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## Studies on Pseudococcidae (Homoptera: Coccoidea) Fauna of Afyon, Ankara, Burdur and Isparta Provinces, Turkey

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**Abstract:** Cultivated and non-cultivated areas were surveyed between 1999 and 2000 for coccoid fauna in Ankara, Afyon, Burdur and Isparta provinces. Nineteen species from 11 genera belonging to Pseudococcidae were found. Among these *Chaetococcus phragmitis* (Marchal, 1909), *Phenacoccus bicerarius* Borchsenius, 1949, *Phenacoccus evelinae* Tereznikova, 1968, *Puto pilosellae* (Sulc, 1898), *Puto superbus* (Leonardi, 1907), *Rhodania porifera* Goux, 1935, and *Spinococcus morrisoni* (Kritchenko, 1935) were new records for Turkish fauna.

**Key Words:** Pseudococcidae, *Chaetococcus*, *Peliococcus*, *Phenacoccus*, *Planococcus*, *Puto*, *Rhodania*, *Spinococcus*, *Trionymus*, Turkey

### Afyon, Ankara, Burdur ve Isparta İllerinde Pseudococcidae (Homoptera: Coccoidea) Faunası Üzerine Çalışmalar

**Özet:** Çalışma 1999-2000 yılları arasında Ankara, Afyon, Isparta ve Burdur illerinde yürütülmüştür. Kültür bitkisi alanları ve yabani floradaki bitkiler incelenmiştir. 11 cinse ait 19 tür tespit edilmiştir. Bunlar arasında *Chaetococcus phragmitis* (Marchal, 1909), *Phenacoccus bicerarius* Borchsenius, 1949, *Phenacoccus evelinae* Tereznikova, 1968, *Puto pilosellae* (Sulc, 1898), *Puto superbus* (Leonardi, 1907), *Rhodania porifera* Goux, 1935, *Spinococcus morrisoni* (Kritchenko, 1935) Türkiye faunası için yeni kayıt niteliğindeki türlerdir.

**Anahtar Sözcükler:** Pseudococcidae, *Chaetococcus*, *Peliococcus*, *Phenacoccus*, *Planococcus*, *Puto*, *Rhodania*, *Spinococcus*, *Trionymus*, Turkey

### Introduction

Studies on the scale insect (Homoptera: Coccoidea) fauna of Turkey have been carried out by several authors (Çanakçıoğlu, 1977; Kozár et al., 1979; Düzgüneş, 1982; Uygun et al., 1998; Ülgentürk and Toros, 1999; Kaydan et al., 2001a) since Bodenheimer (1949, 1952, 1953a, 1953b). These studies have improved our knowledge of scale insects, but have also highlighted the need for more faunistic research.

The family Pseudococcidae is also known as mealybugs, which are usually thinly or thickly covered with a mealy or cottony wax secretion. Pseudococcidae is the second largest family with 1982 species after Diaspididae in Coccoidea (Ben-Dov and German, 2003). Kozár (1998) recorded 708 species in 115 genera in the Palearctic region. Studies on this family were started by Bodenheimer (1953 a, 1953b) who recorded 10 mealybug species in Turkey. After that, Çanakçıoğlu

(1977) recorded 3 species in forestry areas, Düzgüneş (1982) recorded 13 species in different habitats, Kaydan et al. (2001a) recorded 19 species, which 16 of them were a new record for Turkish fauna, and Kaydan et al. (2001b) also recorded 4 new records. Forty-two mealybug species have been recorded in Turkey to date.

This paper deals with new pseudococcid species, their hosts and distribution in non-cultivated and cultivated areas in Ankara, Afyon, Burdur, Isparta provinces in Turkey.

## Materials and Methods

The pseudococcid samples were collected from Ankara, Afyon, Burdur and Isparta provinces in Turkey between 1999 and 2000. The area is generally covered by steppe vegetation at an elevation of 800-1000 m. Specimens were taken from wild plants and cultivated crops once a month during spring and summer. The samples were put in plastic bags and taken to the laboratory. Specimens were prepared for light microscopy using the methodology of Kosztarab and Kozár (1988). Parts of dry and mounted material were deposited at the Plant Protection Department of the Agriculture Faculty, Ankara University, Ankara, Turkey.

## Results and Discussion

List of the collected species with host plant and phenological data:

*Atrococcus achilleae* (Kiritchenko, 1936)

**Material examined:** 10.VI.1999, on the roots of *Melilotus alba*, Kalecik, Ankara; 30.IX.1999, on the roots of *Scobiosa ucranica*, on the roots of *Acantholimon* sp., Beynam, Ankara; 6.XI.1999, on the roots of Asteroaceous plant, Ankara-Şereflikoçhisar road. Kaydan et al. (2001b) previously recorded this species on a plant belonging to Asteraceae on the Ankara-Nevşehir road.

Palaeartic species. Occurring on the roots of the host plant. Egg laying females were frequently found during August-October (Kosztarab and Kozár, 1988).

*Atrococcus paludinus* (Green, 1921)

**Material examined:** 10.VI.1999, on root of undetermined plant, Kalecik, Ankara; 30.IX.1999, on the root of *Senecio* sp.; 5.VII.2000, on undetermined plant,

Bala, Ankara. Kaydan et al. (2001b) previously recorded this species on *Taericum* sp. at Nevşehir (Ihlara).

Palaeartic species. Occurring on the leaves and at the bases of the stems of herbaceous woody plants, most common in Central Europe on *Rubus* sp. (Kosztarab and Kozár, 1988).

*Chaetococcus phragmitis* (Marchal, 1909) (Figure 1a)

**Material examined:** 9.VIII.2000, on the leaf sheath of *Phragmites* sp., Polatlı- Haymana road, Ankara. New record for Turkish scale insect fauna.

This is a Nearctic and Palaeartic species, living between the leaf sheaths and the stem (Kosztarab and Kozár, 1988; Kosztarab, 1996). Widely distributed in the Mediterranean basin, Central Europe, Central Asia and America.

*Heliococcus radicolola* Goux, 1931

**Material examined:** 05.VII.2000, on the root of Brassicaceous plant, Bala, Ankara. This species was recorded at Güzelyurt (Nevşehir) on *Dianthus* sp. by Kaydan et al. (2001b).

Palaeartic. Occurring on the roots and stems of a variety of herbaceous plants.

*Mirococcus inermis* (Hall, 1925)

**Material examined:** 23.VI.1999, on the root of undetermined plant, Aziziye, Burdur. Kaydan et al. (2001a) previously recorded this species on the root of *Chenopodium album*, *Heliotrophium europaeum*, *Polygonum* sp., and *Salsola kali* in Van.

It is an Afrotropical and Palaeartic species and occurs on the roots of different dicotyledons.

*Peliococcus chersonensis* (Kiritchenko, 1935)

**Material examined:** 10.VI.1999, undetermined plant, Kalecik, Ankara; 15.VI.1999, *Artemisia* sp., Beynam, Ankara. It was found in Ankara (Bala) and Van on roots of *Artemisia fragrans*, *Globularia* sp., *Solanum tuberosum*, and *Cnopsis* sp. (Bodenheimer, 1953b; Kaydan et al., 2001a).

Palaeartic. Lives on roots of host plants.

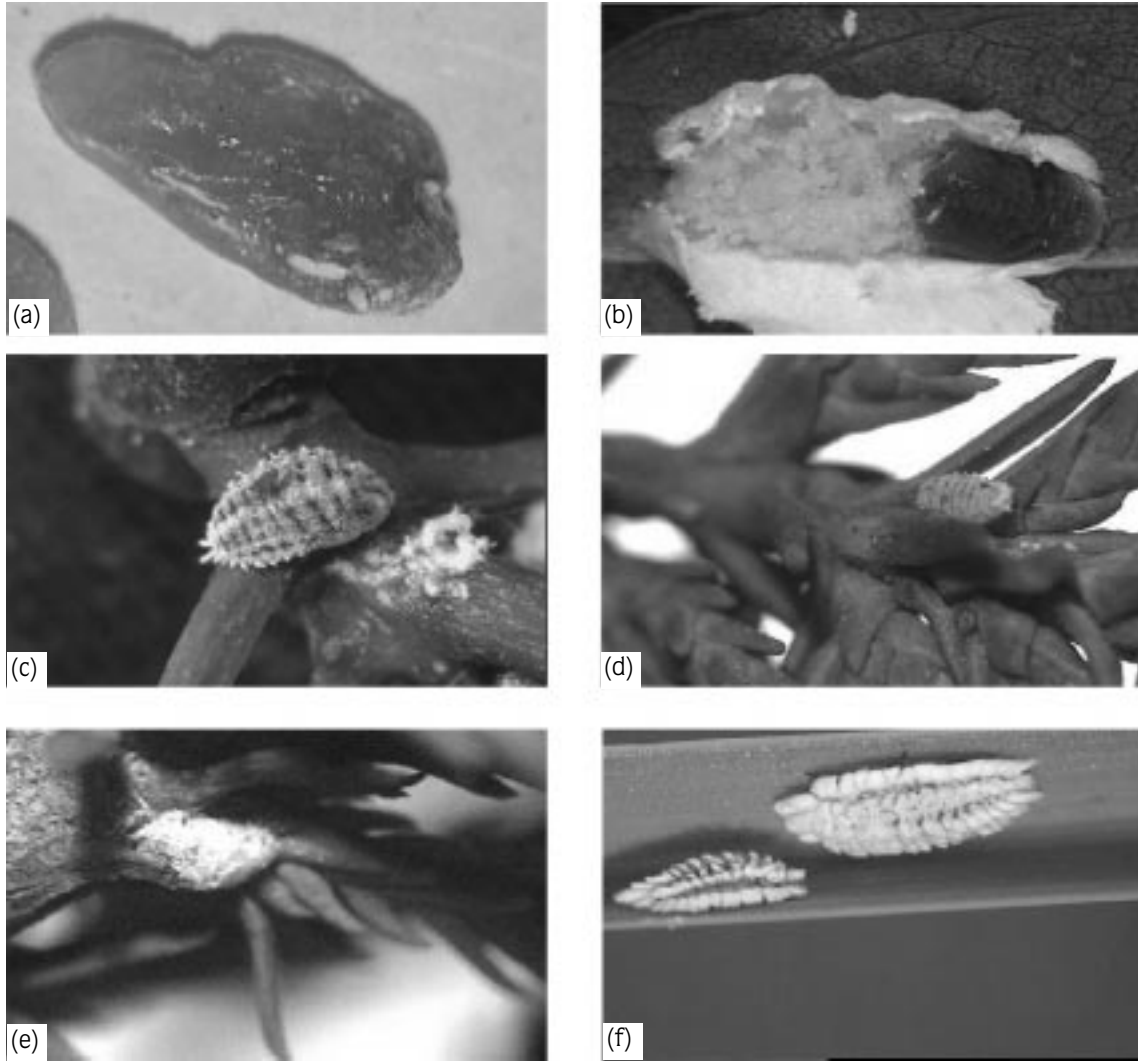


Figure 1. a) *Chaetococcus phragmites*, b, c) *Phenacoccus aceris* d, e) *Planococcus vovae* f) *Puto superbus*.

*Phenacoccus aceris* (Signoret, 1875) (Figure 1. b, c)

**Material examined:** 7.V.1999, 14.V.1999, *Malus communis*, Gölbaşı, Ankara; 13.V.1999, *Fraxinus* sp., Beypazarı, Ankara; 14.V.1999, *Salix* sp., Eymir, Ankara; 9.VIII.2000, *Juglans regia*, *Prunus domestica*, and *Malus communis*, Gölbaşı, Ankara; 11.V.2000, *Cydonia oblonga*, and *Malus communis*, Haymana, Ankara; 16.V.1999, *Quercus* sp., Yalvaç, Isparta; 17.V.1999, *Cydonia* sp., Burdur. It was found in Ankara and Kayseri on *Fraxinus* spp. (Düzgüneş, 1982; Uygun et al., 1998).

Nearctic and Palaearctic species. Fully developed females (with their conspicuous ovisacs) observed in June; the reproducing females were observed to migrate

from the host plant, on which they developed, to surrounding plants. It is a bisexual species which develops with annual generation; second instar nymphs overwinter in bark crevices and migrate to leaves in early spring; adults appear in late spring to early summer; first instars appear in July and feed on leaves; second instar nymphs migrate in fall to the bark. It occurs on the bark of trunk and branches of the host plant.

*Phenacoccus bicerarius* Borchsenius, 1949

**Material examined:** 10.VI.1999, on the leaf sheath of *Lolium* sp., Kalecik and Beynam, Ankara; 6.XI.1999, on the leaf sheath of *Cynodon dactylon*, Salt Lake,

Şereflikoçhisar, Ankara. This species is a new record for Turkish fauna.

Palaeartic. It is Generally found in leaf sheaths of grasses (Kosztarab and Kozár, 1988).

*Phenacoccus evelinae* (Tereznikova, 1968)

**Material examined:** 10.VI.1999, on the leaf sheath of *Lolium* sp., Dolapdere, Kalecik, Ankara. This species is a new record for Turkish fauna.

Palaeartic. Occurring on the upper leaf surface, inside leaf sheaths and more rarely on the roots of the host plant (Kosztarab and Kozár, 1988).

*Phenacoccus tergrigorianae* Borchsenius & Ter-Grigorian, 1956

**Material examined:** 17.VI.1999, on the root of *Artemisia* sp., Çeltikçi, Ankara; 5.VII.2000, on the root of *Xanthium* sp., Bala, Ankara; 5.VII.1999, on the root of *Achillae* sp., Beynam, Ankara; 26.VII.2000, undetermined plant, Güvem, Kızılcahamam, Ankara; 9.VIII.1999, on the root of *Cichorium* sp., Polatlı-Haymana road, Ankara; 31.8.2000, on the root of *Eryngium* sp., Çubuk, Ankara.

It was found at Nevşehir and Van on *Chenopodium* sp., *Chenopodium album*, Apiaceous plant, *Cichorium* sp., *Beta vulgaris*, *Zygophyllum tabacum*, *Onobrychis viciifolia*, *Hordeum vulgare*, *Melilotus* sp. and *Scobiosa* sp. by Kaydan et al. (2001a, 2001b).

Palaeartic. Living on roots of its host plants.

*Phenacoccus pumilus* Kiritchenko, 1935

**Material examined:** 9.VIII.1999, undetermined plant, Polatlı, Haymana; 10.6.1999, *Tarilis* sp. on root, Kalecik, Ankara. It was found on an undetermined host at Nevşehir by Kaydan et al. (2001b).

Palaeartic. Occurring on the roots of a variety of dicotyledonous plants (Ter-Grigorian, 1973).

*Planococcus ficus* (Signoret, 1875)

**Material examined:** 13.V.1999 *Vitis* sp. on the stem. Ankara; 21.IX.2000, *Vitis vinifera*, on the trunk, Burdur. It was found in the Izmir, Rize, Niğde and Marmara

region on *Ficus* sp., *Vitis* sp., and *Punica granatum* (Düzgüneş, 1982; Lodos, 1986).

Afrotropical, Neotropical, Palaeartic and Oriental species. It is a pest of the grapevine in the Mediterranean region, South Africa, Pakistan and Argentina (Ben-Dov, 1994).

*Planococcus vovae* (Nasonov, 1908) (Figure 1. d, e)

**Material examined:** 23.VI.1999, *Cupressus* sp., Burdur, 10.V.2001, *Cupressus* sp., Kocapınar, Burdur; 22.VI.1999, *Juniperus* sp., Aziziye, Burdur; 27.V.1999, *Juniperus* sp., Eğirdir, Isparta; 9.V.2001, *Juniperus* sp., Kovada, Isparta.

*P. vovae* was recorded in the Marmara region, Central Anatolian region, and Mediterranean region on *Cupressus* sp., *C. sempervirens*, *C. goveniana*, *Juniperus exelsa*, *Laurus nobilis*, *Libocedrus decurrens*, *Taxus baccata*, and *Thuja occidentalis* (Çanakçıoğlu, 1977; Selmi, 1979; Uygun et al., 1998).

Neotropical, Palaeartic. Generally on *Juniperus* spp. Often forms large colonies on branches and is tended by ants. Mature females seek out bark crevices (Kosztarab and Kozár, 1988).

*Puto pilosellae* (Šulc, 1898)

**Material examined:** 5.VII.2000, on Poaceous plants, Bala, Ankara; 14.V.1999 and 1.VII.1999 on Poaceous plants, ODTÜ, Ankara; 1.VI.2000, *Salvia* sp., Kovada, Isparta.

It is a new record for Turkish fauna.

Palaeartic. Occurring on the underside of the leaves of the host plant. In heavy populations it has become a pest of strawberries in some countries (Kosztarab and Kozár, 1988).

*Puto superbus* (Leonardi, 1907) (Figure 1. f)

**Material examined:** 30.V.2000 on Poaceous plants and *Gallium* sp. Söğüt, Burdur; 8.V.2001, *Gallium* sp., Çay, Afyon; 31.V.2000, undetermined plant, Sütçüler, Isparta; 30.V.2000 *Quercus* sp. Kovada, Isparta.

It is a new record for Turkish fauna.

Palaeartic. Occurring on the stems and leaves of a wide variety of herbaceous plants. Most common on



grasses in Central Europe (Kosztarab and Kozár, 1988). It is a biparental species, developing with annual generation; adult males and females appear in May-July, and oviposition is in July in Italy (Marotta and Tranfaglia, 1993).

*Rhodania porifera* Goux, 1935

**Material examined:** 30.IX.1999, *Festuca* sp. Beynam, Ankara. This species is a new record for Turkey.

Palaeartic. Occurring on the roots of the host plant. It is a steppe-inhabiting xerophilus species that tolerates warm conditions (Kosztarab and Kozár, 1988). Lives on the roots of *Festuca* sp. and other grasses.

*Spinococcus morrisoni* (Kiritshenko 1935)

**Material examined:** 15.VI.1999 on the root of *Artemisia* sp., Beynam, Ankara. This species is a new record for Turkish fauna.

Palaeartic. Occurring on the trunks and branches of its host plant (Kosztarab and Kozár, 1988).

*Trionymus aberrans* (Goux, 1938)

**Material examined:** 11.VI.1999, *Aegilops* sp. and *Avena* sp., Ankara-Haymana road, 6.XI.1999, *Triticum* sp. Ankara-Şereflikoçhisar road. It was found in Ankara, Nevşehir and Van on *Triticum* sp., *Agropyron repens*, *Agropyron* sp., and *Elymnus repens* (Kaydan et al., 2001a, 2001b).

Palaeartic. Lives in leaf sheaths of various grasses (Kosztarab and Kozár, 1988).

*Trionymus multivorus* (Kritchenko, 1936)

**Material examined:** 16.VI.1999, *Cicer* sp. and *Eryngium* sp., Beynam, Ankara; 17.VI.1999,

*Echinophora tenuifolia*, Ankara-Çeltikçi road; 2.VII.1999, *Cicer* sp., Beynam, Ankara; 5.VII.1999 on undetermined host, Beynam, Ankara; 31.VIII.1999 on undetermined host, Yiğitli-Çubuk, Ankara. It was found at Nevşehir, Osmaniye and Van on *Medicago* sp., *Eryngium* sp., *Malva* sp., *Nepeta* sp., and *Daucus guttatus* (Bodenheimer, 1953a; Kaydan et al., 2001a, 2001b).

Palaeartic. Occurring on the roots and stems but most often on the roots and root crowns of a variety of herbaceous plants, primarily dicotyledons belonging to at least 35 plant genera. High populations cause damage to lucernes. The damage is associated with plant virus infestation, and the mealybugs may serve as vectors of viral diseases (Kosztarab and Kozár, 1988).

Nineteen species from the genera *Atrococcus*, *Chaetococcus*, *Heliococcus*, *Mirococcus*, *Peliococcus*, *Phenacoccus*, *Planococcus*, *Puto*, *Rhodania*, *Spinococcus* *Trionymus* belonging to Pseudococcidae were found in this research. *Chaetococcus phragmitis*, *Phenacoccus bicerarius*, *Phenacoccus evelinae*, *Puto pilosellae*, *Puto superbis*, *Rhodania porifera*, and *Spinococcus morrisoni* are new records for Turkish scale insect fauna. With this study number of mealybug species in Turkey rises to 49.

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