, 39°41.947’N 44°05.803’E, 1532 m, 30 Aug. 2005, 2 females (CCVT 2261) on Labiatae; Erzurum Road, 39°53.221’N 42°22.974’E, 2136 m, 9 June 2006, 1 female (CCVT 2872) on undetermined plant. Van, Albayrak-Beleşen, 38°08.379’N 44°13.222’E, 2070 m, 11 May 2005, 3 females (CCVT 1450) on undetermined plant; Gürpınar-Kirkçeşit, 38°13.414’N 43°32.684’E, 2143 m, 9 June 2005, 2 females (CCVT 1724) on Thymus sp.

Phenacoccus incertus (Kiritchenko, 1940)

Material examined. Ağrı, Mount Ağrı, 39°36.52’N 41°12.498’E, 1635 m, 7 June 2006, 4 females (CCVT 2942) on Poaceae; Doğubeyazıt-Ishak Paşa, 39°31.103’N 44°07.719’E, 1929 m, 8 June 2006, 1 female (CCVT 2947) on Poaceae; Doğubeyazıt-Içdir road, 39°41.847’N 44°05.8’E, 1532 m, 30 Aug. 2005, 2 females (CCVT 2241); Lactuca sp. Bitlis, Adilecevaz-Patnos road, 38°55.913’N 42°39.951’E, 1768 m, 10 July 2007, 2 females (CCVT 4098) on Centaurea sp. İçdir, Doğubeyazıt road, 39°30.467’N 44°04.096’E, 935 m, 29 June 2005, 1 female (CCVT 1960) on Hordeum sp. Van, Muradiye-Beydağları, 38°55.111’N 43°46.185’E, 1781 m, 22 June 2007, 1 female (CCVT 3695) on Capsella bursa-pastoris; Özalp, 38°39.97’N 43°47.344’E, 1922 m, 18 June 2007, 3 females (CCVT 3628) on Brassicaceae; Özalp, 38°39.97’N 43°47.344’E, 1922 m, 18 June 2007, 2 females (CCVT 3642) on Poaceae; Özalp road, 38°36.285’N 43°34.146’E, 1820 m, 5 July 2005, 3 females (CCVT 2020) on Aegilops sp.

Phenacoccus kokandicus Nurmamatov, 1986


Phenacoccus loiki Danzig, 2001

Material examined. Ağrı, Doğubeyazıt, 39°27.383’N 44°14.982’E, 1694 m, 7 June 2006, 1 female (CCVT 2999) on Hordeum. İçdir, Tutuluca road, 40°02.95’N 43°44.683’E, 1015 m, 3 May 2005, 1 female (CCVT 1404) on dried leaf of Poaceae. Van, Bağçasaray-Gayda road, 38°07.299’N 42°36.282’E, 1603 m, 28 June 2006, 2 females (CCVT 3056) on Secale sp.

The species was recorded previously in Turkey (Ankara) on Hordeum murinum (Kaydan et al., 2005).

Phenacoccus persimplex Borchsenius, 1949

Material examined. İçdir, A. Aktaş, 40°06.089’N 43°30.858’E, 1197 m, 13 June 2007, 1 female (CCVT 3580) on Asteraceae; Digor road, 40°07.034’N 43°37.680’E, 978 m, 13 June 2007, 2 females (CCVT 3577) on Matricaria sp.; Ipsiz, 40°03.942’N 43°25.244’E, 1807 m, 13 June 2007, 1 female (CCVT 3582) on undetermined plant. Van, Albayrak, 38°08.935’N 44°12.835’E, 2064 m, 25 May 2007, 5 females (CCVT 3388) on Artemisia sp.; Bağçasaray road, 38°09.232’N 42°58.24’E, 2450 m, 25 May 2007, 2 females (CCVT 3781) on Apiaceae.
**Phenacoccus querculus** (Borchsenius, 1949)

*Material examined.* Van, Gevaş-Artos, 38° 16.159’N 43°18.421’E, 2248 m, 5 June 2007, 3 females (CCVT 3503) on Quercus sp.

**Phenacoccus prope schmeleiti** Bazarov, 1980


**Phenacoccus strigosus** Borchsenius, 1949

*Material examined.* Van, Gürpinar-Çatak, 38°03.868’N 43°25.18’E, 1926 m, 29 June 2007, 1 female (CCVT 3870) on Lactuca sp.

**Planococcus ficus** (Signoret, 1875)


This cosmopolitan species was recorded previously in Turkey (Ankara, Burdur Izmir, Niğde, Marmara Region and Rize) on Ficus sp., F. carica, Hoya sp., Marantha leuconeura, Nerium oleander, Punica grannatum and Vitis sp. (Düzgüneş 1982; Lodos 1986; Kaydan et al., 2004, 2005).

**Planococcus tovae** (Nasonov, 1908)

*Material examined.* Bitlis, Adlicevaz-Center, 38°47.914’N 42°44.193’E, 1653 m, 14 June 2005, 10 females (CCVT 1756) on Cupressus sp.; Hizan-Gayda, 38°09.002’N 42°23.751’E, 1266 m, 10 Aug. 2005, 4 females (CCVT 2211) on Juniperus oxycedrus oxycedrus; Hizan-Gayda road, 38°11.688’N 42°23.372’E, 1276 m, 22 June 2006, 2 females (CCVT 3012) on Juniperus sp.; Karnıcalar, 38°16.79’N 41°56.218’E, 1134 m, 12 Oct. 2005, 2 females (CCVT 2512) on Juniperus sp.; Bitlis road, 38°12.133’N 41°49.691’E, 797 m, 23 June 2006, 4 females (CCVT 3023) on Juniperus sp.

This Palearctic species was previously recorded in Turkey (Middle Anatolia, Marmara and Mediterranean regions) on Cupressus sempervirens, C. gaveniana, Cupressus sp., Juniperus excelsa, Laurus nobilis, Libocedrus decurrens, Taxus baccata, and Thuja occidentalis (Çanakçıoğlu, 1977; Kaydan et al., 2005, 2007).

**Pseudococcus comstocki** (Kuwana, 1902)

*Material examined.* Iğdır, Akyumak, 39°57.895’N 44°03.265’E, 880 m, 14 June 2007, 4 females (CCVT 3539) on Morus sp.; Kadıkışla, 40°01.528’N 44°04.647’E, 862 m, 14 June 2007, 4 females (CCVT 3541) on Vitis vinifera; Melekli, 39°56.754’N 44°03.963’E, 863 m, 12 June 2007, 4 females (CCVT 3540) on Morus sp.; Center, 39°56.415’N 44°06.113’E, 850 m, 12 June 2007, 6 females (CCVT 3538) on Morus sp.; Center, 14 June 2007, 4 females (CCVT 3537) on Platanus orientalis; Center, 14 June 2007, 4 females (CCVT 3542) on Morus sp.; Aralik Tigem, 39°47.125’N 44°17.201’E, 842 m, 10 May 2006, 4 females (CCVT 2565) on Morus sp.; Center, 39°55.576’N 44°02.678’E, 871 m, 1 Sept. 2005, 9 females (CCVT 2228) on Morus sp.; Kadıkışla, 40°01.496’N 44°04.627’E, 863 m, 29 June 2005, 4 females (CCVT 1951) on Vitis vinifera; Kadıkışla, 40°01.513’N 44°04.623’E, 867 m, 30 Aug. 2005, 4 females (CCVT 2220) on Vitis vinifera; Kadıkışla, 40°01.418’N 44°04.914’E, 868 m, 30 Aug. 2005, 2 females (CCVT 2229) on Morus sp.; Karakoyunlu road,
39°57.416’N 44°07.577’E, 835 m, 1 Sept. 2005, 5 females (CCVT 2226) on Morus sp.; Melekli, 39°57.196’N 44°07.213’E, 861 m, 10 June 2006, 4 females (CCVT 3052) on Morus sp.; Melekli, 39°56.775’N 44°06.219’E, 865 m, 27 June 2005, 4 females (CCVT 1842) on Morus sp.; Center, 39°55.549’N 44°02.678’E, 848 m, 3 June 2006, 8 females (CCVT 1395) on Morus sp.; Center, 39°55.156’N 44°02.696’E, 858 m, 1 June 2005, 7 females (CCVT 2225) on Morus sp.; Center, 29 June 2005, 3 females (CCVT 1892) on Morus sp.; Center, 39°58.522’N 44°02.733’E, 864 m, 27 June 2005, 9 females (CCVT 1844) on Morus sp.

*Ripersiella petiti* (Goux, 1941)

*Material examined.* Ağrı, Adilecev-Çatnos road, 38°55.913’N 42°59.951’E, 1768 m, 10 July 2007, 6 females (CCVT 4121) on undetermined plant.

*Ripersiella poltavae* (Laing, 1929)

*Material examined.* Hakkari, Çukurca road, 37°28.767’N 43°37.5’E, 1187 m, 9 May 2007, 1 female (CCVT 3225) on Veronica sp.

*Spilococcus cachovanicus* Danzig, 1998

*Material examined.* Bitlis, Bitlis river, 38°16.510’N 41°57.958’E, 1206 m, 23 June 2006, 2 females (CCVT 3027) on Centaurea sp. Hakkari, Çukurca road, 37°28.725’N 43°31.831’E, 1313 m, 4 July 2007, 2 females (CCVT 3979) on undetermined plant; Çukurca road, 37°28.725’N 43°32.831’E, 1313 m, 4 July 2007, 4 females (CCVT 3990) on Brassicaceae; Yüksekova, road 37°41.940’N 44°03.039’E, 1313 m, 6 July 2007, 4 females (CCVT 3994) on undetermined plant; Şendilni road, 37°24.219’N 44°30.087’E, 1659 m, 6 July 2007, 2 females (CCVT 4010) on undetermined plant.

*Trionymus perissii* (Signoret, 1875)

*Material examined.* Ağrı, Center, 39°40.743’N 43°01.385’E, 1660 m, 29 Sept. 2005, 1 female (CCVT 2486) on Poaceae; Hamur, 39°35.728’N 42°53.389’E, 1616 m, 29 Sept. 2005, 1 female (CCVT 2481); Aegilops sp. *Bittis*, Maunt Nemrut, 38°34.977’N 42°16.191’E, 2435 m, 23 June 2006, 1 female (CCVT 3046) on Poaceae. Van, Gürün-Çat, 38°03.868’N 43°25.108’E, 1926 m, 29 June 2007, 1 female (CCVT 3877) on Poaceae.

The species was previously recorded in Turkey (Ankara and Van) on Agropyron sp., Elymus sp., Hordeum murinum, Cau- calis cf. platycarpos (Kaydan et al., 2001 a; 2005).

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