



## Research article

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# The Afrotropical and West-Palaearctic species of *Ecrizotes* Förster (Hymenoptera: Pirenidae)

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**Abstract.** The Afrotropical and West-Palaearctic species of *Ecrizotes* Förster, 1861 (Hymenoptera: Pirenidae) are reviewed. The genera *Ecrizotomorpha* Mani, 1939 syn. nov. and *Spathopus* Ashmead, 1904 syn. nov. are treated as junior synonyms of *Ecrizotes* based on morphological evidence. Eighteen world species of *Ecrizotes* are recognized, including six described as new: *E. acer* Mitroiu sp. nov., *E. alternativa* (Xiao & Huang, 1999) comb. nov., *E. anomalipes* (Ashmead, 1904) comb. nov., *E. brevicauda* Mitroiu sp. nov., *E. caudatus* (Thomson, 1876), *E. filicornis* (Thomson, 1876), *E. hofferi* (Bouček, 1964) comb. nov., *E. incisus* Mitroiu sp. nov., *E. longicauda* Mitroiu sp. nov., *E. longicornis* (Walker, 1848), *E. longus* Mitroiu sp. nov., *E. montanus* (Huggert, 1976) comb. nov., *E. monticola* Förster, 1861, *E. nasalis* (Springate & Noyes, 1990) comb. nov., *E. rovumae* Mitroiu sp. nov., *E. taskhiri* (Mani, 1939) comb. nov., and *E. tenkasiensis* (Jamal Ahmad & Shafee, 1993) comb. nov. All world species, except for the three East-Palaearctic ones (*E. alternativa*, *E. taskhiri*, and *E. tenkasiensis*), and the single Nearctic species (*E. anomalipes*), are diagnosed, illustrated and keyed; *Ecrizotes* is newly reported from the Afrotropical region and new country records are given for several European species.

**Keywords.** Chalcidoidea, new species, new synonymy, parasitoid, Tridyminae.

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## Introduction

The family Pirenidae was recently erected by Burks *et al.* (2022) to include genera previously classified in Miscogastrinae Walker, 1833 (Graham 1969), Pireninae Haliday, 1844 and Coelocybinae Bouček, 1988 (Bouček 1988) (Pteromalidae), and Eriaporidae Ghesquière, 1955 (Heraty *et al.* 2013). Three rarely collected and morphologically similar genera currently classified in the subfamilies Tridyminae

Thomson, 1876 and Pireninae Haliday, 1844 are treated in this paper: *Ecrizotes* Förster, 1861, *Spathopus* Ashmead, 1904, and *Ecrizotomorpha* Mani, 1939.

The analysis of Afrotropical and West-Palaeartic material revealed several new species that were difficult to assign to one of the three mentioned genera, prompting a reassessment of their limits. They are all small (under 1.5 mm) dark pirenids, whose host records are extremely scarce, with only *Ecrizotomorpha taskhiri* Mani, 1939 being cited as a hyperparasitoid of *Dasineura lini* (Barnes, 1936) (Diptera: Cecidomyiidae) in India (Pruthi *et al.* 1940).

*Ecrizotes* consists of four valid species worldwide (UCD Community 2023): *E. caudatus* (Thomson, 1878), *E. filicornis* (Thomson, 1876), *E. longicornis* (Walker, 1848), and *E. monticola* Förster, 1861. All of the known distribution records of *Ecrizotes* are from the West-Palaeartic region.

*Ecrizotomorpha* contains three valid species worldwide (UCD Community 2023): *E. alternativa* (Xiao & Huang, 1999), *E. taskhiri* Mani, 1939, and *E. tenkasiensis* Jamal Ahmad & Shafee, 1993. The genus is known only from the Oriental and East-Palaeartic regions.

*Spathopus* comprises four valid species worldwide (UCD Community 2023): *S. anomalipes* Ashmead, 1904, *S. hofferi* Bouček, 1964, *S. montanus* Huggert, 1976, and *S. nasalis* Springate & Noyes, 1990. These species are recorded from the Nearctic and West-Palaeartic regions.

The aim of this paper is to propose a new generic concept of *Ecrizotes* based on morphological characters, acknowledge for the first time the presence of this genus in the Afrotropical region, and describe several new species from this region.

## Material and methods

Morphological terminology mostly follows the Hymenoptera Anatomy Ontology (HAO: <http://portal.hymao.org>) (Yoder *et al.* 2010) and Gibson (1997) for structural terms, and Harris (1979) for sculpture terms.

In addition, the size of the flagellomeres is defined as follows:

- microscopic: extremely small (usually 1–5  $\mu\text{m}$  in length), either invisible using light microscopy, or hardly visible using a magnification of up to about 130 $\times$ ; without linear sensilla; extremely short, about 10–20 $\times$  as wide as long (Mitroiu 2010: fig. 6, A1, A2);
- anelliform: reduced (usually 10–20  $\mu\text{m}$  in length), but clearly visible with a magnification of up to about 130 $\times$ ; without linear sensilla; short, about 4–5 $\times$  as wide as long (arrow in Figs 1C, 2E, 8D, 12C, 13F);
- large: normal in size (arrow in Figs 3E, 4E, 7C, 9D) or only slightly reduced (arrow in Figs 5C, 6E, 10E, 11F); with linear sensilla; from transverse to elongate.

Specimens of *Ecrizotes* are rare in museum collections and many are in a rather bad shape because of inappropriate drying, i.e., some body parts such as antennae, head and gaster are more or less collapsed, as is visible in many of the provided images. Consequently, in species diagnoses and descriptions measurements have been avoided as much as possible to allow users to identify even distorted specimens. Thus, when preparing specimens for identification it is strongly advisable that either a critical point dryer (CPD) or hexamethyldisilazane (HMDS) are used. Characters described in the generic description are not repeated in species descriptions.

Observations were made using a Leica S8APO stereo microscope, with a maximum magnification of 128 $\times$ . Images were taken using a Leica DFC500 digital camera attached to a Leica M205A automated



research stereo microscope. The images were then assembled with Zerene Stacker® and their clarity was further enhanced using Adobe® Photoshop® ver. 7.0.

Body length includes the ovipositor sheath. When compared to the maximum length of the hind tibia the ovipositor sheath is measured along its ventral margin.

Abbreviations and terms used in text and figures:

Fla1–Fla7 = flagellomeres 1–7  
Fu1–Fu5 = funiculars 1–5  
LOL = lower ocular line, the imaginary line between the lowest edges of eyes, in frontal view  
MV = marginal vein  
SV = stigmal vein

Abbreviations of depositories:

MICO = Mitroiu Collection, Faculty of Biology, Alexandru Ioan Cuza University of Iași, Romania  
MNHN = Muséum nationale d'Histoire naturelle, Paris, France  
NHMUK = Natural History Museum, London, UK  
NMPC = Natural History Museum, Prague, Czech Republic  
ZMHB = Zoological Museum, Humboldt University, Berlin, Germany  
ZMUL = Zoological Museum, Lund University, Lund, Sweden

## Results

Class Insecta Linnaeus, 1758  
Order Hymenoptera Linnaeus, 1758  
Suborder Apocrita Latreille, 1810  
Superfamily Chalcidoidea Latreille, 1817  
Family Pirenidae Haliday, 1844

Subfamily **Tridyminae** Thomson, 1876

Tridymina Thomson, 1876. Type genus: *Tridymus* Ratzeburg, 1848; treated as Tridyminae by Ashmead (1904).

## Diagnosis

Body usually with metallic reflections (with some yellowish, brown or black exceptions). Female antenna with 1–2 microscopic, 1–2 anelliform, and 3–5 large flagellomeres before a 4-segmented clava (with 3 large clavomeres and a ‘terminal button’). Eyes at most slightly divergent ventrally. Marginal vein at most 3 × as long as the relatively long stigmal vein (except *Ecrizotomorpha alternativa* – see below, and two new species described herein where the marginal vein is slightly longer). Petiole short, hardly visible, without dorsal lamina.

## Taxonomic comments

*Ecrizotomorpha* was previously included in the subfamily Pireninae (Burks *et al.* 2022), based on the smaller number of large flagellomeres before clava (only three instead of four or five in Tridyminae), and the short stigmal vein found in *E. alternativa*. However, in other species such as *E. taskhiri* the fore wing venation is very similar to that of *Ecrizotes* and *Spathopus*. Apart from the peculiar structure of the flagellum, with one anelliform flagellomere flanked by two large ones (Figs 1C, 2E, 9D, 11C, 13F), all other characters of *Ecrizotomorpha* are indistinguishable from those of *Ecrizotes* and *Spathopus*.

Moreover, at least in *Ecrizotes monticola* the same flagellomere shows various degrees of reduction. Thus, *Ecrizotomorpha* should be included in the subfamily Tridyminae, but the structure of the antenna alone cannot justify its distinct generic status (see below).

Genus *Ecrizotes* Förster, 1861

Figs 1–13

*Ecrizotes* Förster, 1861: 33; type species by original monotypy *Ecrizotes monticola* Förster, 1861.

*Henicetrus* Thomson, 1876: 188, 190; type species by subsequent designation *Henicetrus annellus* Thomson, 1876 in Gahan & Fagan 1923: 70; subjective synonym of *Ecrizotes* in Ashmead 1904: 377.

*Spathopus* Ashmead, 1904: 272; type species by original designation or monotypy *Spathopus anomalipes* Ashmead, 1904; **syn. nov.**

*Ecrizotomorpha* Mani, 1939b: 537; type species by original monotypy *Ecrizotomorpha taskhiri* Mani, 1939; **syn. nov.**

*Liaoella* Xiao & Huang, 1999; type species by original designation or monotypy *Liaoella alternativa* Xiao & Huang, 1999; subjective synonym of *Ecrizotomorpha* in Huang & Xiao 2005: 215–216; **syn. nov.**

### Diagnosis

Body dark, with at most faint metallic reflections, mostly on head (Figs 1–13). Female antenna with 2 microscopic, 1–2 anelliiform, and 3–5 large flagellomeres before the 4-segmented clava (with 3 large clavomeres plus a ‘terminal button’) (Figs 1C, 2E, 3E, 4E, 5E, 6C, 7E, 8C, 9D, 10D, 11C, 12F, 13F). Male antenna with 1 microscopic and 6 large flagellomeres before the 3-segmented clava (with 2 large clavomeres and a ‘terminal button’) (Figs 4F, 7F, 9E). Propodeum without plicae or median carina (e.g., Figs 1E, 10E, 13E). Fore wing with parastigmal hyaline break (Figs 1F, 3H, 4H, 5E, 6G, 7F, 8G, 9F, 10C, 11E, 12F, 13C). Female with hypopygium from almost reaching to surpassing the apical tergite of gaster (e.g., Figs 5H, 10F, 11F, 12E). Male sometimes with enlarged tibiae (Figs 5B, 9B).

### Etymology

The name *Ecrizotes* has a Greek origin and comes from the words ‘εκ’ meaning ‘from’ or ‘out’, and ‘ρίζα’ meaning root. It can be translated as ‘the one that takes the root out’ or metaphorically ‘the one that destroys something’; it is of masculine gender.

### Description

#### Female

Body with faint metallic reflections, these most obvious on the head (Figs 1–13). Body sculpture always delicate, alutaceous (e.g., Figs 1E, 3F, 6D, 8E, 10E, 11E, 12C). Setation sparse, setae rather long, piliferous punctures occasionally visible on the upper face (e.g., Figs 10B, 11B, 12B).

Head in frontal view subcircular (e.g., Figs 1B, 2C, 3B, 4C, 5C, 8B, 10B, 11B, 12B). Vertex sometimes conspicuously protruding between posterior ocelli (Figs 5C, 12B). Gena evenly round (Figs 8B, 10B) to conspicuously buccate (Figs 1B, 2C, 3B, 4C, 5C, 6B, 7C, 9C, 12B), not hollowed at mouth corner (e.g., Fig. 6B). Clypeal margin from weakly convex (Figs 4C, 6B, 7D, 8D, 9C, 13D) to strongly convex (Figs 2D, 3D, 5D, 10C, 11D) or acute (Figs 1D, 12D). Tentorial pits invisible. Scrobal depression short and shallow, with weak inter-torular ridge (e.g., Figs 8D, 10B, 12D). Malar sulcus present (e.g., Figs 10A, 12F). Eyes in frontal view slightly diverging in lower part (e.g., Figs 1B, 5C, 8B, 10B, 11B). Temples short and strongly converging in dorsal view of the head (Figs 5G, 8E). Occiput without carina. Antennal inserted much lower than LOL (e.g., Figs 1B, 3B, 4C, 5C, 7C, 8B, 10B, 11B, 12B, 13B), with 2 microscopic, 1–2 anelliiform (one often intercalated between two larger ones), and 3–5 large

flagellomeres before the 4-segmented clava (with 3 large clavomeres plus a ‘terminal button’); antennal clava symmetric, without conspicuous area of microsetation, distal end rounded (Figs 1C, 2E, 3E, 4E, 5E, 6C, 7E, 8C, 9D, 10D, 11C, 12F, 13F). Mandibles usually at least slightly falcate (Figs 1A, 7D, 10C, 12F, 13D), in the few observable cases with the formula 4:3.

Mesosoma dorsally convex (Figs 3A, 4A, 5A, 6A, 8A, 10A, 11A) or almost flat (Figs 1A, 2A, 7A, 9A, 12A, 13A). Pronotum often long, with large diverging shoulders (Figs 1E, 2G, 5G, 10E, 11E, 12C, 13E), occasionally shorter, with smaller shoulders (Figs 3F, 4G, 6D, 7H, 8E, 9F, 10F). Pronotum evenly sloping, without transverse carina (e.g., Fig. 10A). Mesoscutum shorter than mesoscutellum; notauli complete and deep (Figs 1E, 2G, 3F, 4G, 5G, 6D, 7H, 8E, 9F, 10E, 11E, 12C, 13E). Axillae only slightly advanced. Mesoscutellum from convex to almost flat; frenum mostly indistinct. Dorsellum subhorizontal, smooth, semicircular (e.g., Figs 1E, 3F, 4G, 5G, 7H, 8E, 10E, 11E, 12C, 13E). Propodeum much shorter than mesoscutellum, smooth or uniformly and superficially sculptured; plicae and median carina absent; hind corners not prominent and not sharp; spiracles almost touching posterior margin of metanotum (e.g., Figs 1E, 4G, 6D, 10E, 13E). Hind coxa dorsally bare. Fore wing hyaline (Figs 1F, 2H, 3C, 4H, 5H, 6E, 7G, 8F, 9G, 10F, 11F, 12E, 13C), extensively setose, fringe present; veins slender or slightly thickened; parastigma with hyaline break; stigmal vein much shorter than marginal vein, stigma moderately capitate; postmarginal vein much shorter than marginal vein and only slightly longer than stigmal vein.

Gaster at least slightly compressed laterally, occasionally strongly so (Figs 3A, 4A, 6A, 7A, 8A, 9A). Petiole inconspicuous. Gastral tergites subequal in length, their posterior margin straight. Hypopygium from almost reaching to surpassing the apical tergite of gaster, its tip with (e.g., Figs 3G, 6F) or without a small incision (e.g., Fig. 7I).

### Male

Similar to female (Figs 2B, 4B, 5B, 7B, 9B), except mainly for the differential features given in the diagnosis.

### Distribution

The genus *Ecrizotes* is newly recorded in Africa (six species). Various species are present on all continents except for South America, Australia and Antarctica: Europe (seven species), Asia (five species) and North America (one species).

### Hosts

Bouček (1964: 258) considered that *Ecrizotes hofferi* (Bouček, 1964) comb. nov. “probably develops as a parasite of some Cecidomyids”. *Ecrizotes taskhiri* (Mani, 1939) comb. nov. was cited as a hyperparasitoid of *Dasineura lini* (Barnes, 1936) (Diptera: Cecidomyiidae) in India (Pruthi *et al.* 1940).

### Taxonomic comments

Of the four described species of *Spathopus*, males are known only for *S. anomalipes* and *S. hofferi* (Fig. 4B). In both species all tibiae are strongly swollen; this feature only characterizes the males and makes them easily discernible from both conspecific females and males of *Ecrizotes*, which have normal tibiae. According to Mani (1939: 538), the male of *Ecrizotomorpha taskhiri* has the hind tibiae “[...] broad, compressed laterally”. The males of the other two species classified in *Ecrizotomorpha* are unknown. This feature was used by both Graham (1969) and Bouček & Rasplus (1991) to separate the *Ecrizotes* males from the *Spathopus* males. However, in our examined material from Africa, we found several males that have slender fore and mid tibiae (as in *Ecrizotes*) and inflated hind tibiae (as in *Spathopus*) (Fig. 6B). Furthermore, the strong sexual dimorphism present in some species and not in others is not a reliable indication of their generic distinctiveness, as shown in the related genus *Macroglenes*

**Table 1.** Morphological characters used by Graham (1969)\* and Bouček & Rasplus (1991)\*\* to separate the females of *Spathopus* Ashmead, 1904 and *Ecrizotes* Förster, 1861.

No.	Differential characters	<i>Spathopus</i> Ashmead, 1904	<i>Ecrizotes</i> Förster, 1861
1	Fore tibia*	With several short stout spines in a row along the outer edge	With at most 4 stout spines at the apex of tibia and a row of fine slender spines along the dorsal edge
2	Antennal scape*,**	Very short, reaching hardly half way from the torulus to the median ocellus	Relatively longer
3	Stigmal vein*	Nearly half as long as the marginal vein	Relatively shorter
4	Pronotum**	Constricted posteriorly (in dorsal view)	Not constricted
5	Head**	Rather flat, with clypeus distinctly produced	Not flattened, different

Westwood, 1832 (Pirenidae: Pireninae): the males of some species (e.g., *M. gibsoni* Mitroiu, 2010) display abnormally large eyes, the males of other species have a strongly inflated antennal scape (e.g., *M. bouceki* (Graham, 1969)), while the males of other species (e.g., *M. paludum* (Graham, 1969)) do not have any of these unusual characters.

Regarding the separation of the females of *Ecrizotes* and *Spathopus*, according to Graham (1969) and Bouček & Rasplus (1991), the main differences are summarized in Table 1.

The number and development of fore tibial spines (character 1) is difficult to assess and it is virtually impossible to separate the two instances. Characters 2 and 3 are also variable inside many chalcid genera. Character 4 was considered relevant by Bouček & Rasplus (1991), but not Graham (1969) and indeed *Ecrizotes monticola* and *E. caudatus* have a posteriorly constricted pronotum, although less long (Fig. 10F). Character 5 refers to the head thickness in anteroposterior axis, which is a variable character inside many chalcid genera. The ventral clypeal margin is more or less convex in both *Spathopus* and *Ecrizotes* and has a continuous degree of projection, ranging from only slightly convex to sharp (Figs 1D, 2D, 3D, 4D, 5B, 6D, 7D, 9C, 10D, 11D, 12D, 13D).

According to Mani (1939: 537), *Ecrizotomorpha* has affinities with both *Ecrizotes* (“in venation and moniliform antennae of male”) and *Spathopus* (“in its stout and compressed hind tibiae and short stouter fore tibiae”), but differs from *Ecrizotes* in “the pubescent eyes, absence of ring-joints and triarticulate maxillary palpi” and from *Spathopus* in “the longer hind tibiae, pubescent eyes, absence of ring-joints and clypeus produced obtusely but not triangularly”. All of the above differences do not hold upon a closer examination of the three genera involved: (1) the “ring-joints” refer to the microscopic flagellomeres, which are not absent in *Ecrizotomorpha* but can be seen (at least the second) if enough magnification is used; (2) all species of these genera have some eye pubescence; (3) the ventral clypeal margin shows various degrees of convexity, ranging from broadly convex to narrowly pointed (see above); (4) the maxillary palpus is triarticulate at least in *Spathopus hofferi*; (5) the length of hind tibia is irrelevant as it can be variable inside a given genus.

Furthermore, the only character that separates females of *Ecrizotes* from those of *Gastrancistrus* Westwood, 1833 is the position of the hypopygium, which is situated at the same level with the distal tip of the apical tergite or slightly beyond it in *Ecrizotes* and clearly anterior of it (mostly anterior to middle

of gaster) in *Gastrancistrus*. Males of *Ecrizotes* are indistinguishable from those of *Gastrancistrus*, except for those having enlarged hind tibiae. However, *Gastrancistrus* is a hugely diverse genus and until its revision other taxonomic changes are postponed. *Melancistrus* Graham, 1969, which also has the hypopygium near the tip of gaster, differs in having a translucent median projection (the mucro) extending posteriorly from the hypopygium, and a transverse propodeal carina; it could also belong here but unavailability of material prevented further investigations. *Afrothopus* Mitroiu, 2024 also has similarities with *Ecrizotes*, *Gastrancistrus* and *Spathopus* but differs in several key characters (see Discussion and Mitroiu *et al.* 2024).

In conclusion, there are no reliable characters for the separation of *Ecrizotes*, *Ecrizotomorpha* and *Spathopus* and consequently *Ecrizotomorpha* syn. nov., *Liaoella* syn. nov. (previously synonymized with *Ecrizotomorpha*), and *Spathopus* syn. nov. are regarded as junior synonyms of *Ecrizotes*, with the following new combinations: *Ecrizotes alternativa* (Xiao & Huang, 1999) comb. nov.; *E. anomalipes* (Ashmead, 1904) comb. nov.; *E. hofferi* (Bouček, 1964) comb. nov.; *E. montanus* (Huggert, 1976) comb. nov.; *E. nasalis* (Springate & Noyes, 1990) comb. nov.; *E. taskhiri* (Mani, 1939) comb. nov.; and *E. tenkasiensis* (Jamal Ahmad & Shafee, 1993) comb. nov.

### Key to Afrotropical and West-Palaeartic species of *Ecrizotes* (females)

1. Antenna with at least proximal funiculars longer than wide or quadrate and none anelliiform (Figs 4E, 8C); Palaeartic species ..... 2
- Antenna with all funiculars wider than long, usually at least some anelliiform (Figs 1C, 2E, 3E, 5E, 6C, 7E, 9D, 10D, 11C, 12F, 13F); Afrotropical and Palaeartic species ..... 3
2. Funiculars distinctly longer than wide, Fu1 length about twice width (Fig. 8C); clava at most as long as combined length of the three preceding funiculars; scape in lateral view about 6–7 × as long as wide ..... *E. longicornis* (Walker, 1848)
- Funiculars at most slightly longer than wide or quadrate, Fu1 length about 1.1 × width (Fig. 4E); clava length 1.25 × combined length of the three preceding funiculars; scape in lateral view at most about 5.5 × as long as wide ..... *E. filicornis* (Thomson, 1876)
3. Gaster length (without ovipositor sheath) 1.15–1.40 × combined length of head and mesosoma, strongly compressed laterally (Figs 3A, 6A, 7A, 9A); ovipositor sheath length at least 0.5 × length of hind tibia ..... 4
- Gaster length (without ovipositor sheath) at most equal to combined length of head and mesosoma, at most moderately compressed laterally (Figs 1A, 2A, 5A, 10A, 11A, 12A, 13A); ovipositor sheath at most 0.4 × length of hind tibia ..... 7
4. Tip of hypopygium incised (Figs 3G, 6F); Fu3 smaller than Fu2 and Fu4, but not anelliiform (Figs 3E, 6C); Afrotropical and Palaeartic species ..... 5
- Tip of hypopygium not incised (e.g., Fig. 7I); Fu3 variable (Figs 7E, 9D); Afrotropical species .... 6
5. Ovipositor sheath about 0.9 × as long as hind tibia; hind leg slender, tibia length about 8 × width; tibiae extensively yellowish brown (Fig. 6A); Afrotropical species ..... *E. incisus* Mitroiu sp. nov.
- Ovipositor sheath about 0.5–0.6 × as long as hind tibia; hind leg stouter, tibia length about 5 × width; legs entirely dark brown (Fig. 3A); Palaeartic species ..... *E. caudatus* (Thomson, 1876)
6. Ovipositor sheath very long, about 1.2 × as long as hind tibia (Fig. 7A); Fu3 only slightly smaller than Fu2 and Fu4 (Fig. 7E) ..... *E. longicauda* Mitroiu sp. nov.
- Ovipositor sheath shorter, about 0.5–0.6 × as long as hind tibia (Fig. 9A); Fu3 anelliiform (Fig. 9D) ..... *E. longus* Mitroiu sp. nov.



7. Ventral clypeal margin strongly protruding and acute (Fig. 1D); Afrotropical species ..... *E. acer* Mitroiu sp. nov.  
 – Ventral clypeal margin more or less evenly curved (Figs 2C, 5D, 10C, 11D, 13D), if rarely almost acute (*E. nasalis*), then less strongly protruding (Fig. 12D); Afrotropical and Palaearctic species ... 8
8. Antenna with Fu3 not anelliform, not or only slightly smaller than Fu2 or Fu4 (Figs 5E, 10D, 12F); Palaearctic species ..... 9  
 – Antenna with Fu3 conspicuously smaller than Fu2 or Fu4, usually anelliform (Figs 2E, 11C, 13F); Afrotropical and Palaearctic species ..... 11
9. Ventral clypeal margin acute (Fig. 12D) ..... *E. nasalis* (Springate & Noyes, 1990) comb. nov.  
 – Ventral clypeal margin evenly convex (Figs 5D, 10C) ..... 10
10. Head in frontal view with vertex less convex between posterior ocelli and gena evenly rounded (Fig. 10B) ..... *E. montanus* (Huggert, 1976) comb. nov.  
 – Head in frontal view with vertex more strongly convex between posterior ocelli and gena buccate (Fig. 5C) ..... *E. hofferi* (Bouček, 1964) comb. nov.
11. Ventral clypeal margin weakly convex (Fig. 13D); MV about  $2.4 \times$  SV; scape, pedicel, and legs except basal part of femora yellowish (Fig. 13A); Afrotropical species ..... *E. rovumae* Mitroiu sp. nov.  
 – Ventral clypeal margin strongly convex (Figs 2D, 11D); MV about  $2.5\text{--}3.0 \times$  SV; scape, pedicel and legs more extensively dark, femora completely dark (Figs 2A, 11A); Afrotropical and Palaearctic species ..... 12
12. Mesosoma dorsally convex (Fig. 11A); pronotum shorter than mesoscutum (Fig. 11E); Fu3 short but clearly visible (Fig. 11C); hind tibia length  $5.0\text{--}5.2 \times$  width; MV  $2.5\text{--}2.9 \times$  SV; ovipositor sheath length  $0.3\text{--}0.4 \times$  length of hind tibia; Palaearctic species ..... *E. monticola* Förster, 1861  
 – Mesosoma dorsally almost flat (Fig. 2A); pronotum about as long as mesoscutum (Fig. 2G); Fu3 hardly distinct (Fig. 2E); hind tibia length almost  $7 \times$  width; MV about  $3 \times$  SV; ovipositor sheath length about  $0.01 \times$  length of hind tibia; Afrotropical species ..... *E. brevicauda* Mitroiu sp. nov.

*Ecrizotes acer* Mitroiu sp. nov.

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Fig. 1

## Diagnosis

### Female

All funiculars wider than long, Fu3 anelliform (Fig. 1C); ventral margin of clypeus strongly protruding and acute (Fig. 1D); head in frontal view with gena buccate (Fig. 1B); hind tibia length  $4.8\text{--}5.0 \times$  width; gaster shorter than combined length of head and mesosoma, moderately compressed laterally (Fig. 1A); tip of hypopygium not incised (cf. Fig. 7I); ovipositor sheath length about  $0.2 \times$  length of hind tibia.

### Male

Unknown.

## Etymology

The species name refers to the shape of the ventral clypeal margin (from the Latin adjective ‘acer’ = ‘sharp’, ‘pointed’).

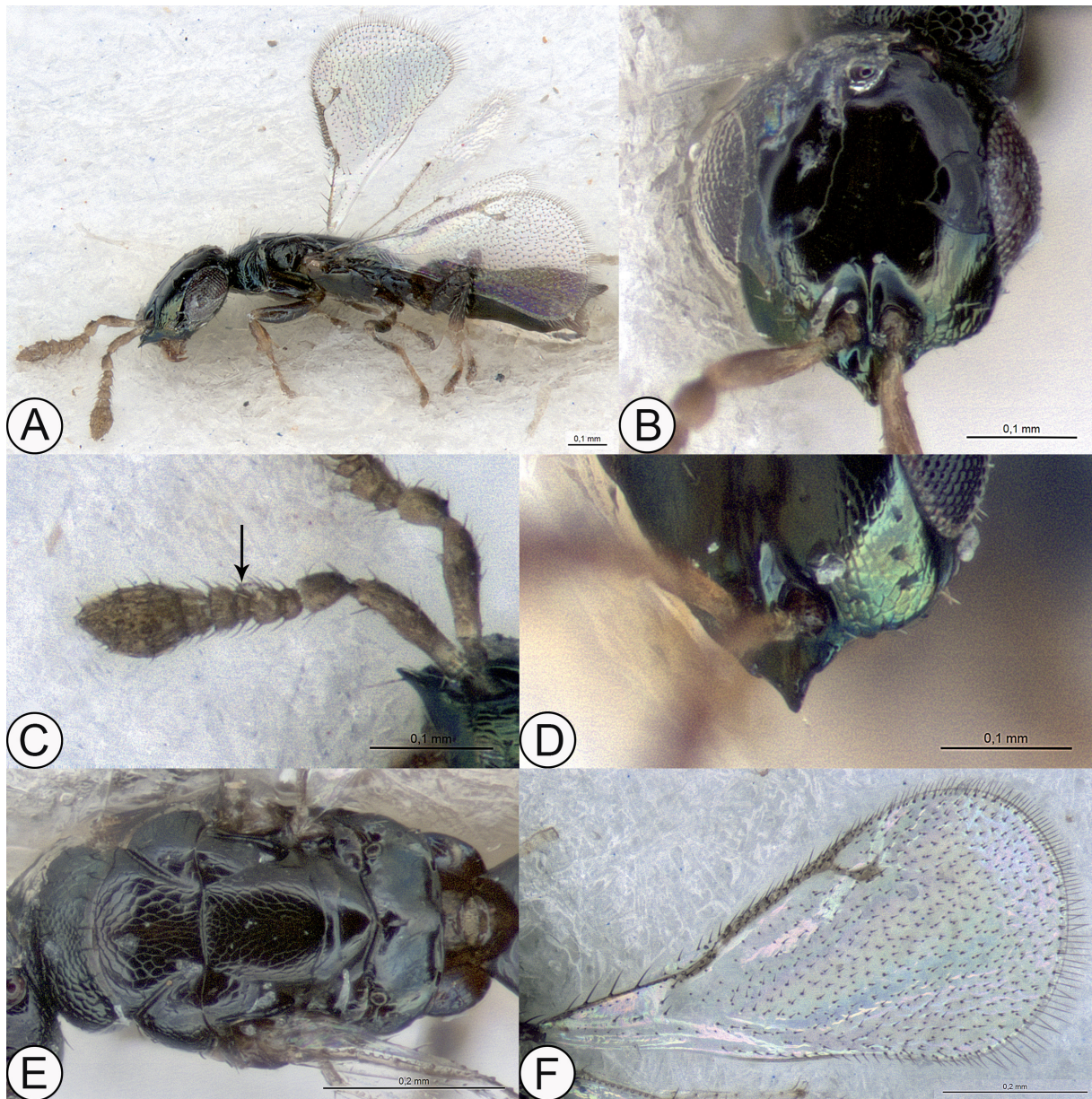
**Type material**

**Holotype**

ZIMBABWE • ♀; “Rhodesia / Salisbury / A. Watsham / WF67 / i×.74”; NHMUK.

**Paratypes**

D.R. CONGO • 1 ♀; “DR Congo: Oriental Prov. / Ituri region, Mongbwalu, / AGK camp, 20-27. III.2015 / A. Gumovsky & C. Dhendro // behind pld fences, / abandoned shamba, bananas, avocado, sweet / potato, 75 YPTs”; MICO.



**Fig. 1.** *Ecrizotes acer* sp. nov. **A–C, E–F.** Holotype, ♀ (NHMUK). **D.** Paratype, ♀ (NHMUK). **A.** Habitus, lateral view. **B.** Head, frontal view. **C.** Antenna (arrow indicates Fu3). **D.** Clypeus. **E.** Mesosoma, dorsal view. **F.** Fore wing, dorsal view.

ZIMBABWE • 2 ♀♀; “Rhodesia / Makumbi Miss / A. Watsham / W.244, ×ii.76 // *Spathopus*! [Bouček’s handwriting]”; NHMUK.

## Description

### Female holotype

Body length: 1.0 mm. Colour as in Fig. 1. Head in frontal view with vertex not protruding between posterior ocelli (Fig. 1B). Gena buccate (Fig. 1B). Ventral margin of clypeus strongly protruding and acute (Fig. 1D). Upper face smooth except rare piliferous punctures (Fig. 1B). Length of pedicel plus flagellum shorter than head width. All funiculars wider than long, Fu3 anelliform (Fig. 1C). Mesosoma dorsally almost flat (Fig. 1A). Pronotum about as long as mesoscutum (Fig. 1E). Basal cell of fore wing with a few scattered setae on upper side (Fig. 1F). MV about  $2.4 \times$  SV. Hind tibia length about  $4.8 \times$  width. Gaster shorter than combined length of head and mesosoma, moderately compressed laterally (Fig. 1A). Tip of hypopygium not incised (cf. Fig. 6I). Ovipositor sheath length about  $0.2 \times$  length of hind tibia.

## Variation

### Female

The specimen collected in the D.R. Congo has a slightly less protruding clypeal margin. Hind tibia length  $4.8\text{--}5.0 \times$  width.

## Distribution

D.R. Congo, Zimbabwe.

## Hosts

Unknown.

## Taxonomic comments

This is one of the most easily recognizable species of *Ecrizotes* due to its large triangular clypeal margin, which is expected to be similar in males.

*Ecrizotes brevicauda* Mitroiu sp. nov.

urn:lsid:zoobank.org:act:7AE37C37-2888-41EB-9BF5-2EA7BDE2BE3E

Fig. 2

## Diagnosis

### Female

All funiculars wider than long, Fu3 anelliform (Fig. 2E); ventral margin of clypeus strongly convex (Fig. 2D); head in frontal view with gena buccate (Fig. 2C); hind tibia length almost  $7 \times$  width; gaster shorter than combined length of head and mesosoma, moderately compressed laterally (Fig. 2A); tip of hypopygium not incised (cf. Fig. 7I); ovipositor sheath length about  $0.01 \times$  length of hind tibia.

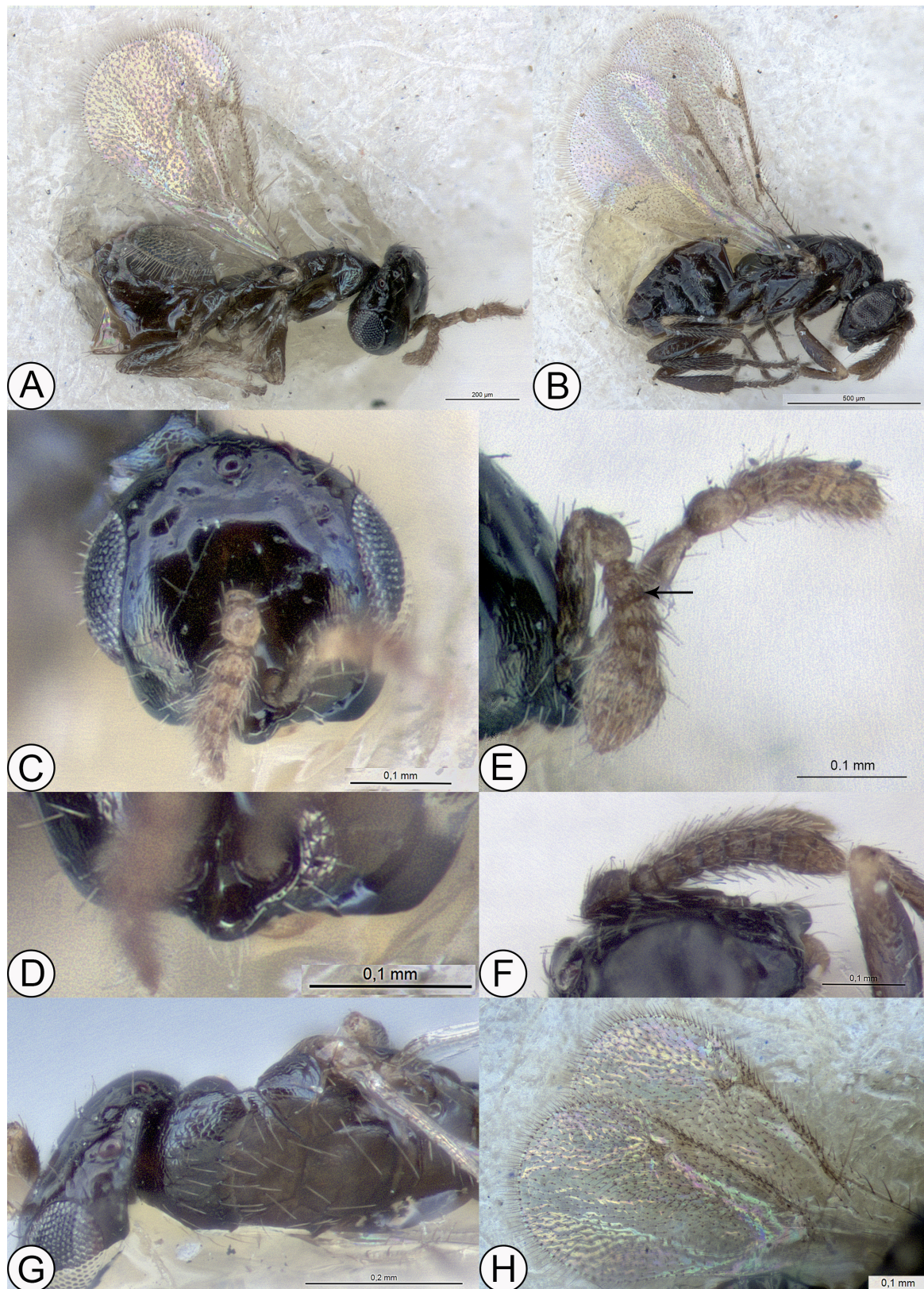
### Male

Hind tibia slightly widened, length  $4.4\text{--}4.7 \times$  width (Fig. 2B). Funicular segments wider than long (Fig. 2F). Fore wing with upper side of basal cell having one irregular row of setae plus several additional ones near basal vein.

## Etymology

The species name refers to the very short ovipositor that characterizes the females of this species (from the Latin words ‘*brevis*’ = ‘short’ and ‘*cauda*’ = ‘tail’; noun in apposition).





**Fig. 2.** *Ecrizotes brevicauda* Mitroiu sp. nov. **A, C–E, G–H.** Holotype, ♀ (NHMUK). **B, F.** Allotype, ♂ (NHMUK). **A.** Habitus, lateral view. **B.** Habitus, lateral view. **C.** Head, frontal view. **D.** Clypeus. **E.** Antennae (arrow indicates Fu3). **F.** Antenna. **G.** Mesosoma, dorsal view. **H.** Fore wings.

## Type material

### Holotype

SOUTH AFRICA • ♀; “S. Africa. / R.E. Turner. / Brit. Mus. / 1921-450 // Mossel Bay, / Cape Province. / October, 1921.”; NHMUK.

### Allotype

SOUTH AFRICA • ♂; “S. Africa / R.E. Turner. / Brit. Mus. / 1921-412 // Mossel Bay, / Cape Province. / Sept, 1921.”; NHMUK.

### Additional paratypes

SOUTH AFRICA • 2 ♂♂; same data as for allotype; NHMUK.

## Description

### Female holotype

Body length: 0.75 mm. Colour as in Fig. 2. Head in frontal view with vertex protruding between posterior ocelli (Fig. 2C). Gena buccate (Fig. 2C). Ventral margin of clypeus strongly convex (Fig. 2C). Upper face smooth except rare piliferous punctures (Fig. 2C). Length of pedicel plus flagellum shorter than head width. All funicular segments wider than long, Fu3 anelliiform, barely visible (Fig. 2E). Mesosoma dorsally almost flat (Fig. 2A). Pronotum about as long as mesoscutum (Fig. 2G). Basal cell of fore wing with a few scattered setae on upper side (Fig. 2H). MV about  $3 \times$  SV. Hind tibia length about  $6.6 \times$  width. Gaster shorter than combined length of head and mesosoma, moderately compressed laterally (Fig. 2A). Tip of hypopygium not incised (cf. Fig. 6I). Ovipositor sheath length about  $0.01 \times$  length of hind tibia.

### Male allotype

Body length: 0.9 mm. Differs from the female holotype in the structure of the antenna (see generic diagnosis) and in the characters stated in the above species diagnosis. Additionally, the mesosoma is more convex and the pronotum is shorter than the mesoscutum (Fig. 2B).

## Variation

### Male

Hind tibia length  $4.4\text{--}4.7 \times$  width.

## Distribution

South Africa.

## Hosts

Unknown.

## Taxonomic comments

This species is somewhat similar to *E. monticola*, from which it differs mainly in the characters given in the key.

*Ecrizotes caudatus* Thomson, 1876

Fig. 3

*Henicetrus caudatus* Thomson, 1876: 191; lectotype ♀, LUZN, designated by Graham 1969: 331, images examined.

*Ecrizotes caudata* – Schmiedeknecht 1909: 273; new combination.

*Ecrizotes caudatus* – Erdős 1947: 110.



## Diagnosis

### Female

All funiculars wider than long; Fu3 smaller than Fu2 and Fu4, but not anelliform (Fig. 3E); ventral margin of clypeus strongly convex (Fig. 3D); head in frontal view with gena buccate (Fig. 3B); hind tibia length about  $5 \times$  width; gaster longer than combined length of head and mesosoma and strongly compressed laterally (Fig. 3A); tip of hypopygium incised (Fig. 3G); ovipositor sheath length about  $0.5\text{--}0.6 \times$  length of hind tibia.

### Male

Unknown.

## Material examined

BULGARIA • 8 ♀♀; “Bulgaria mer. / Pirin, Begovica, 1750m. / 1.-2.VIII.74 / Lgt. Dr. Aug. Hoffer”; NMPC.

CZECH REPUBLIC • 1 ♀; “Praha – Chuchle / Bohemia, 8.8.59 / J. Macek // sec. LT = *H. caudatus* Th.♀ / Zd. Bouček det. 1962”; NMPC.

FRANCE • 1 ♀; “France, Htes Alp. / Queyras: Arvieu × / 18.7.90, Bouček // ♀ *Ecrizotes monticola* Först. / det. Z. Bouček, 1990”; NMPC.

## Distribution

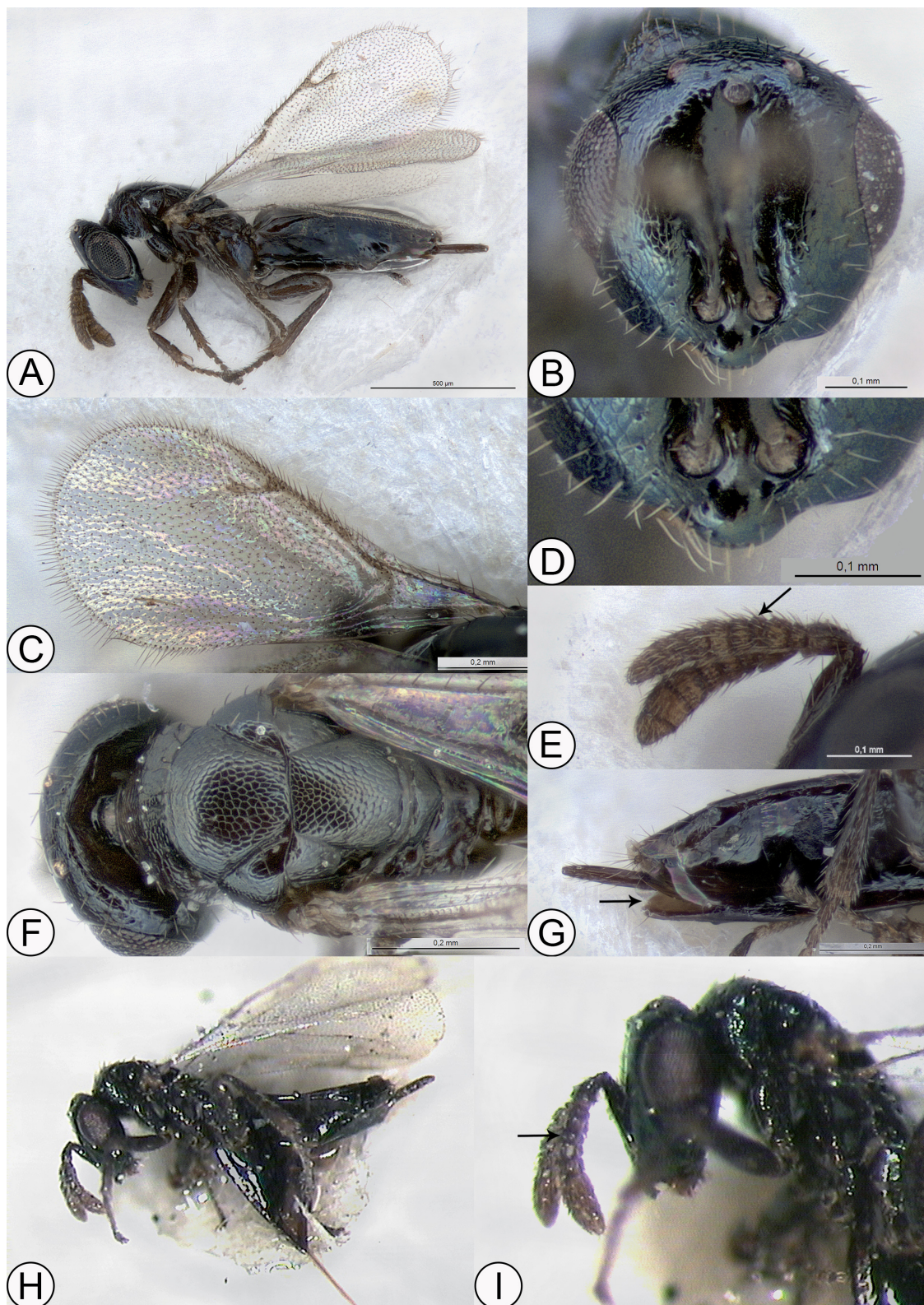
Germany (Haas *et al.* 2021), as *E. monticola*; Hungary (Erdős 1947), Sweden (Thomson 1878), Bulgaria, Czech Republic, France (new records). The record from Germany was assessed based on the images provided by Haas *et al.* (2021) (see Taxonomic comments below).

## Hosts

Unknown.

## Taxonomic comments

We agree with Erdős (1947) that *E. caudatus* (and not *E. caudata*) is the valid name of this species (see Etymology of *Ecrizotes* above). Both Bouček (1961: 58) and Graham (1969: 331) consider *Henicetrus caudatus* a probable junior synonym of *E. monticola*, differing in details such as a slightly longer gaster, hypopygium and ovipositor. Although recorded as a valid species in Noyes (2019) and UCD Community (2023), most users presumably followed Graham’s view and recorded this species as *E. monticola* (see Distribution). Initially, we followed the same species concept of *E. monticola* and considered the possibility to describe a new species that differed from *E. monticola* mainly in having a shorter ovipositor and a more reduced Fu3. However, after examining (1) a paralectotype of *E. monticola* (Figs 11G–I), (2) a specimen compared with the lectotype of *E. caudatus* by Z. Bouček (Fig. 3H–I), and (3) several specimens that could be separated in two groups based on the length of the ovipositor (without intermediate forms), we decided for the most conservative approach and regard both *E. caudatus* and *E. monticola* as valid, with the potentially new species falling within the variability of *E. monticola*. Consequently, we consider *E. caudatus* as having a longer ovipositor sheath ( $0.5\text{--}0.6 \times$  the length of hind tibia), a longer and more laterally compressed gaster (at least slightly longer than head plus mesosoma), and Fu3 only moderately reduced (Fig. 3); we regard *E. monticola* as having a shorter ovipositor sheath ( $0.3\text{--}0.4 \times$  the length of the hind tibia), a shorter and mostly uncompressed gaster (at most as long as head plus mesosoma in un-collapsed specimens, or shorter in collapsed ones), and Fu3 usually anelliform (Fig. 11). Interestingly, the images of the holotype of *Henicetrus annellus* Thomson, 1878 (considered a synonym of *E. monticola* by Graham (1969)) provided by ZMUL



**Fig. 3.** *Ecrizotes caudatus* (Thomson, 1876). **A–G.** ♀ (NMPC). **A.** Habitus, lateral view. **B.** Head, frontal view. **C.** Fore wing, dorsal view. **D.** Clypeus. **E.** Antenna (arrow indicates Fu3). **F.** Mesosoma, dorsal view. **G.** Gaster, lateral view (arrow indicates hypopygium). **H–I.** Female specimen (NMPC), compared by Z. Bouček with the lectotype of *H. caudatus* (see text; arrow indicates Fu3).



(<https://ento.biomus.lu.se/search.php?taxa=henicetrus>) show that in this species Fu3 is shorter than both Fu2 and Fu4 but not anelliform, while the ovipositor is considerably shorter than in *E. caudatus*. Another potential identification problem arises from the positional variability and collapse degree of the hypopygium, which can make the shallow incision present in *E. caudatus* and *E. monticola* (Fig. 3G) difficult or impossible to observe (Fig. 3A, H); nevertheless, *E. caudatus* should be easily separated from the other Palaeartic species having a relatively long ovipositor sheath, i.e., *E. filicornis* and *E. longicornis*, by its much shorter funiculars. Perhaps future molecular studies could help elucidate the taxonomy of this species complex, but at the time of this study no fresh material was available.

***Ecrizotes filicornis* (Thomson, 1876)**

Fig. 4

*Henicetrus filicornis* Thomson, 1876: 191; lectotype ♀, designated by Graham 1969: 332, ZMUL, not examined.

*Ecrizotes filicornis* – Schmiedeknecht 1909: 273; new combination.

**Diagnosis**

**Female**

All funiculars at least slightly longer than wide or quadrate, Fu1 length about  $1.1 \times$  width, Fu3 not smaller than either Fu2 or Fu4 (Fig. 4E); ventral margin of clypeus weakly convex (Fig. 4D); head in frontal view with gena buccate (Fig. 4C); hind tibia length about  $6.6 \times$  width; gaster longer than combined length of head and mesosoma and strongly compressed laterally (Fig. 4A); tip of hypopygium incised (cf. Figs 3G, 6F); ovipositor sheath length about  $0.4 \times$  length of hind tibia.

**Male**

All tibiae normal, hind tibia length about  $5.5 \times$  width (Fig. 4B). Funicular segments quadrate, except Fu1 longer than wide (Fig. 4F). Fore wing with upper side of basal cell having one irregular row of setae plus several additional ones near basal vein.

**Material examined**

CZECH REPUBLIC • 1 ♀; “Bohemia or. Hradec Králové / 29.VII.1945. Bouček leg. // *Ecrizotes* Förster *filicornis* Thoms.”; NMPC • 1 ♀; “Krásná Lipa (Ústí n. L.) / 12.7.56, Bohemia Dlabola”; NMPC • 1 ♀; “Bohemia centr., Veltrusy // P. Mikula, 26.V.64”; NMPC • 1 ♂; “Bohemia, Krkomše / Lysečiny / VIII.1964. J. Macek”; NMPC.

UNITED KINGDOM • 1 ♀; “Burnham Beeches / Bucks. England / Bouček 26.v.80 // *Ecrizotes filicornis* (Thoms.) / det. Z. Bouček 1980”; NHMUK • 1 ♀; “Chobham Comm. / Surrey, England / Bouček 4.6.71 // ♀ *Ecrizotes filicornis* (Thoms.) / det. Z. Bouček, 1981”; NMPC • 1 ♂; “Chobham Comm. / Surrey, England / Bouček 6.6.71”; NMPC.

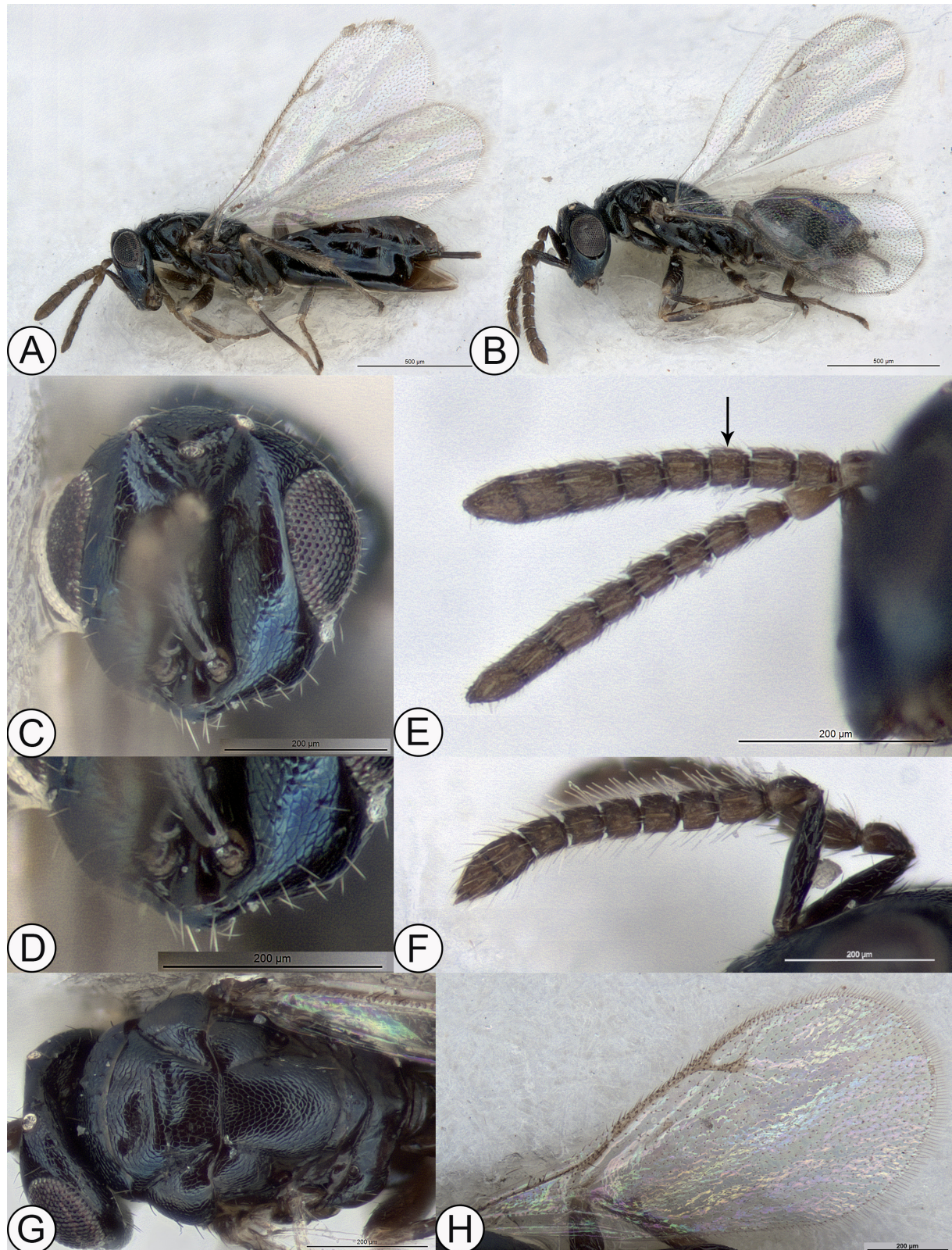
**Distribution**

Czech Republic, Hungary, Netherlands, Sweden, United Kingdom (UCD Community 2023).

**Hosts**

Unknown.





**Fig. 4.** *Ecrizotes filicornis* (Thomson, 1876). **A, C–E, G–H.** ♀ (NMPC). **B, F.** ♂ (NMPC). **A.** Habitus, lateral view. **B.** Habitus, lateral view. **C.** Head, frontal view. **D.** Clypeus. **E.** Antennae (arrow indicates Fu3). **F.** Antenna. **G.** Mesosoma, dorsal view. **H.** Fore wing, dorsal view.



### Taxonomic comments

Alongside *E. longicornis*, the species is easily recognizable by the long antennae, with all funiculars at least slightly longer than wide. From the female of the latter species the female of *E. filicornis* differs mostly in having shorter antennae, with less elongated funicular segments (Fig. 4E).

*Ecrizotes hofferi* (Bouček, 1964) comb. nov.  
Fig. 5

*Spathopus hofferi* Bouček, 1964: 257–258; holotype ♀, NMPC, not examined.

### Diagnosis

#### Female

All funiculars wider than long; Fu3 not smaller than either Fu2 or Fu4 (Fig. 5E); ventral margin of clypeus strongly convex (Fig. 5D); head in frontal view with gena buccate (Fig. 5C); hind tibia length about  $5 \times$  width; gaster about equal to combined length of head and mesosoma, moderately compressed laterally (Fig. 5A); tip of hypopygium not incised (cf. Fig. 7I); ovipositor sheath length about  $0.4 \times$  length of hind tibia.

#### Male

All tibiae strongly inflated, hind tibia length about  $2.9 \times$  width (Fig. 5B). Funicular segments wider than long (Fig. 5F). Fore wing with upper side of basal cell sparsely and more or less uniformly setose. See also Taxonomic comments below.

### Material examined

FRANCE • 1 ♀; “Lac de Tigne / Savoie, France / 9.8.1965. Comellini // *Spathopus hofferi* Bčk. / det. Z. Bouček, 1976”; NMPC.

SPAIN • 1 ♂; “Spain (Madrid): Cercedilla / 8.vii.74. Z. Bouček // ♂ *Spathopus ? hofferi* Bčk. / det. Z. Bouček, 1975”; NMPC.

### Distribution

Iran, Kazakhstan, Russia, Slovakia, Sweden (UCD Community 2023). France (new record).

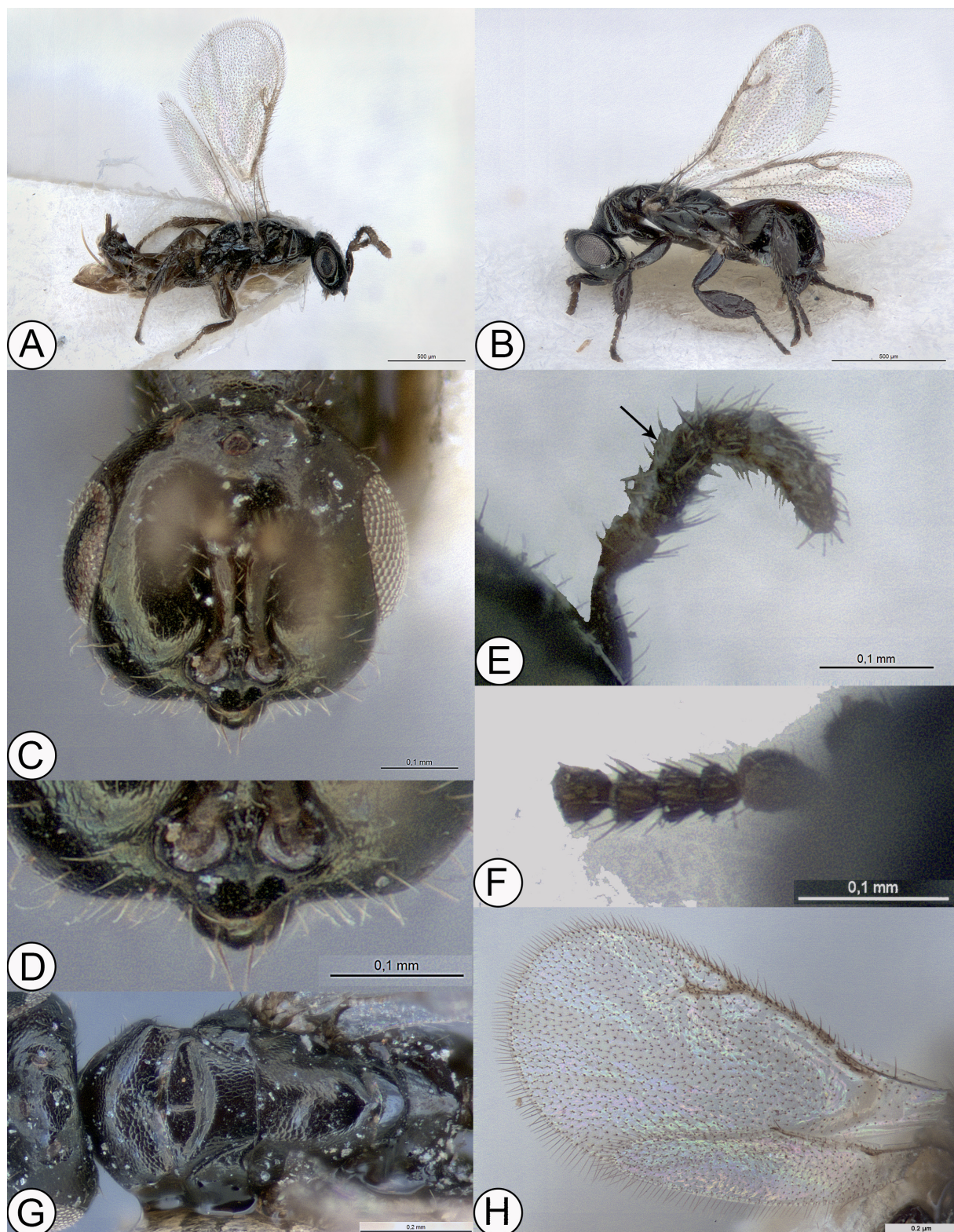
### Hosts

Unknown. According to Bouček (1964: 258), the species might be a parasitoid of Cecidomyiidae Newman, 1835 (Diptera).

### Taxonomic comments

The male specimen from Spain (see above, Fig. 5B, F) identified by Bouček as “? *hofferi*” (see Material examined) remains questionable regarding its species-level identification as it generally fits the description of *E. hofferi* male except for the antenna. In this specimen, the right antenna is broken beyond the pedicel, while the left antenna is broken beyond Fu4. Nevertheless, the first funicular segments are quite different from Bouček’s drawing (Bouček 1964: 256, fig. 4); the antenna drawn by Bouček (apparently belonging to the male allotype collected in Russia) is very curious in having a compact flagellum, with only four large segments before a 3-segmented clava, with an unusually long Fu4; this is rather odd as antennae of males never have fewer funicular segments than the antennae of females. In the redescription of *Spathopus*, Bouček (1964) states that the antennal formula is 11053 in females and 11143 or 11233 in males, the latter formula probably relying on Ashmead’s assertion that the male antenna is “10-jointed, with one or two ring-joints” (Ashmead 1904). However, in the Spanish





**Fig. 5.** *Ecrizotes hofferi* Bouček, 1964 comb. nov. **A, C–E, G–H.** ♀ (NMPC). **B, F.** ♂ (NMPC). **A.** Habitus, lateral view. **B.** Habitus, lateral view. **C.** Head, frontal view. **D.** Clypeus. **E.** Antenna (arrow indicates Fu3). **F.** Antenna (broken beyond fu4). **G.** Mesosoma, dorsal view. **H.** Fore wing, dorsal view.

male specimen listed above, the flagellum is not compact and the first four funicular segments are more or less equally-sized (Fig. 5F); this is the same as seen in the male specimens of *E. brevicauda* sp. nov. (Fig. 2F) and *E. longicauda* sp. nov. (Fig. 7F) described herein, as well as with the male of *E. filicornis* (Fig. 4F). In all these species, the male antennal formula is 11062, with funiculars never compact and with a 2-segmented clava. The Russian specimen examined by Bouček has inflated tibiae and was rightfully identified as a male, but we consider the possibility that it could have been a gynandromorph male, with abnormal antennae.

*Ecrizotes incisus* Mitroiu sp. nov.

urn:lsid:zoobank.org:act:3A495840-DCC1-476B-B554-D6C6D92011C5

Fig. 6

**Diagnosis**

**Female**

All funiculars wider than long; Fu3 smaller than both Fu2 and Fu4, but not anelliform (Fig. 6C); ventral margin of clypeus weakly convex (Fig. 6B); head in frontal view with gena buccate (Fig. 6B); hind tibia length about  $8 \times$  width; gaster longer than combined length of head and mesosoma and strongly compressed laterally (Fig. 6A); tip of hypopygium incised (Fig. 6F); ovipositor sheath length about  $0.9 \times$  length of hind tibia.

**Male**

Unknown.

**Etymology**

The species name refers to the incised tip of the female's hypopygium (from the Latin adjective '*incisus*' = 'cut up').

**Type material**

**Holotype**

SOUTH AFRICA • ♀; "South Africa / Grahamstown / A. Watsham: 12: 73"; NHMUK.

**Description**

**Female holotype**

Body length: 1.5 mm. Colour as in Fig. 6. Head in frontal view with vertex not protruding between posterior ocelli (Fig. 6B). Gena buccate (Fig. 6B). Ventral margin of clypeus weakly convex (Fig. 6B). Upper face uniformly sculptured, piliferous punctures hardly distinct (Fig. 6B). Length of pedicel plus flagellum shorter than head width. All funiculars wider than long; Fu3 smaller than both Fu2 and Fu4, but not anelliform (Fig. 6C). Mesosoma dorsally convex (Fig. 6A). Pronotum shorter than mesoscutum (Fig. 6D). Basal cell of fore wing with a few scattered setae on upper side (Fig. 6E). MV about  $2.7 \times$  SV. Hind tibia length about  $8 \times$  width. Gaster longer than combined length of head and mesosoma and strongly compressed laterally (Fig. 6A). Tip of hypopygium incised (Fig. 6F). Ovipositor sheath length about  $0.9 \times$  length of hind tibia.

**Variation**

Unknown.

**Distribution**

South Africa.

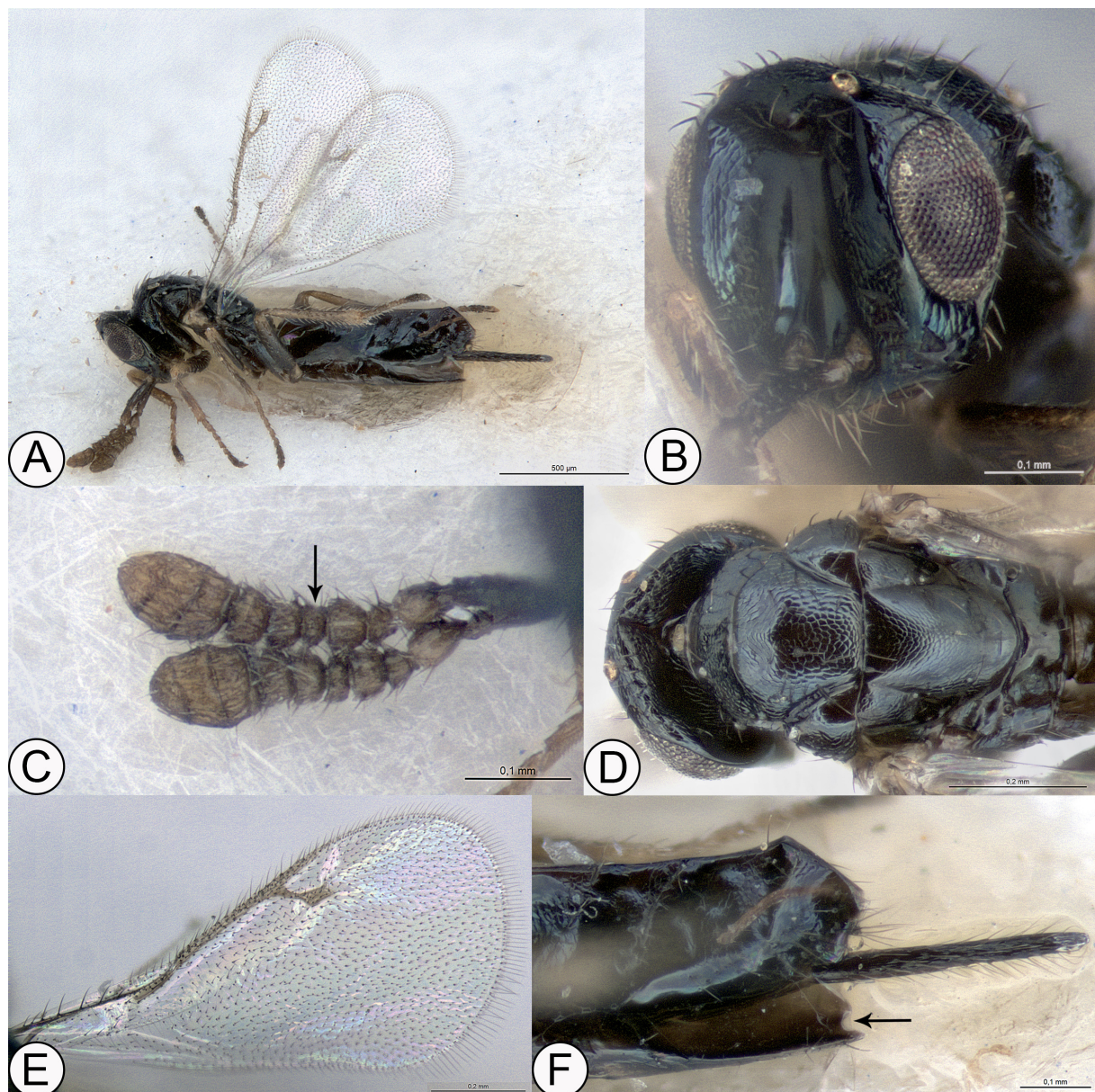


### Hosts

Unknown.

### Taxonomic comments

This species can be separated from the other known species with an incised hypopygium by the longer ovipositor and more slender tibiae.



**Fig. 6.** *Ecrizotes incisus* Mitroiu sp. nov., holotype, ♀ (NHMUK). **A.** Habitus, lateral view. **B.** Head, frontal view. **C.** Antennae (arrow indicates Fu3). **D.** Mesosoma, dorsal view. **E.** Fore wing, dorsal view. **F.** Gaster, lateral view (arrow indicates hypopygium).

*Ecrizotes longicauda* Mitroiu sp. nov.

urn:lsid:zoobank.org:act:14089D86-9EED-4AC5-A2C8-1D36126221A5

Fig. 7

**Diagnosis**

**Female**

All funiculars wider than long, Fu3 only slightly smaller than Fu2 and Fu4 (Fig. 7E); ventral margin of clypeus weakly convex (Fig. 7D); head in frontal view with gena buccate (Fig. 7C); hind tibia length about  $8 \times$  width; gaster longer than combined length of head and mesosoma and strongly compressed laterally (Fig. 7A); tip of hypopygium not incised (Fig. 7I); ovipositor sheath length about  $1.2 \times$  length of hind tibia.

**Male**

Fore and mid tibiae normal, hind tibia inflated, length about  $3.5 \times$  width (Fig. 7B). All funicular segments wider than long (Fig. 7F). Fore wing with upper side of basal cell with one irregular row of setae plus several additional ones near basal vein.

**Etymology**

The species name refers to the long ovipositor that characterizes the females of this species (from the Latin words '*longus*' = 'long' and '*cauda*' = 'tail'; noun in apposition).

**Type material**

**Holotype**

ZIMBABWE • ♀; "Rhodesia / Salisbury / A. Watsham / WF117, (i)75 // 453.R"; NHMUK.

**Allotype**

ZIMBABWE • ♂; "Rhodesia / Mokumbi Miss / A. Watsham (i)76"; NHMUK.

**Additional paratype**

ZIMBABWE • 1 ♀; "Rhodesia / Salisbury / A. Watsham / WF.222, (i)76"; NHMUK.

**Description**

**Female holotype**

Body length: 1.3 mm. Colour as in Fig. 7. Head in frontal view with vertex not protruding between posterior ocelli (Fig. 7C). Gena buccate (Fig. 7C). Ventral margin of clypeus weakly convex (Fig. 7D). Upper face uniformly and very superficially sculptured except several piliferous punctures (Fig. 7C). Length of pedicel plus flagellum slightly longer than head width. All funiculars wider than long, Fu3 only slightly smaller than Fu2 and Fu4 (Fig. 7E). Mesosoma dorsally almost flat (Fig. 7A). Pronotum shorter than mesoscutum (Fig. 7H). Basal cell of fore wing with a few scattered setae on upper side (Fig. 7G). MV about  $2.9 \times$  SV. Hind tibia length about  $8 \times$  width. Gaster longer than combined length of head and mesosoma and strongly compressed laterally (Fig. 7A). Tip of hypopygium not incised (cf. Fig. 7I). Ovipositor sheath length about  $1.2 \times$  length of hind tibia.

**Male allotype**

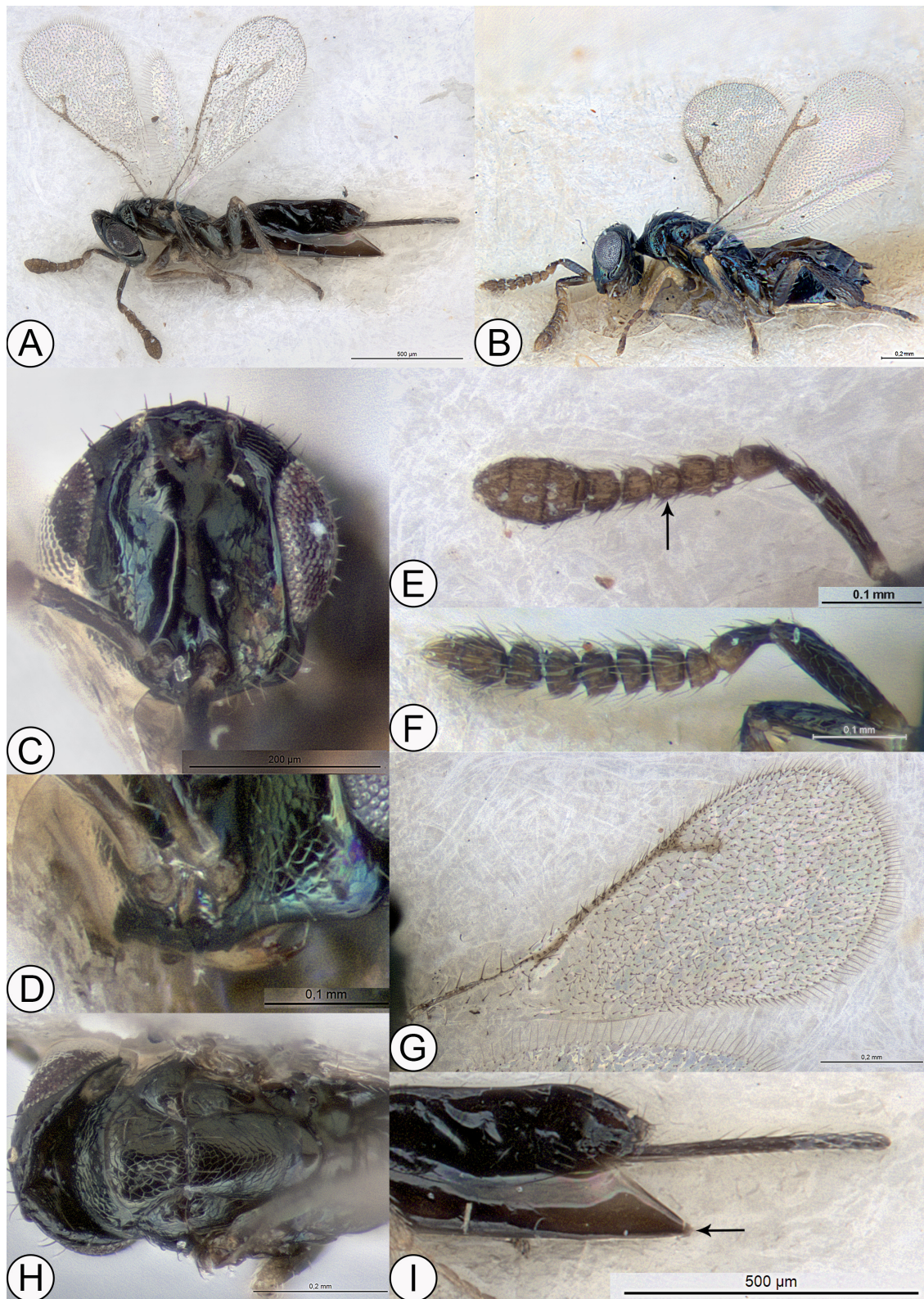
Body length: 1.0 mm. Differs from the female holotype mainly in the structure of the antenna (see generic diagnosis) and the characters given in the above species diagnosis; mesosoma less flattened and gaster much shorter (Fig. 7B).

**Variation**

**Female**

Body length: 1.3–1.5 mm. MV  $2.9\text{--}3.2 \times$  SV.





**Fig. 7.** *Ecrizotes longicauda* Mitroiu sp. nov. **A, C, E, G–I.** Holotype, ♀ (NHMUK). **B, F.** Allotype, ♂ (NHMUK). **D.** Paratype, ♀ (NHMUK). **A.** Habitus, lateral view. **B.** Habitus, lateral view. **C.** Head, frontal view. **D.** Clypeus. **E.** Antenna (arrow indicates Fu3). **F.** Antenna. **G.** Fore wing, dorsal view. **H.** Mesosoma, dorsal view. **I.** Gaster, lateral view (arrow indicates hypopygium).



### Distribution

Zimbabwe.

### Hosts

Unknown.

### Taxonomic comments

*Ecrizotes longicauda* sp. nov. is the species whose females have the longest ovipositor (Fig. 7A). Both sexes are superficially similar to *E. longus* sp. nov. The two sexes were associated based mainly on the setation of the basal cell. The female of *E. longicauda* differs from the female of *E. longus* in having a much longer ovipositor and a non-anelliform Fu3 (Fig. 7E), while the male of *E. longicauda* differs from the male of *E. longus* in having the hind tibiae less strongly inflated (Fig. 7B).

### *Ecrizotes longicornis* (Walker, 1848)

Fig. 8

*Gastrancistrus longicornis* Walker, 1848: 155; lectotype ♀, designated by Graham 1956: 263, NHMUK, examined.

*Ecrizotes longicornis* – Graham 1956: 263; new combination.

### Diagnosis

#### Female

All funiculars distinctly longer than wide, Fu1 length about twice width, Fu3 not smaller than either Fu2 or Fu4 (Fig. 8C); ventral margin of clypeus weakly convex (Fig. 8D); head in frontal view with gena evenly rounded (Fig. 8B); hind tibia length about  $7.5 \times$  width; gaster longer than combined length of head and mesosoma and strongly compressed laterally (Fig. 8A); tip of hypopygium incised (cf. Figs 3G, 6F); ovipositor sheath length about  $0.3\text{--}0.4 \times$  length of hind tibia (about  $0.3 \times$  in the lectotype).

#### Male

Unknown.

### Material examined

CZECH REPUBLIC • 1 ♀; “Děčín. Sněžník / 27.7.56, Bohemia / Bouček // *Ecrizotes longicornis* (Walk. 48) ♀ / Det. Z. Bouček 1958”; NMPC.

UNITED KINGDOM • 1 ♀; “Lectotype // *Gastrancistrus longicornis* // *Gastrancistrus longicornis* Walker [Waterhouse label] // Type C.F. // *Ecrizotes longicornis* (Walk.) ♀ / det. M.W.R. de V. Graham 1956 // B. M. Type Hym. 5.1817”; NHMUK • 1 ♀; “New Forest, Hants. England / Bouček 17.6.76 // ♀ *Ecrizotes longicornis* (Walk.) / det. Z. Bouček, 1980”; NMPC.

### Distribution

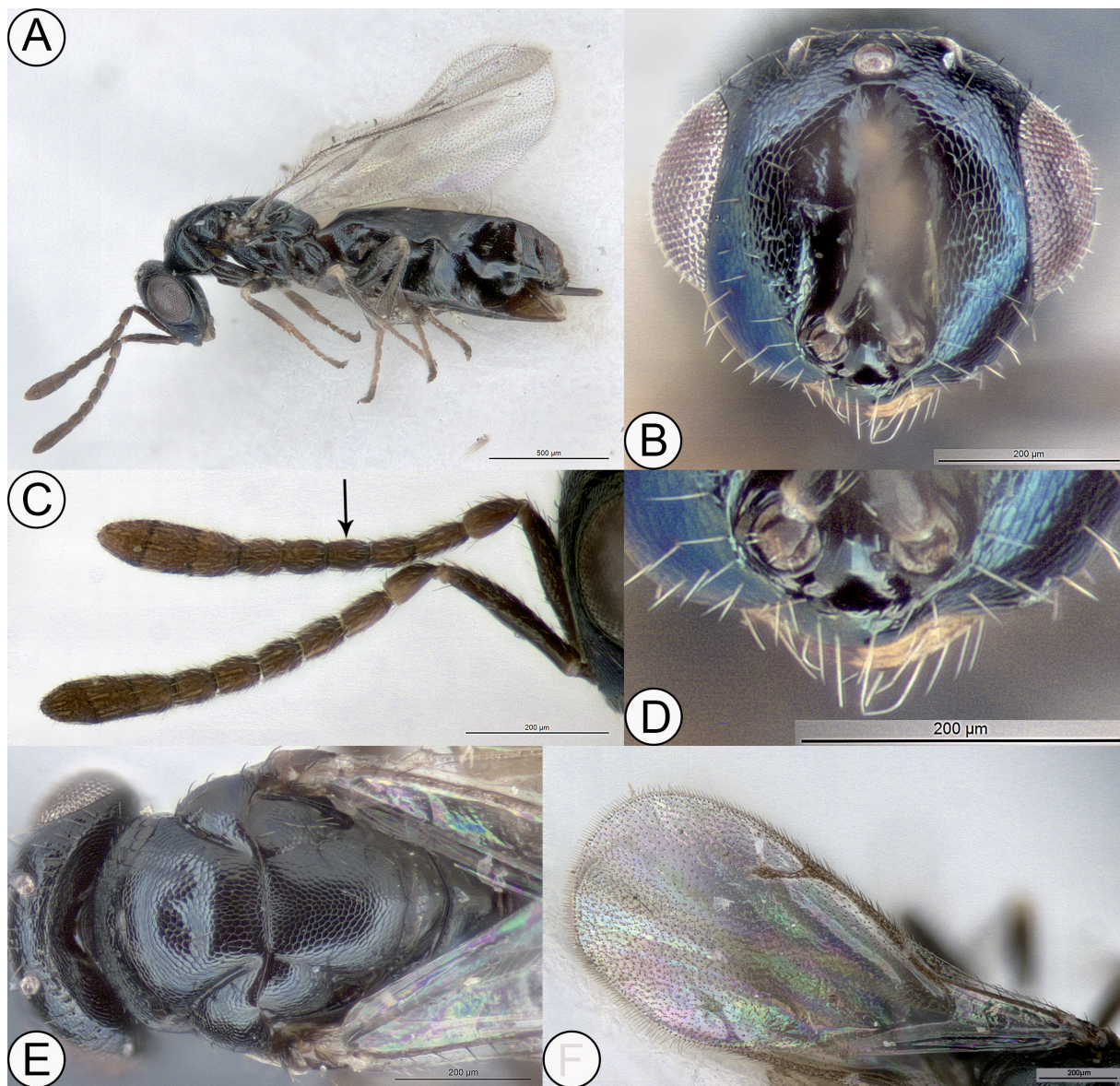
Czech Republic, Hungary, Ireland, Sweden, United Kingdom (UCD Community 2023).

### Hosts

Unknown.

### Taxonomic comments

See *E. filicornis*.



**Fig. 8.** *Ecrizotes longicornis* (Walker, 1848), ♀ (NMPC). **A.** Habitus, lateral view. **B.** Head, frontal view. **C.** Antenna (arrow indicates Fu3). **D.** Clypeus. **E.** Mesosoma, dorsal view. **F.** Fore wing, dorsal view.

***Ecrizotes longus* Mitroiu sp. nov.**

urn:lsid:zoobank.org:act:7405A093-2E00-4E5A-BEA6-B9EB37F3A6EF

Fig. 9

**Diagnosis**

**Female**

All funiculars wider than long, Fu3 anelliform (Fig. 9D); ventral margin of clypeus weakly convex (Fig. 9C); head in frontal view with gena buccate (Fig. 9C); hind tibia length  $6.6\text{--}6.8 \times$  width; gaster longer than combined length of head and mesosoma and strongly compressed laterally (Fig. 9A); tip of hypopygium not incised (cf. Fig. 7I); ovipositor sheath length  $0.5\text{--}0.6 \times$  length of hind tibia.

### Male

Fore and mid tibiae normal, hind tibia strongly inflated, length  $2.6\text{--}2.8 \times$  width (Fig. 9B). All funicular segments wider than long (Fig. 9E). Fore wing with upper side of basal cell densely and uniformly setose.

### Etymology

The species name refers to the elongated body that characterizes the females of this species (from the Latin adjective '*longus*' = 'long').

### Type material

#### Holotype

ZIMBABWE • ♀; "Rhodesia / Salisbury / A. Watsham / WF115 / (i)75"; NHMUK.

#### Allotype

ZIMBABWE • ♂; "Rhodesia / Salisbury / A. Watsham / WF117 / (i)75 // 420.R // *Spathopus* / Pirene m"; NHMUK.

#### Additional paratypes

ZIMBABWE • 1 ♀; "Rhodesia / Salisbury / A. Watsham / WF110 / (i)75"; NHMUK • 2 ♂♂; "Rhodesia / Salisbury / A. Watsham / WF.222 / (i)76"; NHMUK • 1 ♂; "Rhodesia / Salisbury / A. Watsham / WF.99 / ×ii.74 // 597.R; NHMUK • 1 ♂; "Rhodesia / Salisbury / A. Watsham / WF108 / i-75"; NHMUK.

### Description

#### Female holotype

Body length: 1.0 mm. Colour as in Fig. 9. Head in frontal view with vertex protruding between posterior ocelli (Fig. 9C). Gena buccate (Fig. 9C). Ventral margin of clypeus weakly convex (Fig. 9C). Upper face almost wholly very superficially sculptured except rare piliferous punctures (Fig. 9C). Length of pedicel plus flagellum about equal to head width. All funiculars wider than long, Fu3 anelliform (Fig. 9D). Mesosoma dorsally almost flat (Fig. 9A). Pronotum shorter than mesoscutum (Fig. 9F). Basal cell of fore wing entirely setose on upper side (Fig. 9G). MV about  $3 \times$  SV. Hind tibia length about  $6.6 \times$  width. Gaster longer than combined length of head and mesosoma and strongly compressed laterally (Fig. 9A). Tip of hypopygium not incised (cf. Fig. 7I). Ovipositor sheath length about  $0.5 \times$  length of hind tibia.

#### Male allotype

Body length: 0.8 mm. Differs from the female holotype mainly in the structure of the antenna (see generic diagnosis) and the characters given in the above species diagnosis; gaster much shorter (Fig. 9B).

### Variation

#### Female

Body length: 1.00–1.25 mm. MV about  $3.0\text{--}3.3 \times$  SV. Hind tibia length about  $6.6\text{--}6.8 \times$  width. Ovipositor sheath length about  $0.5\text{--}0.6 \times$  length of hind tibia.

#### Male

Body length: 0.8–1.1 mm. Hind tibia length about  $2.6\text{--}2.8 \times$  width.

### Distribution

Zimbabwe.

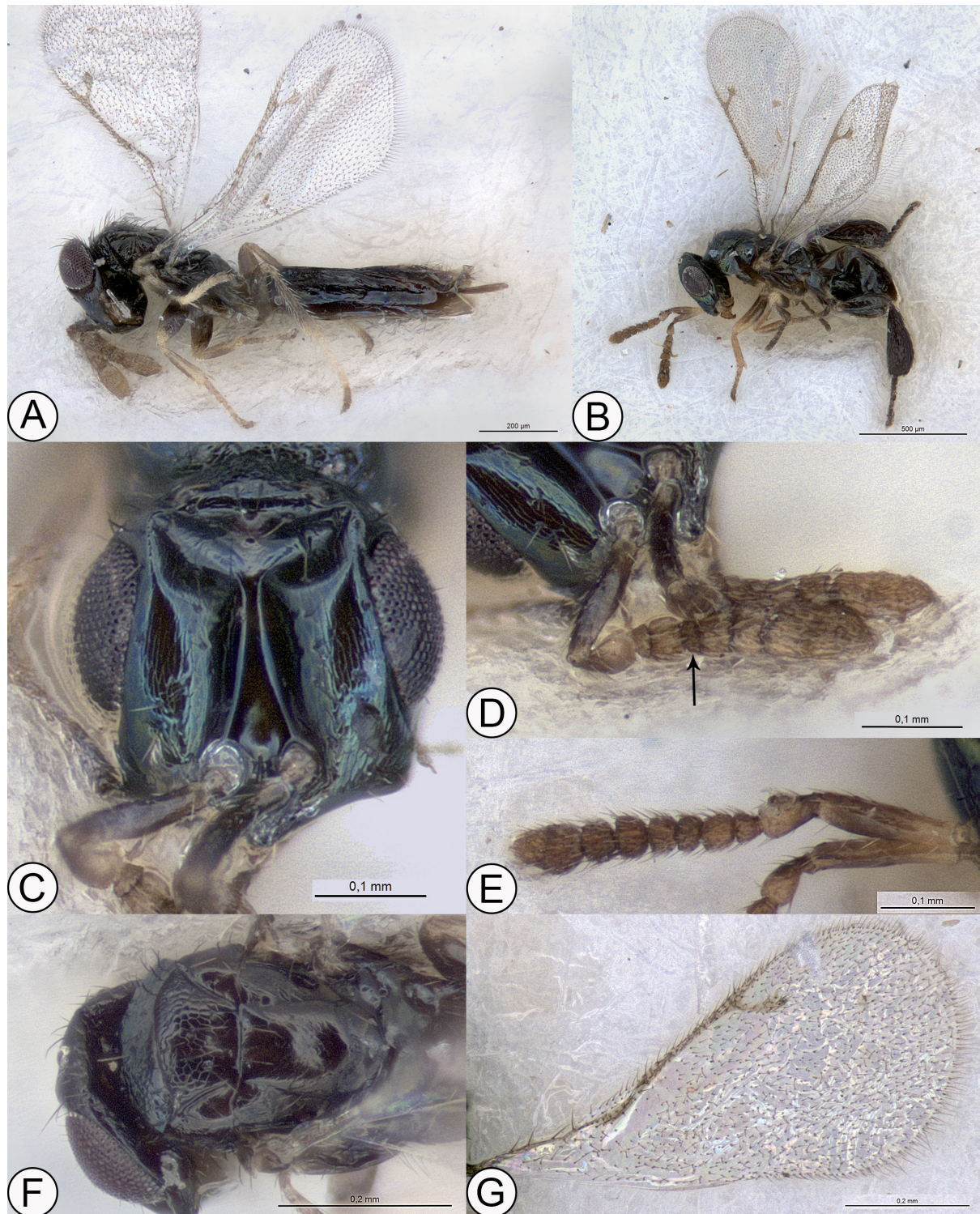
### Hosts

Unknown.



### Taxonomic comments

See *E. longicauda* sp. nov.



**Fig. 9.** *Ecrizotes longus* Mitroiu sp. nov. **A, F–G.** Holotype, ♀ (NHMUK). **B, E.** Allotype, ♂ (NHMUK). **C–D.** Paratype, ♀ (NHMUK). **A.** Habitus, lateral view. **B.** Habitus, lateral view. **C.** Head, frontal view. **D.** Antenna (arrow indicates Fu3). **E.** Antenna. **F.** Mesosoma, dorsal view. **G.** Fore wing, dorsal view.



*Ecrizotes montanus* (Huggert, 1976) comb. nov.

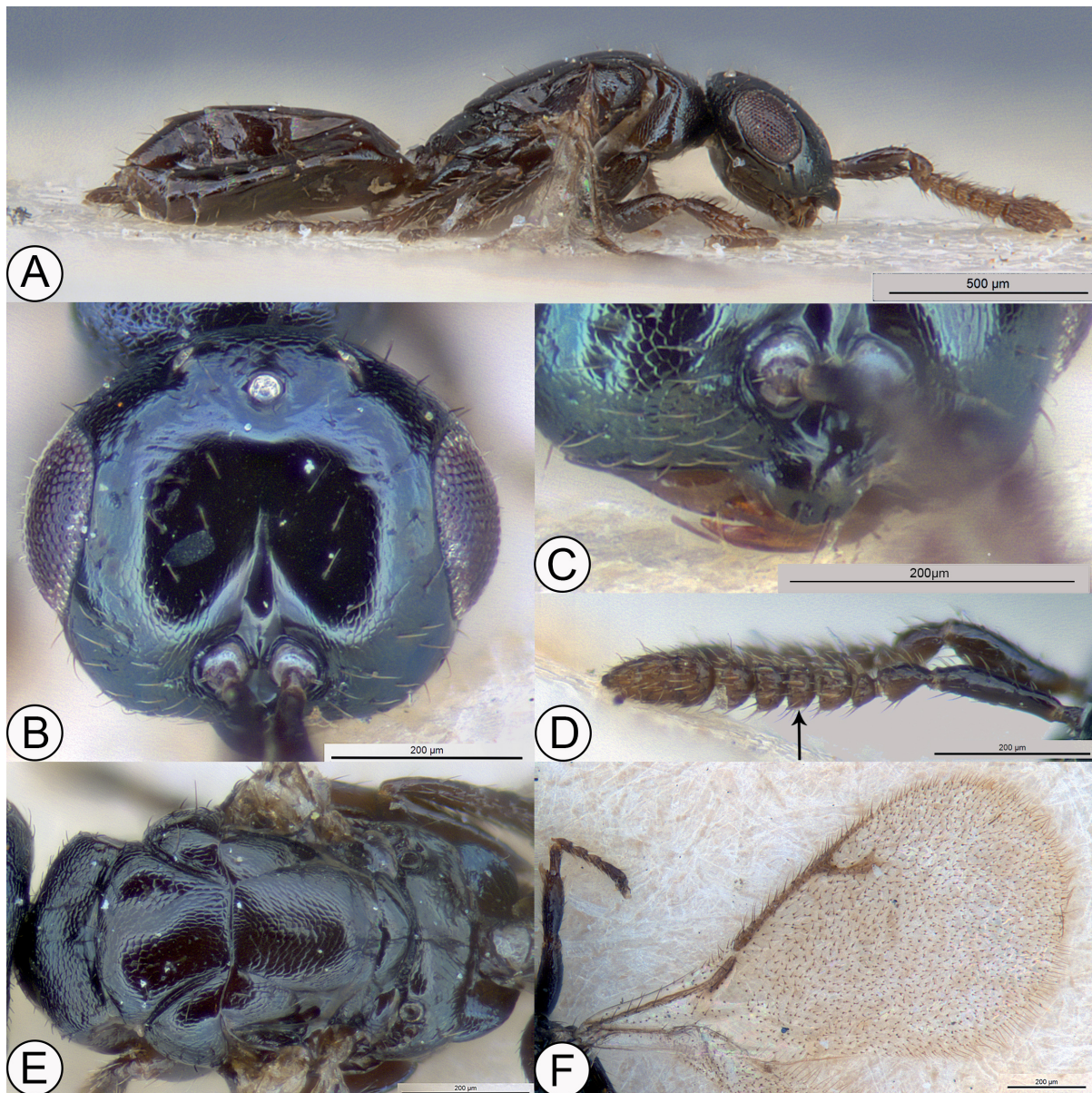
Fig. 10

*Spathopus montanus* Huggert, 1976: 56–58; holotype ♀, Huggert Collection, Sweden, not examined.

**Diagnosis**

**Female**

All funiculars wider than long, Fu3 not smaller than either Fu2 or Fu4 (Fig. 10D); ventral margin of clypeus strongly convex (Fig. 10C); head in frontal view with gena evenly rounded (Fig. 10B); hind tibia length about  $6.8 \times$  width; gaster shorter than combined length of head and mesosoma, not compressed



**Fig. 10.** *Ecrizotes montanus* (Huggert, 1976) comb. nov., ♀ (NHMUK010834304). A. Habitus, lateral view. B. Head, frontal view. C. Clypeus. D. Antenna (arrow indicates Fu3). E. Mesosoma, dorsal view. F. Fore wing, dorsal view.



laterally (Fig. 10A); tip of hypopygium not incised (cf. Fig. 7I); ovipositor sheath length about  $0.3 \times$  length of hind tibia.

#### Male

Unknown.

#### Material examined

SWEDEN • 1 ♀; “Hrj. Tånäs / 28.7.68 / coll. A. Sundholm // Standing over: / *Spathopus montanus* in Hedqvist coll. / BMNH(E) 2011-27 // Det. confirmed ♀ / C. Thuróczy 2013 // NHMUK010834304”; NHMUK.

#### Distribution

Finland, Kazakhstan, Sweden (UCD Community 2023).

#### Hosts

Unknown.

#### Taxonomic comments

The female of *E. montanus* is somewhat similar to the female of *E. hofferi*, from which it differs mainly in the characters given in the key.

#### *Ecrizotes monticola* Förster, 1861

Fig. 11

*Ecrizotes monticola* Förster, 1861: 33; lectotype ♀, ZMHB, designated by Bouček 1961: 58, not examined.

*Henicetrus anellus* Thomson, 1876: 191; holotype ♀, ZMUL, images examined.

*Ecrizotes anellus* – Schmiedeknecht 1909: 273; new combination.

*Henicetrus anellus* – Graham 1969: 331; subjective synonym of *E. monticola*.

#### Diagnosis

##### Female

All funiculars wider than long; Fu3 anelliform (Fig. 11C); ventral margin of clypeus strongly convex (Fig. 11D); head in frontal view with gena buccate (Fig. 11B); hind tibia length  $5.0\text{--}5.2 \times$  width; gaster at most equal to combined length of head and mesosoma, only slightly compressed laterally (Fig. 11A); tip of hypopygium incised (cf. Figs 3G, 6F); ovipositor sheath length  $0.3\text{--}0.4 \times$  length of hind tibia.

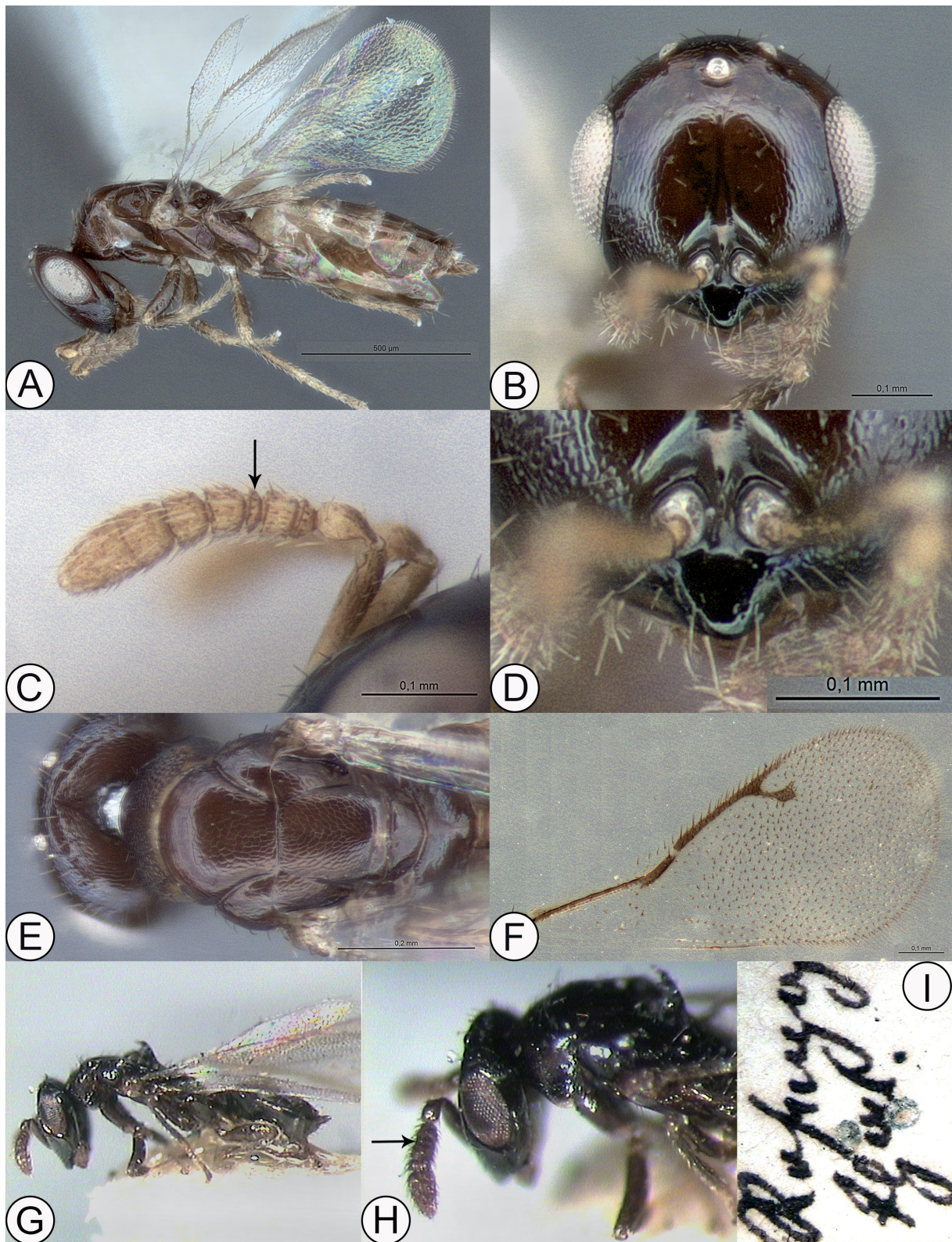
##### Male

Unknown.

#### Material examined

CYPRUS • 1 ♀; “Troodos, Almyrolivado / 1650m, 34°55'42"N 32°53'48"E / 27-29 May 2009, Fusu L. & / Popovici O., YPT, dry slope // MICO UCRC\_ENT 00486453 // DNA Voucher D#4809 / UCR, J.M. Heraty”; MICO • 2 ♀♀; same data as for preceding; “sweep net”; MICO.

FRANCE • 2 ♀♀; “Villefranche / nr. Lyon, France / 13.vi.75 // on *Phacelia congesta* / lg. Piaccordi // det. Z. Bouček 1978 // ♀ *Spathopus*”; NMPC.



**Fig. 11.** *Ecrizotes monticola* Förster, 1861. **A–F.** ♀ (MICO UCRC\_ENT 00486453). **A.** Habitus, lateral view. **B.** Head, frontal view. **C.** Antenna (arrow indicates Fu3). **D.** Clypeus. **E.** Mesosoma, dorsal view. **F.** Fore wing, dorsal view. **G–H.** Female paralectotype (arrow indicates Fu3) (NMPC). **I.** Original label of paralectotype reading “Roseggthal” in Förster’s handwriting.



REPUBLIC OF MOLDOVA • 2 ♀♀; “R. Moldova, Vulcă- / nești, 12.07.2008 / *Medicago sativa* / Leg. Manic Gh.”; MICO • 1 ♀; “Rez. Codrii, r. Stră- / șeni, Rep. Moldova / 19.08.2007 // *Medicago sativa* / leg. Manic G.”; MICO.

ROMANIA • 1 ♀; “VD [Valea lui David], 12.5.07 / leg. O. P. [Ovidiu Popovici] !”; MICO.

SWITZERLAND • 1 ♀, paralectotype; “17 / 251. Frst. / Roseggthal [Förster’s handwriting] // *Ecrizotes monticola* Förster 1861 ♀ / Cotype [red label]”; NMPC.

### Distribution

Switzerland (Förster 1861), Sweden (Thomson 1878); Cyprus, France, Republic of Moldova (new records); also cited from Romania (Mitroiu 2008), but apart from the specimens listed above, previous records need to be confirmed. In UCD Community (2023), there are additional country records, but these also need to be checked in order to establish which of the two species (*E. caudatus* or *E. monticola*) is involved (see Taxonomic comments under *E. caudatus*).

### Hosts

Unknown. Collected on *Phacelia congesta* Hook. (Hydrophyllaceae) in France, steppe vegetation in Romania, and alfalfa in Republic of Moldova.

### Taxonomic comments

In NMPC we examined a female paralectotype of *E. monticola* (labeled as cotype and bearing Förster’s label), probably loaned by Bouček from Berlin (Fig. 11G–I). It agrees well with Förster’s brief description in having the “ovipositor slightly protruding” / “Bohrer etwas vorragend” (Förster 1861: 33). Along with a shorter and less laterally compressed gaster, this character can quite easily separate this species from the otherwise similar *E. caudatus* (see also Taxonomic comments under that species); additionally, we noticed that in *E. monticola* Fu3 tends to be considerably smaller – sometimes virtually invisible in air-dried specimens (Fig. 11C, H) – than in *E. caudatus*, where it was always easily visible (Fig. 3E, I).

*Ecrizotes nasalis* (Springate & Noyes, 1990) comb. nov.

Fig. 12

*Spathopus nasalis* Springate & Noyes, 1990: 224–225; holotype ♀, NHMUK, examined.

### Diagnosis

#### Female

All funiculars wider than long, Fu3 not or only slightly smaller than either Fu2 or Fu4 (Fig. 12F); ventral margin of clypeus acute (Fig. 12D); head in frontal view with gena buccate (Fig. 12B); hind tibia length about  $6.7 \times$  width; gaster shorter than combined length of head and mesosoma, not compressed laterally (Fig. 12A); tip of hypopygium not incised (cf. Fig. 7I); ovipositor sheath length  $0.25 \times$  length of hind tibia.

#### Male

Unknown.

### Material examined

SWEDEN • 1 ♀; “Örebro, Latorp / 12/6 1943 / A. Jansson // Standing over: / *Spathopus montanus* / in Hedqvist coll. / BMNH(E) 2011-27 // Det. confirmed ♀ / C. Thuróczy 2013 // NHMUK010834303”; NHMUK.



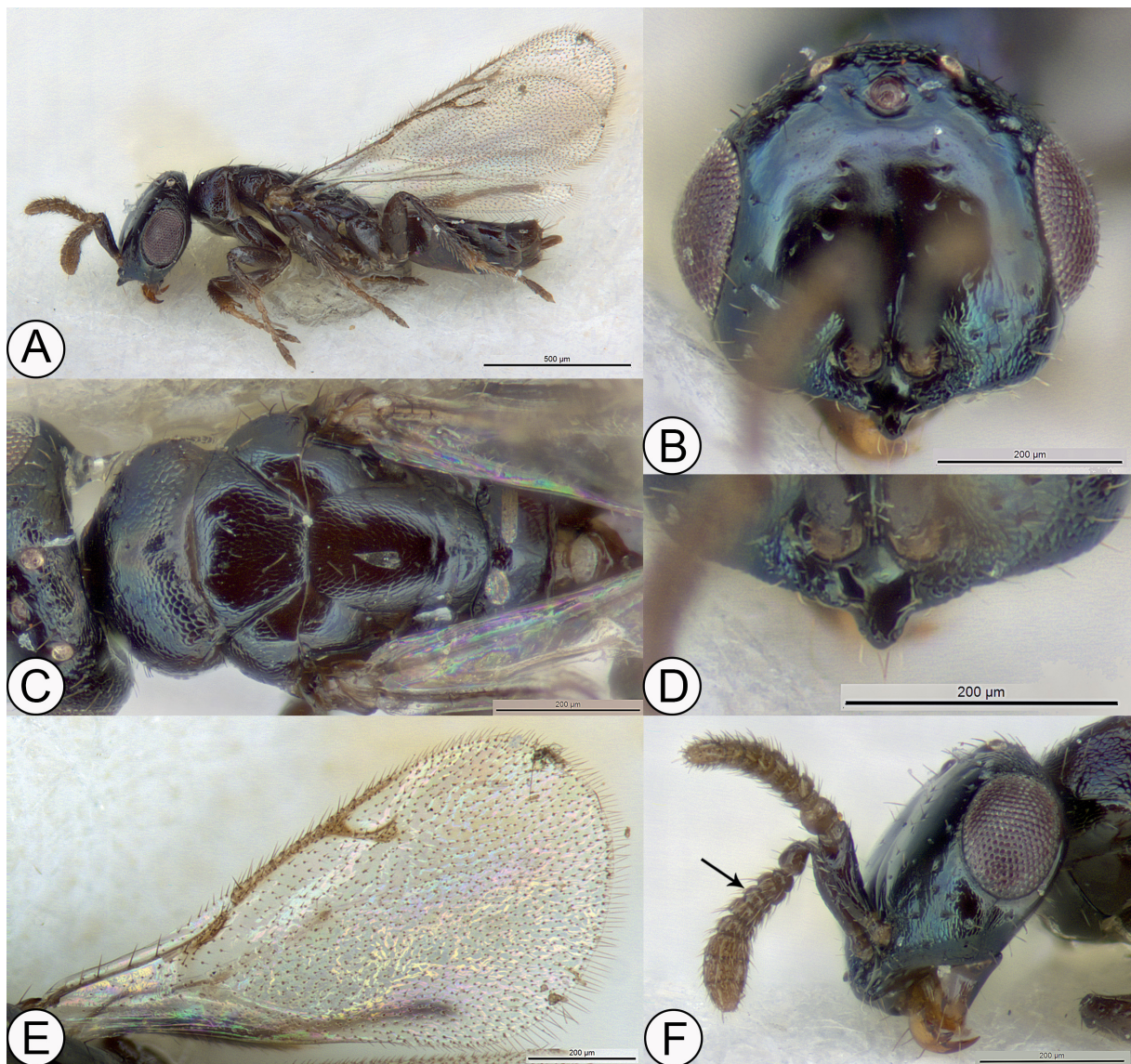
UNITED KINGDOM • 1 ♀; “Holotype // Wales: Mid Glam. / Kenfig Pool LNR / 6.viii.88 / J.S. Noyes // ♀ *Spathopus nasalis* sp.n. / det. N.D. Springate & J.S. Noyes 1990 // B.M. Type Hym 5.3471 // NHMUK 014583381”; NHMUK.

### Distribution

United Kingdom (UCD Community 2023); Sweden (new record).

### Hosts

Unknown.



**Fig. 12.** *Ecrizotes nasalis* (Springate & Noyes, 1990) comb. nov., holotype, ♀ (NHMUK014583381). A. Habitus, lateral view. B. Head, frontal view. C. Mesosoma, dorsal view. D. Clypeus. E. Fore wing, dorsal view. F. Head and antennae, lateral view (arrow indicates Fu3).

### Taxonomic comments

After *E. acer* sp. nov., *E. nasalis* is the species with the most protruding clypeal margin, although considerably less acute than in *E. acer*.

*Ecrizotes rovumae* Mitroiu sp. nov.

urn:lsid:zoobank.org:act:3877D00F-835D-43D2-82F1-2D8D20F6BCE0

Fig. 13

### Diagnosis

#### Female

All funiculars wider than long, Fu3 anelliiform (Fig. 13F); ventral margin of clypeus weakly convex (Fig. 13D); head in frontal view with gena buccate (Fig. 13B); hind tibia length about  $5 \times$  width; gaster shorter than combined length of head and mesosoma, moderately compressed laterally (Fig. 13A); tip of hypopygium not incised (cf. Fig. 7I); ovipositor sheath length about  $0.3 \times$  length of hind tibia.

#### Male

Unknown.

### Etymology

The species name refers to the great river Rovuma, in the vicinity of which the holotype was collected (noun in genitive case).

### Type material

#### Holotype

MOZAMBIQUE • ♀; “Mozambique / Nhica, ‘League 34’ / 20-27.×i.2009 / Claire Villemant // S10°42.372' / E40°13.060 / AH. 71 m, Malaise M3”; MNHN.

### Description

#### Female holotype

Body length: 0.8 mm. Colour as in Fig. 13. Head in frontal view with vertex not protruding between posterior ocelli (Fig. 13B). Gena buccate (Fig. 13B). Ventral margin of clypeus weakly convex (Fig. 13D). Upper face smooth except rare piliferous punctures (Fig. 13B). Length of pedicel plus flagellum shorter than head width. All funiculars wider than long, Fu3 anelliiform (Fig. 13F). Mesosoma dorsally almost flat (Fig. 13A). Pronotum longer than mesoscutum (Fig. 13E). Basal cell of fore wing with a few scattered setae on upper side (Fig. 13C). MV about  $2.4 \times$  SV. Hind tibia length about  $5 \times$  width. Gaster shorter than combined length of head and mesosoma, moderately compressed laterally (Fig. 13A). Tip of hypopygium not incised (cf. Fig. 6I). Ovipositor sheath length about  $0.3 \times$  length of hind tibia.

### Variation

Unknown.

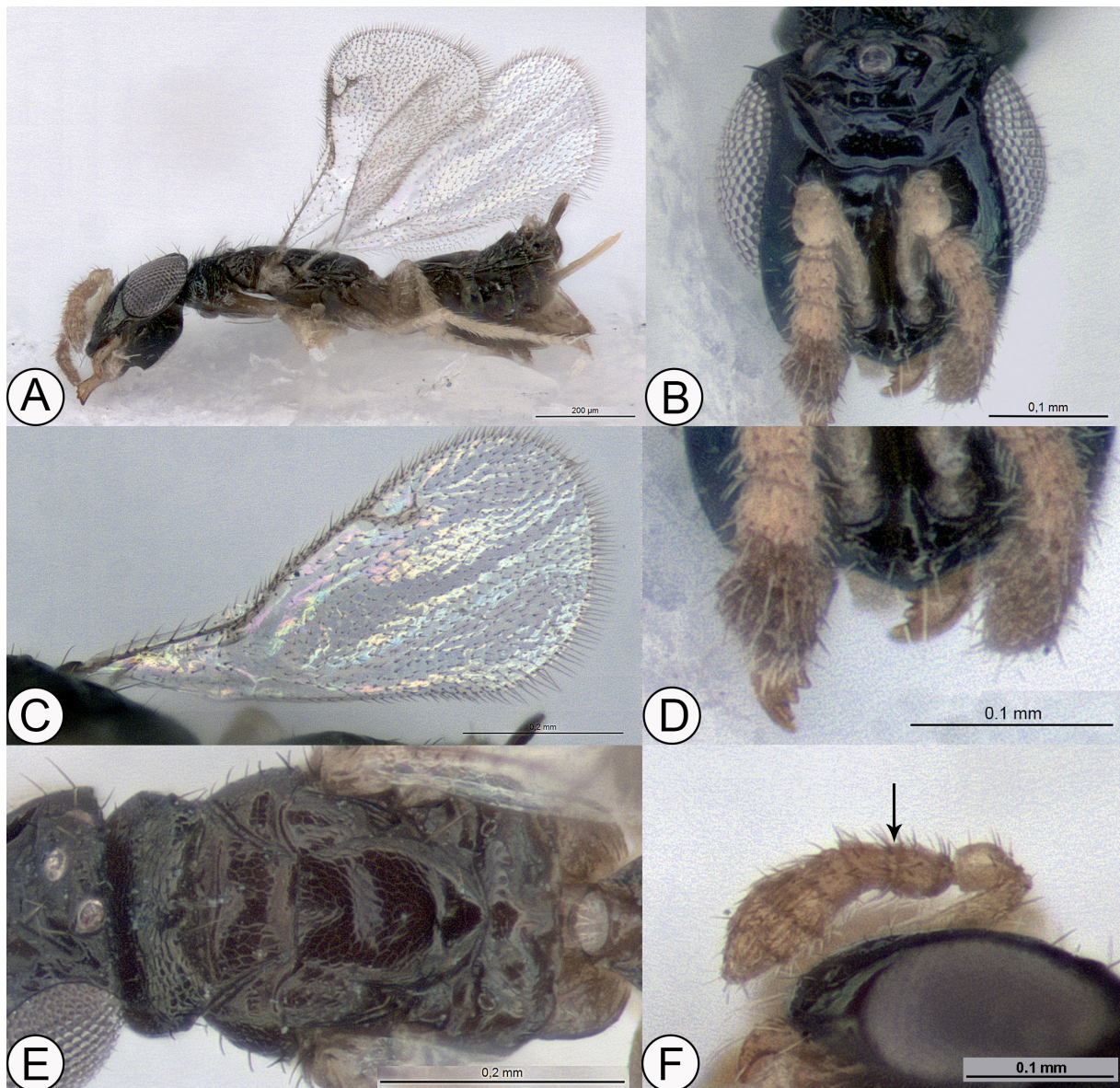
### Distribution

Mozambique.

### Hosts

Unknown.





**Fig. 13.** *Ecrizotes rovumae* Mitroiu sp. nov., holotype, ♀ (MNHN). **A.** Habitus, lateral view. **B.** Head, frontal view. **C.** Fore wing, dorsal view. **D.** Clypeus. **E.** Mesosoma, dorsal view. **F.** Antenna, lateral view (arrow indicates Fu3).

#### Taxonomic comments

This species stands out in having extensively light-coloured legs and differs from similar species such as *E. brevicauda* sp. nov. and *E. monticola* in having a weakly convex clypeal margin and a shorter marginal vein.

#### Discussion

The number and type of antennomeres in Chalcidoidea deserves special treatment as it is a complicated subject. Here we only want to discuss the situation in a few genera of Pirenidae, as it is pertinent to the genus *Ecrizotes*.

**Table 2.** The antennomere size in *Afrothopus* Mitroiu, 2024, *Ecrizotes* Förster, 1861, *Gastrancistrus*, Westwood, 1833 and *Macroglenes* Westwood, 1832.

Female	Antennomeres (scape, pedicel and clava not included)						
	Fla1	Fla2	Fla3	Fla4	Fla5	Fla6	Fla7
	–	–	Fu1	Fu2	Fu3	Fu4	Fu5
<i>Afrothopus</i> Mitroiu, 2024	microscopic	anelliform	large	large	large	large	large
<i>Ecrizotes</i> Förster, 1861	microscopic / anelliform	microscopic / anelliform	anelliform / large	large	anelliform / large	large	large
<i>Gastrancistrus</i> Westwood, 1833	microscopic / anelliform	microscopic / anelliform	large	large	large	large	large
<i>Macroglenes</i> Westwood, 1832	microscopic	microscopic	anelliform	anelliform	anelliform / large	anelliform / large	anelliform / large
Male	Antennomeres (scape, pedicel and clava not included)						
	Fla1	Fla2	Fla3	Fla4	Fla5	Fla6	Fla7
	–	Fu1	Fu2	Fu3	Fu4	Fu5	Fu6
<i>Afrothopus</i> Mitroiu, 2024	microscopic	large	large	large	large	large	large
<i>Ecrizotes</i> Förster, 1861	microscopic	large	large	large	large	large	large
<i>Gastrancistrus</i> Westwood, 1833	microscopic	large	large	large	large	large	large
<i>Macroglenes</i> Westwood, 1832	microscopic	microscopic	anelliform	anelliform	anelliform / large	anelliform / large	anelliform / large

The antennae in *Afrothopus*, *Ecrizotes* and *Gastrancistrus* (Trydiminae) exhibit a rather strong sexual dimorphism, with at least one additional large funicular segment in males (Figs 2F, 4F, 7F, 9E) as compared to the females, while in *Macroglenes* (Pireninae) the antennae are similar in the two sexes (Table 2). Additionally, in Trydiminae the clava has three clavomeres plus a terminal button in females (Figs 1C, 2E, 3E, 4E, 5E, 6C, 7E, 8C, 9D, 10D, 11C, 12F, 13F), and only two clavomeres plus a terminal button in males (Figs 2F, 4F, 7F, 9E).

In females of *Ecrizotes* the first two flagellomeres can range from microscopic to anelliform, while in males the first flagellomere is always microscopic and the second is normal (i.e., large). Thus, the separation of both sexes of *Afrothopus*, *Ecrizotes* and *Gastrancistrus* cannot be done based on the size of antennal flagellomeres (as in the currently available identification keys), and must rely on other characters outlined in the generic diagnosis of *Ecrizotes*.

In females of *Ecrizotes* the development of the fifth flagellomere (Fu3, i.e., the third funicular) is more or less a continuum, as it can be anelliform (*E. acer* – Fig. 1C, *E. alternativa*, *E. brevicauda* – Fig. 2E, *E. longus* – Fig. 9D, *E. monticola* – Fig. 11C, *E. rovumae* – Fig. 13F, *E. tenkasiensis*, *E. taskhiri*), slightly reduced (*E. caudatus* – Fig. 3E, *E. incisus* – Fig. 6C, *E. longicauda* – Fig. 7E, *E. nasalis* – Fig. 12F) or normal (*E. filicornis* – Fig. 4E, *E. hofferi* – Fig. 5E, *E. longicornis* – Fig. 8C, *E. montanus* – Fig. 10D). Thus, it proved impossible to separate *Ecrizotes* from the former genus *Ecrizotomorpha* based on this character.



Until this study, *Ecrizotes* males have been known to have all three pairs of tibiae unmodified (as in *E. filicornis* – Fig. 4B), while in those of the former genus *Spathopus* inflated, or at least in *S. hofferi*, the only species where the male was known (Fig. 5B). The discovery of *E. longicauda* sp. nov. and *E. longus* sp. nov. whose males have only the hind tibiae inflated (Figs 7B, 9B) showed an intermediate case between the two previously known situations, effacing furthermore the differences between the two genera.

As evident from the above species descriptions, *Ecrizotes* displays only a few good characters for species separation, some of the most useful ones being the shape of the clypeal margin and the development of the third funicular segment. Even if all available Afrotropical material of *Ecrizotes* was analyzed, it is expected that the number of species will increase as new material is collected. Thus, this study must be regarded as preliminary and the key should be used with caution.

## Acknowledgements

We are grateful to Natalie Dale-Skey (NHMUK), Jan Macek and Tomas Hovorka (NMPC) for providing access to the collections and loans of material. We thank Lucian Fusu, Alex Gumovsky and Ovidiu Popovici for the donation of several specimens. We are indebted to Evangelos Koutsoukos and Douglas Yanega for explaining the etymology of the name *Ecrizotes*.

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