

Callima icterinella (Mann, 1867) comb. nov. (Lepidoptera, Oecophoridae), a complex consisting of seven species

KAI BERGGREN & LEIF AARVIK

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The Eastern Mediterranean *Callima icterinella* (Mann, 1867) is shown to consist of seven species which can be separated both externally and in the genitalia. We describe *Callima libanotica* sp. n., *C. cretensis* sp. n., *C. levantina* sp. n., *C. klimeschi* sp. n., *C. kos* sp. n. and *C. africana* sp. n. as new to science.

Key words: Lepidoptera, Oecophoridae, *Callima*, new species.

Kai Berggren, Bråvann terrasse 21, NO-4624 Kristiansand, Norway. E-mail: kberggr@online.no

Leif Aarvik, Natural History Museum, University of Oslo, P.O. Box 1172 Blindern, NO-0318 Oslo, Norway. E-mail: leif.aarvik@nhm.uio.no

Introduction

Comparison of recently collected material from Crete (Greek island in the Mediterranean Sea) identified as *Epicallima icterinella* (Mann, 1867) with material of the same species from mainland Greece and elsewhere, revealed that several species had been confused under this name. We found six additional species sharing the same basic wing pattern as *E. icterinella*. The distribution of the species is centered around the eastern part of the Mediterranean Sea. One species recently collected in Zimbabwe in tropical Africa has the same external looks as the species from the Mediterranean area, and we include the description of this species as well.

Callima Clemens, 1860 is a Holarctic genus containing 17 species (Kim et al. 2019), but the real number is difficult to determine as the genus is very close to the species rich *Promalactis* Meyrick, 1908 (Lvovsky et al. 2020). The type species of *Callima* is the North American *C. argenticinctella* Clemens, 1860. *Epicallima* Dyar,

1903 is widely used as a replacement name for *Callima*, but as pointed out by Pohl & Landry (2023) the designation by Dyar (1903) was incorrect. It was based on an incorrect subsequent spelling of *Kallima* Doubleday, 1849 rather than an older valid name. Thus, the correct combination for the species named *Epicallima icterinella* in current European literature is *Callima icterinella* (Mann, 1867) comb. nov.

Material and methods

We denote this group of closely related species as the *Callima icterinella* species complex. The members of the complex have similar wing pattern and structure of the genitalia. The forewing has a simple bicolored pattern in brown/black and yellow (Figure 1). There are four yellow blotches: the basal yellow blotch, the dorsal yellow blotch, the median yellow blotch, and the sub-terminal yellow blotch. In the following species treatments deviations from this pattern are described without

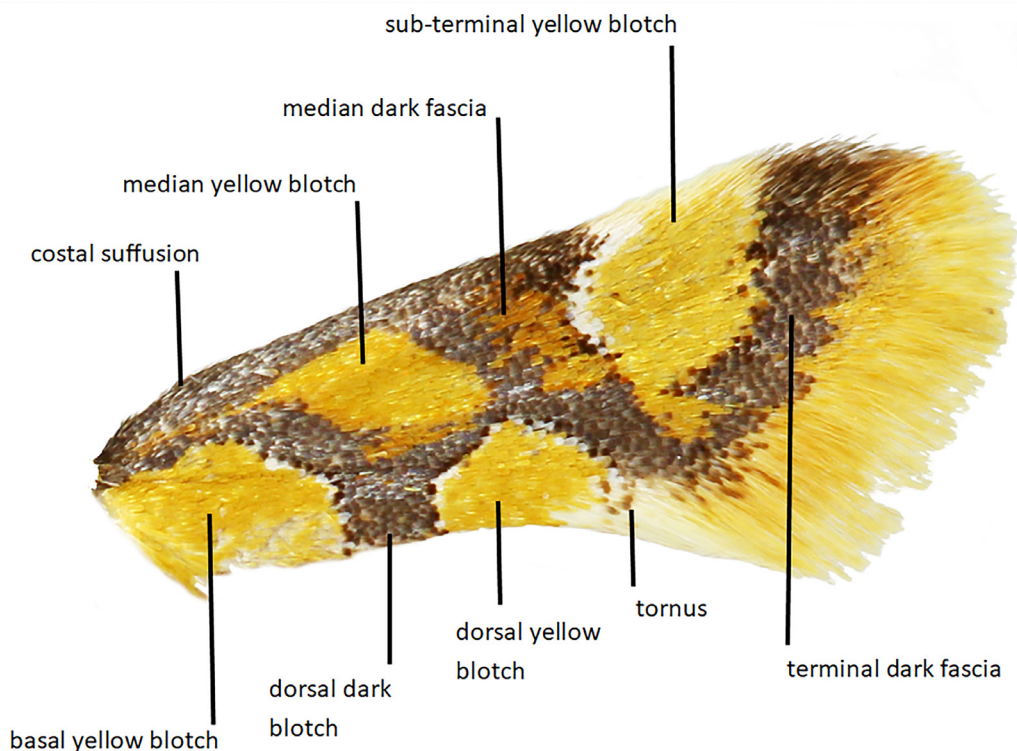


FIGURE 1. Forewing pattern elements in *Callima icterinella* species complex.

repeating the basic shapes common for all species in the complex.

The differences between the species are more pronounced in the female genitalia than in the male genitalia. Consequently, the holotypes of the new species were selected among the females. The definitions of the *antrum* and the *ostium* in the female genitalia follow Gregersen & Karsholt (2022): «The **antrum**, the terminal part of the ductus bursae, terminates in the ostium bursae; it is tubular or funnel-shaped, sclerotized or membranous». Otherwise, the terminology of the genitalia follows Tokár et al. (2005).

Dissections of the genitalia followed Robinson (1976) and were made using Leica MZ6 and Olympus VMZ stereomicroscopes. Photos of the genitalia were taken through a Leica 6000B microscope using a Leica DFC 420 digital camera, and a Celestron microscope using a Samsung S-71 smart phone.

Photos of pinned specimens (Figures 4, 5, 7,

8, 9) were taken using a Canon 650D camera with a 100 mm Canon EF 1:2,8 L IS USM macro or Microptics photographic system with an MP-E 65 mm objective (Figures 6, 10).

DNA barcodes are available for *Callima icterinella* and *C. cretensis* sp. n. DNA barcodes refer to a 658 base-pair long fragment of the mitochondrial cytochrome c oxidase subunit 1 (CO1) (Ratnasingham & Hebert 2007). The data were used to obtain a measurement of the genetic distance between the two species. Tissue samples from other species of the complex have been submitted for sequencing.

Material for the present work was borrowed from the institutions listed below and was supplemented with material collected by the authors in Crete.

Abbreviations: ECKU = Collection of Ecology-Centre, Kiel University, Germany; GP = Genitalia preparation; KBE = Research collection of Kai Berggren, Kristiansand, Norway; MZH =

Finnish Museum of Natural History, University of Helsinki, Finland; NHMO = Natural History Museum, University of Oslo, Norway; NHMW = Naturhistorisches Museum Wien, Vienna, Austria; TLMF = Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria; ZMUC = Zoological Museum, Natural History Museum of Denmark.

Taxonomy

Members of the *Callima icterinella* species complex are recognizable by the forewing pattern (Figure 1). The extent of the dark suffusion separating the yellow blotches varies, and the median yellow blotch may be connected with the basal yellow blotch or the dorsal yellow blotch. The costal suffusion differs in intensity, and in some of the species it may be very indistinct. The forewing underside is dark brownish grey with contrasting yellow-orange cilia, in some species suffused brownish at tornus and apex.

The scape of the antenna is without pecten and has light underside in all species, but the upper

side is dark (except in *C. africana* sp. n.). The flagellum of the antenna in males is double ciliate, in female simple. In some species the upper side of the basal segments of the flagellum is white; in others it is dark. This colour character is helpful in species identification. The labial palps are slender and curved, length 6.5–8.0 times diameter of eye, the third segment is much shorter than the second one (Figure 2). Adults rest with the forelegs stretched forwards and the antennae stretched backwards along the forewing costa (Figure 3).

Male genitalia. Uncus strong, rod-like; gnathos sub-triangular, often with pointed termination; valva apically separated in rounded saccular termination and rounded dorsal termination (cucullus); juxta armed with pair of long, pointed lobes; phallus a long tube, without cornuti; saccus a short, rounded plate. The shape of the valva, juxta lobes and phallus differ between the species and are useful for identification.

Female genitalia. Ovipositor telescopic; apophyses long, posterior pair longer than anterior pair; segment 8 with pair of rounded, setose humps (except *C. africana* sp. n. which has the posterior margin of segment 8 straight); antrum mushroom-shaped; ductus bursae short, with small sclerite near posterior end, ductus seminalis inserted at border of antrum/ductus bursae; corpus bursae oval, with numerous denticles and an irregularly shaped signum. The shape of the antrum and the signum offer useful characters for the separation of the species.



FIGURE 2. Head in profile of *Callima libanotica* sp. n. Photo: K. Berggren.

Callima icterinella (Mann, 1867)

Figures 4, 11, 17.

Identity of *Oecophora icterinella* Mann, 1867. Josef Mann (1867) described *Oecophora icterinella* from an unspecified number of specimens collected by Erber «bei Budua in Dalmatien im Juli». Thanks to NHMW Lepidoptera image collection, H. Bruckner, we could study photos of the type material preserved in NHMW in Vienna. In NHMW there are two specimens collected in Dalmatia by Erber. One is labelled «Erber, Budua, 1868». 1868 is the year after the publication of the description, so it is not a syntype. The other specimen is labelled



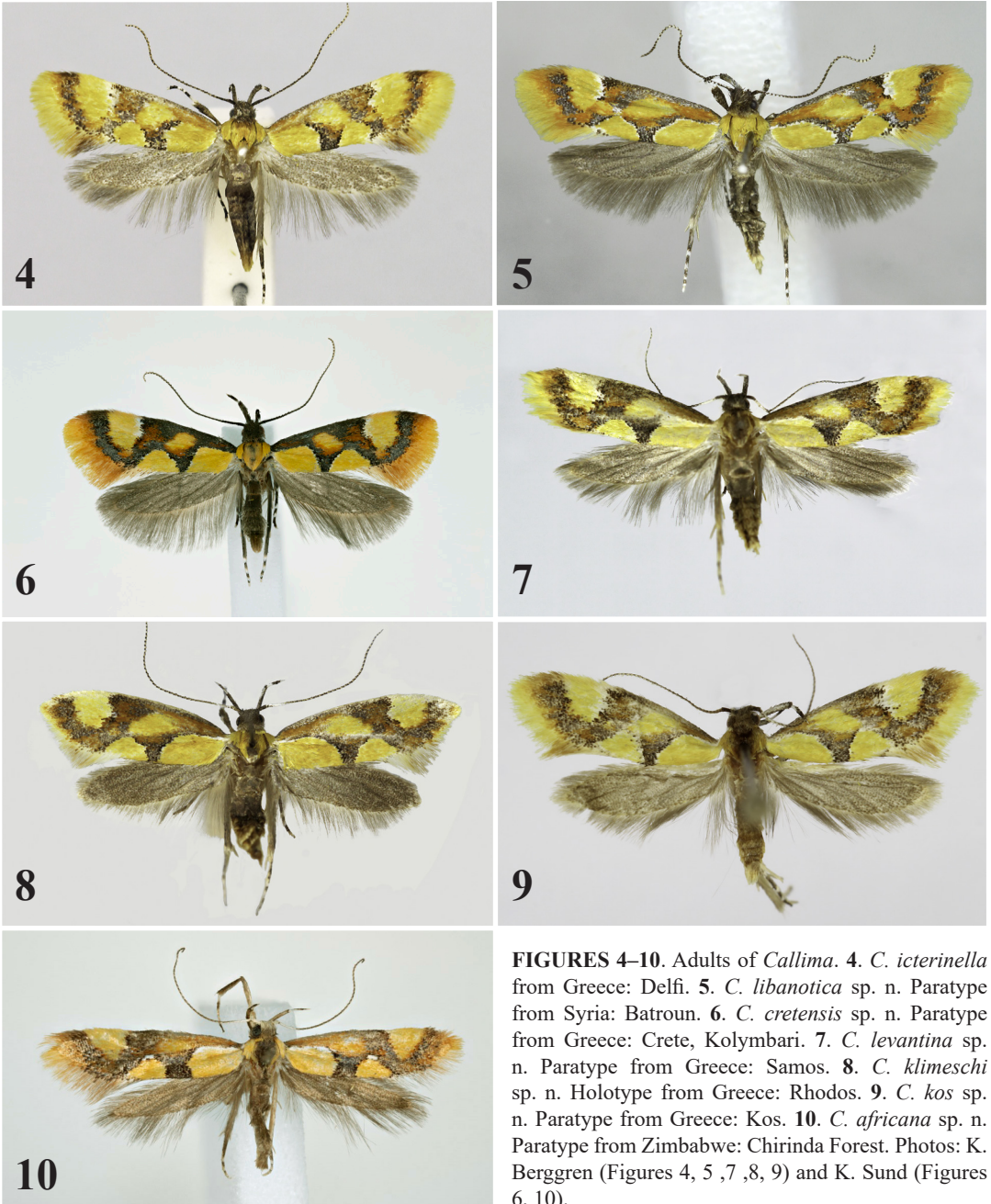
FIGURE 3. *Callima klimeschi* sp. n. in resting position. Photo: G. Vári.

«Erber, Dalm., 1867», and must be regarded as one of the type specimens. It has lost the abdomen but is otherwise in good condition. This could conveniently be selected as the lectotype. The forewing pattern, palps, and antennae of the two Dalmatia specimens agree with the material we have studied from elsewhere and the interpretation of the name *icterinella* presented here.

Diagnosis (Figure 4). Wingspan 10–13 mm. Head brownish above, frons lighter greyish brown; labial palp mottled brownish grey, lighter on inside, segment 3 basally and terminally white. Scape and flagellum dark grey, lightly ringed, rings becoming more distinct towards tip. Thorax yellow, anteriorly variably suffused with orange and brown. Forewing costa ochre, with greyish suffusion; median yellow blotch and dorsal yellow blotch connected in some specimens. Legs brownish grey, underside lighter, tarsi with lighter rings. *C. icterinella* differs from *C. levantina* sp. n., *C. klimeschi* sp. n. and *C. kos* sp. n. by having the upper side of the basal segments of the flagellum dark (the upper side of the basal segments are white in *C. levantina* sp. n., *C. klimeschi* sp. and *C. kos* sp. n.). It differs from *C. cretensis* sp. n. in the lighter forewing costa. In *C. libanotica* sp.

n. the dorsal dark blotch is triangular, whereas in *C. icterinella* the dorsal dark blotch is trapezoidal having a broad lower margin. In the male genitalia (Figure 11) the dorsal edge of the valva is strongly convex, with the sclerotized margin broad basally; the juxta lobes are slender and of nearly the same length as the phallus (the phallus is distinctly longer than the juxta lobes in *C. libanotica* sp. n. and *C. cretensis* sp. n.). The phallus in *C. icterinella* is less widened terminally than in *C. cretensis* sp. n. In the female genitalia (Figure 17) the antrum is narrow, constricted medially, and its unique bulbous termination extends well beyond the anterior margin of segment 7.

Examined material: **BULGARIA:** Vlas, 9–12.VII.1981, 1♂, GPKBE 15136; same locality, 16–19.VII.1981, 1♀, GP KBE 15133, leg. V. Zouhar, coll. ZMUC; **GREECE:** Parga Province, Parga beach, 13–27.VII.1990, 2♂♂1♀, leg. A. Mikalsen, coll. NHMO; Lakonia, Monemvasia, 17.VI.1980 2♂♂; same locality, 23.VI.1982, 1♀, leg. B. Skule & S. Langemark, GB KBE 15132, coll. ZMUC; Lakonia, 5 km S Monemvasia 15–17.VII.1981, 1♂, leg. B. Skule & S. Langemark, GP Lvovsky 18, coll. ZMUC; same locality, 26.VI.1981, 1♀, leg. G. Christensen, coll. ZMUC;



FIGURES 4–10. Adults of *Callima*. 4. *C. icterinella* from Greece: Delfi. 5. *C. libanotica* sp. n. Paratype from Syria: Batroun. 6. *C. cretensis* sp. n. Paratype from Greece: Crete, Kolymbari. 7. *C. levantina* sp. n. Paratype from Greece: Samos. 8. *C. klimeschi* sp. n. Holotype from Greece: Rhodes. 9. *C. kos* sp. n. Paratype from Greece: Kos. 10. *C. africana* sp. n. Paratype from Zimbabwe: Chirinda Forest. Photos: K. Berggren (Figures 4, 5, 7, 8, 9) and K. Sund (Figures 6, 10).

Evros, 5 km S Krki, 17.VII.1998, 1♀, leg. B. Skule & S. Nilsson, GP KBE 15144, coll. ZMUC; Delfi, 700 m.a.s.l., 26.VII.1984, 1♀, leg. M./E. Arenberger, coll. ZMUC; Smolikas, 10 km W Ag. Paraskevi, by Konitsa, 27.VII.1990, 1♀,

leg. M. Fibiger, GP KBE 15160, coll. ZMUC; Litochoro, 3.VII.1997, 1♂, leg. Z. Tokar, GP KBE 15137, coll. ZMUC; Ceroiplatanos, 800 m.a.s.l., 24.VII.1990, 1♀, leg. M. Fibiger, coll. ZMUC; Lakonia, 10 km S Githion, V.1994, 1♀, leg. O.



FIGURES 11–14. Male genitalia of *Callima*. **11.** *C. icterinella* GP KBE 15137. **12.** Paratype *C. libanotica* sp. n. GP KBE 15224. **13.** Paratype *C. cretensis* sp. n. GP KBE 15657. **14.** Paratype *C. levantina* sp. n. GP KBE 15158.

Karsholt, coll. ZMUC; Alexandropolis, Kirki, 24–27.VII.1985, 1♂7♀♀, leg. P. Grotenfelt, GP KBE ♂ 15229 + GP KBE ♀ 15233, coll. MZH; **MONTENEGRO:** Ulcinj, 5.VII.1965, 1♂1♀, leg. H. Steuer, coll. ECKU; **TURKEY:** Adana, Saembeyli, 18 km N, 1700 m.a.s.l., 6.VIII.1997, 1♀, leg. K. Larsen, GP KBE 15157, coll. ZMUC; Nigde, Bolkar Daglari, N. side, 1800 m.a.s.l., 26.VII.1994, 1♂, leg. K. Larsen, GP KBE 15159, coll. ZMUC.

Distribution. Bulgaria, Greece (excluding Crete), Italy (Pinzari 2019) Montenegro and

Turkey. The record from Israel (Lvovsky et al. 2016) represents *C. libanotica* sp. n., see below.

Remarks. The type locality, Budua (also spelled Budva), is situated in present day Montenegro.

In the book by Tokár et al. (2005) fig. 46a and 46b on plate 6 (adults), fig. 46 (male genitalia) and fig. 46 (female genitalia) correctly depict *C. icterinella*. However, fig. 46 on plate 6 (the top one of the three specimens) shows *C. klimeschi* sp. n. from Rhodos.

Three specimens from Greece have been



FIGURES 15–16. Male genitalia of *Callima*. **15.** Paratype *C. klimeschi* sp. n. GP KBE 15130. **16.** Paratype *C. kos* sp. n. GP KBE 15389.

DNA-barcoded, and results from this have kindly been made available by Peter Huemer. The closest species is *C. cretensis* sp. n., and the divergence is 4.81 %.

***Callima libanotica* sp. n.**

Figure 2, 5, 12, 18

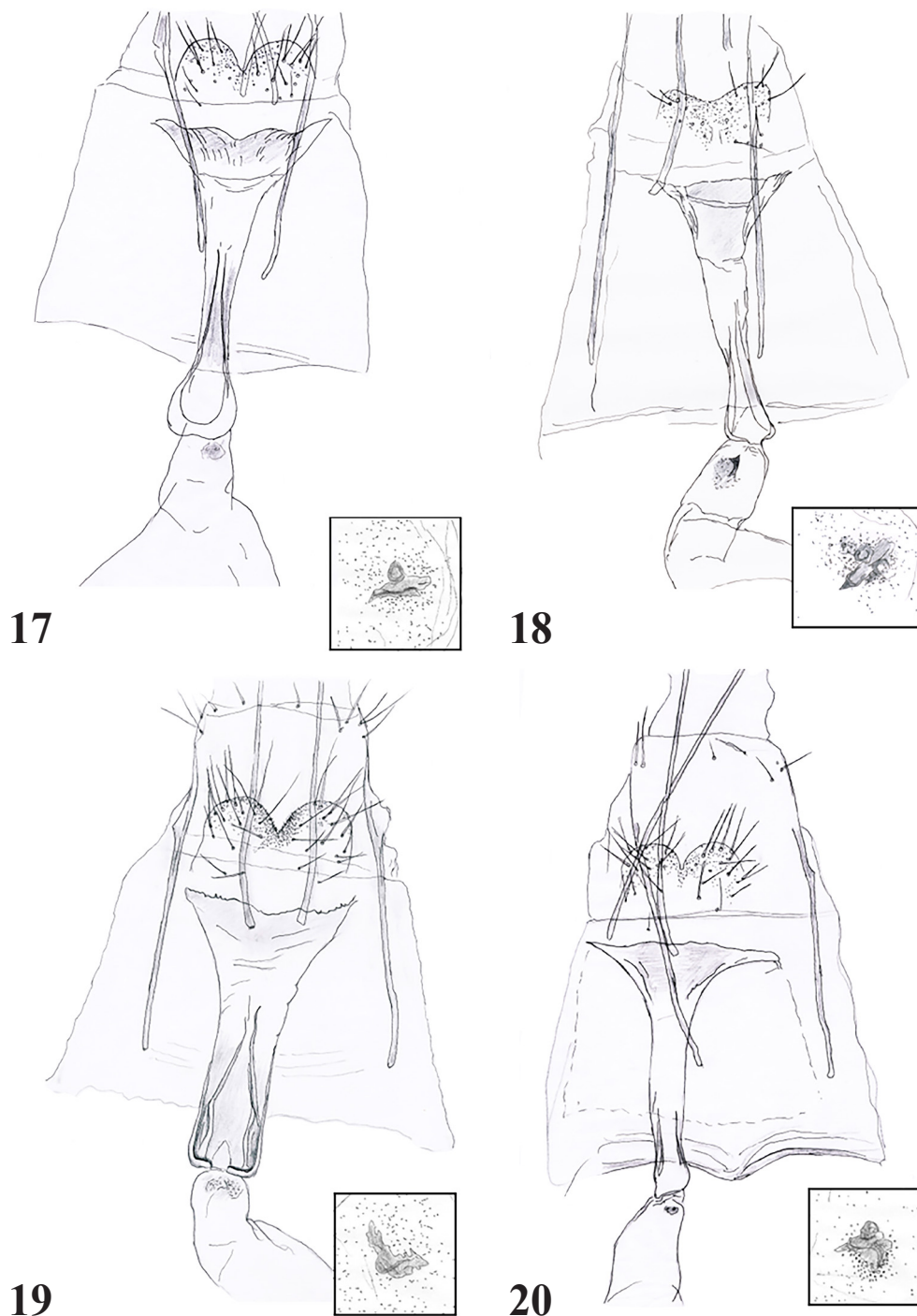
HOLOTYPE ♀, **LEBANON:** Batroun, 200 m.a.s.l., Tel Ras Nhascl, 1.VI.2012, leg. J. Kullberg & T. Lievonen, GP KBE 15226, coll. MZH.

PARATYPES, LEBANON: Batroun, 200 m.a.s.l., Tel Ras Nhascl, 1.VI.2012, 7♂♂3♀♀, GP KBE ♂ 15227 + ♀ 15231 + ♂ 15232, coll. MZH; Kesrouan: Ghbele, 885 m.a.s.l., 5–6.VI.2012, 1♂, leg. J. Kullberg & T. Lievonen, coll. MZH; Beirut, 1893, 2♂♂2♀♀, collector unknown, GP KBE ♀ 15223 + GP KBE ♂ 15224, coll. NHMW; Beirut, no date, 1♂, collector unknown, coll. NHMW; Beirut, 1915, 1♂, leg. Kohlenberg, coll. NHMW; Beirut, 1869, 1♂, leg. Lederer, coll. NHMW; Beirut, Syrien, 1898, 2♂♂, «Cremona», GP KBE 15220, coll. NHMW; **ISRAEL:** N. Distr., Dan, 10–11.VI.1986, 5♂♂; leg. R. Linnavuori, GP KBE 1230 + GP Lvovsky 126, coll. MZH; **SYRIA**, no date, 1♂, leg. Staudinger, coll. MZH; **TURKEY**, Amasia, no date, 1♂, collector unknown, GP KBE 15222, coll. NHMW.

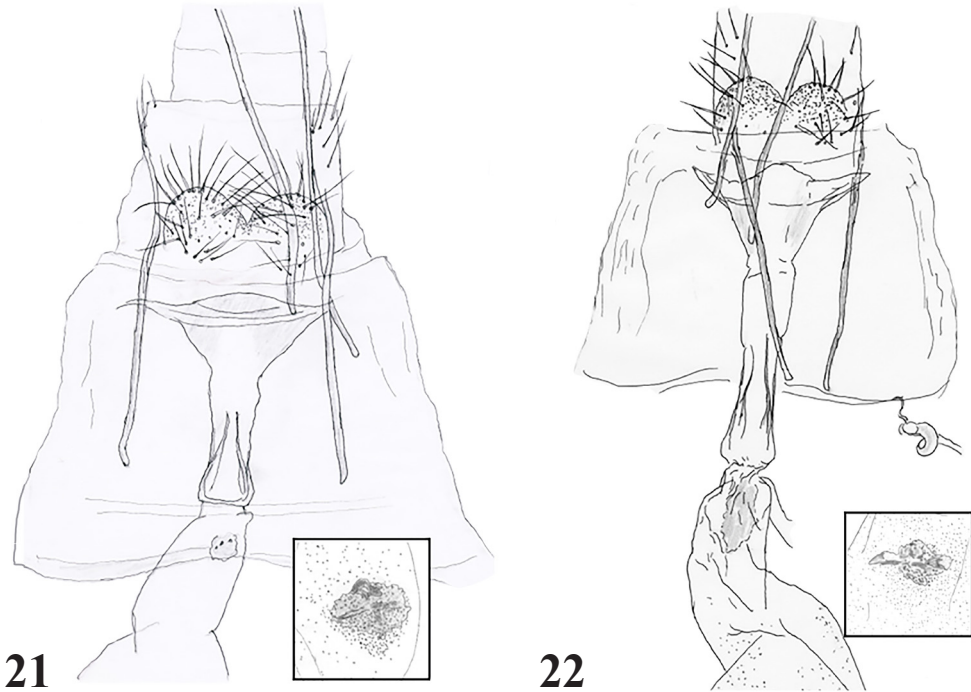
Diagnosis (Figure 5). *Callima libanotica* sp.

n. is externally close to *C. icterinella*, differing from that species by the triangular dorsal dark blotch in the forewing (in *C. icterinella* the dorsal dark blotch is broad at the dorsal margin giving it a trapezoidal shape). *C. libanotica* sp. n. differs from *C. cretensis* sp. n. in the lighter pattern of the forewing. In the male genitalia differing from *C. icterinella* and *C. cretensis* sp. n. by the parallel-side valva with less sclerotized dorso-basal margin. In the female genitalia the antrum extends just beyond the anterior margin of segment 7.

Description. Wingspan 11–15 mm. Head brownish above, frons lighter; labial palp (Figure 2) with segment 2 mottled dark grey on outside, inside white in basal half, becoming grey in terminal half, segment 3 basally and terminally white; flagellum ringed black and white, segment 5–8 with much white, rings become less distinct in the middle and more distinct towards the tip. Thorax yellow, with some brownish scales in middle. Forewing dark pattern blackish with patches of ochreous brown; costal suffusion blackish along wing margin, brownish, below and connected with dorsal dark blotch with thin blackish line; dorsal dark blotch triangular, dorsally narrow; median yellow blotch isolated from basal yellow blotch by narrow dark line, sometimes connected; underside dark greyish brown, with contrasting yellow cilia. Hindwing with cilia dark grey. Fore- and hindleg blackish



FIGURES 17–20. Female genitalia of *Callima*. Signa in separate frames. 17. *C. icterinella* GP KBE 15144. 18. Paratype *C. libanotica* sp. n. GP KBE 15231. 19. Paratype *C. cretensis* sp. n. GP KBE 15143. 20. Paratype *C. levantina* sp. n. GP KBE 15140.



FIGURES 21–22. Female genitalia of *Callima*. Signa in separate frames. **21.** Holotype *C. klimeschi* sp. n. GP KBE 15135. **22.** Holotype *C. kos* sp. n. GP KBE 15390.

brown, tarsi with white rings; hindleg brown, underside lighter than upperside, whitish spots on tarsi.

Male genitalia (Figure 12). Valva parallel-sided in basal half, slightly narrowed terminally, dorsal edge of base relatively weak; sacculus with subapical, dorsally directed convexity; juxta lobes nearly straight; phallus longer than juxta lobes, ratio 1.12–1.26 ($n = 6$), average 1.21.

Female genitalia (Figure 18). Antrum extending beyond to – or slightly beyond – anterior margin of segment 7, hardly widened at anterior termination, posterior part demarcated, funnel-shaped; ductus bursae posteriorly with small sclerite; signum an irregular, relatively large sclerite.

Distribution. Israel, Lebanon, Turkey. The specimen labelled «Syria» could also originate from present day Lebanon or Israel. Material from Israel deposited in Helsinki (MZH) was examined by A.L. Lvovsky and identified by him as *C. icterinella* (Lvovsky et al. 2016). We consider these specimens as belonging to *C. libanotica* sp. n.

Etymology. Named after the country where the holotype and several paratypes were collected, Lebanon.

Callima cretensis sp. n.

Figure 6, 13, 19

HOLOTYPE ♀, **GREECE**: Chania Province, Kolymbari, 35.54593°N, 23.77626°E, 40 m.a.s.l., 12.V.2022, GP NHMO 4275, leg. K. Berggren & L. Aarvik, coll. NHMO.

PARATYPES, **GREECE**: Chania Province, Kolymbari, 35.54593°N, 23.77626°E, 40 m.a.s.l., 12.V.2022, 3♂♂1♀, coll. NHMO; ditto 5♂♂, 1♀, coll. KBE; ditto, but 8.V.2022, 1♂, coll. NHMO; ditto, 1♂, coll. KBE; Chania Province, Kolymbari, 35.53595°N, 23.80096°E, 4 m.a.s.l., 12.V.2022, 2♂♂, leg. K. Berggren & L. Aarvik, coll. NHMO; 30.V.2023, 1♂, leg. K. Berggren & R. Voith, coll. KBE; Chania Province, Kolymbari, 35.537363°N, 23.798129°E, 4 m.a.s.l., 31.V.2023, 1♀, leg. K. Berggren & R. Voith, coll. KBE; the same data as holotype, 30.V.–13.VI.2023, 1♀,

leg. K. Berggren & R. Voith, coll. KBE; Chania Province, Zounaki, 86 m.a.s.l., 35.481792°N, 23.828388°E, 30.V.–13.VI.2023, 6♂♂2♀♀, leg. K. Berggren & R. Voith, coll. KBE; ditto, 1♂, coll. RVO; Chania Province, Sougia 35.26429°N, 23.81097°E, 40 m.a.s.l., 1.VI.2023, 1♂,1♀, leg. K. Berggren & R.Voith, coll. KBE; Chania Province, Sempronas, 35.38184°N, 23.81250°E, 610 m.a.s.l., 9.VI.2023, 1♂, leg. K. Berggren & R. Voith, coll. KBE; ditto, 2♂♂, coll. RVO; Chania Province, Rodopos, 2 km N, 35.583288°N, 23.752410°E, 400 m.a.s.l., 7.VI.2023, 1♂, leg. K. Berggren & R. Voith, coll. KBE; Chania Province, Agia, 35.47482°N, 23.93231°E, 44 m.a.s.l., 2.VI.2023, 1♀, leg. K. Berggren & R. Voith, coll. KBE; Chania Province, Pírgos, 35.36087°N, 23.830266°E, 805 m.a.s.l., 3.VI.2023, 1♂, leg. K. Berggren & R. Voith, coll. RVO; Rethymnon Province, Plakias S, 35.180531°N, 24.401345°E, 13 m.a.s.l., 10.VI.2023, 1♀, leg. K. Berggren & R. Voith, coll. KBE; Rethymnon Province, Agios Vasilios, 35.234867°N, 24.414050°E, 396 m.a.s.l., 10.VI.2023, 1♂1♀, leg. K. Berggren & R. Voith, coll. KBE; Chania Province, Plaka, 35.448149°N, 24.214574°E, 135 m.a.s.l., 2010, 3♂♂, leg. R. Voith, coll. RVO; Chania Province, Imbros, 35.2203°N, 24.1629°E, 780 m.a.s.l., 17.VI.2010, 1♂1♀, leg. L. Aarvik, GP ♂ NHMO 4274, coll. NHMO; Iraklion Province, Fodele a. Pandom., 40 m.a.s.l., 25.V.2000, 3♂♂4♀♀ (DNA Barcode IDs TLMF Lep 30418, TLMF Lep 30475), leg. W. Ruckdeschel, coll. TLMF; ditto, but 100 m.a.s.l., 1♂1♀ (DNA Barcode ID TLMF Lep 30476); ditto, but 10 m.a.s.l., 1♂; Chania Province, Kirtomados a. Xekollimenos, 20–70 m.a.s.l., 8.V.2000, 5♂♂6♀♀, leg. W. Ruckdeschel, coll. TLMF; ditto, but 20 m.a.s.l., 17.V.2003, 1♀ (DNA Barcode ID TLMF Lep 28279); Chania Province, Patellari a. Xekolliomenos, 20 m, 17.VI.1997, 1♀, leg. W. Ruckdeschel, coll. TLMF; Chania Province, Platanias, 20 m.a.s.l., 17.V.2003, 1♀, leg. W. Ruckdeschel, coll. TLMF; Chania Province, Patellari a. Xekolimenos, 20 m.a.s.l., 16.VI.1997, 1♂1♀, leg. W. Ruckdeschel, coll. TLMF; ditto, but 18.VI.1997, 1♀; Chania Province, Omalos, südl. Wald, 1250 m.a.s.l., 6.VII.2010, 1♀, leg. W. Ruckdeschel, coll. TLMF; Chania Province, Omalos nördl. Wald, 1100

m.a.s.l., 5.VII.2010, 1♂, leg. W. Ruckdeschel, coll. TLMF; Lasithiou Province, Vrahasi b. Neapoli, 300 m.a.s.l., 11.VI.1997, 1♂1♀, leg. W. Ruckdeschel, coll. TLMF; Lasithiou Province, Agia Joannis b. Koutsounari, 390 m.a.s.l., 19.V.2000, 1♀, leg. W. Ruckdeschel, coll. TLMF; Rethymnon Province, Agia Galini, O-Strand, 5 m.a.s.l., 14.VI.1997, 1♂, leg. W. Ruckdeschel, coll. TLMF; Iraklion Province, Zaros 5.VI.1988, 1♂1♀, leg. R. Johansson, coll. ZMUC; Chania Province, Omalos, 1040 m.a.s.l., 14–20.VI.2014, 1♂1♀, leg. C. Hviid, O. Karsholt, F. Vilhelmsen, GP KBE ♂ 15138, GP KBE ♀ 15141, coll. ZMUC; Chania Province, Skines, 5–11.VI.2004, 1♂, leg. B. Skule, C. Hviid & E. Vesterhede, coll. ZMUC; Chania, 2 km S Fourné 250 m.a.s.l., 6.VI.2004, 1♀, leg. B. Skule, C. Hviid & E. Vesterhede, GP KBE 15143, coll. ZMUC.

Diagnosis (Figure 6). *Callima cretensis* sp. n. can be separated from the other species of the complex by its black forewing pattern, by the widened termination of the phallus in the male genitalia, and by the broad antrum in the female genitalia.

Description.Wingspan 11.0–18.5 mm. Head dark grey, shiny; labial palp segment 1 and 2 blackish externally, inner side grey except few whitish scales terminally on segment 2; segment 3 white, with black ring in middle; flagellum upper side black, becoming greyish towards tip, indistinctly ringed. Thorax and tegulae yellow. Forewing dark pattern blackish, narrowly edged with white; dorsal dark blotch broad along wing margin, connected with costal suffusion and median dark fascia, causing isolation of median yellow blotch; ochreous brown streak inside costal suffusion; ochreous brown suffusion below median yellow blotch and inside median dark fascia; white band present along inner margin of sub-terminal fascia; cilia ochreous, darker basally. Hindwing with cilia dark grey. Foreleg dark blackish brown, tarsus with white rings; mid- and hindleg dark brown with white rings on tarsi.

Male genitalia (Figure 13). Valva narrower towards tip, dorsum convex, its sclerotized margin extending beyond middle; juxta lobes relatively broad; phallus relatively long, strongly widened at termination.

Female genitalia (Figure 19). Antrum broad, extending to anterior margin of segment 7, anterior termination straight. Signum shaped as an irregular wide V.

Distribution. Greece: Crete.

Etymology. Named after the Greek island, Crete, where it appears to be endemic.

Remarks. Rebel (1916) recorded this species from Crete as *Borkhausenia icterinella* and wrote (translated from German): «I obtained the species in numbers in the beginning of June in a bushy resting place near Neapolis».

Three paratypes from Kolymbari were DNA-barcoded and gave full length sequences: ♀ KBE 2022060, NLON 1230-23; ♂ KBE 2022061, NLON 1231-23; ♂ Nor_Crete_2022136, BGE 00221_C12, all coll. KBE. The species received BIN code, BOLD:AFH3063.

Callima levantina sp. n.

Figure 7, 14, 20

HOLOTYPE ♀, **GREECE**: Samos: Kokkari, 3-8.VI.2012, leg. C. Hviid & B. Skule, GP KBE 15129, coll. ZMUC.

PARATYPES, **CYPRUS**: Garyllis river, 14 km N Limassol, 300 m.a.s.l., 27.VI.1997, 2♀♀, leg. D. Nilsson, A. Madsen, M. Fibiger & P. Svendsen, GP KBE 15134 + 15140, coll. ZMUC; Akrotiri, 19.V.1927, 1♂, collector unknown, GP KBE 15221, coll. NHMW; **TURKEY**: Gaziantep, 16 km NE Kadirli, 10.VII.1987, 2♂♂, leg. M. Fibiger, GP KBE 15158 + 15169, coll. ZMUC.

Diagnosis (Figure 7). *Callima levantina* sp. n. can be separated from *C. icterinella*, *C. libanotica* sp. n. and *C. cretensis* sp. n. by the white basal segments of the flagellum. From *C. klimeschi* sp. n. and *C. kos* sp. n. it differs by darker costal suffusion in the forewing. The male genitalia of *C. levantina* sp. n. and those of *C. klimeschi* sp. n. and *E. kos* sp. n. are rather similar. The valva in *C. levantina* sp. n. is slightly narrower and with weaker base of the dorsal margin. The antrum in the female genitalia of *C. klimeschi* sp. n. is much shorter than in *C. levantina* sp. n. It differs from *C. kos* sp. n. by the even posterior margin of the antrum (with medial convexity in *C. kos* sp. n.).

Description. Wingspan 11–14 mm. Head dark

brownish, frons lighter; labial palp segment 1 and 2 blackish externally, inner side grey; segment 3 white, with black ring in middle; basal segments of flagellum white, terminal 5–6 segments ringed, otherwise nearly unicolorous brownish grey. Thorax with tegulae yellow, anteriorly with brown suffusion. Forewing dark pattern blackish; costal suffusion widened towards middle of wing, with brownish orange core; dorsal dark blotch dorsally broad; median yellow blotch isolated from basal yellow blotch and dorsal yellow blotch by narrow dark lines; underside brownish grey, cilia contrasting yellow, brownish at tornus and apex. Hindwing with cilia dark grey. Foreleg dark blackish brown, tarsus with white rings; mid- and hindleg dark brown, tarsi with whitish spots.

Male genitalia (Figure 14). Valva parallel-sided, dorsal edge of base relatively weak. Juxta lobes straight; valva slenderer than in *C. klimeschi* sp. n. and *C. kos* sp. n. The ratio genital capsule/phallus is 1.3.

Female genitalia (Figure 20). Antrum extending beyond anterior margin of segment 7, hardly widened at anterior termination, posterior termination broad with even margin; ductus bursae posteriorly with tiny sclerite; signum an irregular sclerite.

Distribution. Cyprus, Turkey, and Greece: Samos.

Etymology. Named after the old geographical name «Levant» which denotes the countries situated around the eastern part of the Mediterranean Ocean.

Callima klimeschi sp. n.

Figure 8, 15, 21

HOLOTYPE ♀, **GREECE**: Rhodos, Akropolis of Kamiros (Monte Smith), 1.VI.1989, leg. J. Klimesch, GP KBE 15135, coll. ZMUC.

PARATYPES, **GREECE**: Rhodos, Akropolis of Kamiros (Monte Smith), 21.V.1984, 1♂, leg. J. Klimesch, GP KBE 15130, coll. ZMUC; ditto, but 31.V.1974, 1♂, coll. ECKU.

Diagnosis (Figure 8). *Callima klimeschi* sp. n. can be separated from *C. icterinella*, *C. libanotica* sp. n. and *C. cretensis* sp. n. by the white basal segments of the flagellum. From *C. levantina* sp. n.

it differs by the lighter brownish costal suffusion. In the male genitalia the valva in *C. klimeschi* sp. n. is broader with stronger base of the dorsal margin than in *C. levantina* sp. n. In the female genitalia the antrum is distinctly shorter than in *C. levantina* sp. n. and *C. kos* sp. n. There appears to be no clear-cut difference from *C. kos* sp. n. in the male genitalia. Externally the two species differ slightly in the shape of the dorsal dark blotch (it tends to be triangular in *C. klimeschi* sp. n., more trapezoidal in *C. kos* sp. n.).

Wingspan 15.5 mm. Head brownish grey, frons lighter; labial palp segment 2 externally brownish grey, inner side white, basally blackish; segment 3 white, subapically with broad, dark ring; basal segments of flagellum white, distal 1/5 distinctly ringed, otherwise weakly ringed. Thorax with tegulae yellow, medially some brownish orange scales; posteriorly with blackish patch followed by few white scales. Costa of forewing basally light brown, forming a triangular-shaped patch which has the lower margin edged with black; the black edge forms a line, white below, which extends to proximal margin of the dorsal dark blotch; dorsal dark blotch triangular, dorsally rather narrow; dark pattern elements with ochreous brown suffusion; underside brownish black with contrasting yellowish orange cilia. Hindwing with cilia dark grey. Foreleg blackish brown, tarsus with white rings; mid- and hindleg brown, with lighter underside, tarsi with whitish spots.

Male genitalia (Figure 15). Valva parallel-sided, dorsal edge of base broadly sclerotized. Juxta lobes straight, phallus straight, of even width. The ratio genital capsule/phallus is 1.48, the highest in the species complex, indicating that the phallus is relatively short.

Female genitalia (Figure 21). Antrum short, not reaching anterior margin of segment 7, posterior margin convex, margin of anterior termination straight; small sclerite present in posterior part of ductus bursae; corpus bursae with relatively large, irregular signum.

Distribution. Greece: Rhodes

Etymology. Named after the famous Austrian Microlepidoptera specialist, Josef Klimesch (1902–1997), who collected the three type specimens.

Remarks. Fig. 46 on Tafel 6 in Tokár et al. (2005) (identified as *icterinella*) shows a specimen collected at the type locality of *C. klimeschi* sp. n. on Rhodos Island by J. Klimesch. We consider this specimen to belong to *C. klimeschi* sp. n.

The photo of *C. klimeschi* sp. n. in nature (Figure 3), was taken near the type locality on Rhodos Island, Kameiros, by Gábor Vári on the 27 May 2019.

Callima kos sp. n.

Figure 9, 16, 22

HOLOTYPE ♀, **GREECE:** Kos, Pynaria, Agia Marina, 25.V.1979, leg. P. Grotenfelt, GP KBE 15390, coll. MZH.

PARATYPES, **GREECE:** Kos, Pynaria, Agia Marina, 23.V.1979, 1♂, leg. P. Grotenfelt; ditto, but with date 31.V.1979, 1♂; Kos, Askleioieion, 29.V.1979, 1♂2♀♀, leg. P. Grotenfelt, GP KBE ♀ 15228 + GP KBE ♂ 15389; ditto, 30.V.1979, 1♀, leg. P. Grotenfelt, coll. ZMH; Kos, Psalidi, 12.VIII.2005, 1♀, leg. H. Retzlaff, coll. ECKU.

Diagnosis (Figure 9). *E. kos* sp. n. has the basal segments of the flagellum white. This character is shared with *C. levantina* sp. n. and *C. klimeschi* sp. n. *C. levantina* sp. n. differs externally from the other two in the very dark costal suffusion. Apart from the shape of dorsal blotch which tends to be trapezoidal, we found no external character to separate *C. klimeschi* sp. n. and *C. kos* sp. n. Except slightly shorter length of the phallus in *C. klimeschi* sp. n., the male genitalia also appear to be very similar. The two species, however, differ strongly in the female genitalia; the antrum is much longer in *C. kos* sp. n.

Description. Wingspan 12–15 mm. Head brownish grey, frons light grey; labial palp segment 2 externally brownish grey, inner side dorsally and basally white, segment 3 white with broad, dark medial ring; basal part of flagellum white, single blackish scales on 2–3 segments, otherwise the basal segments are completely white; the remainder of flagellum ringed white and blackish, rings become more distinct towards tip. Thorax light brown in middle, tegulae yellow. Forewing costa ochreous brown, with grey suffusion along wing margin, below edged with

white which continues as a white line to proximal margin of dorsal dark blotch; dorsal dark blotch trapezoidal (broad along wing margin); dark pattern elements with ochreous brown suffusion. Hindwing with cilia dark grey.

Foreleg blackish brown, underside whitish, tarsus with white rings; mid- and hindleg brown, underside yellowish brown, tarsi darker with white spots.

Male genitalia (Figure 16). Uncus narrow; valva slightly narrower towards tip; juxta lobes slightly curved; the ratio genital capsule/phallus is 1.32; otherwise, the male genitalia are similar to those of *C. klimeschi* sp. n.

Female genitalia (Figure 22). Antrum extending well beyond anterior margin of segment 7, anterior termination wide, rounded, posteriorly with medial convexity and pointed lateral corners; sclerite in ductus bursae larger than in other species; signum rounded, irregular, with medial extension on left side.

Distribution. Greece: Kos.

Etymology. Named after the Greek island Kos where the type material was collected.

Epicallima africana sp. n.

Figure 10, 23

HOLOTYPE ♀, **ZIMBABWE**: Manicaland Province: Honde Valley, Nyanga, Aberfoyle Lodge, 840 m.a.s.l., 18°17'651"S, 32°58'130"E, 15.XI.2017, leg. A.J. Kingston, genitalia slide NHMO 4333, coll. NHMO.

PARATYPES, **ZIMBABWE**: Manicaland Province: Chipinge Highlands, Chirinda Forest, 1170 m.a.s.l., 20°24'604"S, 32°41'962"E, 19–20. XI.2017, 3♀♀, leg. A.J. Kingston, coll. NHMO.

Diagnosis (Figure 10). *Callima africana* sp. n. can be separated from the other species of the complex by the white scape of the antenna (the scape is grey in the other species), and in the female genitalia by the straight posterior margin of segment 8 (posterior margin with two humps in the other species).

Description. Wingspan 10.5–13.0 mm. Head. Frons whitish, head above greyish brown; labial palp segment 2 light greyish brown with narrow black termination, segment 3 black, with white

base and apex; scape of antenna as well as six basal segments of flagellum white, antenna otherwise grey, simple. Thorax brown in middle, tegulae yellow. Foreleg dark grey, tarsus with light rings; mid- and hindleg yellowish, with grey suffusion on tibiae, and grey spots on tarsi.

Forewing dark pattern blackish, suffused with orange, costal suffusion orange, edged below with narrow black line followed by white line; dorsal dark patch basally broad; white spot present where dorsal dark blotch touches median dark fascia; cilia yellow, ochreous basally and at tornus. Hindwing with cilia dark grey.

Female genitalia (Figure 23). Posterior margin of segment 8 straight; posterior part of antrum funnel-shaped with straight posterior margin, not clearly separated from ductus bursae, slightly widened anteriorly; ductus bursae constricted before entering corpus bursae; corpus bursae oval, signum a small irregular, dentate sclerite.



FIGURE 23. Female genitalia of *Epicallima africana* sp. n. GP NHMO 4333.

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