



Original article (Orijinal araştırma)

New contributions of the family Eucharitidae (Hymenoptera: Chalcidoidea) of Türkiye, with two new records

Türkiye Eucharitidae (Hymenoptera: Chalcidoidea) familyasına iki yeni kayıtla birlikte yeni katkılar

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Abstract

In this study, the species of the family Eucharitidae (Hymenoptera: Chalcidoidea) in Türkiye are reviewed. The adults belonging to Eucharitidae were collected from Bingöl and Diyarbakır provinces between 2021 and 2023. Two species, namely *Eucharis (Psilogastrellus) acuminata* Ruschka, 1924 and *Eucharis (Psilogastrellus) affinis* Bouček, 1956 are recorded for the first time from Türkiye. Separately, photographs of morphological features for the collected species are also provided, along with an identification key and the first checklist for Turkish Eucharitidae family.

Keywords: Checklist, Hymenoptera, Eucharitidae, new records, Türkiye

Öz

Bu çalışmada Eucharitidae (Hymenoptera: Chalcidoidea) familyasının Türkiye'deki türleri incelenmiştir. Eucharitidae'ye ait erginler 2021 ve 2023 yılları arasında Bingöl ve Diyarbakır illerinden toplanmıştır. *Eucharis (Psilogastrellus) acuminata* Ruschka, 1924 ve *Eucharis (Psilogastrellus) affinis* Bouček, 1956 olmak üzere iki tür Türkiye'den ilk kez kaydedilmiştir. Ayrıca, toplanan türlerin morfolojik özelliklerinin fotoğrafları da verilmiş, teşhis anahtarı ve Türkiye Eucharitidae familyası için ilk kontrol listesi verilmiştir.

Anahtar sözcükler: Tür kontrol listesi, Hymenoptera, Eucharitidae, yeni kayıtlar, Türkiye

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Introduction

Chalcidoidea is the superfamily with the most species diversity in the order Hymenoptera (Heraty et al., 2013). Eucharitidae are a comparatively small group in Chalcidoidea, with approximately 500 species worldwide (Noyes, 2019). Eucharitidae comprise four subfamilies (Akapalinae, Gollumiellinae, Oraseminae, and Eucharitinae) and 66 genera in almost all zoogeographic regions (Noyes, 2019). The family appears to be most diversified and species-rich in tropical regions but comparatively scattered throughout the Palearctic region (Heraty, 2002). The Western Palearctic fauna consists of 37 species belonging to the genus *Eucharis* Latreille, 1804, five species in the genus *Stilbula* Spinola, 1811, and *Hydrorhoa* Kieffer, 1904 (Lotfalizadeh et al., 2022). In previous studies, a total of 48 *Eucharis* species and 41 *Stilbula* species were listed in the world (Noyes, 2019). There are only a small number of studies of Eucharitidae in Türkiye (Ruschka, 1924; Masi, 1934a, b; Bouček, 1951, 1956; Nikol'skaya, 1952; Tudor, 1971; Doğanlar, 1984). In our fauna, we have seven species of two genera, namely *Eucharis* and *Stilbula* (Noyes, 2019).

All Turkish species belonging to Eucharitidae are rare and they are active only in limited periods of the year. Therefore, studying their biology is complicated (Lotfalizadeh, 2022). Eucharitidae are parasitoids of ants, laying their eggs distantly from the host, either in or on plant tissue (Heraty, 2002; Zhang et al., 2004). Some of the Camponotini parasitoids can have 2-3 pupae per host. The active first-instar larvae interact with foraging ant workers, then these ants transport parasitoid larvae to their nest, where they attack the ant-larvae and develop on their pupae (Heraty, 1994; Heraty & Murray, 2013). Therefore, ants are involved in the evolutionary history of these ant parasitoids (Torréns, 2013; Lachaud & Pérez-Lachaud, 2012; Murray et al., 2013).

In our present work, we discuss two new species for Türkiye's Eucharitidae fauna in details providing check list and key for Eucharitidae species of our country.

Materials and Methods

Samples of Eucharitidae were collected from diverse locations on various flowering plants in Bingöl and Diyarbakır provinces between 2021 and 2023 (Figure 1).

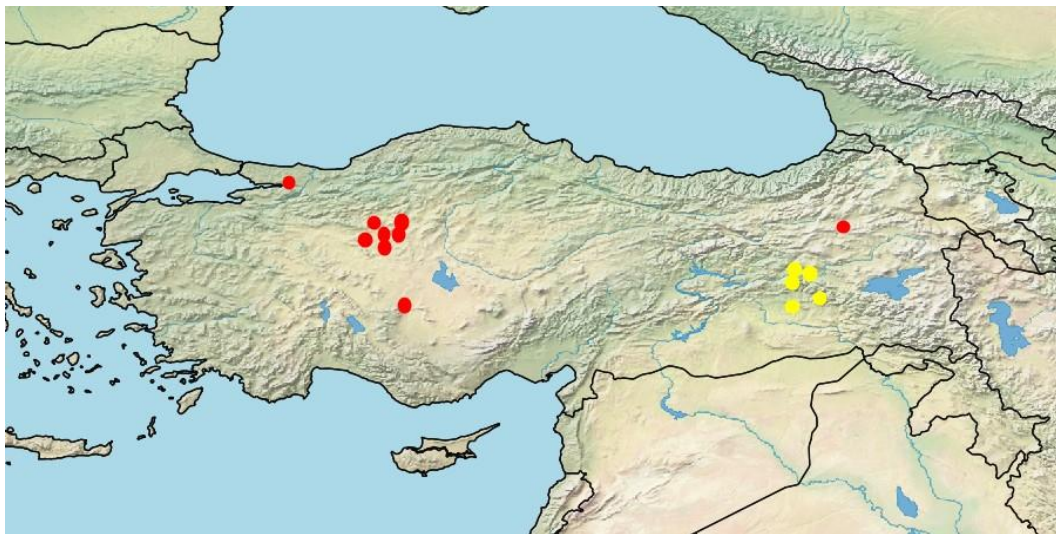


Figure 1. The maps of Eucharitidae collection indicating new localities (Yellow) and previous localities (Red) from Türkiye.

All samples were collected by sweep nets. Specimens were examined with a stereomicroscope and photographed with a digital camera. Morphological terms are based on Gibson et al. (1997) and Heraty (2002). For identification, we consulted the papers and monographs of Gussakovskij (1940), Nikol'skaya

(1952), Bouček (1956), Heraty (2002), Gadallah et al. (2013, 2017), Gadallah & Shairra (2019), and Lotfalizadeh et al. (2022). Terminology for body sculpture follows Harris (1979). The general distribution of the listed species is based mainly on Noyes (2019). The location maps of all samples were created using SimpleMapp (Shorthouse, 2010). Specimens are deposited at the Bingöl University, Faculty of Agriculture, Department of Plant Protection, Bingöl-Türkiye. In addition, an identification key and the first checklist of Turkish Eucharitidae are provided. Valid names are given according to Noyes (2019).

Results

In this study, all species of this family in Türkiye are listed, along with two new records.

Order: Hymenoptera L., 1758

Family: Eucharitidae Walker, 1846

Subfamily: Eucharitinae Walker, 1846

Genus: *Eucharis* Latreille, 1804

Subgenus: *Eucharis* (*Psilogastrellus*) Ghesquière, 1946

***Eucharis* (*Psilogastrellus*) *acuminata* Ruschka, 1924 (Figure 2)**

Material examined. Diyarbakır, Kulp, Yayıkköyü, 38°15'44.00"N, 41°06'30.41"E, alt. 706 m, 21.V.2023, ♀.

Remarks. This species is the new record for Türkiye.

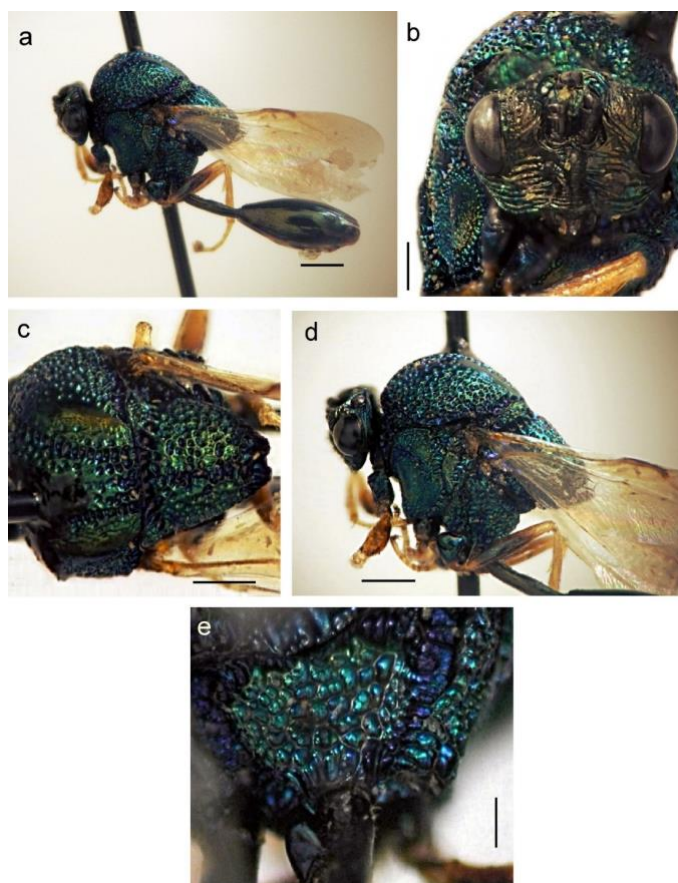


Figure 2. *Eucharis* (*Psilogastrellus*) *acuminata* Ruschka: female; a) lateral view of habitus; b) frontal view of head; c) dorsal view of mesosoma; d) lateral view of mesosoma; e) dorsal view propodeum. Scale bars: 0.5 mm.

***Eucharis (Psilogastrellus) affinis* Bouček, 1956 (Figure 3)**

Material examined. Bingöl, Çukurca, 38°57'02.16"N, 40°29'27.35"E, alt. 1546 m, 27.V.2021, ♀; Diyarbakır, Kocaköy, Suçıktı, 38°11'32.73"N, 40°32'58.57"E, alt. 743 m, 14.V.2022, ♀; Lice, Zümrüt, 38°28'02.12"N, 40°47'53.65"E, alt. 945 m, 20.V.2022, ♀.

Remarks. This species is the new record for Türkiye.

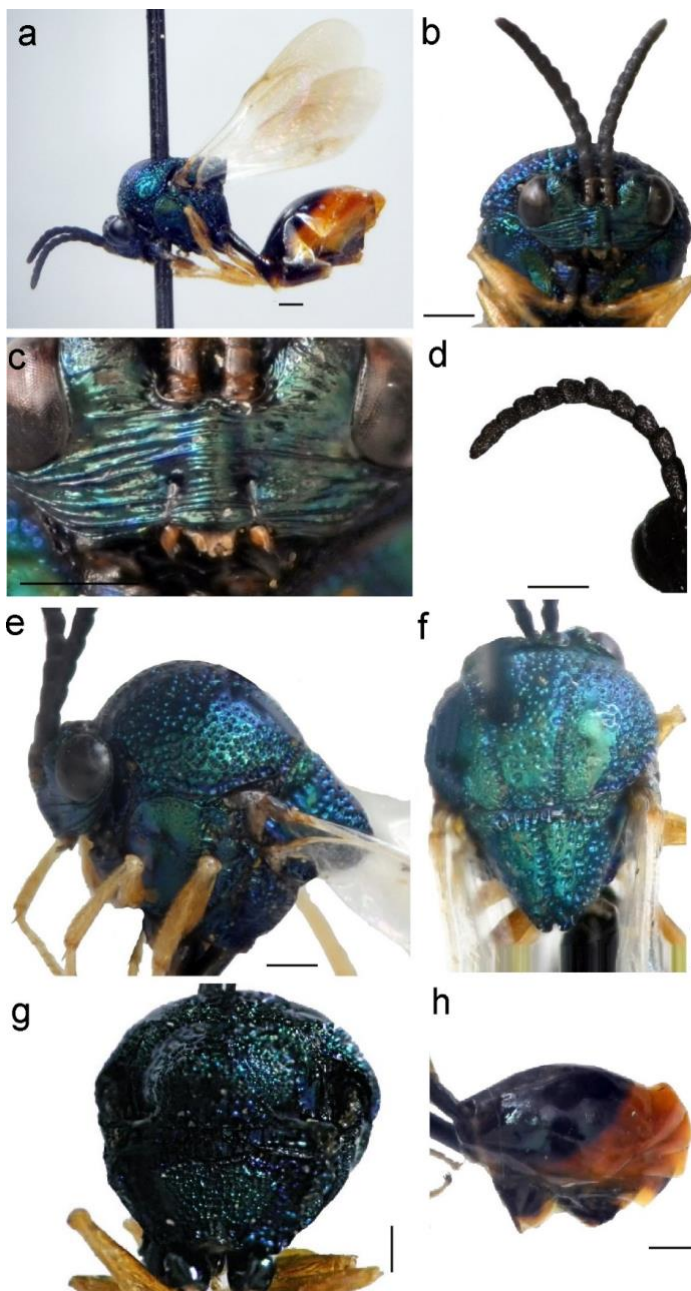


Figure 3. *Eucharis (Psilogastrellus) affinis* Bouček: female; a) lateral view of habitus; b) frontal view of head; c) clypeus; d) antenna; e) lateral view of mesosoma; f) dorsal view of mesosoma; g) propodeum; h) lateral view of metasoma. Scale bars: 0.5 mm.

***Stilbula cyniformis* (Rossi, 1792) (Figure 4)**

Material examined. Diyarbakır, Lice, Gürbeyli, 38°26' 4.31"N, 40°42'48.20"E; alt. 854 m, 21.V.2023, ♀.

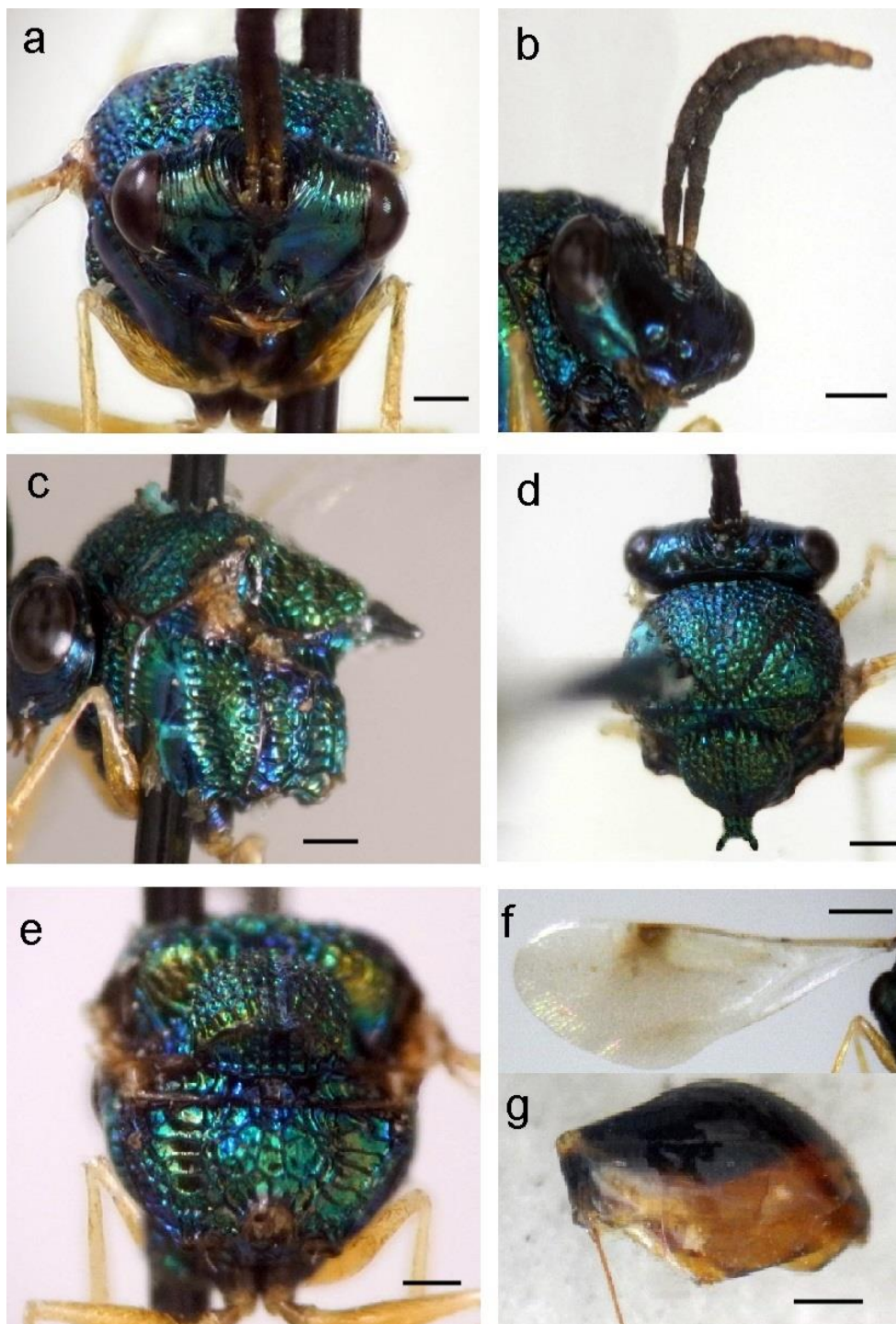


Figure 4. *Stilbula cyniformis* Rossi: female; a) frontal view of head; b) antenna; c) lateral view of mesosoma; d) dorsal view of mesosoma; e) dorsal view of propodeum; f) fore wing; g) lateral view of metasoma (without petiole). Scale bars: 0.5 mm.

Key to genera, subgenera and species of Turkish Eucharitidae

1. Frons shiny with vertical coarse or rarely fine carinae (Figure 4a). Mesoscutellum with apical projection arising from a single basal stalk that diverges into pair of short spines (Figure 4d) ***Stilbula Spinola*, 2**
 - Frons smooth, striate or rugose, lacking vertical carinae (Figure 2b). Mesoscutellum without prominent process, at most with posterior margin slightly emarginate (Figure 2c) ***Eucharis Latreille*, 3**
2. First antennal flagellomere about 3.5x as long as wide (Figure 4b). Mesosoma coarsely areolate-rugose (Figure 4d). Stigmal vein of fore wing enclosed in fuscous cloud (Figure 4f). Metasomal petiole not pale throughout ***Stilbula cyniformis* Rossi**
 - First antennal flagellomere not more than 2.5x as long as wide. Mesosoma more finely punctate. Stigmal vein of fore wing hyaline. Metasomal petiole pale throughout ***Stilbula vitripennis* Masi**
3. Mandibles without subapical tooth, projecting ventrally from oral margin. Lateral lobe of mesoscutum densely punctate ***Eucharis (Psilogastrellus) Ghesquière*, 4**
 - Mandibles with small subapical tooth, opposing and closable. Lateral lobe of mesoscutum sparsely punctate ***Eucharis (Eucharis) Latreille*, 7**
4. Mesoscutellum distinctly longer than wide, with deep longitudinal median furrow ***Eucharis (Psilogastrellus) anatolica* Bouček**
 - Mesoscutellum broader than long, with shallow median furrow **5**
5. Mesoscutellum with two broadly rounded apical lobes, broadly separated by an emargination as broad as each lobe (Figure 2c) ***Eucharis (Psilogastrellus) acuminata* Ruschka**
 - Mesoscutellum with shorter, narrowly separated, triangular lobes **6**
6. Body dull with metasoma brownish green. Frons punctate, lower face transversely carinate. Mesoscutellum irregularly punctate, and projection broadly rounded posteriorly ***Eucharis (Psilogastrellus) punctata* Förster**
 - Body shiny with metasoma black and dark brown (Figure 2). Frons appears to be slightly swollen and weakly sculptured (Figures 3a, b). Mesoscutellum coarsely punctate, and bilobed with emargination narrower than width of lobe (Figures 3c, e) ***Eucharis (Psilogastrellus) affinis* Bouček**
7. Antennal funiculars not convex above ***Eucharis (Eucharis) adscendens* Fabricius**
 - Antennal funiculars convex above **8**
8. Frons marked with radial rugae. Apical projection of mesoscutellum bidentate. Head and mesosoma blue-green with bronze luster. Metasoma rusty, darker above ***Eucharis (Eucharis) reticulata* Ruschka**
 - Frons finely reticulate. Mesoscutellum abruptly truncated apically. Head and mesosoma blue with golden-green cast, two longitudinal bronze bands on mesonotum. Metasoma greenish-bronze ***Eucharis (Eucharis) turca* Nikol'skaya**

Checklist of Turkish species of the family Eucharitidae

Genus *Eucharis* Latreille, 1804

Subgenus *Eucharis* (*Eucharis*) Latreille, 1804

Eucharis (*Eucharis*) *adscendens* (Fabricius, 1787)

Distribution in Türkiye. Erzurum (Doğanlar, 1984).

General distribution. Austria, Belarus, Bosnia Hercegovina, Croatia, Çekya, Germany, Hungary, Italy, Kazakhstan, Lithuania, Moldova, Poland, Romania, Russia (Bashkir ASSR, Daghestan ASSR and Perm' Oblast), Slovakia, Türkiye, Ukraine, United Kingdom (Noyes, 2019).

Host. *Formica cinerea* Mayr, 1853; *Formica glauca* Ruzsky, 1896 and *Formica rufa* L., 1761 (Hymenoptera: Formicidae) (Bouček, 1956; Lotfalizadeh, 2008; Szafranski, 2011).

Eucharis (*Eucharis*) *reticulata* Ruschka, 1924

Distribution in Türkiye. Anatolia (Tudor, 1971).

General distribution. Hungary, Türkiye (Noyes, 2019).

Host. Unknown.

Eucharis (*Eucharis*) *turca* Nikol'skaya, 1952

Distribution in Türkiye. Anatolia (Nicol'skaya, 1952).

General distribution. Türkiye (Noyes, 2019).

Host. Unknown.

Subgenus *Eucharis* (*Psilogastrellus*) Ghesquière, 1946

Eucharis (*Psilogastrellus*) *acuminata* Ruschka, 1924

Distribution in Türkiye. Diyarbakır (in present study).

General distribution. Iran, Russia (Daghestan, ASSR), Saudi Arabia (Noyes, 2019), Türkiye (in present study).

Host. Unknown.

Eucharis (*Psilogastrellus*) *anatolica* Bouček, 1951

Distribution in Türkiye. Ankara (Bouček, 1951).

General distribution. Türkiye (Noyes, 2019).

Host. Unknown.

Eucharis (*Psilogastrellus*) *affinis* Bouček, 1956

Distribution in Türkiye. Bingöl, Diyarbakır (in present study).

General distribution. Israel (Bouček, 1956), Saudi Arabia (Gadallah et al., 2014), Türkiye (in present study).

Host. Unknown.

***Eucharis (Psilogastrellus) punctata* Foerster, 1859**

Distribution in Türkiye. Ankara, Gaziantep, Konya (Bouček, 1951, 1956; Doğanlar, 1984).

General distribution. Algeria, Austria, Bulgaria, Croatia, Egypt, Macedonia, Saudi Arabia, Tunisia, Türkiye (Noyes, 2019).

Host. Unknown.

Genus *Stilbula* Spinola, 1811

***Stilbula cyniformis* (Rossi, 1792)**

Distribution in Türkiye. Ankara, Diyarbakır, Kocaeli (Ruschka, 1924; Bouček, 1951; in present study).

General distribution. Austria, Azerbaijan, Bosnia Hercegovina, China (Hebei, Heilongjiang), Croatia, Çekya, France, Germany, Hungary, Italy (Sicily), Japan, Kazakhstan, Korea, Macedonia, Moldova, Romania, Russia (Adygey AO), Slovakia, Türkiye, Ukraine (Noyes, 2019).

Host. *Camponotus* sp. Mayr, 1861 (Hymenoptera: Formicidae) (Fahringer & Tölg, 1912).

***Stilbula vitripennis* Masi, 1934**

Distribution in Türkiye. Ankara (Masi, 1934a, b; Bouček, 1951).

General distribution. Cyprus, Greece, Israel, Türkiye (Noyes, 2019).

Host. Unknown.

Discussion

The present study evaluated three eucharitid species collected during field studies conducted between 2021 and 2023 in Diyarbakır and Bingöl provinces in eastern Türkiye. Among these samples, *Eucharis (Psilogastrellus) acuminata* and *Eucharis (Psilogastrellus) affinis* (as new records for the Turkish fauna), and *Stilbula cyniformis* have been identified. The sample of *E. acuminata* closely matches Bouček's (1956) description that the scutellum ends in two broad rounded protrusions separated by a distance as large as the length of each protrusion (Figure 2c). In addition, *E. acuminata* species is very similar to *E. punctata*. However, adults of *E. acuminata* can be distinguished from *E. punctata* by the mesoscutellum with a deep, longitudinal central groove, mesoscutellar margin posteriorly bidentate, the body being entirely green (in *E. punctata*, mesoscutellum, with shallow central furrow; mesoscutellar margin rounded posteriorly, only slightly projecting; the body is dark green, with red-banded metasoma). The species of *E. affinis*, clypeus almost smooth, metasoma mostly fulvous, apical two-thirds of the wings are grafted in females, so Gadallah et al. (2014) completely fits the definition (Figure 3a, c). The adults of *E. affinis* is very similar to the *Eucharis (Psilogastrellus) albipennis* Bouček, 1956 and *Eucharis (Pachyeucaris) microcephala* Bouček, 1956 except for the shape of antennae, finer sculpture of face, propodeum densely punctuate and shiny, slightly infusate wings and longer abdominal petiole, body shiny blue and metasoma black and dark brown (in *E. albipennis* and *E. microcephala*, rough sculpture of face, propodeum sparsely punctuate and dull, infusate wings and shorter abdominal petiole, body dark metallic green).

In previously studies, *E. acuminata* was identified by Ruschka (1924) in Iran and Russia (Dagestan, ASSR), and by Gadallah et al. (2019) in Saudi Arabia. Also, *E. affinis* was only recorded in Israel by Bouček (1956), and in Saudi Arabia by Gadallah et al. (2014). Therefore, the detection of this species in Türkiye means its first record in European continent. *E. acuminata* and *E. affinis* species are endemic species that are rarely seen only in certain parts of the world. Therefore, it is very interesting and important that these species have been detected for the first time in Türkiye. The last study on the Turkish Eucharitidae family was conducted by Doğanlar (1984), and no study has been found in the last 40 years. This study has a

special significance in revealing the Eucharitidae fauna in Türkiye. Thus, the number of eucharitid in Türkiye is increased from seven to nine. Also, the identification key and the first checklist for Türkiye Eucharitidae family are provided.

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