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Orijinal araştırma (Original article)

The aphelinid and encyrtid parasitoids (Hymenoptera: Chalcidoidea) of Pseudococcidae (Hemiptera: Coccoidea) in the Van Lake basin of Turkey[1]

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Summary

Parasitoids of mealybugs were surveyed at the Van Lake basin (Ağrı, Bitlis, Hakkari, Iğdır and Van), Turkey, during the years of 2005 and 2008. Parasitized mealybug specimens were collected from ornamental, cultivated and wild plants and to obtain parasitoids, put into controlled environment room and adult emergence was monitored. Sixteen species of parasitoids were recorded, one of which belongs to the family Aphelinidae and 15 to the family Encyrtidae. One genus and nine species were newly recorded for the Turkish fauna. Two species, *Anagyrus kilinceri* Japoshvili sp. nov. and *Charitopus eristoi* Japoshvili sp. nov. (Hymenoptera: Encyrtidae), are described as new species.

Keywords: Mealybugs, Pseudococcidae, parasitoids, Aphelinidae, Encyrtidae, Turkey.

Anahtar sözcükler: Unlu bitler**,** Pseudococcidae, parazitoitler, Aphelinidae, Encyrtidae, Türkiye

Introduction

Mealybugs (Hemiptera: Coccoidea: Pseudococcidae) are commonly known because of their typically white, powdery or mealy wax secretions that cover their body. It is the second largest family in the superfamily Coccoidea (Ben-Dov et al., 2008). This family includes important agricultural pests, especially on perennial plants, fruit and nut trees, ornamental shade trees and

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shrubs, forest trees, greenhouse and indoor plantings. Their feeding may cause deformation or death of plant shoots, and some species can transmit viral diseases (Sforza et al., 2003). Large populations may contaminate foliage with their sticky honeydew excretions, which provide a substrate for sooty mould growth. Mealybug infested fruits become unmarketable.

The superfamily Chalcidoidea (Hymenoptera) is a hyperdiverse group of insects currently including some 22,000 described species worldwide and almost all species are parasitoids of insects, with many attacking economically significant pests such as whiteflies, aphids and scale insects (Noyes, 2009). The families Aphelinidae and Encyrtidae are the most successful groups of Chalcidoidea used in the biological control of pest scale insects (Guerrieri & Noyes, 2000). Species of Encyrtidae are especially important natural enemies of mealybugs as primary parasitoids.

The first comprehensive account of encyrtid and aphelinid parasitoids of coccids in Turkey was given in Öncüer (1991)'s catalogue, where he recorded 27 species of encyrtids and 17 species of aphelinids. The list of encyrtids was increased to 50 by Trjapitzin & Doğanlar (1997), but a further 65 parasitoid species were recorded by various authors (Japoshvili & Karaca, 2002; 2004; Karaca & Japoshvili, 2002; Japoshvili et al., 2004; Uygun et al., 2004; Japoshvili, 2005; Japoshvili & Noyes, 2005 a, b, 2006; Kaydan et al., 2006). There have been no studies of aphelinids in Turkey, excluding a single publication with descriptions of new species (Japoshvili & Karaca, 2002; Uygun et al., 2004).

In this paper, aphelinid and encyrtid parasitoids of mealybugs on cultural plants and naturally-occurring plants in the Van Lake basin (Ağrı, Bitlis, Hakkari, Iğdır and Van), Turkey, were investigated.

Material and Methods

The Van Lake basin is positioned among Irano-Turanian, Euro-Asian and Mediterranean subregion of Palaearctic Zoogeographical Region. This study was conducted in the region in provinces of Ağrı, Bitlis, Hakkari, Iğdır and Van in which the altitudes range between 800-2300 meters. The study was conducted in areas with mixed urban residential, cultivated, and wild areas. The main crops grown in the area are pomes and stone fruits and cereals.

In survey, sampling was carried out twice per week during spring and summer in the years of 2005 and 2008. Mealybug specimens were collected from ornamental, cultivated and wild plants. To obtain parasitoids, infested plant parts were put into plastic bags and taken to laboratory. Parasitised mealybug were put into plastic caps covered by fine mesh material and put into 25±2°C, 65±5% r.h. and 16 h of artificial light of ≈4,000 Lux in a controlled environment

room and adult emergence was monitored. The emerging adult parasitoids were transferred into vials containing 70% ethyl alcohol.

The mealybugs were slide mounted and identified by first author. Preparation of mealybug specimens for identification entailed using the methodology of Kosztarab & Kozár (1998), and identifications were made using the keys and plates of Williams (1963), Ter-Grigorian (1973), Tereznikova (1975), Kosztarab & Kozár (1998) and Danzig (1990). The second author prepared the parasitoid specimens and identified them. Card mounting and slide mounting of parasitoids were done following Noyes (2009) and identifications were done using keys of Trjapitzin (1989), Graham (1991), Yasnosh (1978, 1995), Noyes & Hayat, 1994) and Hayat (1998, 2006). Descriptions of the new species of parasitoids were done according to Noyes & Hayat (1994). The following abbreviations are used in the text: AOL, distance between posterior and anterior ocelli; EL, maximum eye length; EOL, ovipositor exserted part length; FV, minimum frontovertex width; F_1L, F_2L, etc., first funicle segment length, second funicle segment length, etc.; F_1W, F_2W, etc., first funicule segment width, second funicule segment width, etc.; FWL, length of forewing; FWW, width of forewing; GL, maximum length of gonostylus (= third valvula); GOL, abdomen length including exserted part of ovipositor; HW, maximum head width; M, length of marginal vein; MF, the length of the longest marginal setae on the forewing; MS, malar space (shortest distance from eye to mouth margin); MT, length of midtibia; MTS, length of midtibial spur; MTT, length of midbasitarsus; OCL, occipital ocellar line (distance of posterior ocellus from occipital margin); OD, greatest diameter of an ocellus; OL, ovipositor length; OOL, ocular-ocellar line (shortest distance between posterior ocellus and adjacent eye margin); P, length of postmarginal vein; PL, pedicel length; POL, posterior ocellar line (= the shortest distance between the posterior ocelli); PW pedicel width; S, length of stigmal vein; SL, scape length; SW, scape width; ThL, thoax and head length together.

Determination of species were made using keys and plates of Trjapitzin (1989), Noyes & Hayat (1994) and Hayat (2006). Illustrations of parasitoid species were made by using a Hirox KH-7700 digital microscope. Voucher specimens of parasitoids are deposited in the collection of Entomology and Biocontrol Research Centre, Ilia State University, Tbilisi, Georgia; specimes of the mealybug host are deposited in the Coccoidea collection, Yüzüncü Yıl Universty, Agriculture Faculty, Plant Protection Department, Van, Turkey (CCVT). Holotype and paratypes of the new species are deposited in the collection of the Entomology and Biocontrol Research Centre, Ilia State University, Tbilisi, Georgia.

Results and Discussion

In the study, 16 parasitoid species belonging to Aphelinidae (1), Encyrtidae (15) were founded. One genus and nine species were newly recorded for the Turkish fauna. Two of them were described as new record.

Parasitoids of 12 mealybug species were reared during our survey. The number of encyrtids known from Turkey is increased to 123 species as a result of the study.

Aphelinidae

***Marietta picta* (André, 1878)**

Material examined: Iğdır: Tuzluca, Gaziler road, N: 40° 06'335", E: 043° 29'407", 1022 m, 31.VIII.2005, 2 ♀♀, 1 ♂ (in gelatin capsule), Ex *Trabutina crassispinosa* on *Tamarix* sp. (CCVT: 2235).

Host records from Turkey: *Agonoscena succincta* (Heeger, 1856) (Hemiptera: Psyllidae) on *Pistacia vera*; *Chionaspis salicis* (Linnaeus, 1758) (Hemiptera: Diaspididae) on *Salix* sp.; *Lepidosaphes ulmi* (Linnaeus, 1758) (Hemiptera: Diaspididae) on *Malus communis* (Öncüer, 1991).

Previous record in Turkey**:** Erzincan, Erzurum, Gaziantep. (Öncüer, 1991).

Encyrtidae

***Acerophagus malinus* Gahan, 1946**

Material examined: Iğdır: Melekli, N: 39° 56'775", E: 044° 06'219", 27.VI.2005, 5 ♀♀ (1 ♀ on slide, 2 ♀♀ card mounted, 2 ♀♀ in gelatin capsule), Ex *Pseudococcus comstocki* (Kuwana, 1902) on *Morus* sp. (CCVT: 1842).

This is new record for the Turkish parasitoid fauna.

***Anagyrus tamaricicola* Trjapitzin, 1968**

Material examined: Iğdır, Tuzluca, Gaziler road, N: 40° 06'218", E: 043° 28'898"; 28.VI.2005, 5 ♀♀, 1 ♂ (1 ♀ on slide, 1 ♀ card mounted, 3 ♀♀ and 1 ♂ in gelatin capsule Ex *Trabutina crassispinosa* Borchsenius, 1941 on *Tamarix* sp.; (CCVT: 1873).

This is new record for Turkish parasitoid fauna.

***Anagyrus pseudococci* (Girault, 1915)**

Material examined: Iğdır: Tuzluca, Gaziler road, N: 40° 06'335", E: 043° 29'407", 1022 m; 31.VIII.2005, 2 ♀♀ (1 ♀ on slide, 1 ♀ card mounted), Ex *Trabutina crassispinosa* Borchsenius on *Tamarix* sp (CCVT 2235); Hakkari: Çukurca, Narlı, N: 37 ° 15'282", E: 043° 35'228", 792 m, 15.IX.2005, 6 ♀♀, 1 ♂ (2 ♀♀ card mounted, 4 ♀♀, 1 ♂ in gelatin capsule), Ex *Planococcus ficus* on *Platanus orientalis*; (CCVT: 2324).

Host records from Turkey: *Planococcus citri* (Risso, 1813) (Hemiptera: Pseudococcidae) on *Citrus* sp., *C. limon*, *C*. *paradisi*, *C. sinensis*, *Vitis vinifera* (Öncüer, 1991).

Previous record in Turkey: Adana, Antalya, Hatay, İçel, İzmir, Manisa (Öncüer, 1991), Ankara (Kaydan et. al., 2006).

***Anagyrus dactylopii* (Howard, 1898)**

Material examined: Iğdır: Tuzluca, Gaziler road, N: 40° 06'229", E: 043° 22'844", 1017 m, 13.VI.2007, 4 ♀♀, 1 ♂ (3 ♀♀ card mounted),Ex *Trabutina crassispinosa* Borchsenius on *Tamarix* sp (CCVT: 3590); Iğdır: Digor road, N: 40° 67'291", E: 043° 37'233", 970 m, 15.VI.2007, 1 ♀, 1 ♂ (in gelatin capsul), Ex *Trabutina crassispinosa* on *Tamarix* sp. (CCVT: 2324).

This species is new for Turkish parasitoid fauna.

***Anagyrus kilinceri* Japoshvili sp. nov.** (Figure. 1. A-D)

Material examined: Type material. Holotype ♀, TURKEY, Van: Çatak, Pervari road, N: 37° 57'570", E: 043° 00'496", 1364 m, 19.VII.2005, Ex *Heterococcopsis opertus* on *Cynodon dactylon* (CCVT: 2054); Paratype 1 ♀, same data as holotype; TURKEY, 1 ♀, Van: Özalp road, N: 38° 36'285", E: 043° 34'146", 1820 m, 05.VII.2005, Ex *Heterococcopsis opertus* on *Cynodon dactylon* (CCVT: 2012);. Holotype and paratypes in the collection of the Entomology and Biocontrol Research Centre, Ilia State University, Tbilisi, Georgia.

Diagnosis: Female (1.33–2.0 mm): body robust, slightly convex; gaster about as long as head and thorax together; frontovertex about half head width; each antennal torulus separated from mouth margin by 0.2 and from each other by 0.75 of its own length; first flagellar segment shorter than pedicel and as long as F_2; flagellar segments gradually shortening from F_1 to F_6; clava wither than flagellar last segment. ovipositor not exserted; costal cell very narrow, visible only at basal half and at apical half almost absent; body all brown, only mesopleuron, head around eyes and torulli, fore legs, mid and hind tibia yellowish; flagellum with F_1 and basal half of F_2 whitish; F_2 apical half, F_{3-6} and clava brown.

Female: Length of holotype, 1.33 mm. Head mostly pale brown; only lower face bellow eyes is yellow and around eyes with yellow circle; genae brown; malar space with brownish area; pronotum, mesoscutum, scutellum axillae, abdomen brown; metanotum, propodeum, mid and hind femora with yellow-orange color; mesopleuron, legs yellowish; scape brown with apical ¼ whitish, basal part of scape on the ventral surface with orange-light brown spot; F_1 and basal half of F_2 white and F_2 apical half, F_{3-6} and clava brown. Head with fine-shallow rugose sculpture; occipital margin sharp; eyes almost reaching occipital margin; dorsal margin of antennal torulli a little above the ventral eye margins; ocelli forming obtuse triangle; antenna as in figure 1C. Ovipositor (Figure 1D) not exerted. Relative measurements: HW 439.5; HH 406; AOL 49.7; POL 86.7; OOL 42.2; OCL 32.9; OD 23; FVW 224.8; SL 271.5; SW 88.5; MS 83.5; EL 288; FWL 1011; FWW 350.

Thorax with similar sculpture to frontovertex; costal cell very narrow, visible only at basal half and at apical half almost absent (Figure 1A, B); setation at base of forewings and venation as in Figure 1 B. Relative measurements (paratype): S 78.8; M 70.7; P 63.4; FWW 382.9; FWL 1142.3; MF 32.3; HW 497; FVW 209; HH 473.5; MS 115.5; EL 334; SL 293.76; SW 104; PL 153.68; PW 49; F_1L 112.88; F_1W 44.2; F_2L 113; F_2W 41.5; F_3L 100.6; F_3W 44.2; F_4L 96.56; F_4W 45.56; F_5L 95.2; F_5W 50.3; F_6L 77.52; F_6W 53; CL 220.32; CW 68; OL 490.28; GL 103.36; MT 551.5; MTS 180.88; MTT 197.2.

Comments: The closest species to *Anagyrus kilinceri Japoshvili* sp. nov. is *Anagyrus matritensis* (Mercet), females of which can be separated by the characters given in Table 1 A-D.

Table 1. Differences between *Anagyrus kilinceri* Japoshvili sp. nov. and *A. matritensis* (Mercet)

Anagyrus kilinceri Japoshvili sp.nov.	*Anagyrus matritensis*
Mesopleuron yellow	Mesopleuron infuscated
F_1 white	F_1 apical part brown
All legs yellow, only mid and hind femora with orange-yellow color	All legs with some black parts
Abdomen as long as head and thorax together	Abdomen shorter than head and thorax together
Ocelli forming obtuse angle	Ocelli forming angle less than 90°
Malar space 0.3x as long as eye length	Malar space 0.4x shorter than eye length
Pedicel 1.36x as long as F_1	Pedicel as long as F_1
F_6 not more than 1.5x as long as wide	F_6 2x as long as wide

Etymology: The species is named after Prof. Dr. Neşet Kılınçer who made valuable studies on parasitoids in Turkey.

***Charitopus desertus* Myartseva, 1981**

Material examined: Van: Gürpınar, N: 38° 21'071", E: 043° 25'085", 1855 m, 29.VI.2007; 1 ♀, 3 ♂♂ (1 ♀ on slide, 1 ♂ card mounted and 2 ♂♂ in gelatin capsule), Ex mealybug on Graminae (CCVT: 3876).

This species is a new record for Turkish parasitoid fauna.

***Charitopus eristoi* Japoshvili sp. nov.** (Figure 1. E-G)

Material examined: Holotype ♀, Van: Çatak, Pervari road, N: 37° 57'570", E: 043° 00'496", 1364 m, 19.VII.2005, Ex *Heterococcopsis opertus* on *Cynodon dactylon* (CPTV:2054); (CPD, card mounted). Paratype 1 ♀ (slide), 3 ♀♀ 15 ♂♂ (CPD, in gelatin capsule) same data as holotype. Holotype and paratypes in the collection of the Entomology and Biocontrol Research Centre, Ilia State University, Tbilisi, Georgia.

Diagnosis: Female (1.0–1.29 mm): body robust, slightly convex; head brown; scape basal 2/3 brown, apical 1/3 whitish; pedicel basal half brown apical whitish; flagellum and clava brown; mesoscutum generally yellow, front ½

of scutellum yellow, hind ½ brown; abdomen yellow with brown lines at both sides; frontovertex 2.25x less than head wide; antennal torulli considerably lower than that of ventral eye margin; ovipositor slightly exserted.

Female: Length of holotype, 1.29 mm.

Head dark brown with metallic violet-golden-green reflection; pronotum, mesopleuron, hind side of mesoscutum, hind half of scutellum, axillae, sides of abdomen and propodeum brown with metallic violet-golden-green reflection; all legs yellow; occipital margin very sharp; head 2.27x as wide as FV; ocelli forming obtuse triangle; scape 6.7x as long as wide; antenna as in figure 1F. Relative measurements: HW 392.8; HH 336; FV 172.7; MS 95.8; EL 238.6; AOL 33.2; POL 68.7; OOL 24.8; OCL 39; OD 28.2; SL 292.2; SW 43.5; PL 82.3; F_1L 59.1; ThL, 660; GOL 561; EOL 25.

Head and thorax with similar coriaceous sculpture, scutellum with elongated reticulate sculpture; setation at base of forewings and venation as in figure 1E; ovipositor as in figure 1G. Relative measurements (paratype): HW 374.68; HH 340.68; FV 168.64; MS 131.24; EL 224.4; SL 265.88; SW 42.84; PL 73.44; PW 31.28; F_1L 55.76; F_1W 21.76; F_2L 75,48; F_2W 24.48; F_3L 72.08; F_3W 27.88; F_4L 71.4; F_4W 33.32; F_5L 67.32; F_5W 35.36; F_6L 65.28; F_6W 40.12; CL 158.44; CW 52.36; FWL 976.48; FWW 344.08; M 106.08; P 38.76; S 70.72; OL 619.48; GL 149.6; MT 374; MTS 36.72; MTT 81.6.

Comments: The closest species to *Charitopus eristoi* Japoshvili sp. nov. is *Charitopus desertus* Myartseva, female of which can be separated by the characters given in Table 2.

Etymology**:** The species is named after Prof. Eristo Kvavadze who is a well known lumbricologist from Georgia (Country).

Table 2. Differences between *Charitopus eristoi* Japoshvili sp. nov. and *Charitopus desertus* Myartseva

Charitopus eristoi Japoshvili sp.nov.	*Charitopus desertus*
OOL<OD, OCL 1.5x as long as OOL	OOL 1.5-2x as long as OD, posterior ocelli almost touching occipital margin
F_6 1.6x as long as wide	All flagellar segments 2x as long as wide
F_2 1.16x as long as F_6	F_{2-6} are almost equal length
Marginal vein longer than stigmal and less than 2.7x as long as postmarginal	Marginal vein shorter than stigmal and less than 1.5x as long as postmarginal
Exerted part of ovipositor 1/21-1/22x as long as gaster.	Exerted part of ovipositor 1/6-1/7x as long as gaster.

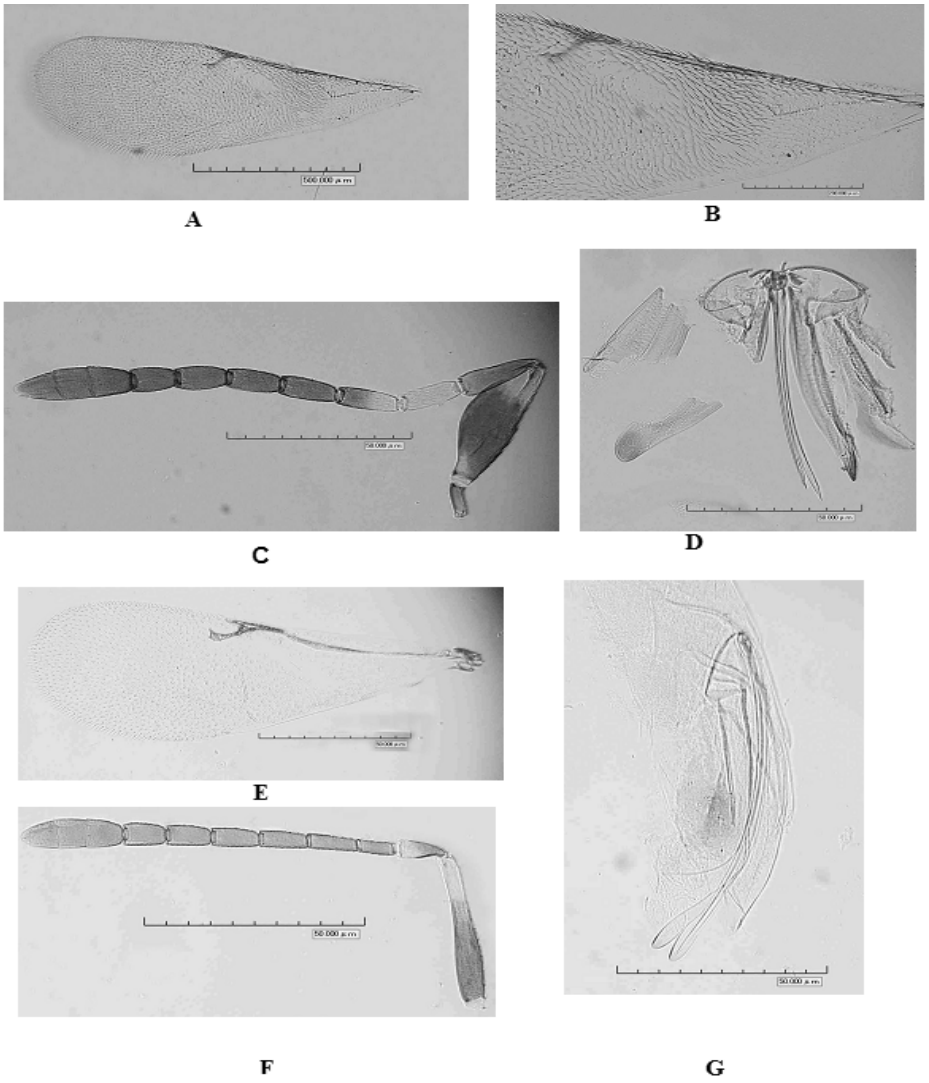

Figure 1. A-D: *Anagyrus kilinceri* Japoshvili sp. nov. female A: Forewing; B: Venation of Forwing; C: Antenna; D: Ovipositor; E-G: *Charitopus eristoi* Japoshvili sp. nov. female E: Forewing; F: Antenna; G: Ovipositor.

***Clausenia* sp.**

Material examined**:** Van-Gürpınar-Kırgeçit, N: 38° 13'869", E: 043° 31'081"; 09.VI.2005; 1 ♂ (card mounted), Ex *Trionymus multivorus* on a plant of the family Umbellifera; (CCVT: 1720).

This genus is a new record for the Turkish parasitoid fauna and the host mealybug is new host record for this genus.

Comment: This species could not be further identified because of the lack of material. The parasitoid should be studied in more detail in the future when more material becomes available.

***Ericydnus caudatus* Erdös, 1957**

Material examined**:** Bitlis: Hizan, Gülpik, N: 38° 16'137", E: 042° 25'058", 1520 m, 22.VI.2006, 1 ♀ (card mounted), Ex *Trionymus aberrans* on *Hordeum* sp. (CCVT: 3020).

This is new record for the Turkish parasitoid fauna.

***Ericydnus sipylus* (Walker, 1837)**

Material examined: Bitlis: Kavakbaşı road, N: 38° 25'607", E: 041° 53'727", 1315 m, 30.V.2007, 2 ♀♀ (both are card mounted), Ex *Phenacoccus pumilus* on *Salvia* sp (CCVT: 3445).

This is new record for the Turkish parasitoid fauna.

***Ericydnus* sp.**

Material examined: Iğdır-Tuzluca-Kula, N: 40° 05'301", E: 043° 24'741", 1440 m, 28.vi.2005; 1 ♀ (card mounted), Ex Pseudococcid on undetermined plant;, (CPVT: 1940); Iğdır-Aralık road, N: 39° 58'216", E: 044° 17'894", 840 m; 27.vi.2005; 1 ♂ (card mounted), Ex *Mirococcus inermis* on undetermined plant; (CPTV 1920); Iğdır-Aralık road, N: 39° 58'864", E: 044° 11'909", 846 m; 27.vi.2005; 1 ♂ (card mounted), Ex *Phenacoccus tergrigorianae* on undetermined plant; (CCVT: 1923).

Two other species in this genus have been recorded previously in Turkey (Japoshvili & Noyes, 2005).

***Leptomastix tanasijtshuki* Sharkov, 1983**

Material examined: Van: Çatak, N: 37° 55'950", E: 042° 59'971", 1535 m, 03.VII.2007, 03.VII.2007 30 ♀♀, 4 ♂♂ (1 ♀ on slide, 1 ♀, 1 ♂ card mounted, 28 ♀♀, 3 ♂♂ in gelatin capsule), Ex *Puto pilosiella* on *Euphorbia* sp. (CCVT: 3900).

This is new record for the Turkish parasitoid fauna.

***Prochiloneurus bolivari* Mercet, 1919**

Material examined: Van: Çatak, Pervari road, N: 37° 57'570", E: 043° 00'496", 1364 m, 19.VII.2005, 5 ♀♀, 2 ♂♂ (2 ♀♀, 2 ♂♂ card mounted, 3 ♀♀ in gelatin capsule), Ex *Heterococcopsis opertus* on *Cynodon dactylon*; (CCVT: 2054); 2 ♀♀, 2 ♂♂ (1 ♀ card mounted, 1 ♀, 2 ♂♂ in gelatin capsule); Van: Çatak, N: 37° 55'950", E: 042° 59'971", 1535 m, 03.VII.2007; 2 ♀♀, 2 ♂♂ (1 ♀ card mounted, 1 ♀, 2 ♂♂ in gelatin capsule) Ex *Puto pilosella* on *Euphorbia* sp. (CCVT: 3900).

Host records from Turkey: *Tryonimus multivorus*, *Atrococcus* sp. on *Verbascum* sp. (Kaydan et. Al., 2006).

Previous record in Turkey: Ankara (Kaydan et. al., 2006).

***Rhopus flavidus* (Mercet, 1921)**

Material examined: Hakkari: A. Merzan, N: 37° 34'064", E: 043° 43'696", 1758 m, N: 37° 34'064", E: 043° 43'696", 1758 m, 04.VIII.2005, 16 ♀♀ (1 ♀ on slide, 2 ♀♀ card mounted, 13 ♀♀ in gelatin capsule), Ex Pseudococcid on *Cynodon dactylon* (CCVT: 2189).

Host records from Turkey: Pseudococcid on *Cynodon dactylon* (Japoshvili, Noyes, 2005)

Previous record in Turkey: Ankara (Japoshvili & Noyes, 2005).

***Rhopus trjapitzini* Myartseva, 1982**

Material examined: Ağrı: Doğubeyazıt road, N: 39° 25'469", E: 043° 59'227", 2140 m, 27.IX.2005, 14 ♀♀ (1 ♀ on slide, 3 ♀♀ card mounted, 10 ♀♀ in gelatin capsule), Ex Pseudococcid on Gramineae; (CCVT: 2443); Van: Başkale road, N: 38° 08'077", E: 043° 58'751", 2369 m, 14.VI.2006; 2 ♀♀, 2 ♂♂ (all card mounted), Ex Pseudococcidae on undetermined plant; (CCVT: 2953); Iğdır: Aralik road, N: 39° 58'864", E: 044° 11'909", 846 m, 27.VI.2005; 4 ♀♀, 1 ♂ (1 ♀ card mounted, 3 ♀♀, 1 ♂ in gelatin capsule), Ex *Phenacoccus tergrigorianae* on undetermined plant; (CCVT: 1923).

This is new record for the Turkish parasitoid fauna.

Özet

Van Gölü havzasında bulunan unlubitlerin (Hemiptera: Coccoidea: Pseudococcidae) aphelinid ve encyrtid parazitoitleri

Çalışma Van Gölü havzası (Ağrı, Bitlis, Hakkari, Iğdır and Van)'nda 2005-2008 yılları arasında yürütülmüş olup bölgede bulunan unlubit parazitioitleri tespit edilmiştir. Belirtilen yıllar arasında yabani ve kültür bitkilerinden toplanan parazitli unlubitler laboratuvara getirilerek kültüre alınmış ve parazitoit çıkışları izlenerek teşhis çalışmaları için alkole alınmıştır. Araştırma sonucunda Aphelinidae familyasına ait bir ve Encyrtidae familyasına ait 15 olmak üzere toplam 16 parazitoit türü saptanmıştır. Saptanan parazitoit türlerinden bir adet cins ve dokuz adet tür Türkiye faunası için yeni kayıt niteliğindedir. Ayrıca, *Anagyrus kilinceri* Japoshvili sp. nov. ve *Charitopus eristoi* Japoshvili sp. nov. (Hymenoptera: Encyrtidae) türleri yeni türler olarak tanımlanmıştır.

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