



## New findings of the family Bethylidae (Hymenoptera) from Türkiye

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**ABSTRACT.** The flat wasps genus, *Pristepyris* Kieffer is reported for the first time from Türkiye based on the identification of *Pristepyris masii* (Soika, 1933). Now, with this new record, the species number of Bethylidae from Türkiye has increased to ten. Additionally, new data are presented for *Epyris niger* Westwood, 1832, *Sclerodermus ephippius* (Saunders, 1881) and *Pristocera depressa* (Fabricius, 1804), which were previously recorded from Turkey. All taxa are morphologically illustrated and their geographical distribution in Türkiye and in the World is also provided.

**Key words:** *Epyris*, flat wasps, new record, *Pristepyris*, *Pristocera*, *Sclerodermus*

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### INTRODUCTION

Bethylidae Haliday, 1839 are one of the widely distributed families of Chrysidoidea (Hymenoptera), with almost 3000 species (Azevedo et al., 2018). This family has been subdivided into five extant (and four extinct) subfamilies; among them, Pristocerinae Mocsáry, 1881 with 1062 species and 30 genera are considered the largest group (Azevedo et al., 2018; Azevedo & Colombo, 2022; Colombo et al., 2020, 2021). The genus *Pristepyris*, belonging to the subfamily Pristocerinae, is represented by 38 species, most of which are distributed in the New world (23 species), and a few in the Oriental (six species), Oriental + Palaearctic (eight species) and Palaearctic regions (one species) (Alencar et al., 2016; Azevedo et al., 2018; Gordh & Moczar, 1990; Terayama et al., 2002). The species of the genus is known as parasitoids of the elaterid coleopteran larvae (Fadeev, 2021). To date, only nine species belonging to nine genera of Bethylidae were recorded from Türkiye (Can, 2022; Doğanlar & Laz, 2022). However, no species have been recorded so far from this country belonging to genus *Pristepyris*.

The aim of this study is to present new data on the occurrence of the Bethylidae species from the north of Türkiye. For this purpose, *Pristepyris masii* was reported for the first time, and additional new data on the previously known species *Epyris niger*, *Pristocera depressa* and *Sclerodermus ephippius* are also presented.

### MATERIAL AND METHODS

The specimens examined in this study were newly collected by Malaise trap and sweeping net from the Yeşilirmak lowlands in the Middle Black Sea region (Samsun province) during summer, 2022. The collected specimens were kept in 75% ethanol and then they were properly pinned and labelled for the

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subsequent examination. The generic identifications of the specimens were made according to the keys prepared by Azevedo et al. (2018) and Colombo et al. (2022). The species-level identifications were made according to the keys prepared by Kieffer (1914) for *Sclerodermus ephippius*, Kieffer (1914), Nagy (1970) and Richards (1939) for *Epyris niger*, and Fadeev (2021) for *Pristepyris masii* and *Pristocera depressa*. The photographs of the specimens were taken using a Leica® M205C stereomicroscope (Heerburg, Switzerland) controlled by the Leica Application Suite 3 software. Final illustrations were improved for contrast and brightness using Adobe Photoshop® CS5 (Adobe systems Inc., San Jose, USA). The terminology for general morphology follows Lanés et al. (2020). For genitalia extraction, dried specimens were placed in softening containers for about 24 hours until becoming flexible. The genitalia was removed from the abdomen with a fine needle, immersed in 10% potassium hydroxide (KOH), and kept for about four hours. Genitalia was cleaned by washing several times with distilled water. The genitalia were placed on a microscope slide with Entellan™ (Merck KGaA, Germany). The specimens were preserved in the Entomology Research Laboratory, Department of Biology, Tokat Gaziosmanpaşa University (Tokat, Türkiye).

## RESULTS

### *Taxonomic hierarchy*

**Class Insecta Linnaeus, 1758**

**Order Hymenoptera Linnaeus, 1758**

**Superfamily Chrysidoidea Latreille, 1802**

**Family Bethylidae Haliday, 1839**

**Subfamily Epyrinae Kieffer, 1914**

***Epyris* Westwood, 1832**

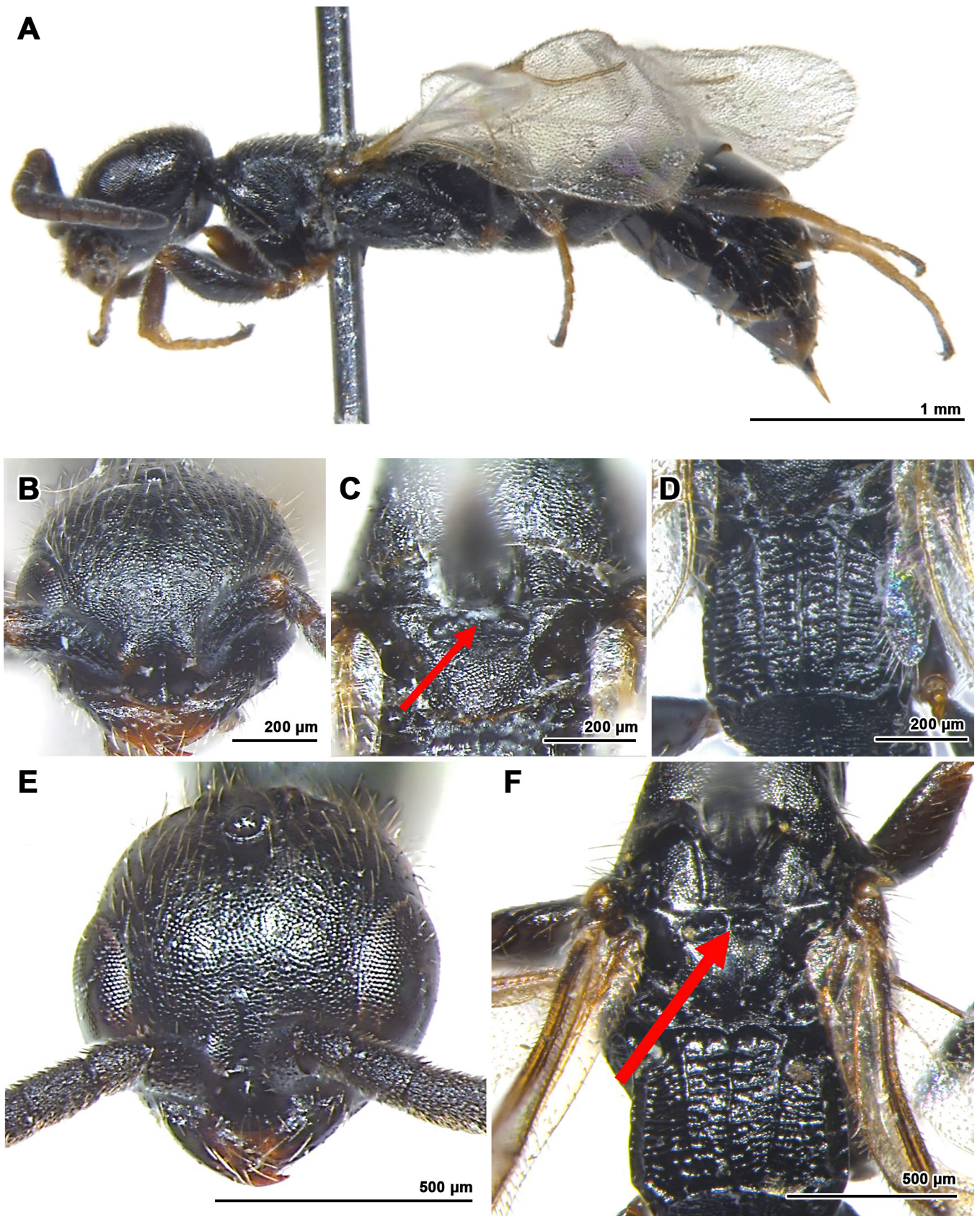
***Epyris niger* Westwood, 1832 (Fig. 1)**

**Material examined:** 2♀, 2♂, TÜRKİYE: Samsun, Çarşamba, Bafracalı [41°12'43.0"N 36°44'08.3"E], 30 m a.s.l., 14.07.2022, sweep net, leg.: İ. Can.

**Distribution.** Egypt, England, Germany, France, Iran, Italy, Hungary, Romania, Türkiye [Tokat] (Can, 2022).

**Remarks.** This species was recorded from a single female specimen from Tokat, Türkiye (Can, 2022). With this study, it was recorded from Samsun province for the second time in Türkiye. In this study, newly collected specimens of the species were caught on *Anethum graveolens* L. (Apiaceae) flowers with an insect net. While it is known that this species has been detected only on *Atriplex hastatum* L. (Amaranthaceae) so far (Gordh & Moczar, 1990), the second plant record of this species is given in this study as *Anethum graveolens* L. (Apiaceae).

**Brief description.** **Female**—Body length 4 mm (Fig. 1A). Body black; apical part of mandible and palpi castaneous (Fig. 1B & 1E); legs black except apical of tibia and tarsi light castaneous; forewing subhyaline, veins yellowish. Clypeus with high median carina, median lobe rounded. Head slightly elongated, dull, finely leathery, quite densely but not roughly dotted. Eye hairy. Pronotum dorsally dull, punctured less than the head and twice as long as mesonotum, continuous parapsid furrows. Mesoscuto-scutellar suture transverse separated from each other only by a small median carina (Fig. 1C). Metapectal propodeal complex shiny with three parallel longitudinal carinae, metapostnotal median carina and first metapostnotal lateral carina complete and reaches to transverse posterior carina; spaces between the metapostnotal median carina and the first metapostnotal lateral carina roughly wrinkled (Fig. 1D). **Male**—Body length 3.6 mm. morphologically similar to females; The first metapostnotal lateral carina of male in the metapectal-propodeal complex disappear before reaching the transverse posterior carina; mesoscuto-scutellar suture slightly oblique (Fig. 1F); spaces between the metapostnotal median carina and the first metapostnotal lateral carina weakly wrinkled (Fig. 1F).



**Figure 1.** *Epyris niger* Westwood, 1832, A-D, female; E-F, male; A. General habitus, lateral view; B. & E. head, dorsal view; C. & D. Mesoscutum-scutellar suture, red arrow indicating separating carina; D. Metapectal-propodeal complex in dorsal view.

### Subfamily Pristocerinae Mocsáry, 1881

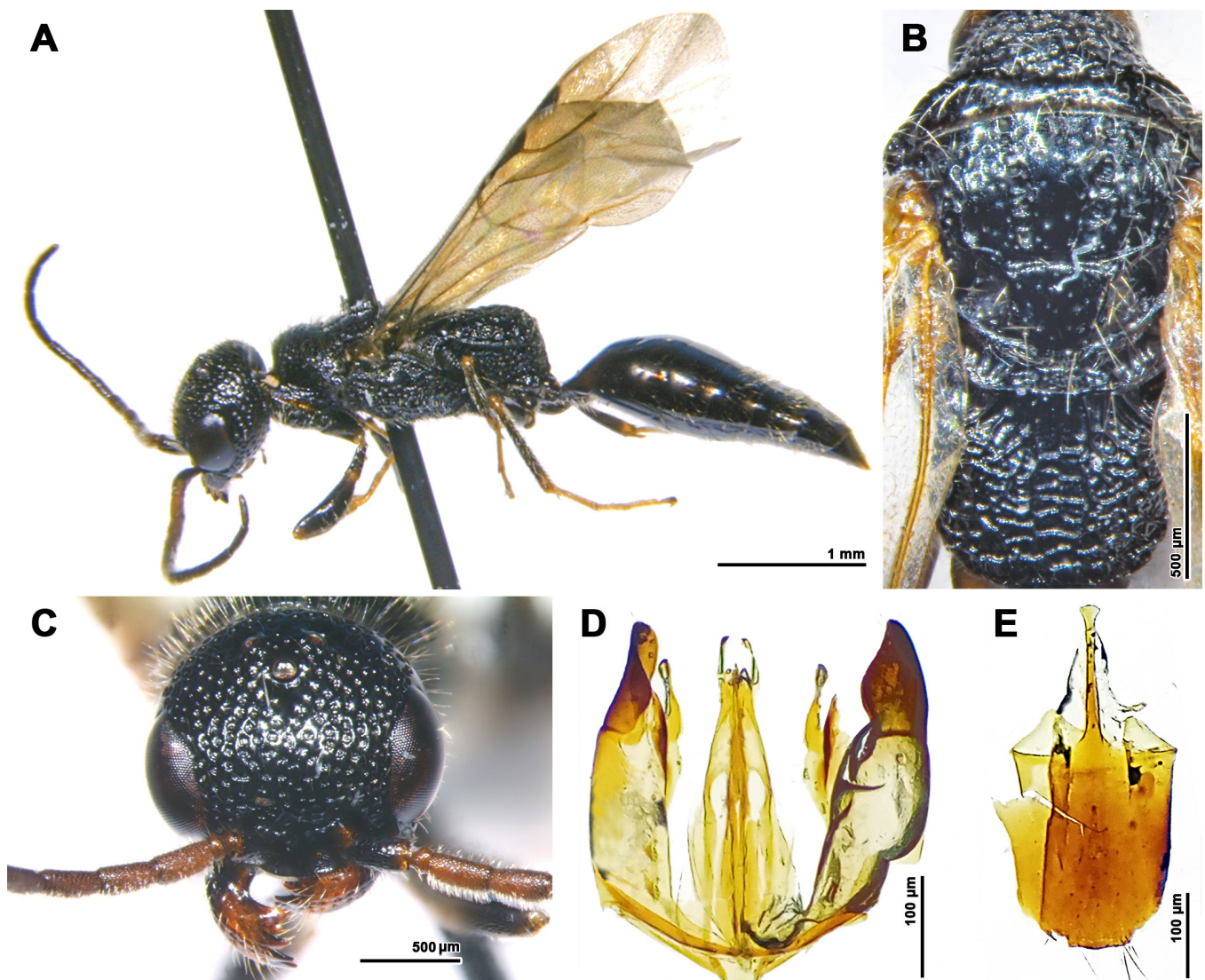
#### *Pristepyris* Kieffer, 1905

#### *Pristepyris masii* (Soika, 1933) (Fig. 2)

**Material examined:** 1 ♂, TÜRKİYE: Samsun, Çarşamba, Bafracalı [41°12'43.0"N 36°44'08.3"E], 30 m a.s.l., 15.07–19.08.2022, Malaise trap, Leg.: İ. Can; 5 ♂♂, 19.08–03.09.2022, Malaise trap, Leg.: İ. Can; 11 ♂♂, 03.09–16.09.2022, Malaise trap, Leg.: İ. Can; 9 ♂♂, 16.09–22.10.2022, Malaise trap, Leg.: İ. Can.

**Distribution.** Azerbaijan, Georgia, Italy, Russia (Fadeev, 2021), Türkiye [New record] (Fig. 3).

**Remarks.** *Pristepyris masii* is reported here for the first time in Türkiye. This species is the only member of the genus *Pristepyris* in the western Palearctic region. Twenty-six males specimens were captured with Malaise trap in September and October. The morphological and genitalia characteristics of the male collected in this study (Figs 2A–2E) correspond to the detailed descriptions made by Alencar et al. (2016) and Fadeev (2021). In addition, the measurements of the specimens are as follows: Body 5–7.5 mm long; length of head 1.1–1.4 mm; width of head 1.0–1.3 mm and forewing 3.5–4.5 mm.



**Figure 2.** *Pristepyris masii* (Soika, 1933), male. **A.** General habitus, lateral view; **B.** Mesosoma, dorsal view; **C.** Head, dorsal view; **D.** Genitalia, dorsal view; **E.** Hypopygium, ventral view.



**Figure 3.** Distribution of *Pristepyris masii* in Western Palearctic region (Red circle: previous locality; black circle: new locality).

#### *Pristocera depressa* (Fabricius, 1804) (Fig. 4)

**Material examined:** 2 ♂♂, TÜRKİYE: Samsun, Çarşamba, Bafracalı [41°12'43.0"N 36°44'08.3"E], 30 m a.s.l., 16.09–22.10.2022, Malaise trap, Leg.: İ. Can.

**Distribution.** Armenia, Austria, Azerbaijan, Moldova, Romania, Russia, Türkiye [Adana - Fadeev 2021, Samsun], Ukraine (Can, 2022).

**Remarks.** This species was first recorded from Adana province in the south in Türkiye. However, the specific locality and date of collection of the specimen were unknown (Fadeev, 2021). In this study, it was determined for the second time from the province of Samsun in the northern of Türkiye. The morphological characteristics of the male collected in this study (Figs 4A–4E) correspond to those described by Fadeev (2021). In addition, the measurements of the specimens are as follows: body length 7.13 mm; head length 1.50 mm; head width 1.20 mm; forewing length 5.65 mm.

#### Subfamily Scleroderminae Kieffer, 1914

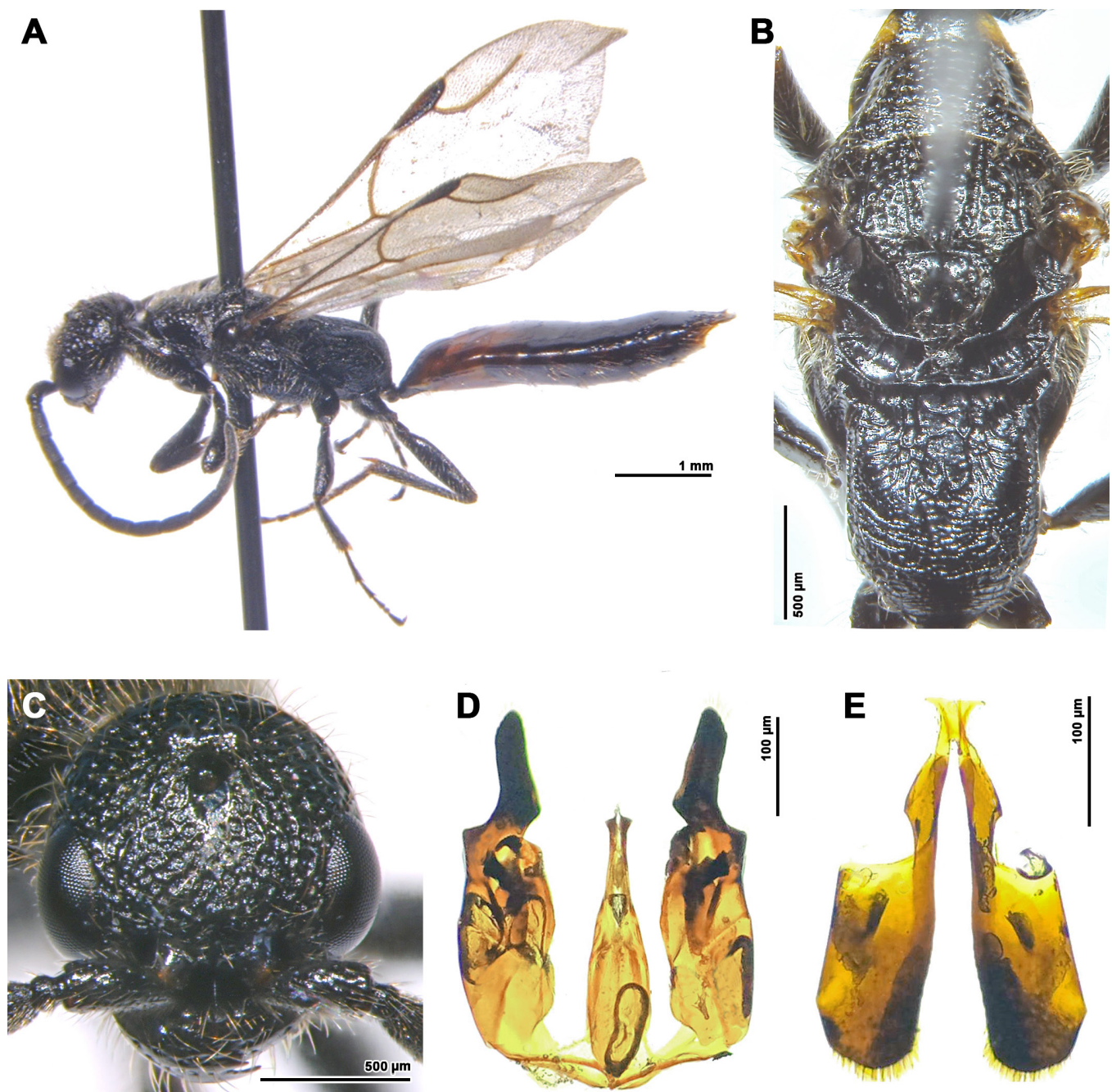
##### *Sclerodermus* Latreille, 1809

##### *Sclerodermus ephippius* Saunders, 1881 (Fig. 5)

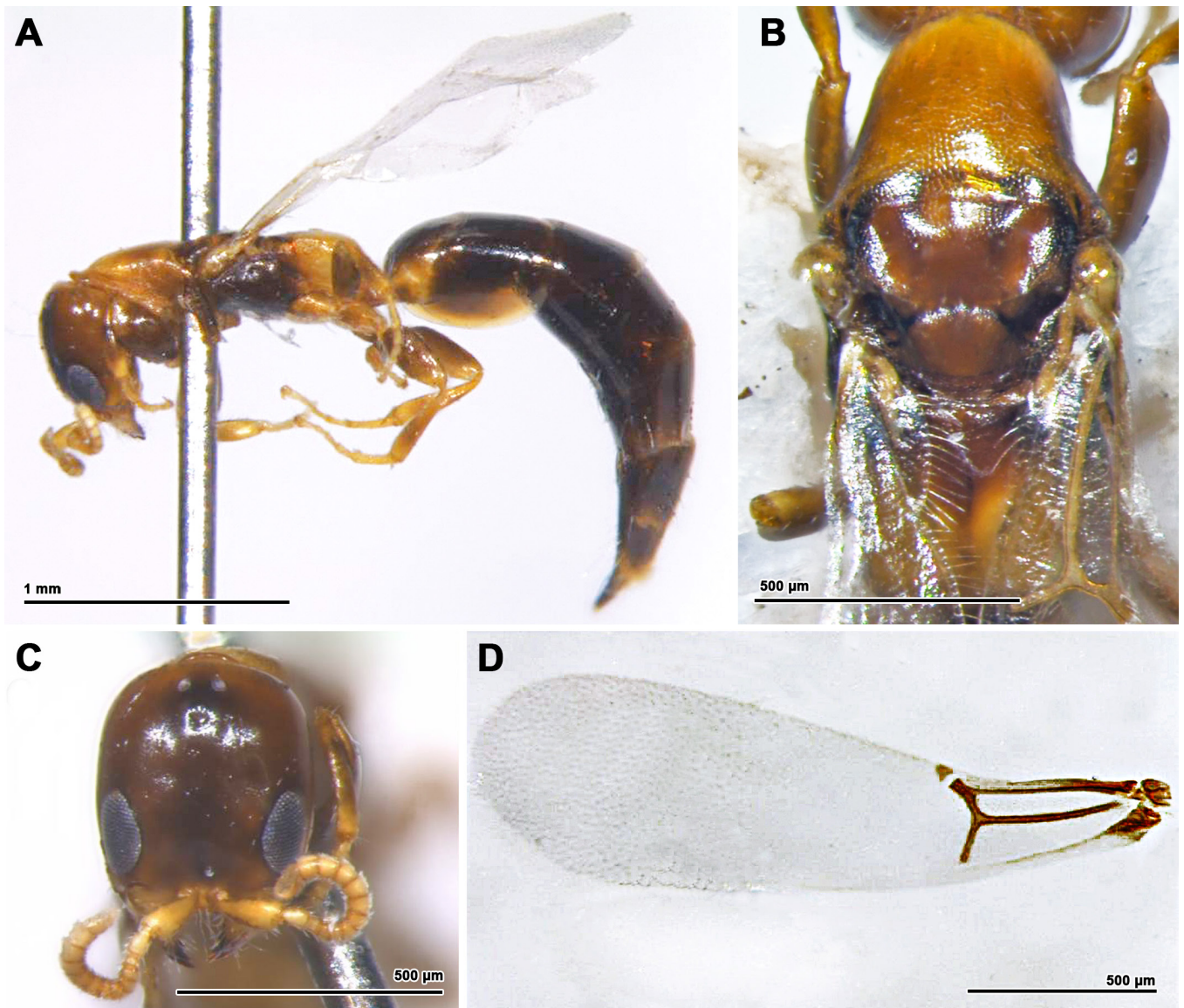
**Material examined:** 4 ♀♀, TÜRKİYE: Samsun, Çarşamba, Bafracalı [41°12'43.0"N 36°44'08.3"E], 30 m a.s.l., 15.07–19.08.2022, Malaise trap, Leg.: İ. Can; 3 ♀♀, 19.08–03.09.2022, Malaise trap, Leg.: İ. Can.

**Distribution.** Albania, Türkiye [Samsun] (Can, 2022).

**Remarks.** Macropterous specimens of this species were digitally photographed for the first time (Figs 5A–5D). The macropterous specimens have morphologically almost similar with the apterous ones of the species (for more details about apterous specimen, see Can, 2022).



**Figure 4.** *Pristocera depressa* (Fabricius, 1804) male. **A.** General habitus, lateral view; **B.** Mesosoma, dorsal view; **C.** Head, dorsal view; **D.** Genitalia; **E.** Hypopygium.



**Figure 5.** *Sclerodermus ephippius* (Saunders, 1881), macropterous female. **A.** General habitus, lateral view; **B.** Mesosoma, dorsal view; **C.** Head, dorsal view; **D.** Forewing.

## DISCUSSION

The presence of the parasitoid flat wasp genus *Pristepyris* and the species *P. masii* in Türkiye is reported for the first time in this paper. With this new record, the number of Bethyridae species in Türkiye has reached 10. *Pristepyris masii* was originally described from Italy based on the single male specimen as *Pristocera masii* by Soika (1933). Alencar et al. (2016) re-examined the genital morphology of the holotype and determined that the position of the species was mistaken. Thus, they proposed this species as *Acrepyris masii*. A recent taxonomic study has led to changes in the taxonomy of *Acrepyris* and it has been proposed as a junior synonym for *Pristepyris* (for more details, see Azevedo et al., 2018).

There is strong sexual dimorphism between males and females in genus *Pristepyris* like as all other pristocerine genera. According to Azevedo et al. (2018), the taxonomy of this genus is mostly based on the characters of the male genitalia. Especially, the presence of three different apical valves dividing the aedeagus in the male genitalia, a unique feature in Bethyridae, makes it easy to distinguish *Pristepyris*

from other *Pristocerinae* genera. Fadeev (2021) stated that *Pristepyrus* is active in the second half of summer and from autumn to October, which may be due to the biological characteristics of its victims, while *Pristocera* is active mainly from early spring to mid-summer, February to June, depending on the climate of the habitats. Furthermore, he reflected this information on the key to use this biological data for genera discrimination. However, in this study, male specimens belonging to both genera were detected together in the Malaise trap in September and October. The detection of specimens belonging to these genera in the same period showed that the usability of these ecological data in the differentiation of the two genera may not be appropriate. Geographically, *P. masii* is relatively widespread in Western Palearctic, but it is generally rare with a fragmentary distribution. Apart from Italy, where type location, it was recently recorded from Azerbaijan, Georgia and Russia (Fadeev, 2021). In the last decades, studies on the Bethylidae in the West Palearctic region were very few. Therefore, this and other bethylid species, which are presumed to be common, have not yet been reported in many countries.

Currently, only a small fraction of the estimated number of Bethylidae species in Türkiye have been identified. Given that many more species have been documented in neighbouring countries like Russia (Fadeev, 2021) and Iran (Barahoei et al., 2022), it is likely that additional species exist in Türkiye as well. However, studies on this group in this country are very few and have been probably overlooked by local researchers because of their small size and the presence of wingless ant-like females. Conducting faunistic studies on this group will help to generate interest among researchers and promote further investigation.

#### AUTHOR'S CONTRIBUTION

The author confirms his contribution in the whole processing steps in the research, preparation and revising the manuscript. He read and approved the final version of the manuscript.

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#### AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the Entomology Research Laboratory, Department of Biology, Tokat Gaziosmanpaşa University (Tokat, Türkiye) and are available from the curator, upon request.

#### ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

#### CONSENT FOR PUBLICATION

Not applicable.

#### CONFLICT OF INTERESTS

The author declares that there is no conflict of interest regarding the publication of this paper.

#### ACKNOWLEDGMENTS

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## REFERENCES

- Alencar, I.D.C.C., Colombo, W.D. & Azevedo, C.O. (2016) *Pristocera masii*: rediscovery of the holotype and its transfer to *Acrepyris* (Hymenoptera: Bethyridae). *Acta Entomologica Musei Nationalis Pragae*, 56 (2), 795–803.
- Azevedo, C.O., Alencar, I.D.C.C., Ramos, M.S., Barbosa, D.N., Colombo, W.D., Vargas, R.J.M. & Lim, J. (2018) Global guide of the flat wasps (Hymenoptera, Bethyridae). *Zootaxa*, 4489, 1–294. <https://doi.org/10.11646/zootaxa.4489.1.1>
- Azevedo, C.O. & Colombo, W.D. (2022) *Glutodon* gen. nov. (Hymenoptera, Bethyridae), a flap-metasomed Pristocerinae from Madagascar. *Zootaxa*, 5124 (1), 61–68. <https://doi.org/10.11646/zootaxa.5124.1.3>
- Barahoei, H., Khajeh, N., Azevedo, C.O., Olmi, M. & Rakhshani, E. (2022) A review of Chrysididae (Hymenoptera, Aculeata), excluding Chrysididae of Iran. *Journal of Insect Biodiversity and Systematics*, 8 (4), 617–645. <https://doi.org/10.52547/jibs.8.4.617>
- Can, İ. (2022) The Turkish Bethyridae (Hymenoptera, Chrysididae) fauna, with the new records of Epyrinae and Scleroderminae. *Zootaxa*, 5169 (5), 447–456. <https://doi.org/10.11646/zootaxa.5169.5.3>
- Colombo, W.D., Perkovsky, E.E. & Azevedo, C.O. (2020) Phylogenetic overview of flat wasps (Hymenoptera, Bethyridae) reveals Elektroepyrinae, a new fossil subfamily. *Palaeoentomology*, 3 (3), 269–283. <https://doi.org/10.11646/palaeoentomology.3.3.8>
- Colombo, W.D., Gobbi, F.T., Perkovsky, E.E. & Azevedo, C.O. (2021) Synopsis of the fossil Pristocerinae (Hymenoptera, Bethyridae), with description of two new genera and six species from Burmese, Taimyr, Baltic and Rovno ambers. *Historical Biology*, 33 (9), 1736–1752. <https://doi.org/10.1080/08912963.2020.1733551>
- Colombo, W.D., Tribull, C.M., Waichert, C. & Azevedo, C.O. (2022) Integrative taxonomy solves taxonomic impasses: a case study from Epyrinae (Hymenoptera, Bethyridae). *Systematic Entomology*, 47 (3), 504–529. <https://doi.org/10.1111/syen.12544>
- Doğanlar, M. & Laz, B. (2022) Notes on the parasitoid community of Bethyridae and Chalcidoidea (Hymenoptera) reared from *Gundelia tournefortii* L. (Asterales: Asteraceae) in Kahramanmaraş, Turkey. *Munis Entomology & Zoology*, 17 (2), 1104–1111.
- Fadeev, K.I. (2021) Review of the genera *Pristocera* Klug and *Pristepyrus* Kieffer (Hymenoptera: Bethyridae, Pristocerinae) of Russia and adjacent territories. *Zootaxa*, 4965 (3), 461–482. <https://doi.org/10.11646/zootaxa.4965.3.3>
- Gordh, G. & Moczar, L. (1990) A catalog of the world Bethyridae (Hymenoptera). *Memoirs of the American Entomological Institute*, 46, 1–364.
- Kieffer, J.J. (1914) Bethyridae. *Das Tierreich*, 41, 1–205. <https://doi.org/10.5962/bhl.title.1095>
- Lanes, G.O., Kawada, R., Azevedo, C.O. & Brothers, D. (2020) Revisited morphology applied for systematic of flat wasps (Hymenoptera, Bethyridae). *Zootaxa*, 4752 (1), 1–127. <https://doi.org/10.11646/zootaxa.4752.1.1>
- Nagy, C.G. (1970) Contribution toward a revision of the European species of the genus *Epyris* Westw. (Hym., Bethyridae). *Zoologisches Museum und Institut. Mitteilungen Berlin Universität*, 46, 265–272. <https://doi.org/10.1002/mmnz.19700460204>
- Richards, O.W. (1939) The British Bethyridae (s.l.) (Hymenoptera). *Transactions of the Royal Entomological Society of London* 89 (8), 185–344. <https://doi.org/10.1111/j.1365-2311.1939.tb00740.x>
- Soika, A.G. (1933) Descrizione di un nuovo “Betilide,, del genere “*Pristocera*,, Klug. *Atti della Società Veneto-Trentina di Scienze Naturali Residente in Padova*, Serie 3, 23, 99–101.
- Terayama, M., Xu, Z. & HE, J. (2002) Three new species of the genus *Acrepyris* Kieffer, 1905 (Hymenoptera, Bethyridae) from China. *Japanese Journal Systematic Entomology*, 8, 81–86.

## یافته‌های جدید از زنبورهای خانواده Bethylidae (Hymenoptera) از ترکیه

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**چکیده:** زنبورهای مسطح متعلق به جنس *Pristepyris* Kieffer برای اولین بار با معرفی گونه *Pristepyris masii* (Soika, 1933) از ترکیه گزارش شدند. با این گزارش جدید تعداد کل گونه‌های ثبت شده خانواده Bethylidae از ترکیه به ده عدد رسید. علاوه بر این، یافته‌های جدیدی از گونه‌های دیگر شامل *Epyris niger* Westwood, 1832، *Sclerodermus ephippius* (Saunders, 1881) و *Pristocera depressa* (Fabricius, 1804) که پیش از این، از ترکیه گزارش شده بودند نیز ثبت شد. تصاویر همه گونه‌ها به همراه انتشار جغرافیایی در ترکیه و در سطح جهانی ارائه شد.

**واژگان کلیدی:** زنبورهای مسطح، گزارش جدید، *Sclerodermus*، *Pristocera*، *Pristepyris*، *Epyris*