



<https://doi.org/10.11646/megataxa.17.2.4>

<http://zoobank.org/urn:lsid:zoobank.org:pub:334291F6-8A7A-49FA-9F82-6E2DBB830094>

## A taxonomic revision of the Afrotropical signal fly genus *Engistoneura* Loew, 1873 (Diptera: Platystomatidae) with the description of sixteen new species, an identification key to species and a discussion of biogeography

ASHLEY H. KIRK-SPRIGGS<sup>1</sup>, ANDREW E. WHITTINGTON<sup>2</sup> & GILLIAN K. MCGREGOR<sup>3</sup>


<sup>1</sup>African Natural History Research Trust, Street Court, Kingsland, Leominster, Herefordshire HR6 9QA, United Kingdom and Research Associate, Insects Division, Natural History Museum, Cromwell Road, South Kensington, London SW7 5BD, United Kingdom

✉ [ashley.kirk-spriggs@anhrt.org.uk](mailto:ashley.kirk-spriggs@anhrt.org.uk);  <https://orcid.org/0000-0002-0216-4653>

<sup>2</sup>FlyEvidence, Drumfearn, Sleat, Isle of Skye, IV43 8QZ, Scotland, United Kingdom

✉ [awhittington@flyevidence.co.uk](mailto:awhittington@flyevidence.co.uk);  <https://orcid.org/0000-0002-0465-1172>

<sup>3</sup>Geography Department, Rhodes University, Grahamstown 6140, South Africa

✉ [g.k.mcgregor@ru.ac.za](mailto:g.k.mcgregor@ru.ac.za);  <https://orcid.org/0000-0003-1524-5222>

### Table of contents

Abstract.....	411	<i>Engistoneura mcalpinei</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	445
Introduction.....	412	<i>Engistoneura moerens</i> (Fabricius, 1794) .....	446
Historical account .....	413	<i>Engistoneura nebula</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	458
Material and methods.....	415	<i>Engistoneura obscura</i> Hendel, 1914 .....	459
Results .....	417	<i>Engistoneura parallela</i> (Wiedemann, 1830) .....	461
Taxonomy .....	417	<i>Engistoneura smithi</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> ..	463
Genus <i>ENGISTONEURA</i> Loew, 1873 .....	417	<i>Engistoneura vicina</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> ..	469
Identification key to adult <i>Engistoneura</i> Loew species .....	421	Intuitive species-groups .....	478
Species accounts .....	423	Names no longer assigned to <i>Engistoneura</i> .....	486
<i>Engistoneura ankasa</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	423	<i>Engistoneura albolineata</i> Bezzi, 1908 .....	486
<i>Engistoneura biseriata</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	425	<i>Engistoneura bicolor</i> Bezzi, 1908 .....	486
<i>Engistoneura circumfusus</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	426	<i>Engistoneura cohaesa</i> Speiser, 1911 .....	486
<i>Engistoneura currani</i> Steyskal, 1965 .....	427	<i>Engistoneura concolor</i> Bezzi, 1908 .....	487
<i>Engistoneura deemingi</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	428	<i>Engistoneura guttata</i> Bezzi, 1908 .....	487
<i>Engistoneura distincta</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	431	<i>Engistoneura octodecim</i> Speiser, 1911 .....	487
<i>Engistoneura elvillah</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	432	<i>Engistoneura surniipennis</i> Speiser, 1911 .....	488
<i>Engistoneura fatima</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	433	<i>Engistoneura unilineata</i> Bezzi, 1914 .....	488
<i>Engistoneura flavipennis</i> Hendel, 1914 .....	434	Discussion .....	488
<i>Engistoneura ghanensis</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	437	Geographical coverage .....	488
<i>Engistoneura hemifascia</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	439	River Barrier Hypothesis .....	488
<i>Engistoneura hexafascia</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	440	Refuge Hypothesis .....	489
<i>Engistoneura kachana</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	441	Elevational distribution .....	490
<i>Engistoneura lugens</i> (Fabricius, 1794) .....	443	Forest fragmentation and conservation .....	491
<i>Engistoneura maya</i> Kirk-Spriggs & Whittington, <b>sp. nov.</b> .....	444	Conclusion .....	494
		Acknowledgements .....	494
		References .....	495

### Abstract

The Afrotropical endemic platystomatine genus *Engistoneura* Loew, 1873 is revised taxonomically, based on the study of name-bearing types of all described species and varieties, material housed in museums around the world and recently collected specimens from the rainforests of Central and West

Africa. Following revisionary study, the genus now comprises 22 species, six previously described, namely: *E. currani* Steyskal, 1965 (Liberia), *E. flavipennis* Hendel, 1914 (Ghana), *E. lugens* (Fabricius, 1794) (Guinea and Sierra Leone), *E. moerens* (Fabricius, 1794) (Benin, Cameroon, Côte d'Ivoire, Equatorial Guinea, Ghana, Guinea, Nigeria and Togo), *E. obscura* Hendel, 1914 (Cameroon, Equatorial Guinea, Gabon and Republic of Congo) and *E. parallela* (Wiedemann, 1830) (Sierra Leone) and 16 species are described and figured as new to science, namely: *E. ankasa*, **sp. nov.** (Ghana), *E. biseriata*, **sp. nov.** (Côte d'Ivoire), *E. circumfusus*, **sp. nov.** (Guinea), *E. deemingi*, **sp. nov.** (Côte d'Ivoire, Nigeria and Togo), *E. distincta*, **sp. nov.** (Liberia and Sierra Leone), *E. elvillah*, **sp. nov.** (Guinea), *E. hemifascia*, **sp. nov.** (Côte d'Ivoire), *E. hexafascia*, **sp. nov.** (Sierra Leone), *E. kachana*, **sp. nov.** (Ghana), *E. maya*, **sp. nov.** (Guinea), *E. mcalpinei*, **sp. nov.** (Sierra Leone), *E. nebula*, **sp. nov.** (Sierra Leone), *E. fatima*, **sp. nov.** (Côte d'Ivoire and Sierra Leone), *E. ghanensis*, **sp. nov.** (Ghana), *E. smithi*, **sp. nov.** (Côte d'Ivoire and Ghana) and *E. vicina*, **sp. nov.** (Cameroon, Côte d'Ivoire, Equatorial Guinea, ?Gabon, Guinea and Liberia). The following nomenclatorial acts are proposed: *E. catogastera* (Bigot, 1891) **syn. n.** is sunk as a junior synonym of *E. moerens*; *E. unilineata* Bezzi, 1914 is removed from the genus *Engistoneura* and placed in new combination as *Peltacanthina (Peltacanthina) unilineata* (Bezzi, 1914) **comb. n.**; the variety names *E. catogastera* var. *melanopleura* Enderlein, 1924, **syn. n.**, *E. obscura* var. *duplicata* Enderlein, 1924, **syn. n.** and *E. obscura* var. *interrupta* Enderlein, 1924, **syn. n.** are all sunk as junior synonyms of *E. moerens* and the variety name *E. obscura* var. *simplex* Enderlein, 1924, **syn. n.** is sunk as a junior synonym of *E. obscura* Hendel, 1914. Bezzi's (1908) synonymy of *E. albovaria* (Walker, 1853) as a junior synonym of *E. moerens* (Fabricius, 1794) is here confirmed and upheld, based on the examination of the name-bearing types of both species. Lectotypes are designated for the following 18 taxa: *E. albolineata* Bezzi, 1908, *E. bicolor* Bezzi, 1908, *E. catogastera* var. *melanopleura* Enderlein, 1924, *E. cohaesa* Speiser, 1911, *E. flavipennis* Hendel, 1914, *E. guttata* Bezzi, 1908, *E. obscura* Hendel, 1914, *E. obscura* var. *duplicata* Enderlein, 1924, *E. obscura* var. *interrupta* Enderlein, 1924, *E. obscura* var. *simplex* Enderlein, 1924, *E. octodecim* Speiser, 1911, *E. surniipennis* Speiser, 1911, *E. unilineata* Bezzi, 1914, *Megaglossa catogastera* Bigot, 1891, *Musca lugens* Fabricius, 1794, *Mu. moerens* Fabricius, 1794, *Ortalis parallela* Wiedemann, 1830 and *Trypeta albovaria* Walker, 1853. An identification key to the 22 species is provided and the distributions of the species are mapped and biogeography of the genus is discussed in relation to the Riverine Barriers Hypothesis, the Refuge Hypothesis, forest fragmentation and elevational considerations. Although the limited distribution of some species appear to be bounded by rivers, examination of collective patterns indicate that forest refugia rather than rivers appear to have driven diversification and speciation in the genus.

**Key words:** Afrotropical Region, biogeography, Central Africa, Congo basin, conservation, distribution, forest fragmentation, identification key, new species, new status, new synonymy, Platystomatinae, Refuge Hypothesis, Riverine Barriers Hypothesis, taxonomy, type designation, West Africa

## Introduction

Despite being conspicuously large and beautifully marked flies, the genus *Engistoneura* Loew, 1873 (Figs 1–6) has received scant attention and no recent identification key to described species has been published. The genus is endemic to the Afrotropical Region and appears to be confined to the indigenous rainforests of Central and West Africa, where adults are often attracted to indigenous fruits, carrion and dung (including dung of Western lowland gorilla) sometimes in large numbers and are regularly sampled using faeces-baited pitfall traps (Fig. 7) hanging butterfly traps, baited with fermenting fruit baits and carrion (Figs 9, 10) and also in white and coloured pan traps (Fig. 8). Nothing is currently known regarding their larval biology and the immature stages remain unknown, although it is most likely larvae develop in the fallen fruits of indigenous trees.

The genus was most recently reviewed by Whittington & Kirk-Spriggs (2021: 1647) who recorded eight species then thought to be confined to West Africa, although examination here of historical and recent material of *E. obscura* Hendel, 1914, from Cameroon, Equatorial Guinea, Gabon and Republic of Congo, extends the range of the genus into Central Africa (*sensu* Kirk-Spriggs 2017: 6). *Engistoneura* can be identified using the generic key provided by Whittington & Kirk-Spriggs (2021: 1639) and by reference to the detailed generic diagnosis provided below, but it should be noted that fig. 70.1 in Whittington & Kirk-Spriggs (2021: 1619) was mislabelled as the genus *Engistoneura* and the figure legend should read “Male of *Peltacanthina (Peltacanthina) stictica* (F.) ...”. The most important character distinguishing *Engistoneura* from *Peltacanthina* Enderlein, 1912, is the presence of tubules at the base of the scutellar marginal setae in *Peltacanthina* (these being absent in *Engistoneura*). The wing pattern in *Peltacanthina (Peltacanthina)* is maculate or “speckled”, whereas in *Engistoneura* and *Peltacanthina (Engistoneurodes)* the wing membrane is largely dark brown with hyaline bands and/or stripes. Generally speaking, specimens assigned to *Engistoneura* are more slender than the heavily built *Peltacanthina* and many specimens assigned to the latter have a more punctate scutellum (and sometimes scutum) than the species in *Engistoneura*, but this character is, to an extent, subjective and difficult to accurately diagnose.

*Engistoneura* has not previously been included in any morphological or molecular phylogenies, but two species of the genus, namely: *E. moerens* (Fabricius, 1794) and *E. obscura* Hendel, 1914, shall be included in a forthcoming molecular phylogeny of the Platystomatidae (Bayless *et al.* in prep.).

This paper applies the Evolutionary Species Concept in its broad sense, *i.e.*, “A species is a single lineage of ancestor-descendant populations which maintain its identity from other such lineages and which has its own evolutionary tendencies and historical fate” (Wiley 1981: 25).



FIGURES 1–6. Living examples of *Engistoneura* species. 1. *E. vicina* sp. nov. (Ghana) (© R. Hakenbeck). 2. *E. moerens* (Guinea) (© E. Bidault). 3. *E. obscura* Hendel (Republic of Congo) (© V. Dérozier). 4. *E. obscura* (© V. Dérozier). 5. *E. smithi*, sp. nov. (Ghana) (© J. Vallender). 6. *Engistoneura* (undescribed species) (Côte d'Ivoire) (© R. Babin). All reproduced with permission.

### Historical account

Fabricius (1794) was the first to describe species now assigned to the genus *Engistoneura*. He described the two species *Musca lugens* from “Sierra Leon” (p. 348) (Figs 52, 53) and *M. moerens* from “Guinea” (p. 349) (Figs 58, 59). Later, Fabricius (1805) listed both *lugens* and *moerens* in the genus *Dictya* Meigen (p. 327). He was followed by Wiedemann (1830) who described *Ortalis parallela* from “Sierra Leone” (p. 458) (Figs 64, 65) and included all three species in the genus *Ortalis* Fallén and

in 1853, Walker described *Trypeta albovaria* from “? Senegal” (p. 383).

The genus *Engistoneura* was erected by Loew (1873) in recognition that the three species that Wiedemann (1830) had placed in the genus *Ortalis*, plus *Trypeta albovaria* Walker, did not belong in the then named group *Ortalina*, but required a separate genus in the then named group *Platystomina*. He intimated that *T. albovaria* may be a junior synonym of *O. moerens*, but did not formally propose a change in status.

In 1891, Bigot described a further species, *Megaglossa*



**FIGURES 7–10.** Trapping methods effective for sampling *Engistoneura* species in indigenous forests (all Nouabalé-Ndoki National Park, Republic of Congo). **7.** Faeces-baited pitfall trap (© A.H. Kirk-Spriggs). **8.** White pan trap with trapped *E. obscura* Hendel (red circle) (© V. Dérozier). **9.** Hanging butterfly trap baited with carrion or fermenting banana bait (© V. Dérozier). **10.** “Ikea” trap baited with fermenting banana bait at ground level (© V. Dérozier). All reproduced with permission.

*catogastera* from “Assinie” (Côte d’Ivoire) (p. 384) followed by Bezzi (1908a) who described a further four species in the genus from Democratic Republic of Congo, namely: *E. albolineata* (p. 385) *E. bicolor* (p. 385) *E. concolor* (p. 385) and *E. guttata* (p. 385).

Bezzi (1908b) provided a list of species in which the spelling “*maerens*” first appears. This represented an incorrect subsequent spelling of the Latin epithet “*moerens*”, with no explanation provided as to why the spelling was altered. Bezzi indented the name *E. albovarria* under the name *E. maerens*, thus clearly inferring an act of synonymy.

In 1911, Speiser described a further three species in the genus, namely: *E. cohaesa* from Tanzania (p. 256) *E. octodecim* from Cameroon (p. 254) and *E. surniipennis* from Tanzania (p. 255).

Enderlein (1912) included *E. maerens*, listing the historical nomenclature as *Musca maerens* Fabricius, 1794 [*sic!* = *moerens*], *Dictya maerens* Fabricius, 1805 [*sic!* = *moerens*], *Engistoneura maerens* (F.) Loew, 1873 [*sic!* = *moerens*], *?Megaglossa catogastera* Bigot, 1891 and *Engistoneura maerens* (F.). At this point Enderlein also did not formally change the status of *Megaglossa catogastera*, stating (p. 375) that “The description of *Megaglossa catogastera* Big. 1891 fits perfectly with the specimens available, but since the locality [“Assinie”, Côte d’Ivoire] of this is quite far away [from “Guinea”], I only assign this species to *Engistoneura maerens* (F.) with a question mark for the time being.” [English translation from German: A.E. Whittington]. In 1914, Bezzi described the single species *E. unilineata* from “Senegal” (p. 297).

Following this, a far more comprehensive revision of *Engistoneura* was published by Hendel (1914a, b) in which *E. flavipennis* was described from Ghana (p. 152) (Figs 42, 43) and *E. obscura* from Cameroon (p. 152) (Figs 62, 63). In his 1914a publication, Hendel placed the genus in group D—Ceitamiina, Rivelliina and Aehnliche, designating the type of the genus as *E. maerens* (F.).

Following this, under the geographical account of the genus he transferred the following species to the related genus *Peltacanthina*: *E. albolineata* Bezzi, 1908, *E. bicolor* Bezzi, 1908, *E. cohaesa* Speiser, 1911, *E. concolor* Bezzi, 1898, *E. guttata* Bezzi, 1908, *E. octodecim* Speiser, 1911 and *E. surniipennis* Speiser, 1911. Hendel (1914a) retained the alternative spelling “*maerens*” and, following Bezzi (1908b) in including *T. albovarria* as a junior synonym of *E. maerens*. As a consequence, once these misplacements and synonymies are omitted from the list, the genus included six species, viz. *E. catogastera* Bigot, 1891, *E. flavipennis* Hendel, 1914, *E. lugens* (Fabricius, 1794) *E. maerens* (Fabricius, 1794) *E. obscura* Hendel, 1914 and *E. parallela* (Wiedemann, 1830). Hendel (1914a) also illustrated the genus for the first time, providing frontal and profile views of the head of *E. flavipennis* and dorsal views of the right wings of *E. flavipennis*, *E. lugens*, *E. maerens* and *E. parallela*. The Hendel (1914b) publication provided an identification key to species of the genus and detailed species accounts of the above six mentioned species.

Enderlein (1924) added the new variety name *melanopleura* for the species *E. catogastera* and the three new variety names *duplicata*, *interrupta* and *simplex* for the species *E. obscura*, all of which have subsequently only been regarded as varieties. The most recent species description was that of Steyskal (1965a) who described *E. currani* from Liberia (p. 172) (Figs 32, 33).

Steyskal (1980: 566, 567) catalogued eight species in the genus *Engistoneura*, with the addition of the two species *E. currani* Steyskal, 1965 and *E. unilineata* Bezzi, 1914. Steyskal did not propose any new combinations or synonymies, but did formalise the spelling “*moerens*”, indicating “*maerens*” as a variant spelling (p. 567). It is apparent that during the preparation of this catalogue, Steyskal did not examine the name-bearing types and relied solely on the published literature. For example, the variety names proposed by Enderlein (1924)

required synonymisation with nominate species, but not necessarily those originally assigned by Enderlein and there are no annotations regarding these varieties in Steyskal's unpublished notes (copies in TAU and AEW). Furthermore, *E. unilineata* Bezzi, 1914 is clearly misplaced in the original combination, which Steyskal would have noted had he examined the type. The genus has remained static since that time.

## Material and methods

Material identified as *Engistoneura* was borrowed and examined from most major museum collections around the world (see list below). The name-bearing types of all species (e.g., Figs 26–69) were borrowed and the status of these specimens assessed and recorded. Determination labels were appended to all specimens examined.

The greater part of the recent material examined was generated through the combined efforts of the Association *Catharsius* and the African Natural History Research Trust (ANHRT) sampled during regular research expeditions to Côte d'Ivoire (and in the case of the latter, other African countries) since 2015, in particular to the Classified Forest of Mt Tonkoui (Moretto *et al.* 2021).

Wherever possible descriptions were based on the name-bearing types and wholly describe adult morphology. No molecular analysis was conducted as part of this revision.

For dissection of male and female terminalia, the tip of the abdomen was removed with micro-scissors and macerated in 10% potassium hydroxide in a heated block for ten minutes. Once macerated, the abdomen was transferred to 70% ethanol with a few drops of lactic acid in an excavated glass block. Following dissection, the abdomen and male terminalia were washed in clean ethanol and permanently stored in a micro-vial in glycerol pinned beneath the respective specimen.

Male and female terminalia were mounted laterally or dorsally, in a blob of heated and set glycerin jelly. Figures of the male and female terminalia (Fig. 24 and inset A and Fig. 25 inset B) were prepared using a ©Wild M3Z binocular microscope with a camera lucida attachment. Fig. 24 (inset: A) and Fig. 25 (inset: B) were prepared from specimens mounted on temporary slide mounts in glycerol under a coverslip. Images were enlarged and traced and details added by hand in pen and ink by constant referral to the specimen.

All photographic images of structures were captured with a mounted ©Canon EOS 80D digital camera. Multiple images were captured manually and were combined using the program ©Helicon Focus 8. Images were cleaned and made up into plates and labelled using the program ©CorelDraw 2021. Images of name-bearing types (Figs 26–69) were not digitally cleaned. Images of wings were prepared from detached wings placed between two microscope slides, thus ensuring the wing was completely flat.

Measurements are provided for the name-bearing type of each taxon, followed in parenthesis by the mean

statistics for all specimens measured (including the name-bearing type). Body length and wing length measurement were taken using either a ©Wild Heerbrugg M7S or ©Meiji EMT stereomicroscopes with calibrated graticule eyepieces. Precision was set at tenths of a millimetres. Body length was measured in dorsal or lateral aspects (whichever was more suitable for the specimen) from the ptilinal fissure to the apex of abdominal tergite 5 (taken as a sum of lengths if the abdomen was deflexed); wing lengths were taken from the apex of the tegula in a straight line to the apex of the wing. Where possible the right wing was measured, but if this was missing or damaged then measurements were taken from the left wing. The range of measurements were provided for species where multiple specimens were available, followed by arithmetical mean values ( $\bar{x}$ ) plus minus ( $\pm$ ) the standard deviations of the sample and the count ( $n$ ) of specimens.

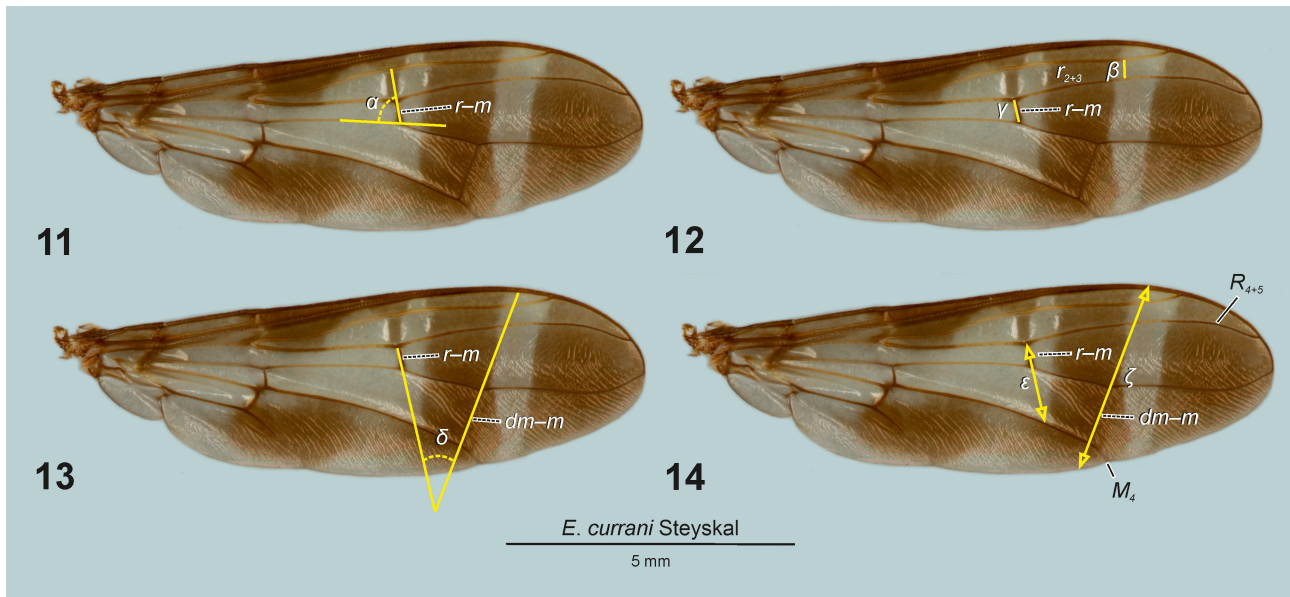
The following wing morphometrics (Figs 11–14) were applied: (1) crossvein *r-m* angle (Fig. 11,  $\alpha$ ) calculated as  $90^\circ$  less the angle measured between line that transects through *r-m* across anterior wing margin and straight line that transects through vein  $R_{4+5}$  basal to point where crossvein *r-m* joins (all *r-m* crossveins angled basally); (2) ratio of minimum width of cell  $r_{2+3}$  (Fig. 12,  $\beta$ ): length of crossvein *r-m* (Fig. 12,  $\gamma$ ): measured as ratio between minimum width of cell  $r_{2+3}$  and length of crossvein *r-m*; (3) crossvein *r-m* : crossvein *dm-m* angle (Fig. 13,  $\delta$ ): measured as angle between lines that transect through crossveins to point of intersection beyond posterior wing margin; and (4) ratio of crossvein *r-m* (veins  $R_{4+5}$ - $M_1$ ) (Fig. 14,  $\epsilon$ ): wing width at crossvein *dm-m* (Fig. 14,  $\zeta$ ): measured as ratio between two lines, one that transects veins  $R_{4+5}$  to  $M_1$  through crossvein *r-m*, the other that transects wing width through crossvein *dm-m*.

Type label data are quoted exactly as they appear. A division slash (/) denotes the commencement of a new line, two division slashes (//) data on a further label. Significant supplementary or qualifying information is presented in square brackets when considered necessary. All labels are printed on white card unless otherwise stated. To avoid confusion, unless quoting from type labels, dates are standardised to the format dd.mm.yyyy with the month in lower case Roman numerals. The abbreviations “Fig.” or “Figs” as used in the text refers to figures in this revision and “fig.” and “figs” to figures in other publications.

Morphological terminology follow that adopted in the *Manual of Afrotropical Diptera* by Cumming & Wood (2017). Longitudinal marks on the scutum are referred to as vittae, transverse marks on the wing are referred to as bands and longitudinal marks on the wing are referred to as stripes.

The limits of the Afrotropical Region, as applied in this revision, follows the revised concept of the region as outlined in Kirk-Spriggs (2017: 2, fig. 1.1) which extended the region farther eastwards to include the modern coastal Arabian states of Oman, United Arab Emirates and Yemen. State names and abbreviations for morphological structures used on the plates follow those applied in the *Manual of Afrotropical Diptera*.

Abbreviations for morphological structures indicated



**FIGURES 11–14.** Wing morphometrics of *Engistoneura* (based on right wing of *E. currani* Steyskal):  $\alpha$  = angle of radial-medial crossvein ( $r-m$ );  $\beta$  = minimum width of second + third radial cell ( $r_{2+3}$ );  $\gamma$  = length of radial-medial crossvein ( $r-m$ );  $\delta$  = angle between radial-medial ( $r-m$ ) and discal medial ( $dm-m$ ) crossveins;  $\varepsilon$  = distance between veins  $R_{4+5}$  and  $M_4$ , measured through radial-medial crossvein ( $r-m$ );  $\zeta$  = wing width measured through discal medial crossvein ( $dm-m$ ). Abbreviations:  $dm-m$ —discal medial crossvein;  $M_4$ —fourth branch of media;  $r_{2+3}$ —second + third radial cell;  $R_{4+5}$ —third branch of radius;  $r-m$ —radial-medial crossvein.

on the figures are listed after the figure legends; the following non-standard abbreviations are used in the text to indicate type status: HT—holotype; LT—lectotype; N-T—non-type.

Locality data for 286 species records of *Engistoneura* were compiled, based on the material examined cited in this paper. A spreadsheet of localities and decimal coordinates was transformed into a point feature class in ArcGIS Pro 3.0.3 and overlaid with spatial data layers of West African forest refugia (after Maley 1996) elevation (USDA n.d.) rainfall (NASA 2023) and ecoregions (WWF & The Nature Conservancy 2001). Distribution maps were compiled in ArcGIS Pro 3.0.3. Decimal coordinates listed in the distribution section of species descriptions in square brackets were rounded off to two decimal places, although more precise data were used during mapping.

Terrestrial Ecoregions of the World (TEOW) as applied in the text, is a biogeographic regionalization of the Earth's terrestrial biodiversity. Ecoregions are defined as relatively large units of land or water containing a distinct assemblage of natural communities sharing a large majority of species, dynamics and environmental conditions. There are 867 terrestrial ecoregions, classified into 14 different biomes, such as forests, grasslands, or deserts. Ecoregions represent the original distribution of distinct assemblages of species and communities (Olson *et al.* 2001).

A list of institutional codens used in the text is provided below. The codens exactly follow those listed in the *Insect and Spider Collections of the World*, as updated on the Bishop Museum website, available from: <http://hbs.bishopmuseum.org/codens/>, except in the case of the private collection.

AEWC—private collection of A.E. Whittington.

AMNH—American Museum of Natural History, New York, United States.

ANHRT—African Natural History Research Trust, Leominster, United Kingdom.

CAS—California Academy of Sciences, San Francisco, United States.

CMNH—Carnegie Museum of Natural History, Pittsburgh, United States.

CUMZ—Cambridge Museum of Zoology, Cambridge, United Kingdom.

ETHZ—Erdgenössische Technische Hochschule-Zentrum, Zürich, Switzerland.

IITAB—International Institute of Tropical Agriculture, Benin Station, Cotonou, Benin.

MHNG—Muséum d'Histoire Naturelle, Geneva, Switzerland.

MNHN—Muséum national d'Histoire naturelle, Paris, France.

MSNM—Museo di Storia Naturale di Milano, Italy.

MZH—Finnish Museum of Natural History, Helsinki, Finland.

MZLU—Lund University, Lund, Sweden.

NHMUK—Natural History Museum, London, United Kingdom.

NHMV—Naturhistorisches Museum, Wien, Austria.

NHRS—Naturhistoriska riksmuseet, Stockholm, Sweden.

NMSA—KwaZulu-Natal Museum, Pietermaritzburg, South Africa.

NMWC—National Museum of Wales, Cardiff, Wales, United Kingdom.

OUMNH—Oxford University Museum of Natural History, Oxford, United Kingdom.

RBINS—Royal Belgian Institute of Natural Sciences, Brussels, Belgium.

RMCA—Musée Royal de l’Afrique Centrale, Tervuren, Belgium.

SDEI—Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany.

TAU—Tel Aviv University, Tel Aviv, Israel.

USNM—National Museum of Natural History, Washington D.C., United States.

ZMHB—Museum für Naturkunde, Berlin, Germany.

ZMUC—Zoological Museum, University of Copenhagen, Copenhagen, Denmark.

## Results

## Taxonomy

### Genus *ENGISTONEURA* Loew, 1873

*ENGISTONEURA* Loew, 1873: 43. Type species: *Musca moerens* Fabricius, 1794: 349, by subsequent designation of Hendel (1914b: 8) (as *Engistoneura maerens*).

*MUSCA* Linnaeus, 1758: 589. Type species: *Musca domestica* Linnaeus, 1758: 596, by designation of I.C.Z.N. (1925: 1 (Opinion 82)).

*DICTYA* Meigen, 1803: 277. Type species: *Musca umbrarum* Linnaeus, 1758: 599, by subsequent designation of Steyskal 1965b: 689.

*ORTALIS* Fallén, 1810: 17. Type species: *Musca vibrans* Linnaeus 1758: 599, by subsequent designation of Westwood 1840: 149.

*PELTACANTHINA* Enderlein, 1912: 363. Type species: *Peltacanthina excellens* Enderlein, 1912: 364, by original designation.

*Diagnosis:* Body length: 9.3 mm (range: 6.4–12.8 mm;  $\bar{x}$  = 9.3 ± 0.3 mm;  $n$  = 292); wing length: 10.0 mm (range: 7.5–13.0 mm;  $\bar{x}$  = 10.0 ± 0.3 mm;  $n$  = 292).

*Head* (Figs 16–19). Face slightly concave, with well-developed flat, facial carina, separating antennal insertions, these approximately separated by width of antennal scape; frons shiny with uneven surface, sunken in centre anterior to ocellar triangle, but protruding dorsal to ptilinal fissure, there tending to bulge convexly; ocellar triangle small, black; compound eye in profile occupying most of head, with long axis at 45° to vertical; parafacial dorsally narrow adjacent to lower margin of antennal socket, expanding ventrally below compound eye to full width of gena; upper occiput concave; antennal postpedicel usually short, oval, usually comprising 60% or less of antennal length from base to apex; arista pubescent over entire length; posterior orbital setulae fine, indistinct and black; 1 pair of orbital setae shorter (at most 1/2 length) and weaker than vertical setae; 2 pairs of vertical setae present on vertex approximately equal in length and slightly divergent; genal seta well-developed.

*Thorax* (Figs 16, 17). Scutum wrinkled, covered with fine microtrichia, sparse in the subshining areas and dense

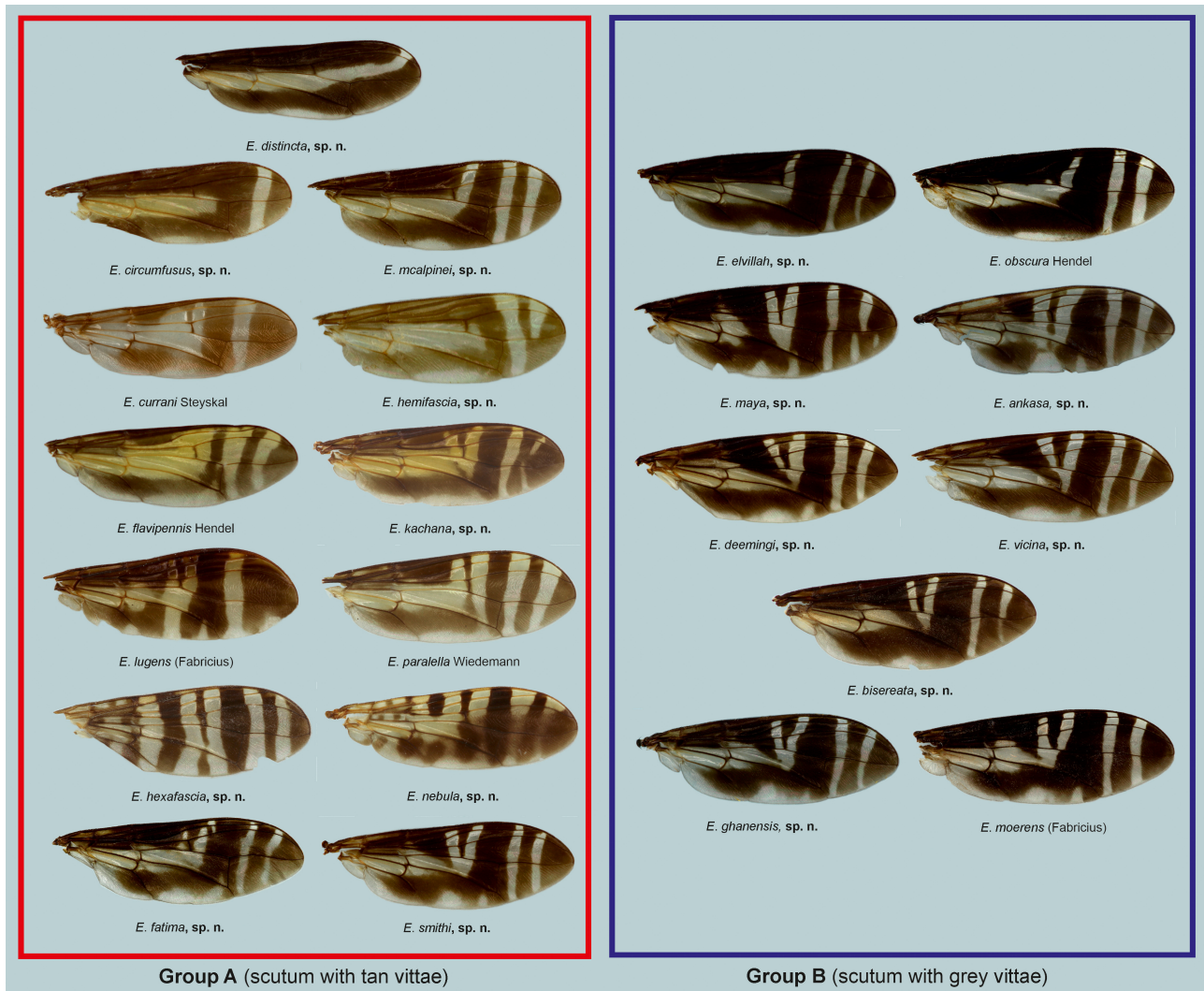
in silvery-grey or white vittae and with sparser, fine erect setulae inserted regularly into the deeper intersections of the wrinkles; narrower across postpronotum than width of head, but broader at the level of postalar setae; cervical sclerites bullate; notopleural callosity weakly developed; katepisternal setulae absent; paired thoracic setae as follows: 1 postpronotal seta, 2 notopleural setae (the posterior of which inserted on small callus) 1 supra-alar seta, 1 postalar seta (inserted on small tubercle), 1 dorsocentral (inserted adjacent to scutoscutellar suture), 1 intrapostalar seta, 3 scutellar setae (1 apical, 2 lateral) and 1 anepisternal seta (inserted in dorsal 1/4 of anepisternum).

*Scutellum* (Fig. 16). Trapezoid, flat to slightly convex on dorsal surface; margin tending to bulge slightly at insertion of lateral and apical setae.

*Legs* (Fig. 17). Fore femur with armature of spines apically on posterior ventral margin (biserial in one species, in which spines are present on both anterior and posterior ventral margins); mid coxal prong (Fig. 23) weakly developed, narrow, rounded at apex; mid coxal apophysis triangulate to conical, articulating with small notch on trochanter; hind coxa with narrow posterior margin, the outermost extremity of which developed into stout, rounded lobe; mid tibia with ventral apex with 1 long spinose setula and 2 short spinose setulae either side; hind coxa with posterodorsal margin with small rounded lobe; postmetacoxal area without sclerotised bridge, entirely membranous; tarsomere 1 of all legs with ventral surface densely clothed in golden-brown setulae; pulvilli densely golden on ventral surface, contrasting with dark brown apical tarsomere and claws, empodium pale brown and fine.

*Wing* (Fig. 20). Mean crossvein *r-m* angle = 12.1°; mean ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.7; mean crossveins *r-m* : *dm-m* angle = 13.8°; mean ratio crossvein *r-m* ( $R_{4+5}$ - $M_1$ ) : wing width at crossvein *dm-m* = 0.43. Wing membrane noticeably undulating in cells  $r_{4+5}$ , distal 1/2 of *dm*,  $m_1$ ,  $m_4$ , anal lobe and alula; costal vein (*C*) ending at vein  $M_1$ ; crossvein *r-m* less than 1/2 length of crossvein *dm-m* and separated from *dm-m* by more than length of *dm-m*; vein  $R_{2+3}$  shallowly sinuous, with cell  $r_{2+3}$  narrow at base, broadening adjacent to *r-m*, then narrowing again before broadening at apex; cell  $r_{4+5}$  constricted at apex to approximately length of *r-m* by convergence of veins  $R_{4+5}$  and  $M_1$ ; pterostigma poorly defined, but dark brown; short black setulae dorsally and ventrally along veins  $R_1$  and  $R_{4+5}$ , sparser ventrally on latter; entire wing membrane with fine microtrichia on all wing cells; hind margin of wing with evenly-spaced, fine brown setulae; tegula small, dark brown, with dark brown to black setulae; ventral auxiliary sclerite (Fig. 22) mushroom-shaped, shiny; upper calypter narrow and strap-like; lower calypter slightly more expanded and lobe-like, microtrichose and folded along margin.

*Abdomen* (Figs 16, 17). Ovate, tergite 3 widest (equal to or wider than maximum thoracic width); tergites approximately equally long; posterior margin of each tergite narrowly shiny; setulae of tergites short and dark brown or black, but much longer and pale (silver, white or yellowish) on lateral margin of tergite 3; syntergite 1 + 2 short,



**FIGURE 15.** Intuitive species-groups of the genus *Engistoneura* (based on ground colour of scutum) and species pairs (based on similarities in wing pattern). Not to scale.

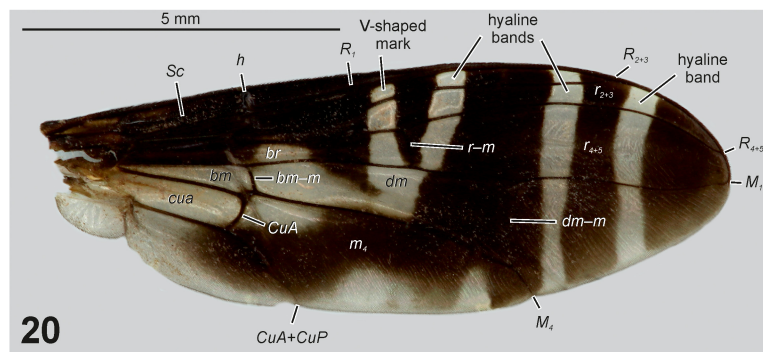
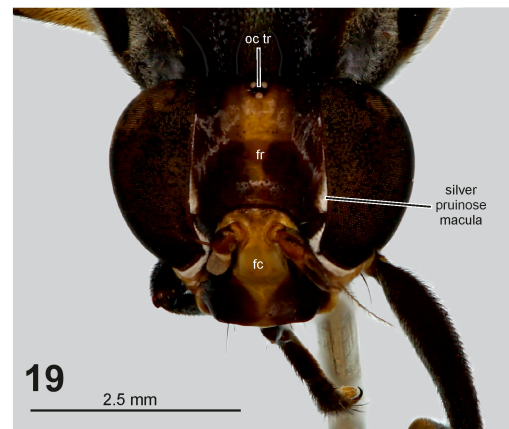
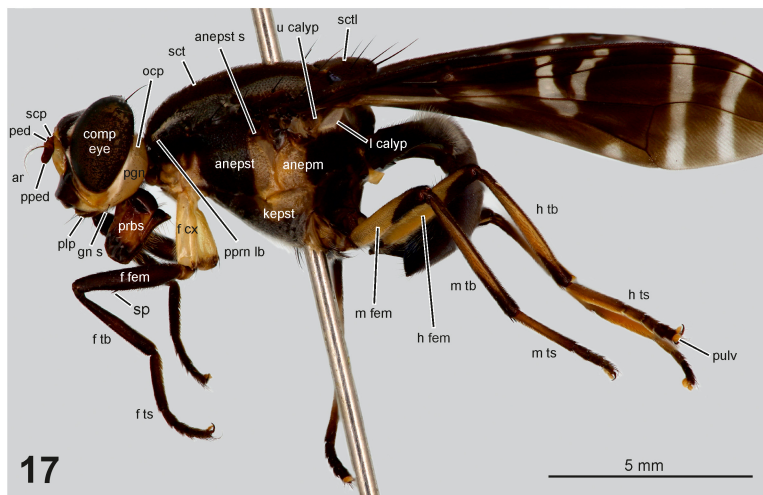
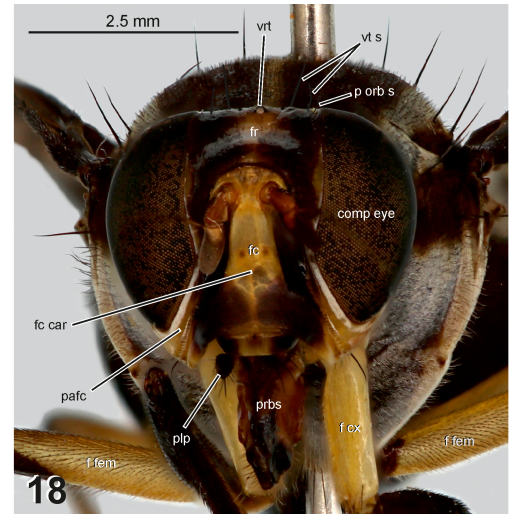
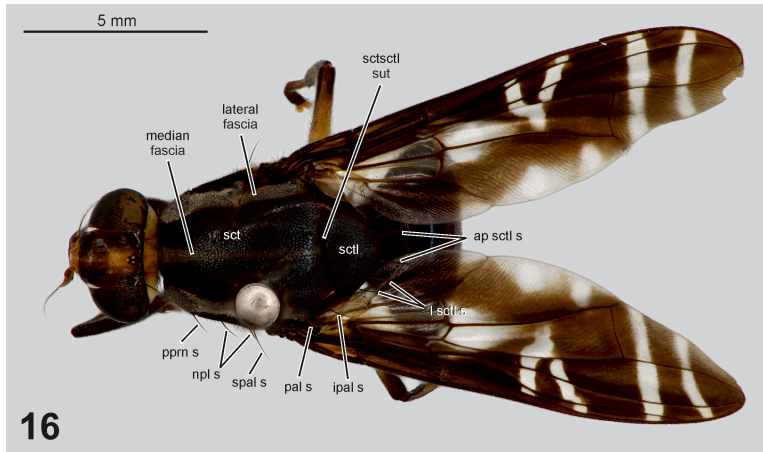
uniformly microtrichose (“dull”); medium-sized appressed white microtrichia sparse and poorly expressed on tergites 3–5, often longer on lateral margins and mixed with short, brown to black microtrichia medially on tergites 4 and 5; spiracle 1 positioned in membrane towards base of syntergite 1 + 2 and spiracles 2–5 all positioned in membrane, inserted in anterior  $\frac{4}{5}$  of corresponding tergite length (Fig. 25).

**Male terminalia** (Fig. 24). Symmetrical; epandrium saddle-shaped, with cuticle darker than cercus, setose over most of surface, setae slightly shorter towards posterior margin; cercus with cuticle pale, elongated, strongly protruding, with bluntly pointed apex, apparently fused (at least in part) surface with relatively long compact setae dorsally; surstyli strongly developed and convergent, surstylus flattened and wide basally, narrow apically, with acute bend at  $\frac{2}{5}$  of length, then tapering to sub-rounded apex, apical region studded with small protuberances, regions beyond bend with cuticle darker, inner side in region of bend with darker arrow-shaped black structure (visible through cuticle in lateral view; homology and function unknown); hypandrium as long as epandrium and cercus combined, subdivided longitudinally into 2 separate

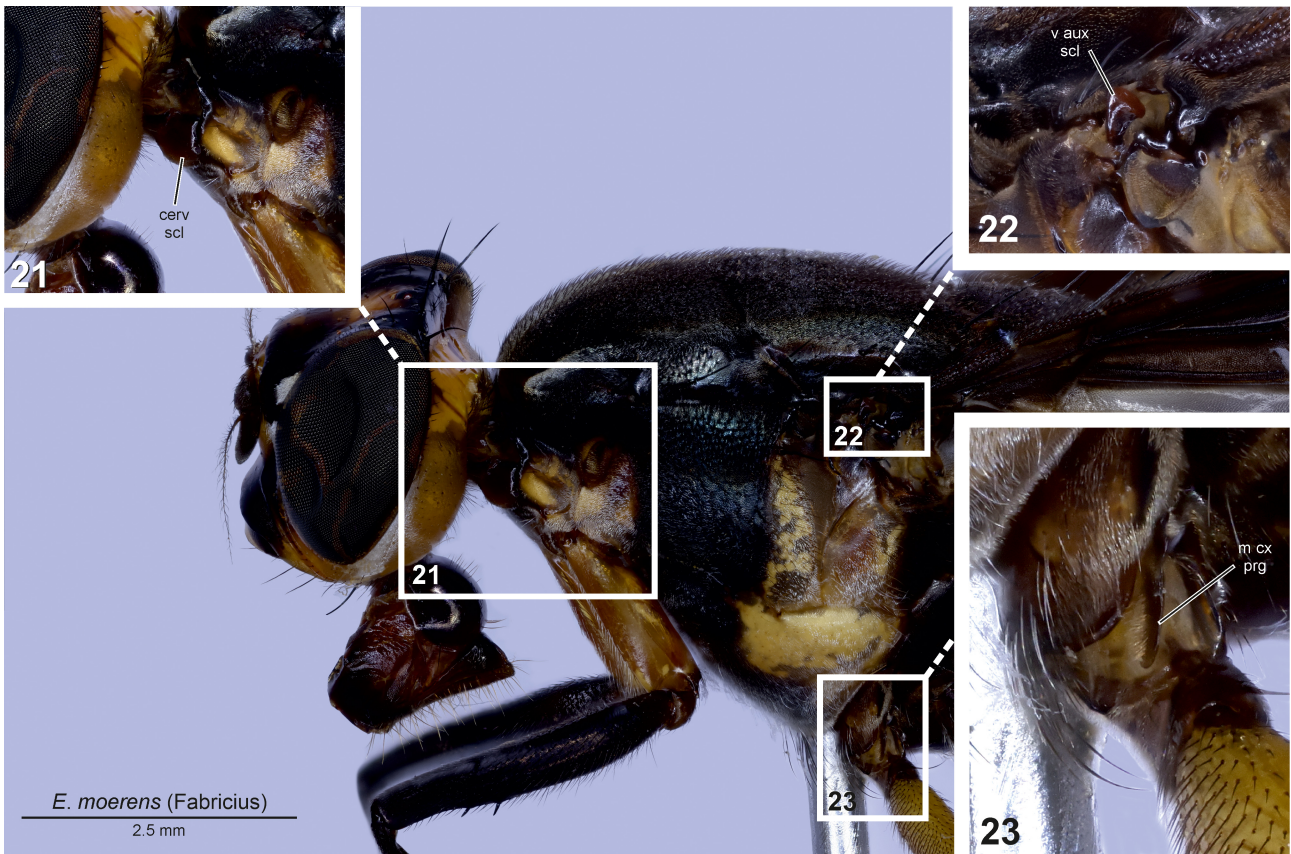
lateral arms, in profile narrowest basally, constricted medially and expanded posteriorly, with posterior region forming narrow loop (through which phallapodeme articulates); phallapodeme U-shaped (in profile) long and narrow, narrowly connected to hypandrium in posterolateral region, sub-basal region expanded and poorly sclerotised, apically separated from distiphallus by greatly reduced sub-triangular basiphallus (not visible on Fig. 24); ejaculatory apodeme (when present) very large, subtriangular and flattened, with undulating surface, sperm duct connected to reduced basiphallus dorsally; only single filament present; distiphallus long, coiled and flattened, with indistinct median groove throughout length, terminal section (Fig. 24, inset A) with elongate, narrow slightly pigmented elliptical preglans and larger and darker uniform egg-shaped glans, terminating in a single filament.

**Female terminalia** (Fig. 25, inset B). Entirely devoid of setae (except at extreme apex of cercus); tergostenite 7 (oviscape) shiny, glabrous, subquadrate, heavily sclerotised, normally dark metallic in colour; eversible membrane subparallel-sided, weakly sclerotised; aculeus

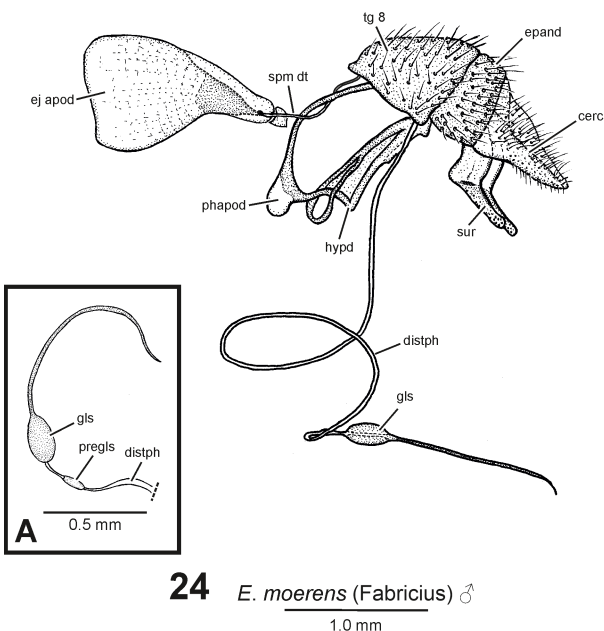




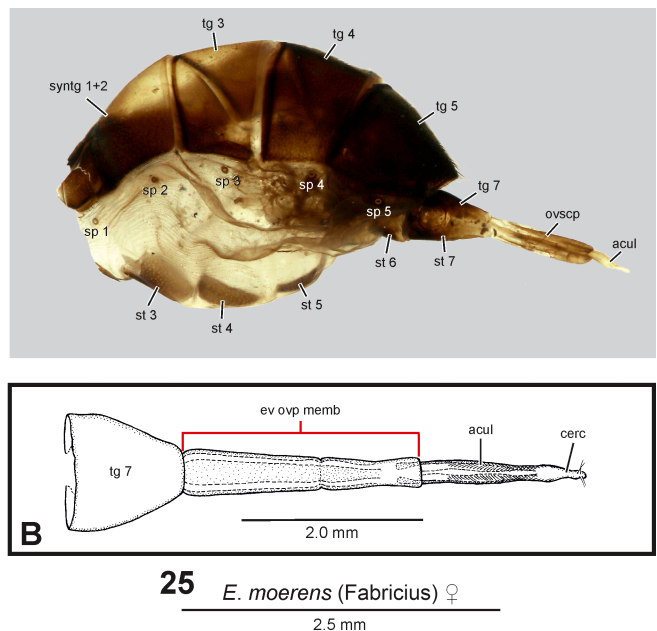
**FIGURES 16–20.** External generic features of *Engistoneura* with morphological structures referred to in the text (all *E. moerens* (Fabricius)—type species of the genus—N-T, Banco National Park, Côte d’Ivoire, NMSA). **16.** Habitus, dorsal view. **17.** Same, lateral view; **18.** Head, frontal view; **19.** Same, dorsal view. **20.** Wing, dorsal view. Abbreviations: anepm—anepimeron; anepst—anepisternum; anepst s—anepisternal seta; ap sctls—apical scutellar setae; ar—arista; bm—basal medial cell; bm-m—basal medial crossvein; br—basal radial cell; comp eye—compound eye; CuA—anterior branch of cubital vein; cua—anterior cubital cell; CuA+CuP—anterior branch of cubital vein + posterior branch of cubital vein; dm—discal medial cell; dm-m—discal medial crossvein; f cx—fore coxa; f fem—fore femur; f tb—fore tibia; f ts—fore tarsus; fc—face; fc car—facial carina; fr—frons; gn s—genal seta; h—humeral crossvein; h fem—hind femur; h tb—hind tibia; h ts—hind tarsus; ipal s—intrapostalar seta; kepst—katepisternum; l calyp—lower calypter; l sctls—lateral scutellar setae; m fem—mid femur; m tb—mid tibia; m ts—mid tarsus;  $M_1$ —first branch of media;  $M_4$ —fourth branch of media;  $m_4$ —fourth medial cell; npl s—notopleural setae; oc tr—ocellar triangle; ocp—occiput; p orb s—posterior orbital seta; pafc—parafacial; pal s—postalar seta; ped—pedicel; pgn—postgena; plp—palpus; pped—postpedicel; ppn lb—postpronotal lobe; ppn s—postpronotal seta; prbs—proboscis; pulv—pulvillus;  $R_1$ —anterior branch of radius;  $r_{2+3}$ —second + third radial cell;  $R_{2+3}$ —second branch of radius;  $r_{4+5}$ —fourth + fifth radial cells;  $R_{4+5}$ —third branch of radius; r-m—radial-medial crossvein; Sc—subcostal vein; scp—scape; sct—scutum; sctl—scutellum; sctscut sut—scutoscutellar suture; sp—spine; spal s—supra-alar seta; u calyp—upper calypter; vrt—vertex; vt s—vertical setae.



**FIGURE 21–23.** Detail of external generic features of *Engistoneura* with morphological structures referred to in the text (all *E. moerens* (Fabricius)—type species of the genus—N-T, Banco National Park, Côte d’Ivoire, NMSA). **21.** Junction of head and thorax indicating cervical sclerite, lateral view; **22.** Base of wing indicating ventral auxiliary sclerite, lateral view; **23.** Mid coxa indicating mid coxal prong, dorsal view; Abbreviations: cerv scl—cervical sclerite; m cx prg—mid coxal prong; v aux scl—ventral auxiliary sclerite.



**24** *E. moerens* (Fabricius) ♂  
1.0 mm



**25** *E. moerens* (Fabricius) ♀  
2.5 mm

**FIGURES 24–25.** Male and female terminalia of *Engistoneura* with morphological structures referred to in the text (all *E. moerens* (Fabricius)—type species of the genus—NT, Banco National Park, Côte d’Ivoire, ANHRT). **24.** Cleared male terminalia, lateral view (inset **A**: detail of apical part of distiphallus, preglans and glans, ventral view). **25.** Cleared female abdomen and terminalia, lateral view (with spiracles digitally enhanced for visibility) (inset **B**: detail of apical part of fully distended eversible ovipositor membrane and aculeus, dorsal view). Abbreviations: acul—aculeus; cerc—cercus; distph—distiphallus; ej apod—ejaculatory apodeme; epand—epandrium; ev ovp memb—eversible ovipositor membrane; gls—glans; hypd—hypandrium; phapod—phallapodeme; preglans—preglans; spm dt—sperm duct; spr—spiracle; st—sternite; sur—surstylus; syntg—syntergite; tg—tergite.

with margins more heavily sclerotised, with serial impressed shallow and fine grooves laterally; cercus fused, poorly defined dorsally, demarcated ventrally, with 2 pairs of minute setae preapically; 3 pale brown ovoid spermathecae present (arranged 1 + 2) with complex terminal vesicles.

*Variation.* Other than the obvious differences in terminalia, little or no sexual dimorphism is apparent in the genus.

## Species included

*Engistoneura ankasa* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura biseriata* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura circumfusus* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura currani* Steyskal, 1965  
*Engistoneura deemingi* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura distincta* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura elvillah* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura fatima* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura flavipennis* Hendel, 1914  
*Engistoneura ghanensis* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura hemifascia* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura hexafascia* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura kachana* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura lugens* (Fabricius, 1794)  
*Engistoneura maya* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura mcalpinei* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura moerens* (Fabricius, 1794)  
 = *Engistoneura albovaria* (Walker, 1853)  
 = *Engistoneura catogastera* (Bigot, 1891) **syn. n.**  
 = *Engistoneura catogastera* var. *melanopleura* Enderlein, 1924, **syn. n.**  
 = *Engistoneura obscura* var. *duplicata* Enderlein, 1924, **syn. n.**  
 = *Engistoneura obscura* var. *interrupta* Enderlein, 1924, **syn. n.**  
*Engistoneura nebula* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura obscura* Hendel, 1914  
 = *Engistoneura obscura* var. *simplex* Enderlein, 1924, **syn. n.**  
*Engistoneura parallela* (Wiedemann, 1830)  
*Engistoneura smithi* Kirk-Spriggs & Whittington, **sp. nov.**  
*Engistoneura vicina* Kirk-Spriggs & Whittington, **sp. nov.**

## Identification key to adult *Engistoneura* Loew species

1. Scutum predominantly pale tan to orange-brown, with 2 brown vittae, separated either by ground colour (Figs 92–98, 100–104) or by presence of a medial grey-brown vitta (Fig. 99) ..... 2
- Scutum predominantly dark grey-brown, with vittae comprised of pale grey-brown to silver (Figs 105–112) or golden-green microtrichia (Fig. 113) which in living specimens may be more vibrantly metallic than in pinned specimens (Fig. 1) ..... 14
2. Scutum with 2 brown vittae evanescent before reaching scutoscutellar suture (Figs 92, 94, 98) or continuing across scutoscutellar suture to lateral margins of scutellum (Figs 93, 95–97) ..... 3

- Scutum with 2 brown vittae never evanescent before reaching scutoscutellar suture, invariably continuing across scutoscutellar suture to converge at centre of scutellum, leaving lateral margins of scutellum pale tan to orange-brown (Figs 99–104) ..... 9
3. Scutum with 2 brown vittae evanescent before reaching scutoscutellar suture (Figs 92, 94, 98) ..... 4
- Scutum with 2 brown vittae continuing across scutoscutellar suture to lateral margins of scutellum (Figs 93, 95–97) ... 6
4. Wing membrane without hyaline band adjacent to crossvein *r-m*; hyaline stripe through cells *br*, *bm*, *cua* and base of cell *dm* rectangular, isolated from single hyaline preapical band (Fig. 71) ..... *E. circumfusus*, **sp. nov.** (p. 426)
- Wing membrane with hyaline band adjacent to crossvein *r-m* joined (even if narrowly so) to hyaline stripe through cells *br*, *bm*, *cua* and base of cell *dm* and 2 hyaline preapical bands (Figs 81, 86) ..... 5
5. Wing membrane without hyaline mark proximal to crossvein *r-m*, with single hyaline mark distal to crossvein *r-m* joined to hyaline stripe through cells *bm* and *cua* and base of cell *dm*, resulting in L-shaped pattern; paired subapical hyaline bands distal to crossvein *dm-m* subequal in width and slightly wider than brown band between them; hyaline mark on posterior wing margin in cell *m<sub>4</sub>* restricted to single elongate mark (Fig. 81) .....  
 ..... *E. mcalpinei*, **sp. nov.** (p. 445)
- Wing membrane with hyaline marks either side of crossvein *r-m* angled to meet in cell *dm*, resulting in V-shaped hyaline mark, narrowly joined to hyaline stripe through cells *br*, *bm* and *cua* and base of cell *dm*; paired subapical hyaline bands distal to *dm-m* subequal in width and slightly narrower than brown band between them; hyaline marks on posterior wing margin in cell *m<sub>4</sub>* restricted to 2 rounded marks (Fig. 86) ..... *E. smithi*, **sp. nov.** (p. 463)
6. Wing membrane predominantly dark brown with single hyaline stripe from base of cell *br* to wing apex, without banding (Fig. 70) ..... *E. distincta*, **sp. nov.** (p. 431)
- Wing membrane predominantly dark brown with hyaline stripe and bands, often with orange tinge (Figs 72–74) ... 7
7. Wing membrane without hyaline bands at crossvein *r-m*; apical-most subapical band incomplete, terminating at vein *M<sub>1</sub>*; stripe through cells *br*, *bm*, *cua* and base of cell *dm* wedge-shaped, with poorly defined margins terminating beyond *r-m* (Fig. 72) ..... *E. hemifascia*, **sp. nov.** (p. 439)
- Wing membrane with short hyaline bands at crossvein *r-m*; apical-most subapical band complete, extending between anterior and posterior wing margins or fragmented midway through cell *r<sub>4+5</sub>*; stripe through cells *br*, *bm*, *cua* and base of cell *dm* wedge-shaped, with poorly defined margins joining short hyaline bands at *r-m* (Figs 73, 74) ..... 8
8. Wing membrane without distinct hyaline bands at crossvein *r-m*, rather with wedge-shaped hyaline mark through cells *br*, *bm*, *cua* and base of cell *dm*, extending forwards towards costal vein (*C*) beyond *r-m*; subapical hyaline

- bands unequal, broader than brown band between them, with basal-most band broader at *C* and narrowing toward crossvein *dm-m* (Fig. 74).....  
.....*E. flavipennis* Hendel (p. 434)
- Wing membrane with 2 distinct hyaline bands either side of crossvein *r-m*, angled to meet in cell *dm*, where weakly joined to hyaline stripe through cells *br*, *bm* and *cua* and base of cell *dm*, resulting in V-shaped pattern; distal to complete near parallel-sided preapical hyaline band is narrower hyaline band, fragmented midway through cell *r<sub>4+5</sub>* (Fig. 73) ..... *E. kachana* **sp. nov.** (p. 441)
9. Wing membrane without stripe (Figs 77, 78) ..... 10
- Wing membrane with stripe through cells *br*, *bm*, *cua* and base of cell *dm* (Figs 75, 76, 79, 87) ..... 11
10. Wing membrane predominantly hyaline, with 6 complete brown bands, extending between anterior and posterior wing margins (basal-most of which fragmented); posterior cells not infusate brown (Fig. 77).....  
.....*E. hexafascia*, **sp. nov.** (p. 440)
- Wing membrane with 4 complete brown bands extending between anterior and posterior margins and 3 additional basal bands fragmented by indistinct hyaline stripe through cells *br*, *bm* and *cua* and base of cell *dm*; cells *dm* and *m<sub>1</sub>* infusate brown (Fig. 78) .....*E. nebula*, **sp. nov.** (p. 458)
11. Wing membrane with 3 complete hyaline bands distal to crossvein *r-m* extending between anterior and posterior wing margins, 2 of which also distal to cell *dm* and partial hyaline band basal to crossvein *r-m* extending as far as vein *M<sub>4</sub>* and joined to stripe through cells *br*, *bm* and *cua* and most of cell *dm* (Fig. 76) .....  
.....*E. parallela* (Wiedemann) (p. 461)
- Wing membrane with fewer than 3 complete hyaline bands distal to crossvein *r-m* extending between anterior and posterior wing margins and stripe through cells *br*, *bm* and *cua* and most of cell *dm* (Figs 75, 79, 87) ..... 12
12. Wing membrane with 2 subparallel preapical hyaline bands distal to crossvein *dm-m*, extending between anterior and posterior wing margins and fragmented hyaline bands either side of crossvein *r-m* converging in crossvein *dm-m*, resulting in poorly defined V-shaped mark, broadly joined to stripe through cells *br*, *bm* and *cua* and base of cell *dm* (Fig. 87).....*E. fatima*, **sp. nov.** (p. 433)
- Wing membrane with 1 preapical hyaline band distal to crossvein *dm-m*, extending between anterior and posterior wing margins (Figs 75, 79)..... 13
13. Wing narrow in appearance; costal vein (*C*) appearing straight, then evenly curving toward apex after vein *R<sub>1</sub>* and cell *m<sub>1</sub>* not bulging posteriorly; wing membrane with single hyaline band distal to crossvein *r-m* terminating in cell *dm* and broadly joining with wedge-shaped hyaline stripe through cells *br*, *bm*, *cua* and base of cell *dm*, that extends as rounded lobe toward *C* basal to crossvein *r-m*; without hyaline mark on posterior margin of wing in cell *m<sub>1</sub>* distal to complete preapical hyaline band (Fig. 79) .....  
.....*E. currani* Steyskal (p. 427)
- Wing broad in appearance; costal vein (*C*) appearing to bend beyond apex of subcostal vein (*Sc*) and cell *m<sub>1</sub>* bulging posteriorly (more so than other species); 2 hyaline bands either side of crossvein *r-m* meet in cell *dm* and extend to hind margin of wing (in some specimens fragmented near anterior margin into multiple marks or bands) giving overall impression of vaguely Y-shaped mark over *r-m*, narrowly joined in *dm* to indistinct and irregularly margined stripe through cells *bm*, *cua* and base of cell *dm*; distal to complete preapical hyaline band is rounded hyaline mark on posterior margin in cell *m<sub>1</sub>* (Fig. 75).....  
.....*E. lugens* (Fabricius) (p. 443)
14. Wing membrane with 1 hyaline band distal to crossvein *r-m*, joined to stripe through cells *bm* and *cua* and base of cell *dm*, resulting in L-shaped hyaline mark (Figs 80, 82) ..... 15
- Wing membrane with paired hyaline bands either side of crossvein *r-m* converging to form V-shaped or Y-shaped hyaline mark, usually weakly joined to hyaline marks across cells *br*, *bm* and *cua* and base of cell *dm* (Figs 83–85, 88–91)..... 16
15. Thoracic pleura entirely orange-brown, in contrast to dark grey-brown scutum (Figs 39, 116); abdominal intersegmental membrane orange-brown, with large round to oval dull brown macula adjacent to tergites 3 and 4 (Fig. 39).....*E. elvillah*, **sp. nov.** (p. 432)
- Thoracic pleura mostly concolorous with dark grey-brown scutum (Fig. 63); abdominal intersegmental membrane dull brown, slightly paler basally, without large round to oval dull brown macula adjacent to tergites 3 and 4 .....  
.....*E. obscura* Hendel (p. 459)
16. Fore femur with armature consisting of biserial peg-like short, blunt spines (as opposed to long pointed spines) on anterior (*i.e.*, inner) and posterior (*i.e.*, outer) ventral margin (Fig. 130) .....*E. biseriata*, **sp. nov.** (p. 425)
- Fore femur with armature consisting of single or uniserial pointed spines on posterior ventral (*i.e.*, outer) margin (Figs 17, 129)..... 17
17. Wing membrane with paired hyaline bands either side of crossvein *r-m* converging and extending beyond vein *M<sub>4</sub>* (even if slightly disjointed) to posterior margin of wing, forming Y-shaped hyaline mark not, or weakly, joined to hyaline mark over cells *br*, *bm*, *cua* and base of cell *dm*; paired subapical hyaline bands either tapering or fragmented (Figs 83, 85)..... 18
- Wing membrane with paired hyaline bands either side of crossvein *r-m* converging to form V-shaped mark, not extending beyond vein *M<sub>4</sub>* to posterior margin of wing and not (or weakly) joined to hyaline stripe through cells *br*, *bm*, *cua* and base of cell *dm*; paired subapical hyaline bands narrow and subparallel (Figs 88–91)..... 19
18. Thorax with posterior margin of anepisternum and most of posterior part of katepisternum pale tan, in contrast to dark grey to black anterior margins (Figs 27, 118); wing membrane with stem of Y-shaped mark weakly joined to

hyaline stripe through cells *br*, *bm*, *cua* and base of cell *dm*, this tinged brown across base of *dm*; cell *m*<sub>4</sub> with L-shaped brown macula that interrupts stem of Y-shaped mark; paired subapical hyaline bands subequal in width, narrowing slightly toward posterior margin of wing and separated by broader, parallel-sided brown band (Fig. 83) .....

.....*E. ankasa*, **sp. nov.** (p. 423)

- Thorax with anepisternum and katepisternum entirely black (Figs 55, 120); wing membrane with stem of Y-shaped mark located at crossvein *r-m* disjointed at vein *M*<sub>4</sub>, not joined to hyaline mark over cells *br*, *bm*, *cua* and base of cell *dm*—distinct brown bar present through cell *dm*, separating hyaline mark in base of *dm* from base of Y-shaped hyaline mark; apical-most hyaline band fragmented at vein *M*<sub>1</sub>, beyond which are 2 short, parallel hyaline marks (Fig. 85) .....

.....*E. maya*, **sp. nov.** (p. 444)

- 19. Thorax with anepisternum bicoloured, with black median band contrasting with distinct pale cream anterior and posterior bands, the latter extending onto anterior anepimeron (Figs 45, 59, 119, 122)..... 20

- Thorax with anepisternum unicoloured, entirely dark brown to black, without distinct pale anterior and posterior vertical bands, sometimes with patchy pale marks (Figs 35, 69, 123, 124)..... 21

- 20. Scutum with vittae comprised of dense golden-green microtrichia (Fig. 113); postpronotal lobe tan brown (at least in centre) (Fig. 119); wing membrane with junction between base of V-shaped mark and hyaline stripe through cells *br*, *bm*, *cua* and base of cell *dm* partially obscured by brown tinge; paired subapical hyaline bands separated by brown band broader at anterior and posterior margins of wing than in cells *r*<sub>4+5</sub> and *m*<sub>1</sub> (Fig. 91) .....

.....*E. ghanensis*, **sp. nov.** (p. 437)

- Scutum with vittae comprised of pale grey to silver microtrichia (Fig. 109); postpronotal lobe black-brown throughout (Fig. 122); wing membrane with base of V-shaped mark clearly joined to hyaline stripe through cells *br*, *bm*, *cua* and base of cell *dm*, without brown tinge at junction; paired subapical hyaline bands separated by brown band, broader in cell *m*<sub>1</sub> than in cell *r*<sub>4+5</sub> (Fig. 89)...

.....*E. moerens* (Fabricius) (p. 446)

- 21. Head with frontal carina bell-shaped, lateral margins broad below antennae, then sharply narrowing and converging before reaching antennal sockets (Fig. 125); wing membrane with V-shaped hyaline mark narrowly joined to stripe through cells *br*, *bm* and *cua* and basal <sup>2</sup>/<sub>3</sub> of cell *dm*, which is brown-tinged (Fig. 88).....

.....*E. deemingi*, **sp. nov.** (p. 428)

- Head with frontal carina narrow, triangular, lateral margins straight and evenly converging between antennal sockets (Fig. 127); wing membrane with V-shaped hyaline mark not joined to stripe through cells *br*, *bm* and *cua* and basal <sup>2</sup>/<sub>3</sub> of cell *dm*, which is hyaline throughout, but separated by distinct narrow brown band through middle of *dm* (Fig. 90).....

.....*E. vicina*, **sp. nov.** (p. 469)

## Species accounts

### *Engistoneura ankasa* Kirk-Spriggs & Whittington, **sp. nov.**

Figs 26, 27, 83, 112, 118, 138

*Etymology.* The specific epithet *ankasa* is a Latin-derived adjective and is named after the type locality, Ankasa Forest Reserve, Ghana.

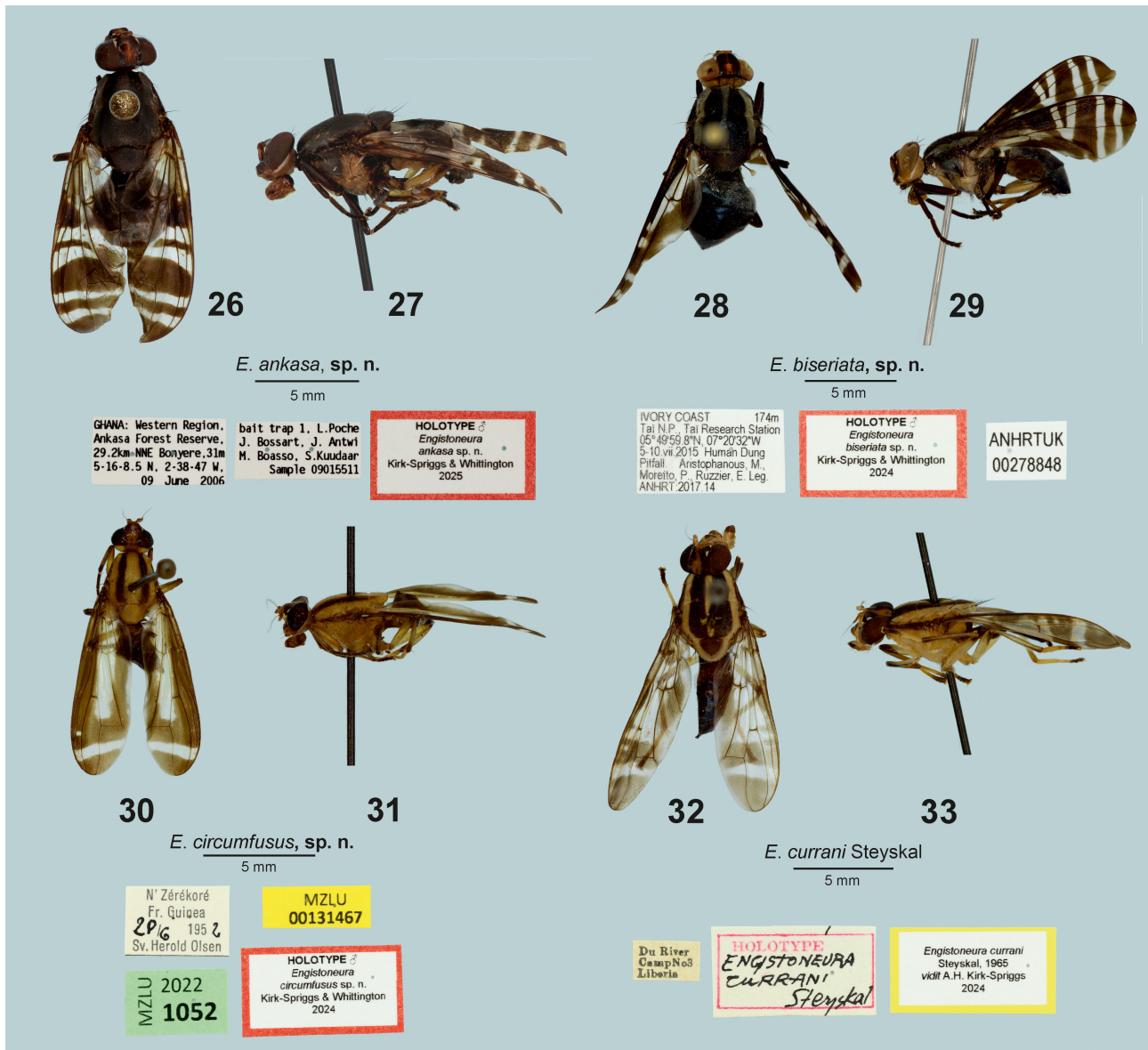
*Description.* ♂ (largely based on field-pinned holotype).

*Measurements.* Holotype ♂ (Figs 26, 27) body length: 10.7 mm (range: 9.6–12.0 mm;  $\bar{x}$  = 11.0 ± 0.7 mm; *n* = 30); wing length: 10.7 mm (range: 9.8–11.9 mm;  $\bar{x}$  = 10.9 ± 0.5 mm; *n* = 30).

*Colour/vestiture.* Ground colour (Figs 26, 27) dark grey-brown, abdominal tergites with dark metallic blue-green lustre, in contrast to buff-yellow on: occiput, medial sub-triangular mark on frons, antennae, facial carina, centre of face, clypeus, gena, fore coxae, basal <sup>4</sup>/<sub>5</sub> of mid and hind femora and tibiae and marks on tergites. Scutum (Fig. 112) with median and 2 lateral broad vittae formed of dense pale grey microtrichia, terminating at scutoscutellar suture (viewed obliquely). Wing membrane (Figs 83) dark brown, with Y-shaped hyaline mark adjacent to crossvein *r-m* and paired parallel preapical hyaline bands. Abdominal syntergite 1 + 2 black basally, dark metallic blue-green in posterior <sup>2</sup>/<sub>3</sub>; tergites 3–5 dark metallic blue-green; intersegmental membranes dull brown, sternites brown, with violet reflections.

*Head* (Figs 26, 27, 118). Facial carina as broad as antennal postpedicel, bell-shaped, with rounded margins and shagreened surface, especially dorsal extremity between antennae, with poorly defined radiating ridges (or rugosity) on flatter surface below. Fine silver microtrichia in narrow margin around compound eye, along upper margin of gena and as 2 distinct maculae on lateral frons, where this joins parafacial and slightly dorsal to it. Antennal pedicel with fine black setae clustered dorsally and apically. Postpedicel uniformly grey, with thick grey-white microtrichia (strongly contrasting with buff, thinly microtrichia pedicel). Arista with combined length of dorsal and ventral vestiture shorter than width of postpedicel. Antennal groove shiny dark brown at ventral extremity, not forming distinct facial vitta. Gena with single black, forwardly directed seta, posterior to which is small patch of black setulae at oral margin; genal and postgenal setulae fine and pale, virtually indistinct and widely spaced, longer around occipital foramen. Palpus uniformly buff yellow; setulae black. Prementum orange-brown; labellum brown, darker at apex; setulae orange-brown.

*Thorax* (Figs 26, 27, 112, 118). Bullate cervical sclerite chestnut brown, contrasting with pale buff proepisternum. Scutum broad basally. Anepisternum bicoloured, with densely black median vitta contrasting strongly with yellowish anterior and posterior margins; katepisternum bicoloured dark yellowish-brown on anterior ventral <sup>2</sup>/<sub>3</sub>, yellowish on posterior dorsal <sup>1</sup>/<sub>3</sub>. Anepisternum and katepisternum densely covered in pale, silver-grey microtrichia (viewed obliquely). Short



**FIGURES 26–33.** Primary name-bearing types of *Engistoneura* species (left: dorsal view; right: lateral view) and associated specimen labels (below). **26–27.** *E. ankasa*, **sp. nov.** (HT ♂, Ankasa Forest Reserve, Ghana, CMNH). **28–29.** *E. biseriata*, **sp. nov.** (HT ♂, Tai Research Station, Côte d’Ivoire, ANHRT). **30–31.** *E. circumfusus*, **sp. nov.** (HT ♂, N’Zérékoré, Guinea, MZLU). **32–33.** *E. currani* Steyskal (HT ♀, Du River, Liberia, AMNH).

black setulae evenly distributed across scutum and anepisternum, longer on remaining pleura.

**Scutellum** (Fig. 112). Slightly convex on dorsal surface; margin slightly concave between insertions of scutellar setae.

**Legs** (Figs 26, 27, 118). Fore femur with 2 pointed, black subapical spines on posterior ventral margin. Mid coxal prong well-developed, narrow and parallel-sided, rounded at apex. Mid coxal apophysis triangulate, bluntly pointed at apex, with black preapical setulae dorsally. Hind coxa with narrow posterior margin, the outermost extremity of which developed into stout, rounded lobe.

**Wing** (Fig. 83). Crossvein *r-m* angle = 10°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 2.3; crossveins *r-m* : *dm-m* angle = 6°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.37. Wing

membrane with hyaline and dark brown markings: 2 parallel preapical bands distal to crossvein *dm-m* transecting wing margin from anterior to posterior margins (both of which widen towards anterior wing margin) and 2 converging hyaline bands that extend to vein  $M_4$ , merging with hyaline stripe through basal cells and basal 1/2 of cell *dm*. Extensive hyaline marks present along hind margin of anal lobe and most apparent in cell  $m_4$ . Ventral auxiliary sclerite dark red-brown, with narrow, rounded extension. Halter knob and stem pale buff-yellow, base of stem slightly darker.

**Abdomen** (Fig. 26). White setulae and silver-grey microtrichia apparent on tergites intermingled with brown setulae towards apex of abdomen.

**Terminalia.** External parts with epandrium dark brown and cerci paler tan brown.

Female similar to male, only differing in genitalic characters.

*Variation.* There is some variation in the width, shape and extent of the hyaline wing bands and in some specimens the two hyaline bands either side of crossvein *r-m* reach as far as the posterior wing margin, merging with the largest marginal mark in cell  $m_4$ .

*Diagnosis.* Scutum (Fig. 112) broad basally, predominantly dark grey-brown, with vittae comprised of dense pale grey microtrichia; thoracic pleura (Figs 118) at least in part, concolorous with dark grey-brown scutum; anepisternum bicoloured, with black median vitta contrasting with pale yellowish anterior and posterior margins; dark areas brown-black, contrasting with yellowish white anterior and posterior margins of face, anepisternum and katepisternum; wing membrane (Fig. 83) with 2 parallel preapical hyaline bands distal to crossvein *dm-m* transecting wing from anterior to posterior margins (both of which widen towards the anterior wing margin) and 2 converging hyaline bands that either extend to vein  $M_4$  or fully to posterior wing margin, merging with basal stripe through basal cells and basal  $1/2$  of cell *dm*. Extensive hyaline marks present along hind margin of anal lobe, most extensive in cell  $m_4$ , or merging with hyaline bands.

*Type material examined.* **GHANA:** holotype ♂, “GHANA: Western Region, / Ankasa Forest Reserve, / 29.2km NNE Bonyere, 31m / 5-16-8.5 N, 2-38-47 W, [= 5.27, -2.65] / 09 June 2006 [printed] // bait trap 1, L. Poche / J. Bossart, J. Antwi / M. Boasso, S. Kuudaar / Sample 09015511 [printed] // **HOLOTYPE** ♂ / *Engistoneura* / *ankasa* **sp. nov.** / Kirk-Spriggs & Whittington / 2025 [white card with red border; printed]” (CMNH). Direct-pinned, in good condition. Paratypes (all labelled “// **PARATYPE** ♂ [or ♀] / *Engistoneura* / *ankasa* **sp. nov.** / Kirk-Spriggs & Whittington / 2025 [white card with blue border; printed]”): 3♂, 10♀, “GHANA: Western Region, / Ankasa Forest Reserve, / 27km NNE Bonyere, 65m / 5-14-43.5 N, 2-38-19.1 W, [= 5.25, -2.64] / 10 June 2006 [printed] // bait trap 2. L. Poche / J. Bossart, J. Antwi / M. Boasso, S. Kuudaar / Sample 09025512 [printed]”; 2♂, “GHANA: Western Region, / Ankasa Forest Reserve, / 25.4km NNE Bonyere, 48m / 5-13-56 N, 2-38-34.3 W, [= 5.23, -2.64] / 10 June 2006 [printed] // bait trap 3. J. Antwi / J. Bossart, M. Boasso / L. Poche, S. Kuudaar / Sample 09025512 [printed]”; 6♂, 4♀, same, except “11 June 2006”, “Sample 09025513”; 1♂, 1♀, “GHANA: Western Region, / Ankasa Forest Reserve, / 30.7km NNE Bonyere, 40m / 5-16-53.2 N, 2-38-23.2 W, [= 5.28, -2.64] / 11 June 2006 [printed] // bait trap 4. J. Antwi / J. Bossart, M. Boasso / L. Poche, S. Kuudaar / Sample 09045513 [printed]”; 1♀, “GHANA: Western Region, / Ankasa Forest Reserve, / 30.9km NNE Bonyere, 72m / 5-16-55.5 N, 2-38-10.7 W, [= 5.28, -2.64] / 11 June 2006 [printed] // bait trap 6. L. Poche / J. Bossart, J. Antwi / M. Boasso, S. Kuudaar / Sample 09065513 [printed]”; 1♀, “GHANA: Western Region, / Ankasa Forest Reserve, / 29.2km NNE Bonyere, 31m / 5-16-8.5 N, 2-38-47 W, [= 5.27, -2.65] / 11 June 2006 [printed] // bait trap 1. L. Poche / J. Bossart, J. Antwi /

M. Boasso, S. Kuudaar / Sample 09015513 [printed]” (all CMNH).

*Distribution.* Ghana.

*Bionomics.* A lowland Eastern Guinean Forest species, apparently restricted to Ankasa Forest Reserve, Ghana, at elevations between 31 and 72 m (Fig. 138). The type material was sampled in hanging butterfly traps baited with fermenting fruit (J.L. Bossart, pers. comm. 2025). Specimen label data indicate that the species is active in June.

### *Engistoneura biseriata* Kirk-Spriggs & Whittington, **sp. nov.**

Figs 28, 29, 84, 108, 121, 130, 139

*Etymology.* The specific epithet *biseriata* is a compound Latin adjective and refers to the paired serial row of protuberances ventrally on the fore femora of the species.

*Description:* ♂ (largely based on ex ethanol holotype).

*Measurements.* Holotype ♂ (Figs 28, 29) body length: 10.8 mm (range: 9.5–11.1 mm;  $\bar{x}$  = 10.3 ± 0.6 mm;  $n$  = 8); wing length: 11.7 mm (range: 9.0–11.9 mm;  $\bar{x}$  = 10.9 ± 0.9 mm;  $n$  = 8).

*Colour/vestiture.* Ground colour (Figs 28, 29, 108, 121) dark grey-brown, abdominal tergites with metallic dark blue-green to violet lustre, in contrast to buff-yellow on: central face, clypeus and facial carina, gena, postgena and occiput, fore coxae, basal  $2/3$  of mid and hind femora, middle  $3/5$  of hind tibiae, hind tarsomere 1, posterodorsal  $1/3$  of katepisternum and anterior  $1/2$  of anepimeron; frons with orange, oval-shaped mark medially in front of ocellar triangle. Scutum with 3 broad vittae, formed of dense pale grey-brown microtrichia, terminating at scutoscutellar suture, median vitta  $1/2$  width of lateral vittae. Wing membrane (Fig. 84) dark brown, with V-shaped hyaline mark adjacent to crossvein *r-m* and paired parallel preapical hyaline bands. Abdominal syntergite 1 + 2 dull, tergites 3–5 metallic dark blue; intersegmental membranes dull brown, with poorly defined, large, round to oval dull brown mark adjacent to tergites 3 and 4, sternites brown, without metallic reflections.

*Head* (Figs 28, 29, 121). Facial carina with rounded margins and rugose surface, with 4 longitudinal divergent grooves. Fine silver microtrichia adjacent to compound eye along dorsal margin of gena and as 2 distinct maculae on lateral frons adjoining parafacial and slightly dorsal to it. Antennal pedicel with fine black setae in dense dorsal cluster and row along ventral margin. Postpedicel dull brown, pale buff-yellow on ventral base, with fine yellowish white microtrichia (extent of which differs with angle of viewing). Arista with combined length of dorsal and ventral vestiture approximately equal to width of postpedicel. Antennal groove shiny dark brown at ventral extremity adjoining brown facial vitta, extending to extreme lateral margins of clypeus. Gena with single black, forwardly directed seta, posterior to which is sparse group of fine black setulae; genal and postgenal setulae fine,

black, widely spaced, longer around occipital foramen. Palpus with apex dull brown; setulae black. Prementum pale orange-brown, sclerotised parts of labellum brown, setulae pale brown to black.

**Thorax** (Figs 28, 29, 108, 121). Bullate cervical sclerite pale brown, contrasting with pale buff proepisternum. Anepisternum and katepisternum densely covered in pale, silver-grey microtrichia (viewed obliquely) with brown microtrichose vitta along dorsal margin of anepisternum. Short black setulae evenly distributed across scutum, scutellum and pleura, but yellowish on microtrichose vittae and silver on anepimeron and katepisternum. With row of long black setulae in front of mid coxae, in front of which are silver setulae longer than elsewhere on katepisternum.

**Scutellum** (Fig. 108). Slightly flattened on dorsal surface; margin slightly swollen where apical scutellar setae inserted.

**Legs** (Figs 29, 130). Fore femur with 3 stout, black, peg-like subapical spines on anterior and posterior ventral margin, those on anterior surface more closely approximated and located nearer to apex of femur than those on posterior surface. Mid coxal prong parallel-sided, round at apex. Mid coxal apophysis brown, stout and cone-shaped.

**Wing** (Fig. 84). Crossvein *r-m* angle = 10°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 2; crossveins *r-m* : *dm-m* angle = 12°; ratio crossvein *r-m* ( $R_{4+5}$ - $M_1$ ): wing width at crossvein *dm-m* = 0.42. Wing membrane with hyaline and dark brown bands: 2 parallel hyaline preapical bands distal to crossvein *dm-m*, transecting wing margin from anterior to posterior margin and 2 short hyaline bands either side of crossvein *r-m*, converging to form V-shape, this terminating at vein  $M_4$ , not joined to basal hyaline stripe through basal cells and basal  $1/2$  of cell *dm*; 2 hyaline marks (1 large 1 small) present along hind margin of wing in cell  $m_4$  and along posterior margin of anal lobe. Ventral auxiliary sclerite dark brown with red-brown apical surface. Halter knob cream-white, stem dark buff.

**Abdomen** (Figs 28, 29). Tergites and sternites with white to pale brown setulae, slightly longer laterally on tergite 3, with some black setulae scattered along lateral margins of tergites.

**Terminalia**. External parts dark brown, with cerci and surstyli buff.

Female similar to male, only differing in sexual characters.

**Variation**. There is some variation in the extent of the pale marking on the posteromedial area of the katepisternum, the width and shape of the hyaline wing bands and the extent of the hyaline patches along the margin of cell  $m_4$ .

**Diagnosis**. Scutum (Fig. 108) predominantly dark grey-brown, with vittae comprised of pale grey to silver microtrichia; thoracic pleura (Fig. 121) at least in part concolorous with dark grey-brown scutum; wing membrane (Fig. 84) with V-shaped hyaline mark converging in cell *dm* level with crossvein *r-m*, joined to stripe through cells *bm*, *cua* and basal  $2/3$  of cell *dm*;

fore femur (Fig. 130) with armature consisting of biserial short, blunt peg-like spines (as opposed to long pointed spines) on anterior (*i.e.*, inner) and posterior (*i.e.*, outer) ventral margin.

**Type material examined**. **CÔTE D'IVOIRE**: holotype ♂, "IVORY COAST 174m/Tai NP., Tai Research Station / 05°49'59.8"N, 07°20'32"W, [= 5.83, -7.34] / 5–10.vii.2015 Human Dung / Pitfall. Aristophanous, M., / Moretto, P., Ruzzier, E. Leg. / ANHRT:2017.14 [printed] // ANHRTUK / 00278848 [printed] // **HOLOTYPE** ♂ / *Engistoneura* / *biseriata* sp. nov. / Kirk-Spriggs & Whittington / 2023 [white card with red border; printed]" (ANHRT). Direct-pinned, in good condition. Paratypes (all labelled " // **PARATYPE** ♂ [or ♀] / *Engistoneura* / *biseriata* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with blue border; printed]"): 1♂, same data as holotype, except: " // ANHRTUK / 00278849 [printed]"; 3♂, 2♀, "IVORY COAST 174m / Tai NP., Tai Research Station / 05°50'00"N, 07°20'32"W [= 4.83, -7.34] / 14–23.xi.2015 Human Dung / Pitfall. Aristophanous, M., / Moretto, P., Ruzzier, E. Leg. / ANHRT:2017.16 [printed] // ANHRTUK / 00279352, 00279353, 00279355, 00280696, 00280698 [printed]"; 2♀, "IVORY COAST 205m / 3km W Tai Research Station / (SRET) / 05°51'08"N, 07°21'08.1"W [= 5.85, -7.35] / 8–14.iv.2017 Human Dung / Pitfall. Aristophanous, A., / Aristophanous, M., Geiser, M. / Moretto, P. Leg. / ANHRT:2017.25 [printed] // ANHRTUK / 00258012, 00279356 [printed]" (all ANHRT).

**Distribution**. Côte d'Ivoire.

**Bionomics**. A Western Guinean Lowland Forest species, only recorded from Tai National Park, Côte d'Ivoire and its environs, at elevations between 174 and 205 m (Fig. 139). The type series was sampled in faeces-baited pitfall traps in indigenous forest. Specimen label data indicate that the species is active in April, July and November.

***Engistoneura circumfusum* Kirk-Spriggs & Whittington, sp. nov.**

Figs 30, 31, 71, 94, 140

**Etymology**. The specific epithet *circumfusum* is derived from the Latin, meaning "surrounded" and refers to the brown band surrounding the central hyaline mark through the basal cells.

**Description**: ♂ (largely based on field-pinned holotype).

**Measurements**. Holotype ♂ (Figs 30, 31) body length: 7.0 mm (range: 7.0–8.1 mm;  $\bar{x}$  = 7.4 ± 0.6 mm;  $n$  = 3); wing length: 8.4 mm (range: 8.0–8.5 mm;  $\bar{x}$  = 8.3 ± 0.3 mm;  $n$  = 3).

**Colour/vestiture**. Ground colour (Figs 30, 31, 94) pale tan-brown to orange-brown, scutum with 2 broad dark brown vittae, which cross scutoscutellar suture, but remain separate, not converging at centre of scutellum, fading toward scutellar margin, but present on subscutellum and mediotergite; dorsal margin of anepisternum and proepisternum with narrow dark brown vittae that narrowly extends onto lateral margins of scutum; thoracic



pleura without brown banding; legs bicoloured: generally consistent with ground colour, but with faint brown apical bands on femora and faint brown basal and apical bands on tibiae. Wing membrane (Fig. 71) dark brown with hyaline basal stripe and single preapical hyaline band. Abdomen brown with dark metallic ultramarine blue lustre; intersegmental membrane tan-brown; sternites brown.

**Head** (Figs 30, 31, 94). Frons centrally slightly dull, shiny laterally. Facial carina narrower than width of antennal postpedicel, wedge-shaped with rounded margins and weakly developed single medial groove; surface of facial carina and face finely rugose. Centre of frons paler than margins, gradually becoming darker towards ptilinal fissure. Fine silver macula on lateral frons adjoining parafacial. Antennal pedicel with fine black setulae on dorsal surface and across apical and ventral margins. Postpedicel pale buff-yellow. Arista with combined length of dorsal and ventral vestiture equivalent to width of postpedicel. Antennal groove dull buff-yellow with shiny dark brown apical macula. Gena with single black, forwardly directed seta, posterior to which are 2 or 3 finer golden setulae at oral margin; genal and postgenal setulae short, pale brown, widely spaced and inconspicuous. Palpus with apex narrowly and faintly dull grey-brown, with silver microtrichia; setulae black, short to long, longest seta longer than width of palpus. Prementum consistent with ground colour, labellum mostly dull brown, with margins of labeller lobes tan-brown; setulae brown on prementum, brassy-brown ventrally on labellum.

**Thorax** (Figs 30, 31, 94). Bullate cervical sclerite pale buff, concolorous with proepisternum. Anepisternum and katepisternum with poorly defined silver-grey microtrichia (viewed obliquely). Short black setulae evenly distributed across scutum, anepisternum and scutellum, interspersed with golden-yellow setulae on pleura. With row of long black setulae in front of mid coxae, in front of which is small patch of slightly shorter, golden-yellow setulae.

**Scutellum** (Fig. 94). Flat on dorsal surface, margins slightly concave between insertions of scutellar setae.

**Legs** (Fig. 31). Fore femur with 3 pointed, black subapical spines on posterior ventral margin, basal-most slightly weaker, inserted slightly closer to mid spine than distance between 2 distal spines. Legs pale tan-brown to orange-brown, with faint brown bands on apex of femur and base and apex of tibia; entire fore tarsus dark brown, but only apical 3 tarsomeres of mid and hind tarsi dark brown. Mid coxal prong weakly developed, narrowly spatulate. Mid coxal apophysis conical and sharply pointed. Posterodorsal margin of hind coxa with small rounded lobe. Ventral surface of tarsomere 1 of all legs densely covered in microtrichose vestiture, brown on fore leg, pale yellowish on mid and hind legs. Pulvilli densely pale orange on ventral surface, contrasting with dark brown terminal tarsomere and claws. Empodium pale brown and fine.

**Wing** (Fig. 71). Crossvein  $r-m$  angle =  $12^\circ$ ; ratio minimum width cell  $r_{2+3}$  : length crossvein  $r-m$  = 1.7; crossveins  $r-m$  :  $dm-m$  angle =  $12^\circ$ ; ratio crossvein  $r-m$

( $R_{4+5}-M_1$ ) : wing width at crossvein  $dm-m$  = 0.44. Wing membrane mostly dark brown, with hyaline basal stripe from wing base to apical  $\frac{1}{5}$  of cell  $dm$  and with single preapical hyaline band distal to crossvein  $dm-m$ . Ventral auxiliary sclerite dark red-brown consistent with base of costal vein ( $C$ ). Halter knob slightly paler than buff-brown stem.

**Abdomen** (Figs 30, 31). Tergites with surface finely rugose. Long brassy to brown setae present at lateral margins of tergites, intermingled with black setae at apex of tergites 4 and across tergite 5; sparse silver-grey microtrichia difficult to discern, but apparent with changing direction of light.

**Terminalia**. External parts brown, densely clothed in black setae.

Female similar to male, only differing in sexual characters.

**Variation**. Insufficient material is available to assess variation.

**Diagnosis**. Scutum (Fig. 94) predominantly pale tan-brown to orange-brown, with 2 brown vittae extending across scutoscuteellar suture onto scutellar disc; wing membrane (Fig. 71) predominantly dark brown with basal hyaline stripe from wing base to apical  $\frac{1}{5}$  of cell  $dm$  and single preapical hyaline band distal to crossvein  $dm-m$ .

**Type material examined**. **GUINEA**: holotype ♂, “N’Zérékoré [= 7.753, -8.82] / Fr. Guinea / 28/6 1952 / Sv. Herold Olsen [printed and handwritten] // MZLU / 2022 / **1052** [green card, printed] // MZLU / 00131467 [yellow card, printed] // **HOLOTYPE** ♂ / *Engistoneura* / *circumfusus* sp. nov. / Kirk-Spriggs and Whittington / 2024 [white card with red border; printed]” (MZLU). Direct-pinned in good condition. Paratypes (both labelled: “// **PARATYPE** ♀ / *Engistoneura* / *circumfusus* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with blue border; printed]”); 1♀, same labels as holotype, except: “MZLU / 2022 / **1053** [green card, printed] // MZLU / 00131469 [yellow card, printed]”; 1♀, same labels as holotype, except: “/ 31/8 1951 // MZLU / 2022 / **1051** [green card, printed] // MZLU / 00131468 [yellow card, printed]” (both MZLU).

**Remarks**. One specimen has *Stylogaster* Macquart (Conopidae) eggs embedded in the intersegmental membrane adjacent to sternite 2 on both the left and right sides.

**Distribution**. Guinea.

**Bionomics**. A Western Guinean Lowland Forest species, only recorded from N’Zérékoré, Guinea, at an elevation of ca 560 m (Fig. 140). The locality is associated with Diecke Forest; a large intact lowland forest of high conservation importance (H. Takano, pers. comm. 2025). Specimen label data indicate that the species is active in June and August.

### *Engistoneura currani* Steyskal, 1965

Figs 11–14, 32, 33, 79, 102, 141

*Engistoneura currani* Steyskal, 1965a: 172, fig. 6; Steyskal 1980: 567.

*Redescription*: ♀ (largely based on field-pinned holotype).

*Measurements*. Holotype ♀ (Figs 32, 33) body length: 9.3 mm (range: 8.0–9.3 mm;  $\bar{x}$  = 8.7 ± 0.9 mm;  $n$  = 2); wing length: 10.2 mm (range: 10.1–10.2 mm;  $\bar{x}$  = 10.2 ± 0.1 mm;  $n$  = 2).

*Colour/vestiture*. Ground colour (Figs 32, 33, 102) pale tan-brown to orange-brown; scutum with 2 brown vittae, converging at centre of scutellum and brown lateral margins; pleura entirely consistent with ground colour; abdominal tergites dull brown with faint blue metallic lustre. Wing membrane (Fig. 79) brown with hyaline marks surrounding and basal to *r-m* and a single preapical hyaline band. Abdomen dull brown with blue metallic iridescence; intersegmental membrane and sternites pale tan-brown.

*Head* (Figs 32, 33). Facial carina sharp-edged, flat and shiny dorsally, duller beneath, with weakly developed paired median longitudinal grooves from level with antennal insertions to facial bulge. Fine silver pubescence expressed as 2 distinct maculae on lateral frons adjoining parafacial and slightly dorsal to it, as narrow margin along ventral and posterior margins of compound eye. Antennal pedicel with fine black setulae on dorsal surface and along apical margin. Postpedicel pale buff-yellow. Arista with combined length of dorsal and ventral vestiture equal to width of postpedicel. Antennal groove dull buff-yellow, with small dark brown apical macula. Gena with single black, forwardly directed seta, without setulae at oral margin; genal and postgenal setulae short, black, widely spaced, longest around occipital foramen. Palpus with apex dull black, with velvety ash grey tip; setulae black. Prementum and labellum consistent with ground colour, but apex of labellum dark brown; setulae black on prementum and pale golden ventrally on labellum.

*Thorax* (Figs 32, 33, 102). Bullate cervical sclerite pale buff, consistent with proepisternum. Notopleural callosity poorly developed. Anepisternum and katepisternum apparently devoid of silver-grey microtrichia (viewed obliquely), except for extreme ventral margin. Short black setulae evenly distributed across scutum, pleura and scutellum. With row of long black setulae in front of mid coxae, in front of which is small patch of slightly shorter, silvery setulae.

*Scutellum* (Fig. 102). Slightly convex on dorsal surface, margin slightly swollen where apical scutellar setae inserted.

*Legs* (Fig. 33). Fore femur basally concolorous with thoracic pleura, brown at apical  $\frac{1}{3}$  trailing as elongate brown mark along full length of posterior surface, with single pointed, black subapical spine on posterior ventral margin. Mid coxal prong weakly developed, short, narrowly ovate. Mid coxal apophysis sharply pointed. Tibiae and terminal 4 tarsomeres dark brown.

*Wing* (Figs 11–14, 79). Crossvein *r-m* angle = 15°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.3; crossveins *r-m* : *dm-m* angle = 15°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.34. Wing membrane (Fig. 79) brown (faded in holotype) with hyaline stripe through cells *br*, *bm* and basal  $\frac{4}{5}$  of crossvein *dm-m* broadening and terminating at crossvein

*r-m* where there is single short, narrow brown band and beyond which is single preapical hyaline band just apical of crossvein *dm-m*. Ventral auxiliary sclerite shiny, red-brown. Halter knob tan-brown to yellow, stem pale buff-brown.

*Abdomen* (Figs 32, 33). Tergite 3 with long, pale setae at lateral margins and tergite 5 with fine black setae at apex; sparse silver-grey microtrichia difficult to discern.

*Terminalia*. Oviscape brown, aculeus paler.

♂ Unknown.

*Variation*. Insufficient material is available to assess variation.

*Diagnosis*. Scutum (Fig. 102) predominantly pale tan-brown to orange-brown, with 2 brown vittae that extend across scutoscutellar suture onto disc of scutellum where they converge; wing membrane (Figs 11–14, 79) with 1 preapical hyaline band distal to crossvein *dm-m*; hyaline bands adjacent to crossvein *r-m* either single or comprised of multiple small disjointed hyaline marks; hyaline band at *r-m* complete (not fragmented) terminating in cell *dm*; palpus with black; abdomen (Figs 32, 33) entirely dark brown, with vivid blue-violet metallic iridescence.

*Type material examined*: **LIBERIA**: holotype ♀, “Du River [= Dukwia River, 6.34, -10.36] / Camp No3 / Liberia” [printed] // “**HOLOTYPE** [printed in pink lettering] / *Engistoneura* / *currani* / Steyskal” [white card with pink border; handwritten] // *Engistoneura currani* / Steyskal, 1965 / *vidit* A.H. Kirk-Spriggs / 2024 [white card with yellow border; printed]” (AMNH). Direct-pinned in good condition. Paratype ♀, same labels as holotype, except: “**PARATYPE** [printed in blue lettering] / *Engistoneura* / *currani* / Steyskal” [white card with blue border; handwritten]” (AMNH).

*Remarks*. Steyskal (1965a: 172) cited “Holotype and one paratype, females, Du River Camp No.3, Liberia”. The female holotype and paratype are deposited in AMNH and the holotype was examined and redescribed.

*Distribution*. Liberia.

*Bionomics*. A Western Guinean Lowland Forest species, only recorded from Du River, Liberia, at an elevation of *ca* 97 m (Fig. 141). There are no seasonal data available for this species.

### *Engistoneura deemingi* Kirk-Spriggs & Whittington, sp. nov.

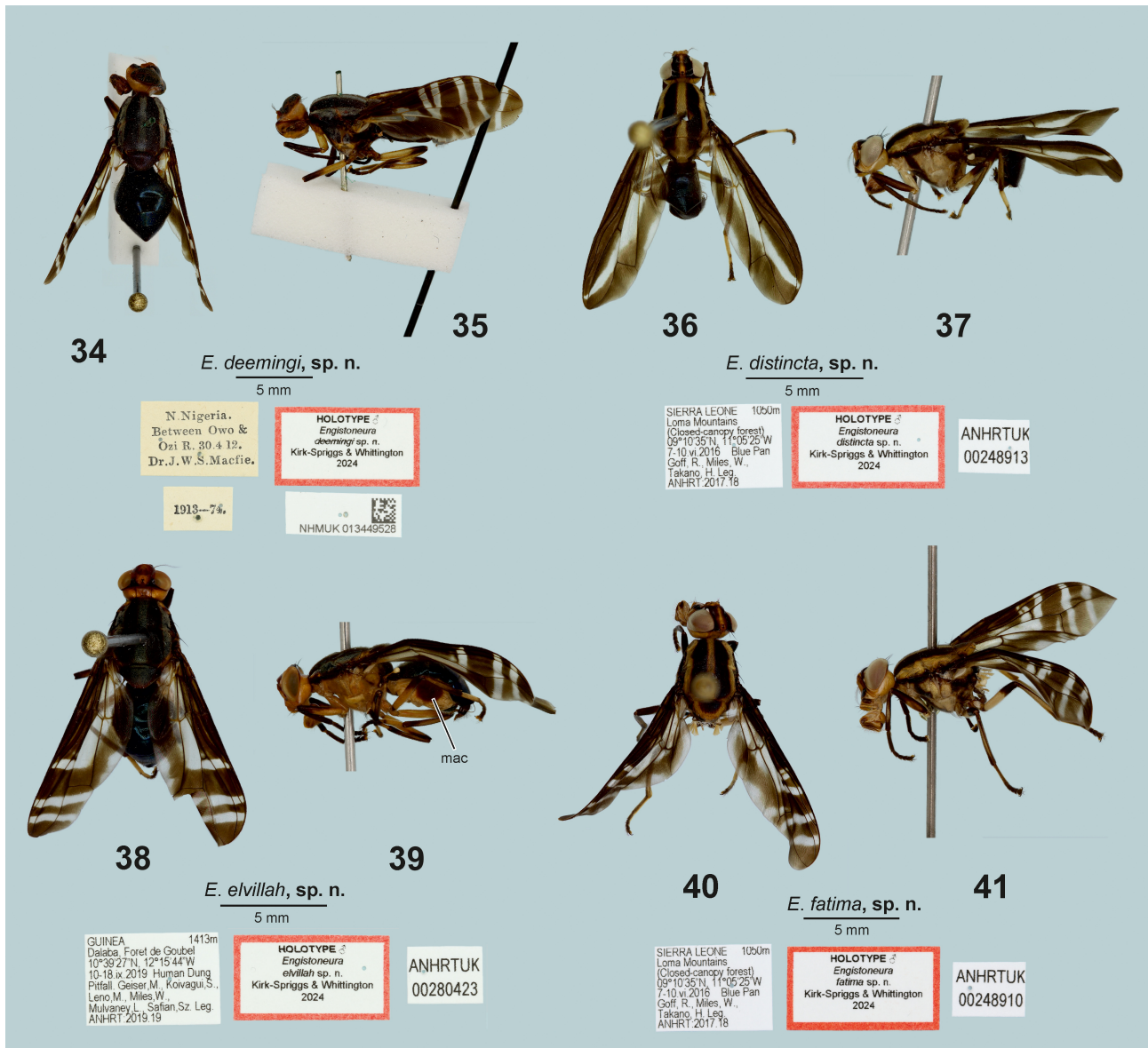
Figs 34, 35, 88, 110, 123, 125, 126, 142

*Etymology*. The specific epithet *deemingi*, is a genitive case noun in honour of John Christopher Deeming, in recognition of his substantial contribution to Afrotropical dipterology, especially the fauna of Nigeria.

*Description*: ♂ (largely based on field-pinned holotype).

*Measurements*. Holotype ♂ (Figs 34, 35) body length: 11.4 mm (range: 9.6–12.7 mm;  $\bar{x}$  = 11.3 ± 0.8 mm;  $n$  = 30); wing length: 11.1 mm (range: 9.3–12.4 mm;  $\bar{x}$  = 11.1 ± 0.8 mm;  $n$  = 30).

*Colour/vestiture*. Ground colour (Figs 34, 35, 110, 123) dark grey-brown, abdominal tergites with dark metallic



**FIGURES 34–41.** Primary name-bearing types of *Engistoneura* species (left: dorsal view; right: lateral view) and associated specimen labels (below). **34–35.** *E. deemingi*, **sp. nov.** (HT ♂, Between Owa and Ozi R., Nigeria, NHMUK). **36–37.** *E. distincta*, **sp. nov.** (HT ♂, Loma Mountains, Sierra Leone, ANHRT). **38–39.** *E. elvillah*, **sp. nov.** (HT ♂, Dalaba, Foret de Goubel, Guinea, ANHRT). **40–41.** *E. fatima*, **sp. nov.** (HT ♂, Loma Mountains, Sierra Leone, ANHRT) [abdomen removed for dissection]. Abbreviation: mac—macula.

blue-green lustre, in contrast to buff-yellow on: occiput, medial linear mark on frons, antennae, facial carina, centre of face and clypeus, gena, postgena, posteromedial area of katepisternum, fore coxae, basal  $\frac{2}{3}$  of mid and hind femora and central portion of mid and hind tibiae. Scutum, scutellum and upper margin of anepisternum with faint metallic violet lustre (under certain angles of light) with 3 broad vittae on scutum formed of dense pale grey microtrichia, terminating at scutoscutellar suture. Wing (Fig. 88) dark brown, with V-shaped hyaline mark adjacent to crossvein *r-m* and paired parallel preapical hyaline bands. Abdomen dark brown with metallic blue lustre; intersegmental membranes dark brown, sternites brown, with blue metallic reflections.

*Head* (Figs 34, 35, 123, 125, 126). Facial carina as

broad as antennal postpedicel, bell-shaped, with rounded margins and smooth surface, especially dorsal extremity between antennae, with poorly defined radiating ridges (or rugosity) on flatter surface below. Fine silver microtrichia in narrow margin around compound eye, along upper margin of gena and as 2 distinct maculae on lateral frons, where this joins parafacial and slightly dorsal to it. Antennal pedicel with fine black setae clustered dorsally and apically. Postpedicel pale buff-yellow at base and ventrally, tinged brown dorsally and toward apex, with fine yellowish golden microtrichia on ventral margin basally (extent of which differs with angle of light and viewing). Arista with combined length of dorsal and ventral vestiture no greater than width of postpedicel. Antennal groove shiny dark brown at ventral extremity, where this

joins brown facial vitta. Gena with single black, forwardly directed seta, posterior to which is small patch of black setulae at oral margin; genal and postgenal setulae fine and pale, virtually indistinct and widely spaced, longer around occipital foramen. Palpus with apex dull black, with narrow extremity of ash grey microtrichia; setulae black. Prementum orange-brown; labellum brown, darker at apex; setulae orange-brown to golden.

**Thorax** (Figs 34, 35, 110, 123). Thoracic pleura dark brown, except proepisternum and posteromedial area of katepisternum buff-yellow. Bullate cervical sclerite pale brown, contrasting with pale buff proepisternum. Anepisternum and katepisternum, anterior  $\frac{1}{2}$  of anepimeron and entire anatergite densely covered in pale, silver-grey microtrichia (viewed obliquely). Short brown setulae evenly distributed across scutum and anepisternum, longer on remaining pleura.

**Scutellum** (Fig. 110). Slightly convex on dorsal surface; margin slightly concave between insertions of scutellar setae.

**Legs** (Figs 33, 123). Fore femur with 2 pointed, black subapical spines on posterior ventral margin. Mid coxal prong well-developed, narrow and parallel-sided, rounded at apex. Mid coxal apophysis triangulate, bluntly pointed at apex, with black preapical setulae dorsally. Hind coxa with narrow posterior margin, the outermost extremity of which is developed into stout, rounded lobe.

**Wing** (Fig. 88). Crossvein *r-m* angle =  $6^\circ$ ; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 2.5; crossveins *r-m* : *dm-m* angle =  $8^\circ$ ; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.41. Wing membrane predominantly dark brown with 2 preapical hyaline bands distal to crossvein *dm-m* transecting wing margin from anterior to posterior margins and 2 short hyaline bands converging on crossvein *r-m* forming V-shape, joined to a single hyaline stripe through basal cells and basal  $\frac{1}{2}$  of cell *dm*. Narrow hyaline marks present along hind margin of anal lobe and cell  $m_4$ . Ventral auxiliary sclerite dark red-brown with rounded orange apex. Halter knob and stem pale buff-brown, base of stem slightly darker.

**Abdomen** (Fig. 34). White setulae and silver-grey microtrichia apparent on tergites intermingled with brown setulae towards apex of abdomen.

**Terminalia**. External parts dark brown.

Female similar to male, only differing in sexual characters.

**Variation**. There is some variation to the extent of the pale marking on the posteromedial area of the katepisternum and in the width and shape of the hyaline wing bands and the extent of the hyaline patches along the margin of cell  $m_4$ .

**Diagnosis**. Scutum (Fig. 110) predominantly dark grey-brown, with vittae comprised of pale grey to silver microtrichia; thoracic pleura (Fig. 123) at least in part, concolorous with dark grey-brown scutum; anepisternum unicoloured, entirely dark brown to black, without pale anterior and posterior margins; wing membrane (Fig. 88) with V-shaped hyaline mark converging in cell *dm* level with crossvein *r-m* joined to stripe through cells

*bm*, *cua* and basal  $\frac{2}{3}$  of cell *dm*; frontal carina (Figs 125, 126) bell-shaped, lateral margins broad below antennae, then sharply narrowed and convergent before reaching antennal sockets; armature of fore femur consisting of uniserial pointed spines on posterior (*i.e.*, outer) ventral margin.

**Type material examined**: **NIGERIA**: holotype ♂, “N. Nigeria. / Between Owo & / Ozi R. [= 6.37, 8.04] 30.4.[19]12. / Dr.J.W.S. Macfie [printed] // 1913—74. [printed] // **HOLOTYPE** ♂ / *Engistoneura / deemingi* sp. nov. / Kirk-Spriggs & Whittington / 2023 [white card with red border; printed] // NHMUK013449528 [printed with QR code] (NHMUK). Staged on nu-poly strip in good condition. Paratypes (all labelled: “// **PARATYPE** ♂ [or ♀] / *Engistoneura / deemingi* sp. nov. / Kirk-Spriggs & Whittington / 2023 [or 2024] [white card with blue border; printed]”): **CÔTE D’IVOIRE**: 2♂, “IVORY COAST 174m / Tai NP., Tai Research Station / 05°49’59.8”N, 07°20’32”W, [= 5.83, -7.34] / 5–10.vii.2015 Human Dung / Pitfall. Aristophanous, M., Moretto, P., / Ruzzier, E. Leg. / ANHRT:2017.14 [printed] // ANHRTUK / 00279350, 00279351 [printed]; 8♀, same except: “14–23.xi.2015. Human Dung / Pitfall. Aristophanous, M., / Moretto, P., Ruzzier, E. Leg. / ANHRT:2017.16 [printed] // ANHRTUK / 00280697, 00280699–00280704, 00279354 [white card; printed]” (all ANHRT). **NIGERIA**: 8♂, 2♀, same label as holotype, except: “NHMUK013449527–013449542, 013449550–013449552, 013449554 [printed with QR code]”; 3♂, 2♀, “N. Nigeria. / Near Oku R. [= 5.73, 5.65] / 15.6.[19]12. / Dr.J.W.S. Macfie [printed] // 1913—74. [printed] // NHMUK013449537, 013449546, 013449547, 013449544, 013449549” [printed with QR code]”; 1♂, “Between / Owo and Ozi / river 30.4.[19]12 [handwritten] / NIGERIA / J.W. Scott Macfie [printed] // NHMUK013449564 [printed with QR code]”; 2♂, “N. Nigeria. / Between Owo / & Isaulu [= Isanlu, 7.68, 5.75]. 1.v.[19]12 / Dr.J.W.S. Macfie / 1913—74. [handwritten] // 1913—74. [printed] // NHMUK013449535, 013449545 [printed with QR code]; 1♀, “Between Owo & / Isaulu, N. Nigeria / Dr J.W. Scott Macfie / 1.x.[19]12 [handwritten] // NHMUK013449534 [printed with QR code]”; 1♂, 2♀, “N. Nigeria. / 30.iv.1912 / Dr.J.W.Scott Macfie / Between Owo and / Oyi R. [= 6.32, 5.82] [printed and handwritten] // NHMUK013449507–013449509 [printed with QR code]”; 1♂, 1♀, “N. Nigeria. / 15.iv.1912 / Dr.J.W.Scott Macfie / near Oki Village [= 6.23, 6.13] / in thick bush [printed and handwritten] // NHMUK013449504, 013449506 [printed with QR code]”; 1♀, “N. Nigeria. / 18.VI.1912 / Dr.J.W.Scott Macfie / from bushy parts / on road Idofin—Ilaffin [= Ilafin, 8.28, 5.80] [printed and handwritten] // NHMUK013449505 [printed with QR code]”; 1♀, “Nigeria / Benin City [= 6.33, 5.62] / 24.v.1927 / F.D. Golding [handwritten] // Pres. by / Imp.Bur.Ent. / Brit. Mus. / 1930—215 [printed] // *Engistoneura / albovarria* Wlk. / Det. G.A.K.Marshall [printed and handwritten] // NHMUK013449503 [printed with QR code]”; 1♂, “IBADON [= 7.38, 3.94] NIGERIA / 2.5.[19]48 / E.O. HAIG [handwritten] // NHMUK013449584 [printed with QR code]”; 1♂, 1♀, “Dr. A. Connal / S. Nigeria [printed and handwritten] // On Bush / Path 3.30 pm / 3.4.[19]11

/ Agege [= 6.63, 3.28] / near Lagos [large white disc, handwritten] // NHMUK013449512, 013449514 [printed with QR code]"(all NHMUK); 1♂, "Ibadan / 24.4.23 / Nigeria [type-written and handwritten] // S. NIGERIA, / Ibadan [= 7.37, 3.95]. / 1923 / F.D. Golding [printed]" (CUMZ). **TOGO:** 1♂, "TOGO/Dzoghbégan [= 7.248, 0.68] / S.net forest: monastery / 3. Jul. 1997 / Col.: G. Goergen [printed]" (IITAB). **COUNTRY UNKNOWN:** 1♀, "Angola [no locality; probably mislabelled and should be Cameroon] / [on reverse] 73 / 66 [white disc; handwritten] // Angola / Mr.&Mrs. Montero / 73.66 / [on reverse] *Engistoneura / albovaria* / Walk. / (E.E.A) [handwritten] // NHMUK013449501 [printed with QR code]" (NHMUK).

*Distribution.* Côte d'Ivoire, Nigeria and Togo.

*Remarks.* The single specimen recorded from "Angola" has no specific locality and is clearly an error. Joachim John and Rose Monteiro (the name is misspelt in the NHMUK register and on the specimen labels) although stationed in Cabinda (an enclave of Angola) also collected specimens in Cameroon and Bioko Is (as Fernando Po) (B.M. 1868–109), presumably during one of the regular stops that vessels would have made on their voyages towards Southern Africa (including Angola) via West Africa. Although conjecture, it is possible that this very distinctive insect was captured in Cameroon and was accidentally labelled at a later date as originating from Angola (H. Takano, pers. comm. 2025).

*Bionomics.* Occurring in the Western Congolian Forest-Savanna Mosaic, Western Guinean Lowland Forest, Nigerian Lowland Forest, Guinean Forest-Savanna Mosaic and Eastern Guinean Forest, at elevations between 47 and 737 m (Fig. 142). Material from Côte d'Ivoire was sampled in faeces-baited pitfall traps in indigenous forest. Other records are from thick bush. Specimen label data indicates that the species is active from April–July and in October and November.

### ***Engistoneura distincta* Kirk-Spriggs & Whittington, sp. nov.**

Figs 36, 37, 70, 93, 143

*Etymology.* The specific epithet *distincta* is a Latin adjective and refers to the highly distinct appearance of the new species.

*Description:* ♂ (largely based on ex ethanol holotype).

*Measurements.* Holotype ♂ (Figs 36, 37) body length: 7.1 mm (range: 6.7–8.8 mm;  $\bar{x}$  = 7.6 ± 0.6 mm;  $n$  = 22); wing length: 8.6 mm (range: 7.7–10.1 mm;  $\bar{x}$  = 8.6 ± 0.6 mm;  $n$  = 22).

*Colour/vestiture.* Ground colour (Figs 36, 37, 93) pale tan-brown to orange-brown; scutum with 2 broad dark brown vittae, crossing scutoscutellar suture, that remain separate and do not converge in centre of scutellum, continuing over scutellar margin and across subscutellum and mediotergite; dorsal margin of anepisternum and proepisternum with broad dark brown vittae narrowly extending over lateral margins of scutum; pleura and legs bicoloured, generally consistent with ground

colour, but with broad dark brown vertical vitta through anterior anepisternum and katepisternum; katatergite and anatergite dark brown. Wing membrane (Fig. 70) dark brown with a single hyaline stripe from base to apex. Abdominal tergites dark metallic ultramarine blue, surface finely rugose; abdominal sternites dark brown; abdominal intersegmental membrane and sternites tan-brown.

*Head* (Figs 36, 37). Frons slightly dull. Facial carina with rounded margins and weakly developed medial groove, which divides in two mid-ways; surface of facial carina and face finely rugose. Centre of frons paler than margins, gradually becoming darker towards ptilinal fissure. Fine silver macula on lateral frons adjoining parafacial. Antennal pedicel with fine black setulae on dorsal surface and along apical and ventral margins. Postpedicel pale buff-yellow. Arista with combined length of dorsal and ventral vestiture equivalent to width of postpedicel. Antennal groove dull buff-yellow, with shiny dark brown apical macula. Gena with single black, forwardly directed seta, posterior to which are 2 or 3 finer black setulae at oral margin; genal and postgenal setulae short, pale brown and widely spaced, darker and longer toward occipital foramen. Palpus with apex narrowly and faintly dull grey; setulae black, longer than width of palpus. Prementum consistent with ground colour, labellum mostly dull brown with margins of labellar lobes tan-brown; setulae brown on prementum and pale golden ventrally on labellum.

*Thorax* (Figs 37, 93). Bullate cervical sclerite pale buff, concolorous with proepisternum. Anepisternum and katepisternum with poorly defined silver-grey microtrichia (viewed obliquely). Short black setulae evenly distributed across scutum, anepisternum and scutellum. With row of long black setulae in front of mid coxae, in front of which is small patch of slightly shorter, silver setulae.

*Scutellum* (Fig. 93). Flat on dorsal surface, margins quite straight between insertions of scutellar setae.

*Legs* (Fig. 37). Fore femur with 3 evenly spaced, pointed, black subapical spines on posterior ventral margin, foremost of which slightly weaker, inserted at more acute angle than basal two. Fore leg (except coxa) dark brown, apical  $\frac{2}{5}$  of mid and hind femur dark brown; mid and hind tibiae with basal  $\frac{1}{5}$  brown and apical  $\frac{2}{5}$  dark brown between which tibia dark yellowish brown; mid and hind tarsi with narrow dark brown ring at apex of basal 2 mid and hind tarsomeres and dark brown apical 3 mid and hind tarsomeres. Mid coxal prong weakly developed, narrow, straight and rounded at apex. Mid coxal apophysis sharply pointed. Posterodorsal margin of hind coxa with small rounded lobe. Ventral surface of tarsomere 1 of all legs densely clothed in setulae, brown on fore leg, pale yellowish on mid and hind legs. Pulvilli densely orange on ventral surface, contrasting with dark brown apical tarsomere and claws. Empodium pale brown and fine.

*Wing* (Fig. 70). Crossvein *r-m* angle = 20°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.8; crossveins *r-m* : *dm-m* angle = 22°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.52. Wing membrane predominantly dark brown, without hyaline

bands, but with single hyaline stripe from base of cell *br* to wing apex and with posterior margin of wing membrane narrowly hyaline in cell *m*<sub>4</sub>. Ventral auxiliary sclerite yellow-brown. Halter knob white, stem pale buff-brown.

**Abdomen** (Figs 36, 37). Long black setae on lateral margins of tergite 3 and fine black setae on tergites 4 and 5; sparse silver-grey microtrichia difficult to discern (apparent with changing direction of light).

**Terminalia**. External parts brown, densely clothed in black setae, *in situ* distiphallus double coiled.

Female similar to male, only differing in sexual characters.

**Variation**. No substantial variation is apparent.

**Diagnosis**. Scutum (Fig. 93) predominantly pale tan-brown to orange-brown, with 2 brown vittae extending across scutoscuteellar suture onto scutellar disc, evanescent prior to reaching scutoscuteellar apex; wing membrane (Fig. 70) predominantly dark brown, with single hyaline stripe from base of cell *br* to wing apex (without bands).

**Type material examined**. **SIERRA LEONE**: holotype ♂, “SIERRA LEONE 1050m / Loma Mountains / (Closed-canopy forest) / 09°10'35"N, 11°05'25"W [= 9.18, -11.09] / 7–10.vi.2016 Blue Pan / Trap. Goff, R., Miles, W., / Takano, H. Leg. / ANHRT:2017.18 [printed] // ANHRTUK / 00248913 [printed] // **HOLOTYPE** ♂ / *Engistoneura* / *distincta* sp. nov. / Kirk-Spriggs & Whittington / 2023 [white card with red border; printed]” (ANHRT). Direct-pinned in good condition. Paratypes (all labelled: “// **PARATYPE** ♂ [or ♀] / *Engistoneura* / *distincta* sp. nov. / Kirk-Spriggs & Whittington / 2025 [white card with blue border; printed]”): 3♂, 10♀, same data as holotype, except: “ANHRTUK / 00248914–00248924 [printed]”; 4♂, 2♀, same data, except: “Yellow Pan” // ANHRTUK / 00248925–00248930 [printed]”; 1♂, 1♀, same data, except: “Snake pitfall” // ANHRTUK / 00244453, 00244454 [printed]”; 1♀, same, except: “Light trap” // ANHRTUK / 00347010 [printed]” (all ANHRT). **LIBERIA**: 3♀, “LIBERIA: Kolahun [= 8.29, -10.09] / (Virgin forest) / 13-viii-1966 / E. S. Ross & / K. Lorenzen [printed] // CASENT / 8629420, 8629391 & 8629392 [printed with QR codes]” (CAS).

**Distribution**. Liberia and Sierra Leone.

**Bionomics**. A Guinean Montane Forest species, apparently with a disjunct distribution Loma Mountains of Sierra Leone and Kolahun in Liberia, at elevations between *ca* 444 m and 1,050 m (Fig. 143). The species has been sampled in yellow and blue pan traps and in a snake baited pitfall trap. Specimen label data indicate that the species is active in April and August.

### ***Engistoneura elvillah* Kirk-Spriggs & Whittington, sp. nov.**

Figs 38, 39, 80, 105, 116, 144

**Etymology**. The specific epithet *elvillah* is a noun in apposition and the species is named in honour of Elvillah Rweyemamu.

**Description**: ♂ (largely based on ex ethanol holotype).

**Measurements**. Holotype ♂ (Figs 38, 39) body length:

9.3 mm (range: 6.8–9.3 mm;  $\bar{x}$  = 7.8 ± 0.6 mm; *n* = 30); wing length: 9.8 mm (range: 8.2–10.3 mm;  $\bar{x}$  = 9.2 ± 0.6 mm; *n* = 30).

**Colour/vestiture**. A bicoloured species (Figs 38, 39, 105, 116) with scutum, scutellum and abdominal tergites and sternites with dark brown ground colour, abdominal intersegmental membrane orange-brown, with large round to oval dull brown mark adjacent to tergites 3 and 4; remainder of body tan-brown to yellowish-brown to orange-brown; head mostly orange-brown, darker on frons, black at vertex; scutum with notopleural callus, post-alar wall and ventral surface of apex of scutellum orange-brown; median and 2 lateral broad vittae formed of dense pale grey microtrichia on scutum (viewed obliquely; darker grey vitta between paler grey vittae may appear brown), lateral vittae terminating at scutoscuteellar suture, but median vitta covering centre of scutellum. Wing membrane (Fig. 80) dark brown, with L-shaped hyaline mark adjacent to crossvein *r-m* and paired parallel preapical hyaline bands. Abdominal tergites and sternites with dark metallic blue lustre, less distinct on syntergite 1 + 2 which is dull.

**Head** (Figs 38, 39, 116). Frons shiny. Facial carina sharp-edged between antennal insertions, but mostly with rounded margins, surface not grooved, but with some rugosity medially. Fine silver microtrichia expressed as 2 distinct maculae on lateral frons adjoining parafacial and slightly dorsal to it and a third macula on gena adjacent to lower margin of compound eye. Antennal pedicel with fine black setae forming line dorsally and fringe along distal margin. Postpedicel pale buff-yellow, with fine yellowish golden microtrichia on entire surface. Arista with combined length of dorsal and ventral vestiture equivalent to width of postpedicel. Antennal groove with small, shiny, dark brown macula at ventral extremity; face entirely orange-brown. Gena with single black, forwardly directed seta (detached in holotype) posterior to which is small clump of golden setulae; genal and postgenal setulae fine, black, virtually indistinct and widely spaced, longer around occipital foramen. Palpus, prementum and labellum entirely orange-brown; setulae of palpus and prementum black, of labellum golden.

**Thorax** (Figs 105, 116). Bullate cervical sclerite pale orange-brown, concolorous with proepisternum. Anepisternum and katepisternum densely covered in pale, silver-grey microtrichia (viewed obliquely). Short black setulae evenly distributed across scutum and anepisternum, longer on other pleura, white in posterior 1/2 of anepimeron and most of katepisternum. With row of long black setulae in front of mid coxae, in front of which are slightly shorter and quite dense silver setulae.

**Scutellum** (Fig. 105). Slightly convex on dorsal surface; margin slightly swollen where apical scutellar setae inserted.

**Legs** (Figs 39, 116). Fore femur with 3 pointed, black subapical spines on posterior ventral margin; distal-most of which, small and weakly differentiated from background setulae. Coxae, basal 3/5 of femora and tarsomere 1 of mid and hind legs pale orange-brown, dorsal surface of mid-trochanter dark brown and dark brown mark dorsally

on fore femur, except basal  $\frac{1}{5}$ ; mid and hind tibiae dark yellowish brown in medial  $\frac{4}{5}$ . Mid coxal prong narrowly developed, parallel-sided, round at apex, curving forwards at midpoint. Mid coxal apophysis cone-shaped, pointed, black at apex.

*Wing* (Fig. 80). Crossvein *r-m* angle =  $3^\circ$ ; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.8; crossveins *r-m* : *dm-m* angle =  $11^\circ$ ; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.40. Wing membrane dark brown with slight metallic violet reflections along hind margin; 2 parallel hyaline preapical bands distal to crossvein *dm-m* from anterior to posterior margins and 1 short hyaline band distal to crossvein *r-m*, joined to basal stripe through basal cells and basal  $\frac{1}{2}$  of cell *dm*, resulting in an L-shaped mark. Faint hyaline marks present along hind margin of cell  $m_4$ . Ventral auxiliary sclerite red-brown. Halter knob cream-white, stem orange-brown.

*Abdomen* (Figs 38, 39). White to pale brown setulae and silver-grey microtrichia apparent on tergites 2–5.

*Terminalia*. External parts dark brown, with cerci and surstyli buff; setulae black.

Female similar to male, only differing in sexual characters.

*Variation*. The frons varies from dark orange-brown to red-brown. A few specimens examined have a second hyaline mark across wing cell  $r_{2+3}$  and  $\frac{1}{2}$  way across cell  $r_{4+5}$  (usually only one side of the specimen). This may be either reduced (as in Fig. 80) or more extensive, merging with the main hyaline band adjacent to the *r-m* crossvein. Despite this, in the most extreme cases it does not form a distinct V-shaped mark. In the majority of specimens examined, the terminal hyaline mark reaches the posterior wing margin as a broad band, but this narrows markedly towards the posterior wing in some specimens (as in Fig. 80).

*Diagnosis*. Scutum (Fig. 105) predominantly dark grey-brown, with vittae comprised of pale grey to silver microtrichia; thoracic pleura (Fig. 116) entirely orange-brown, in contrast to dark grey-brown scutum; wing membrane (Fig. 80) with hyaline mark adjacent to crossvein *r-m* usually single, located distal to *r-m*, joined in cell *dm* to hyaline stripe through cells *br*, *bm* and *cua*, resulting in an L-shaped mark; narrow hyaline marks on posterior margin of cell  $m_4$ ; abdominal intersegmental membrane (Fig. 39) orange-brown, with large round to oval dull brown mark adjacent to tergites 3 and 4; legs (Figs 39, 116) pale orange-brown, with apex of femur and tibia and tarsomeres 4 and 5 contrasting dark brown.

*Type material examined*: **GUINEA**: holotype ♂, “GUINEA 1413m / Dalaba, Foret de Goubel /  $10^\circ 39' 27''$ N,  $12^\circ 15' 44''$ W [= 10.66, -12.26] / 10–18.ix.2019 Human Dung / Pitfall. Geiser, M., Koivagui, S. / Leno, M., / Miles, W., / Mulvaney, L., Safian, Sz. Leg. / ANHRT:2019.19 [printed] // **HOLOTYPE** ♂ / *Engistoneura* / *elvillah* **sp. nov.** / Kirk-Spriggs & Whittington / 2023 [white card with red border; printed]” // ANHRTUK / 00280423 [printed]” (ANHRT). Direct-pinned in good condition. Paratypes (all labelled: “// **PARATYPE** ♂ [or ♀] / *Engistoneura* / *elvillah* **sp. nov.** / Kirk-Spriggs & Whittington / 2023

[white card with blue border; printed]”): 74♂, 162♀, same labels as holotype, except: “ANHRTUK / 00280419–00280422, 00280424–00280655 [printed]”; 2♀, “GUINEA 1413m / Dalaba, Foret de Goubel / (Upland Forest & Savannah) /  $10^\circ 39' 27''$ N,  $12^\circ 15' 44''$ W [= 10.66, -12.26] / 10–18.ix.2019 Flight Interception / Trap. Geiser, M., Koivagui, S., / Leno, M., Miles, W., / Mulvaney, L., Safian, Sz. Leg. / ANHRT:2019.19 [printed] // ANHRTUK / 00280681, 00280682 [printed]” (all ANHRT).

*Distribution*. Guinea.

*Bionomics*. A Guinean Montane Forest species, apparently restricted to Foret de Goubel near Dalaba, Guinea, at an elevation of 1,413 m (Fig. 144). This locality is in the Fouta Djallon, an area of high endemism (H. Takano, pers. comm. 2025). The majority of specimens in the type series were sampled in faeces-baited pitfall traps, with two sampled in flight interception traps. Specimen label data indicate that the species is active in September.

### *Engistoneura fatima* Kirk-Spriggs & Whittington, **sp. nov.**

Figs 40, 41, 87, 100, 114, 145

*Etymology*. The specific epithet *fatima* is a noun in apposition, named in honour of the first author's eldest daughter Fatima Maria Alves.

*Description*: ♂ (largely based on ex ethanol holotype).

*Measurements*. Holotype ♂ (Figs 40, 41) body length: unavailable (range: 10–10.7 mm;  $\bar{x}$  =  $10.4 \pm 0.5$  mm;  $n$  = 3); wing length: 10.1 mm (range: 10.1–11.1 mm;  $\bar{x}$  =  $10.7 \pm 0.5$  mm;  $n$  = 3).

*Colour/vestiture*. Ground colour (Figs 40, 41, 100, 114) pale tan-brown to yellow-brown; scutum with 2 brown vittae, converging at centre of scutellum, with narrow brown lateral margins only slightly developed on ventral margin of postpronotal and notopleural callosities; anepisternum with J-shaped dark brown mark and posteroventral  $\frac{2}{3}$  of katepisternum dark brown. Wing membrane (Fig. 87) dark brown, with poorly defined V-shaped hyaline mark adjacent to crossvein *r-m* and paired parallel preapical hyaline bands. Abdominal tergites (Fig. 40) brown, with blue-violet metallic lustre; intersegmental membrane grey-brown; sternites dull brown with weak metallic blue reflections.

*Head* (Figs 40, 41, 114). Facial carina square-edged dorsally, becoming more rounded toward face, with 3 weakly developed medial grooves, otherwise with generally smooth surface. Frons with centre paler than margins. Fine silver macula on lateral frons adjoining parafacial, continuing around lower margin of compound eye to upper margin of gena. Antennal pedicel with fine, black setulae on dorsal surface, arranged in line either side of which are several scattered setulae; fine black setulae also present along apical and ventral margins. Postpedicel pale buff-yellow ventrally. Arista with combined length of dorsal and ventral vestiture greater than width of postpedicel. Antennal groove dull buff-yellow, with shiny dark brown apical macula. Gena with single black, forwardly directed seta, posterior to which is small group

of finer black setulae at oral margin; genal and postgenal setulae short, black and widely spaced, longer around occipital foramen. Palpus with apex dull black; setulae black. Prementum and labellum consistent with ground colour, but apex of labellum deeply black; setulae brown on prementum and pale golden ventrally on labellum.

**Thorax** (Figs 40, 41, 100, 114). Bullate cervical sclerite pale buff, concolorous with proepisternum. Anepisternum and katapisternum covered in silver-grey microtrichia (viewed obliquely). Most of katatergite and anatergite dark brown, with vertical tan-brown to yellow-brown vitta medially. Short black setulae evenly distributed across scutum, anepisternum and scutellum; silver to white setulae scattered over pleura. With row of long black setulae in front of mid coxae, in front of which setulae are longer on ventral parts of katapisternum.

**Scutellum** (Fig. 100). Slightly convex on dorsal surface, margin barely swollen where apical scutellar setae inserted.

**Legs** (Figs 41, 114). Fore femur with 3 evenly spaced, pointed, black subapical spines on posterior ventral margin, apical-most of which slightly less thick. Mid coxal prong weakly spatulate. Mid coxal apophysis stout, conical with square apex. Hind coxal lobe strongly developed.

**Wing** (Fig. 87). Crossvein *r-m* angle = 22°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 2.7; crossveins *r-m* : *dm-m* angle = 17°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.40. Wing membrane predominantly dark brown with 2 parallel preapical hyaline bands distal to crossvein *dm-m* and 2 hyaline bands either side of crossvein *r-m* which form V-shaped mark, basal-most of which does not reach costal vein (*C*) and distal-most of which joins hyaline stripe through cells *br*, *bm* and basal  $\frac{1}{2}$  of crossvein *dm-m*. Ventral auxiliary sclerite red-brown throughout. Halter knob white, stem pale buff-brown.

**Abdomen** (Figs 40, 41). Tergites and sternites with white to pale brown setulae, slightly longer laterally on tergite 3, with some brown setulae scattered along lateral margins of tergites.

**Terminalia**. Externally visible parts brown, with cerci and surstyli orange-brown.

Female similar to male, only differing in sexual characters.

**Variation**. There is some variation in the width and shape of the hyaline wing bands and the extent of the hyaline patches along the margin of cell  $m_4$ .

**Diagnosis**. Scutum (Fig. 100) predominantly pale tan-brown to orange-brown, with 2 brown vittae extending across scutoscuteellar suture onto disc of scutellum where these converge; thoracic pleura (Fig. 114) orange-brown, with contrasting dark grey on median anepisternum and anterior  $\frac{1}{2}$  of katapisternum; wing membrane (Fig. 87) with 2 preapical hyaline bands distal to crossvein *dm-m* reaching hind margin of wing; 2 parallel hyaline bands either side of crossvein *r-m* (or in some specimens converging on crossvein *r-m*) reaching midway across cell *dm*, basal-most of these joining basal stripe through cells *br*, *bm*, *cua* and base of cell *dm*.

**Type material examined**: **SIERRA LEONE**:

holotype ♂, “SIERRA LEONE 1050m / Loma Mountains / (Closed-canopy forest) / 09°10'35"N, 11°05'25"W [= 9.18, -11.09] / 7–10.vi.2016 Blue Pan / Trap. Goff, R., Miles, W., / Takano, H. Leg. / ANHRT:2017.18 [printed] // **HOLOTYPE** ♂ / *Engistoneura* / *fatima* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with red border; printed]” // ANHRTUK / 00248910 [printed]” (ANHRT). Direct-pinned in good condition; dissected, abdomen and terminalia in micro-vial pinned beneath specimen. Paratypes (all labelled: “// **PARATYPE** ♂ [or ♀] / *Engistoneura* / *fatima* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with blue border; printed]”): 1♀, same labels as holotype, except: “ANHRTUK / 00248911 [printed]”; **CÔTE D’IVOIRE**: 1♂, “IVORY COAST 256m / Comoe N.P., Comoe 2 / (Open Forest) / 08°40'03.1"N, 03°47'03.1"W [= 8.67, -3.78] / 27.vi.–02.vii.2015 Human Dung / Pitfall. Aristophanous, M., / Moretto, P., Ruzzier, E. Leg. / ANHRT:2017.14 [printed] // ANHRTUK / 00280679 [printed]” (both ANHRT).

**Distribution**. Côte d’Ivoire and Sierra Leone.

**Bionomics**. A species with a disjunct distribution, occurring in the Guinean Montane Forest of the Loma Mountains of Sierra Leone at an elevation of 1,050 m and in the Guinean Forest-Savanna Mosaic in Comoe National Park, Côte d’Ivoire at an elevation of 256 m (Fig. 145). Despite the disjunct distribution, the butterfly fauna sampled at these two sites was surprisingly similar (H. Takano, pers. comm. 2025). Specimens were sampled in blue pans and in faeces-baited pitfall traps in indigenous forests. Specimen label data indicate that the species is active in June and July.

### *Engistoneura flavipennis* Hendel, 1914

Figs 42, 43, 74, 97, 146

*Engistoneura flavipennis* Hendel, 1914a: 152, figs 260–262, 1914b: 366; Steyskal 1980: 567.

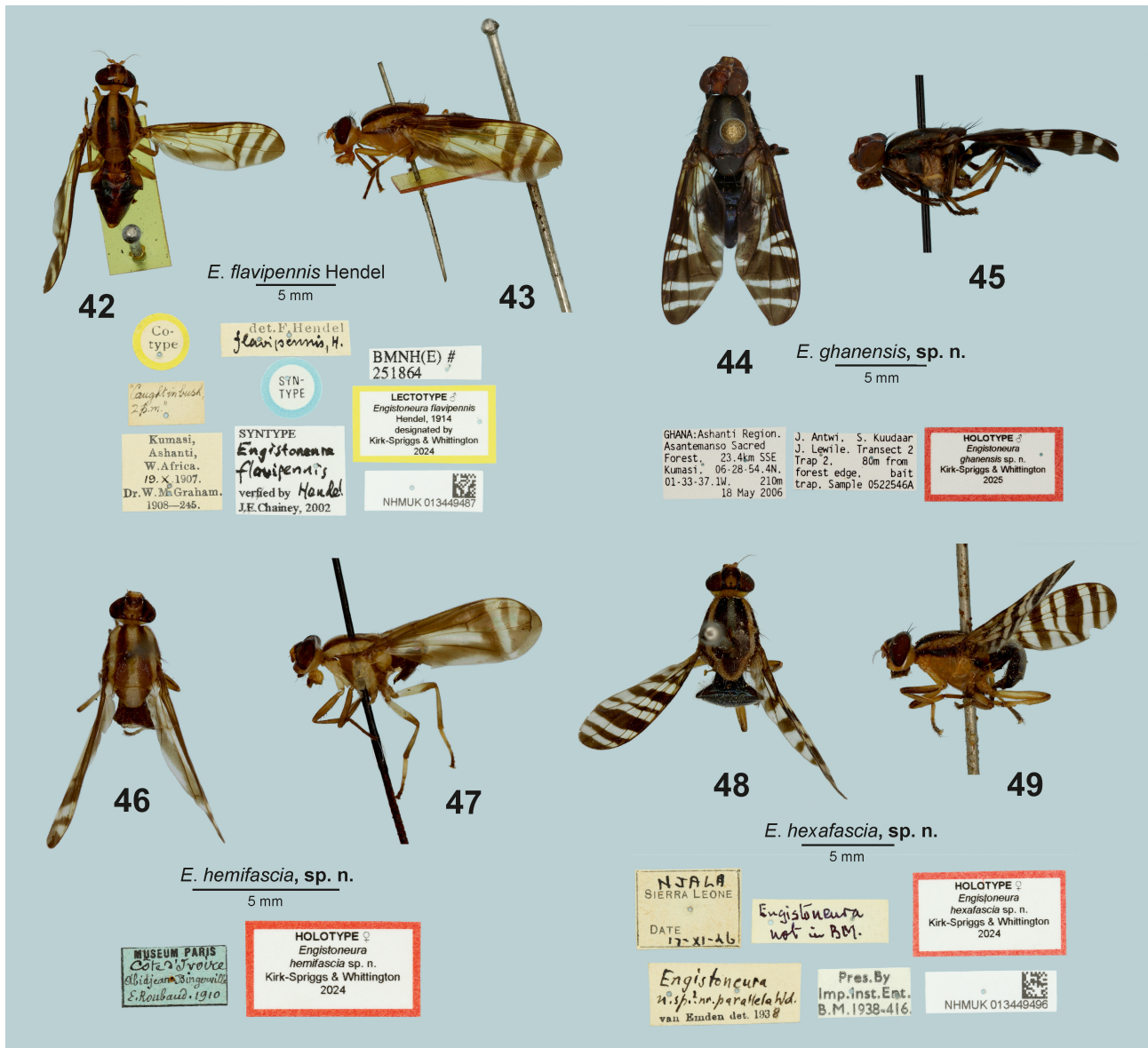
**Redescription**: ♂ (largely based on field-pinned lectotype).

**Measurements**. Lectotype ♂ (Figs 42, 43) body length: 10.2 mm (range: 9.8–10.6 mm;  $\bar{x}$  = 10.2 ± 0.4 mm;  $n$  = 3); wing length: 10 mm (range: 10.0–11.0 mm;  $\bar{x}$  = 10.5 ± 0.5 mm;  $n$  = 3).

**Colour/vestiture**. Ground colour (Figs 42, 43, 97) pale tan-brown; scutum with 2 distinctive dark-brown dorsocentral vittae, extending across scutellum, then ventrally across anatergite; dorsal margin of anepisternum and proepisternum with narrow dark brown vitta, narrowly extending onto lateral margins of scutum. Wing membrane (Fig. 74) dark brown, with wedge-shaped orange stripe from wing base to a little beyond crossvein *r-m* and paired parallel preapical orange to hyaline bands. Base of abdomen and median vitta pale tan-brown, with lateral and apical extremities darker brown, with faint sky-blue metallic lustre; intersegmental membranes and sternites tan-brown.

**Head** (Figs 42, 43). Face pale orange to tan-brown, with poorly defined brown lateral vittae from distinct





**FIGURES 42–49.** Primary name-bearing types of *Engistoneura* species (left: dorsal view; right: lateral view) and associated specimen labels (below). **42–43.** *E. flavipennis* Hendel, 1914 (LT ♂, Kumasi, Ghana, NHMUK). **44–45.** *E. ghanensis*, *sp. nov.* (HT ♂, Asantemanso Sacred Forest, Ghana, CMNH). **46–47.** *E. hemifascia*, *sp. nov.* (HT ♀, Bingerville, Côte d'Ivoire, MNHN) [right wing subsequently removed for imaging]. **48–49.** *E. hexafascia*, *sp. nov.* (HT ♀, Njala, Sierra Leone, NHMUK) [right wing subsequently removed for imaging].

black maculae at base of antennal groove, across clypeus; concave, epistomal margin protruding beyond antennae; facial carina wedge-shaped, with rounded margins; surface finely rugose, with 3 median furrows separated by raised ridges diverging ventrally. Frons shiny, bullate, brown toward ptilinal fissure, black laterally on vertex and centrally paler anterior to black ocellar triangle. Compound eyes dark red-brown. Fine silver microtrichia limited to narrow ventral margin of compound eye and as 2 distinct triangular maculae on lateral frons adjoining parafacial. Antennal pedicel with fine black setae dorsally and as fringe along ventral margin. Postpedicel pale buff-yellow slightly darker apicodorsally; with fine yellow microtrichose vestiture. Antennal groove shiny, cream-white, with distinct black macula at ventral extremity

adjoining faint brown facial vitta. Gena with single black, forwardly directed seta, surrounded at base ventrally by 4 or 5 shorter and weaker black setulae; setulae on postgena fine, a mixture of pale, virtually indistinct setulae dorsally with black, widely spaced and slightly longer setulae ventrally and around occipital foramen. Palpus entirely pale orange to tan-brown; setulae black. Prementum and labellum pale buff, labellum faintly brown at apex, setulae orange-brown to golden.

**Thorax** (Figs 42, 43, 97). Bullate cervical sclerite pale buff, concolorous with proepisternum, centrally with sparse, short, black setulae. Anepisternum and katepisternum obscurely covered in pale, silver-grey microtrichia (viewed obliquely). Short brown setulae evenly distributed across scutum, anepisternum and

katapisternum, interspersed on pleura with pale golden setulae; pale longer setulae ventrally on katapisternum with row of black setulae in front of mid coxae.

*Scutellum* (Fig. 97). Slightly flattened on dorsal surface, trapezoid, apex quite square between apical scutellar setae. Dorsal and marginal surfaces evenly clothed in widely spaced black setulae. Paired lateral scutellar setae evenly spaced; apical scutellar setae (missing in lectotype) longer than lateral setae (based on paralectotypes).

*Legs* (Fig. 43). Mostly pale tan-brown in contrast to brown fore tarsus and apical 3 tarsomere of mid and hind tarsi. Fore femur with single pointed, brown subapical spine on posterior ventral margin. Mid coxal prong weakly developed, narrowly spatulate. Mid coxal apophysis (obscured in lectotype) triangulate, bluntly pointed at apex, with black preapical setulae dorsally (based on paralectotypes). Hind coxa with narrow posterior margin, outermost extremity developed into stout, rounded lobe (obscured in lectotype; based on paralectotypes).

*Wing* (Fig. 74). Crossvein *r-m* angle = 17°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 2.3; crossveins *r-m* : *dm-m* angle = 16°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.50. Wing membrane brown, with pale yellowish tinged hyaline marks, darker toward base of wing, paler at apex; cells *br*, *bm* and basal 1/2 of crossvein *dm-m* yellow-hyaline, forming wedge-shaped stripe; two subparallel preapical yellowish tinged hyaline marks, narrowing toward posterior margin of wing; anal lobe and hind margin of  $m_4$  hyaline. Ventral auxiliary sclerite buff, with slightly more yellow bulbous, shiny apex. Halter knob cream-white, stem slightly darker tan-brown.

*Abdomen*. Tergites with mottled coloration (in lectotype) with pattern indistinct, in paralectotypes with distinct tan-brown median line with remainder of abdomen brown, with faint (virtually indiscernible) metallic sky-blue reflections. White to pale brown setulae intermingled with brown setulae towards apex of abdomen. Silver-grey microtrichia barely apparent on tergites 2–5. Sternites with golden setulae.

*Terminalia*. Externally visible epandrium and surstyli brown.

Female similar to male, only differing in sexual characters.

*Variation*. Insufficient material is available to fully assess variation.

*Diagnosis*. Scutum (Fig. 97) predominantly pale tan-brown to orange-brown, with 2 brown vittae extending across scutoscutellar suture onto scutellar disc, continuing ventrally across anatergite; wing membrane (Fig. 74) with pattern comprised of hyaline to orange and brown stripes, with 2 preapical hyaline bands beyond crossvein *dm-m*, broader than brown band between them; a single basal band distal to crossvein *r-m* joining wedge-shaped orange stripe through cells *br*, *bm*, *cua* and base of cell *dm*, with broad band basal to *r-m* extending toward (but not reaching) anterior margin of wing, ending in cell  $r_1$ .

*Type material examined*. **GHANA**: lectotype ♂ (here designated) “Co- / type [disc; yellow border] // “caught

in bush / 2 p.m.” [handwritten] // Kumasi, [= 6.67, -1.62] / Ashanti, W. Africa. / 19.X.1907 / Dr. W.M. Graham. / 1908—245 [printed and handwritten] // det. Hendel / *flavipennis*, H. [printed and handwritten] // SYN- / TYPE [disc; pale blue border] // SYNTYPE / *Engistoneura flavipennis* Hendel / verified by / J.E. Chainey, 2002 [printed and handwritten] // BMNH(E) # / 251864 [printed] // NHMUK013449487 [printed with QR code] // **LECTOTYPE** ♂ / *Engistoneura flavipennis* / Hendel, 1914 / designated by / Kirk-Spriggs & Whittington / 2024 [white card with yellow border; printed]” (NHMUK). Micro-pinned and staged on cellophane strip in good condition. Paralectotypes (both labelled “// **PARALECTOTYPE** ♀ / *Engistoneura flavipennis* / Hendel, 1914 / designated by / Kirk-Spriggs & Whittington / 2024 [white card with yellow border; printed]”; 1 ♀, same labels as lectotype, except: ““caught on leaf / in bush path [handwritten]” // “18.VI.1907” // BMNH(E) # / 251866 [printed] // NHMUK013449485 [printed with QR code]”; 1 ♀, same labels, except: “18.X.1907” // BMNH(E) # / 251865 [printed] / NHMUK013449486 [printed with QR code]” (both NHMUK).

*Remarks*. Hendel applied the name *E. flavipennis* in two publications that both appeared in June 1914. McAlpine (1994) definitively established the priority of these two publications. The name was first applied by Hendel (1914a) which appeared on 20 June 1914, but the formal species description was only published in Hendel (1914b) which appeared on 15 June 1914, meaning that the name as it appeared in Hendel (1914a) would represent a *nomen nudum*. As Hendel (1914a) provided illustrations of the head in profile (fig. 260) from in front (fig. 261) and the wing in dorsal view (fig. 162) this is here regarded as sufficient to represent a species description, so the *nomen nudum* does not apply. In the formal description of *E. flavipennis*, Hendel (1914b: 366) cited the following material on which the description was based: “3♂♀ aus West-Afrika, Kumasi, Ashanti (leg. Dr. Graham, 18. Oktober) im British Museum”. These three specimens were examined in NHMUK and as none of the specimens were originally designated as holotype, are here regarded as syntypes (and were subsequently labelled as such). The three specimens bear three different dates: “18.X.1907”, “19.X.1907” and “18.VI.1907”, but as all three bear the same Hendel determination labels, these are clearly the three specimens on which Hendel based his description and to which he refers. The male specimen is here selected and designated as lectotype and the two female specimens as paralectotypes.

*Additional material examined* (labelled: “*Engistoneura flavipennis* Hendel, 1914, det. A.H. Kirk-Spriggs 2025”). **GHANA**: 1 ♀, Ghana, Ashanti Region, Bobiri Forest Reserve, 2.6 km NNE Kubeasi, 06°41.20.5"N, 01°21.39.6"W [= 6.69, -1.36], 297 m, 19.iv.2006, J. Antwi, S. Kuudaar, J. Lewile, D. Amankwaa, transect 1, trap 1, forest edge, bait trap, sample 01115446B (CMNH).

*Distribution*. Ghana.

*Bionomics*. An Eastern Guinean Forest species restricted to Ghana (Kumasi, ca 300 m and Bobiri Forest Reserve, 297 m) (Fig. 146). The three type specimens are

labelled as “caught in bush 2 p.m.” and “caught on leaf in bush path”. The single non-type specimen was sampled in hanging butterfly traps baited with fermenting fruit (J.L. Bossart, pers. comm. 2025). Specimen label data indicate that the species is active in April and October.

***Engistoneura ghanensis* Kirk-Spriggs & Whittington, sp. nov.**

Figs 44, 45, 91, 113, 119, 147

**Etymology.** The specific epithet *ghanensis* is a Latin-derived adjective and is named after the country of origin of the type material Ghana and the suffix *-ensis*.

**Description:** ♂ (largely based on field-pinned holotype).

**Measurements.** Holotype ♂ (Figs 44, 45) body length: 9.8 mm (range: 8.0–10.7 mm;  $\bar{x} = 9.7 \pm 0.7$  mm;  $n = 30$ ); wing length: 9.8 mm (range: 9.3–11.0 mm;  $\bar{x} = 10.1 \pm 0.4$  mm;  $n = 30$ ).

**Colour/vestiture.** Ground colour (Figs 44, 45) dark black-brown, abdominal tergites with dark metallic blue-green lustre, in contrast to buff-yellow on: occiput, extensive mark on frons, antennae, facial carina, centre of face and clypeus, gena, postgena, posteromedial area of katepisternum, fore coxae, basal  $\frac{2}{3}$  of mid and hind femora and central portion of mid and hind tibiae. Scutum with 3 broad vittae formed of dense golden-green microtrichia, terminating at scutoscutellar suture and similar vitta across dark band on anepisternum. Postpronotal lobe, lateral margin of transverse suture and pre-scutellar margin of scutum tan brown (concolorous with centre frons). Wing membrane (Fig. 91) dark brown, with V-shaped hyaline mark adjacent to crossvein *r-m* and paired parallel preapical hyaline bands. Abdomen dark brown with metallic blue lustre; intersegmental membranes dark brown, sternites brown, with blue metallic reflections.

**Head** (Figs 44, 45, 119). Facial carina broader than antennal postpedicel, bell-shaped, with rounded margins and smooth surface, especially dorsal extremity between antennae, with poorly defined radiating ridges (or rugosity) on flatter surface below. Fine silver microtrichia in narrow margin around compound eye, along upper margin of gena and as 2 distinct maculae on lateral frons, where this joins parafacial and slightly dorsal to it. Antennal pedicel with fine black setae clustered dorsally and apically. Postpedicel uniformly pale buff-yellow tinged brown centrally, with fine yellowish white microtrichia. Arista with combined length of dorsal and ventral vestiture less than width of postpedicel. Antennal groove shiny dark black at ventral extremity. Gena with single black, forwardly directed seta, posterior to which is small patch of black setulae at oral margin; genal and postgenal setulae fine and pale, virtually indistinct and widely spaced, longer around occipital foramen. Palpus uniformly buff brown; setulae black. Prementum pale orange-brown; labellum brown; setulae orange-brown.

**Thorax** (Figs 113, 119). Bullate cervical sclerite buff brown, darker basally, concolorous with proepisternum. Scutum not markedly broad basally. Anepisternum bicoloured, with black-brown median vitta contrasting

strongly with yellowish anterior and posterior margins; katepisternum bicoloured dark black-brown on anterior ventral  $\frac{3}{5}$ , yellowish on posterior dorsal  $\frac{2}{5}$ . Anepisternum and katepisternum densely covered in pale, golden/greenish microtrichia (viewed obliquely). Short black setulae evenly distributed across scutum and anepisternum, longer on remaining pleura.

**Scutellum** (Fig. 113). Slightly convex on dorsal surface; margin slightly concave between insertions of scutellar setae.

**Legs** (Figs 44, 45, 119). Fore femur with 2 pointed, black subapical spines on posterior ventral margin. Mid coxal prong well-developed, narrow and parallel-sided, rounded at apex. Mid coxal apophysis triangulate, bluntly pointed at apex, with black preapical setulae dorsally. Hind coxa with narrow posterior margin, the outermost extremity of which is developed into long, narrow lobe.

**Wing** (Fig. 91). Crossvein *r-m* angle =  $11^\circ$ ; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.8; crossveins *r-m* : *dm-m* angle =  $12^\circ$ ; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.50. Wing membrane with 2 hyaline preapical bands distal to crossvein *dm-m* transecting wing margin from anterior to posterior margins diminishing in width toward posterior margin and 2 short hyaline bands converging on crossvein *r-m* forming V-shape, joined to basal stripe through basal cells and basal  $\frac{1}{2}$  of cell *dm*. Narrow hyaline marks present along hind margin anal lobe and cell  $m_4$ . Ventral auxiliary sclerite dark red-brown thorn-like in shape. Halter knob and stem pale buff-yellow, base of stem slightly darker.

**Abdomen** (Fig. 45). White setulae and silver-grey microtrichia apparent on tergites intermingled with brown setulae towards apex of abdomen.

**Terminalia.** External parts with epandrium black-brown, cercus paler.

Female similar to male, only differing in sexual characters.

**Variation.** Mature and clearly marked specimens are easy to distinguish, but some (probably teneral) specimens examined have the dark vitta across the anepisternum less distinctly marked, appearing separated or reduced to a horizontal streak in some specimens. The anepisternum is, however, entirely pale buff in *E. smithi* sp. nov.; the two species occurring sympatrically.

**Diagnosis.** Scutum (Fig. 113) narrow basally, predominantly dark grey-brown, with vittae comprised of dense golden-green microtrichia, terminating at scutoscutellar suture and similar vitta across dark band on anepisternum. Postpronotal lobe, lateral margin of transverse suture and pre-scutellar margin of scutum tan brown (concolorous with centre frons); thorax (Fig. 119) with anepisternum bicoloured, with black-brown median vitta contrasting strongly with yellowish anterior and posterior margins; katepisternum bicoloured dark black-brown on anterior ventral  $\frac{3}{5}$ , yellowish on posterior dorsal  $\frac{2}{5}$ ; wing membrane (Fig. 91) predominately dark brown, with distinctive V-shaped hyaline mark located at crossvein *r-m*, joined to basal stripe through cells *br*, *bm* and basal  $\frac{1}{2}$  of cell *dm*; and double preapical hyaline bands.

*Type material examined.* **GHANA:** holotype ♂, “GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.4km SSE / Kumasi. 06-28-54.4N. / 01-33-37.1W. [= 6.48, -1.56] 210m / 18 May 2006 [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 2 / Trap 2. 80m from / forest edge. bait / trap. Sample 0522546A [printed] // **HOLOTYPE** ♂ / *Engistoneura* / *ghanensis* **sp. nov.** / Kirk-Spriggs & Whittington / 2025 [white card with red border; printed]” (CMNH). Direct-pinned, in good condition. Paratypes (all labelled “// **PARATYPE** ♂ [or ♀] / *Engistoneura* / *ghanensis* **sp. nov.** / Kirk-Spriggs & Whittington / 2025 [white card with blue border; printed]”): 1♀, same labels as holotype, except: “31 August 2005 // Sample 0522532B”; 1♂, 1♀, same, except: “28 September 2005 // Sample 0522534B”; 1♂, same, except: “14 September 2005 // Sample 0522533B”; 1♂, same, except: “2 February 2006 // Sample 0522541A”; 1♂, “GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.6km SSE / Kumasi. 06-28-44.3N. / 01-33-49.3W. [= 6.48, -1.56] 225m / 5 July 2005 [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 3 / Trap 3. / forest / interior. bait trap. Sample 0533531A [printed]”; 1♀, same, except: “30 August 2005 // Sample 0533532A”; 1♂, 1♀, same, except: “31 August 2005 // Sample 0533532B”; 2♀, same, except: “14 September 2005 // Sample 0533533B”; 1♀, same, except: “3 February 2006 // Sample 0533541B”; 2♀, same, except: “7 April 2006 // Sample 0533544B”; 1♂, same, except: “27 April 2006 // Sample 0533545A”; 2♀, same, except: “18 May 2006 // Sample 0533546A”; 1♂, 2♀, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.5km SSE / Kumasi. 06-28-51.6N. / 01-33-35.5W. [= 6.48, -1.56] 208 m. / 14 September 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 2 / Trap 3. 160m from / forest edge. bait / trap. Sample 0523533B [printed]”; 1♂, same, except: “2 February 2006 // Sample 0523541A”; 1♀, same, except: “3 February 2006 // Sample 0523541B”; 3♂, same, except: “7 April 2006 // Sample 0523544B”; 1♀, same, except: “27 April 2006 // Sample 0523545A”; 1♀, same, except: “19 May 2006 // Sample 0523546B”; 1♀, same, except: “28 August 2005 // Sample 0523534B”; 1♀, “GHANA: Ashanti Region. / Asantemanso Sacred Forest / 23.7km SSE Kumasi. / 06-28-41.8N. 01-33-44.3W. [= 6.48, -1.56] / 208m. 16 March 2006 [printed] // S. Kuudaar. J. Lewile. / D. Amankwaa. Transect 1 / Trap 2. 80m from / forest edge. bait / trap. Sample 0512543A [printed]”; 1♂, same, except: “31 August 2005 // Sample 0512534B”; 1♀, same, except: “Sample 0512532B”; 2♂, same, except: “14 September 2005 // Sample 0512533B”; 1♀, same, except: “22 December 2005 // Sample 0512538A” // “Carnegie Museum / Specimen Number / CMNH-440,628 [printed]”; 1♀, “GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.5km SSE / Kumasi. 06-28-48.1N. / 01-33-52.6W. [= 6.48, -1.56] 235m. / 30 August 2005 [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 3 / Trap 1. forest / interior. bait trap. / Sample 0531532A [printed]”; 3♀, same, except: “13 September 2005 // Sample 0531533A”; 1♀, “GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.6km SSE / Kumasi. 06-28-49.4N. / 01-33-35.5W. [= 6.48, -1.56] 212m. / 31 August 2005 [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 2 / Trap 4. 240m from / forest edge. bait / trap. Sample 0524532B [printed]”; 2♀, same, except: “14 September 2005 // Sample 0524533B”; 1♂, same, except: “26 September 2005 // Sample 0524534A”; 2♂, 1♀, same, except: “27 September 2005 // Sample 0524534A”; 1♂, “GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.5km SSE / Kumasi. 06-28-45.5N. / 01-33-51.6W. [= 6.48, -1.56] 233m / 30 August 2005 [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 3 / Trap 2. forest / interior. bait trap / Sample 0532532A [printed]”; 1♂, 2♀, same, except: “31 August 2005 // Sample 0532532B”; 1♀, same, except: “13 September 2005 // Sample 0532533A”; 1♀, same, except: “28 April 2006 // Sample 0532545B”; 1♀, same, except: “27 April 2006 // Sample 0532545A”; 1♀, same, except: “18 May 2006 // Sample 0532546A”; 1♂, “GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.6km SSE / Kumasi. 06-28-46.9N. / 01-33-43.1W. [= 6.48, -1.56] 218m / 13 September 2005 [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 1 / Trap 4. 240 m from / forest edge. bait / trap. Sample 0514533A [printed]”; 1♂, same, except: “14 September 2005 // Sample 0514533B”; 1♂, 1♀, same, except: “27 September 2005 // Sample 0514534A”; 1♂, 1♀, same, except: “28 September 2005 // Sample 0514534B”; 1♀, same, except: “23 December 2005 // Sample 0514538B”; 1♂, same, except: “16 March 2006 // Sample 0514543A”; 1♀, same, except: “7 April 2006 // Sample 0514544B”; 1♀, same, except: “27 April 2006 // Sample 0514545A”; 2♀, same, except: “18 May 2006 // Sample 0514546A”; 1♀, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.3km SSE / Kumasi. 06-28-56.8N. / 01-33-35.7W. [= 6.48, -1.56] 211m. / 7 April 2006 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 2. / Trap 1. forest edge. / bait trap. / Sample 0521544B [printed]”; 1♂, same, except: “27 April 2006 // Sample 0521545A”; 1♀, same, except: “28 April 2006 // Sample 0521545B”; 1♀, same, except: “19 May 2006 // Sample 0521546B”; 1♂, “GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.7km SSE / Kumasi. 06-28-43.8N. / 01-33-43.9W. [= 6.48, -1.56] 213m / [no date] [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 1 / Trap 3. 160m from / forest edge. bait / trap. Sample 0513535A [printed]”; 1♀, same, except: “Sample 0513546A”; 1♀, same, except: “3 February 2006 // Sample 0513541B // Carnegie Museum / Specimen Number / CMNH-440,294 [printed]”; 1♂, same, except: “23 February 2006 // Sample 0513542A”; 1♀, same, except: “28 April 2006 // Sample 0513545B”; 1♂, same, except: “19 May 2006 // Sample 0513546B”; 1♂, 1♀, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.8km SSE / Kumasi. 06-28-39.3N. / 01-33-42.1W. [= 6.48, -1.56] 202m [printed] // 14 Sep 2005. J. Antwi / S. Kuudaar. J. Lewile / D. Transect 1. Trap 1. / forest edge. bait / trap. Sample 0511533B [printed]”; 2♀, same, except: “18 April 2006 // Sample 0511546A”; 1♀, same, except: “19 May 2006 // Sample 0511546B”; 1♂, GHANA: Ashanti Region. / Bobiri Forest Reserve / 2.6 km NNE Kubeasi. / 06-42-19.4N, 01-21-11.7W [6.70538889, -1.35325000] / 255 m. 28 March 2006 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. D. Amankwaa. / Transect 3. Trap

4. 240m / from forest edge. bait / trap. Sample 0134545A” (all CMNH).

*Distribution.* Ghana.

*Bionomics.* An Eastern Guinean Forest and Guinean Forest-Savanna Mosaic species, apparently restricted to Asantemanso Sacred Forest, at elevations between 202 and 235 m (Fig. 147). The single specimen record from Bobiri Forest Reserve probably represents a mislabelled specimen. The type material was sampled in hanging butterfly traps baited with fermenting fruit (J.L. Bossart, pers. comm. 2025). Specimen label data indicate that the species is active most of the year, from February–May and June–September.

***Engistoneura hemifascia* Kirk-Spriggs & Whittington, sp. nov.**

Figs 46, 47, 72, 95, 148

*Etymology.* The specific epithet *hemifascia* is a compound Latin adjective and refers to the partial hyaline band at the apex of the wing of the species.

*Description:* ♀ (based on field-pinned holotype) [♂ unknown].

*Measurements.* Holotype ♀ (Figs 46, 47) body length: 4.9 mm; wing length: 5.9 mm.

*Colour/vestiture.* Ground colour (Figs 46, 47, 95) pale tan-brown, abdomen entirely brown, with 2 distinctive red-brown dorsocentral vittae on scutum, continue across scutellum, then ventrally across anatergite. Wing membrane (Fig. 72) brown, with hyaline stripe through basal cells and *dm* and single complete preapical hyaline band, apical to which is partial wedge-shaped band reaching  $M_1$ . Abdominal tergites brown with faint purple metallic lustre; intersegmental membranes dull brown, sternites with violet reflections.

*Head* (Figs 46, 47). Face cream-white with broad brown lateral vittae from base of antennal grooves, across clypeus; concave, epistomal margin protruding beyond antennae; facial carina wedge-shaped, with rounded margins. Frons brown, glossy, paler in sunken centre anterior to ocellar triangle, darkened to dark brown on bulge above ptilinal fissure. Ocellar triangle and compound eye dark red-brown. Fine silver microtrichia limited to narrow ventral margin to compound eye and as 2 distinct triangular maculae on lateral frons adjoining parafacial. Antennal pedicel with fine black setae dorsally and as fringe along ventral margin. Postpedicel pale buff-yellow basoventrally and brown apicodorsally, consistent with colour pattern on face; with fine yellow microtrichose vestiture. Antennal groove shiny, cream-white, but dark brown at ventral extremity adjoining brown facial vitta. Gena with single black, forwardly directed seta, surrounded at base ventrally by 4 or 5 shorter and weaker black setulae; setulae on postgena fine and pale, virtually indistinct, with intermittent brown setulae; black, widely spaced and slightly longer setulae around occipital foramen. Palpus with apical  $\frac{2}{3}$  velvety black; setulae black. Prementum and labellum pale buff, labellum faintly brown at apex, setulae orange-brown to golden.

*Thorax* (Figs 46, 47, 95). Anepisternum bicoloured:

anterior  $\frac{1}{2}$  brown ventrally continuing across katepisternum, likewise bicoloured, posterior  $\frac{1}{2}$  pale tan-brown and dorsally with thin brown vitta running along dorsal margin, narrowly extending onto lateral margin of scutum. With additional vertical brown vitta running from wing base across suture between anepimeron and katatergite, then across almost entirely brown meron. Anatergite with vertical brown vitta consistent with position of vitta on scutellum. Bullate cervical sclerite pale buff distally concolorous with proepisternum and darkening to brown basally concolorous with brown vitta along dorsal margin of anepisternum. Anepisternum and katepisternum densely covered in pale, silver-grey microtrichia (viewed obliquely). Short brown setulae evenly distributed across scutum and anepisternum, longer on remaining pleura, pale ventrally on katepisternum.

*Scutellum* (Fig. 95). Slightly flattened on dorsal surface, trapezoid, apex quite square between apical scutellar setae. Dorsal and marginal surfaces evenly clothed in widely spaced black setulae, ventral margin with widely spaced pale setulae. Paired lateral setae evenly spaced, with apical setae longer than lateral setulae.

*Legs* (Fig. 47). Fore coxae pale tan-brown in contrast to brown remainder of fore leg. Mid and hind coxae brown in contrast with pale tan-brown femora, brown apically. Tibiae and tarsi brown. Fore femur with 3 pointed, brown subapical spines on posterior ventral margin. Mid coxal prong weakly developed, parallel-sided, round at apex with anterior fringe of pale dense setulae.

*Wing* (Fig. 72). Crossvein *r-m* angle =  $10^\circ$ ; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.1; crossveins *r-m* : *dm-m* angle =  $15^\circ$ ; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.46. Wing membrane brown with slight metallic violet reflections and hyaline portion tinged orange; with hyaline stripe through basal cells *br*, *bm* and *cua* and *dm* and a single complete preapical hyaline band distal to crossvein *dm-m* reaching from anterior to posterior margin, apical to which is a partial wedge-shaped band reaching  $M_1$ ; *r-m* surrounded by a narrow brown mark. Vein  $R_{2+3}$  slightly sinuous and vein  $R_{4+5}$  arched beyond *r-m*, cell  $r_{2+3}$  basally narrow, widening near *r-m*, becoming narrow again before apex of  $R_{2+3}$ . Cell  $r_{4+5}$  narrower apically than at mid length. Ventral auxiliary sclerite, shiny red-brown. Halter knob cream-white, stem slightly darker brown.

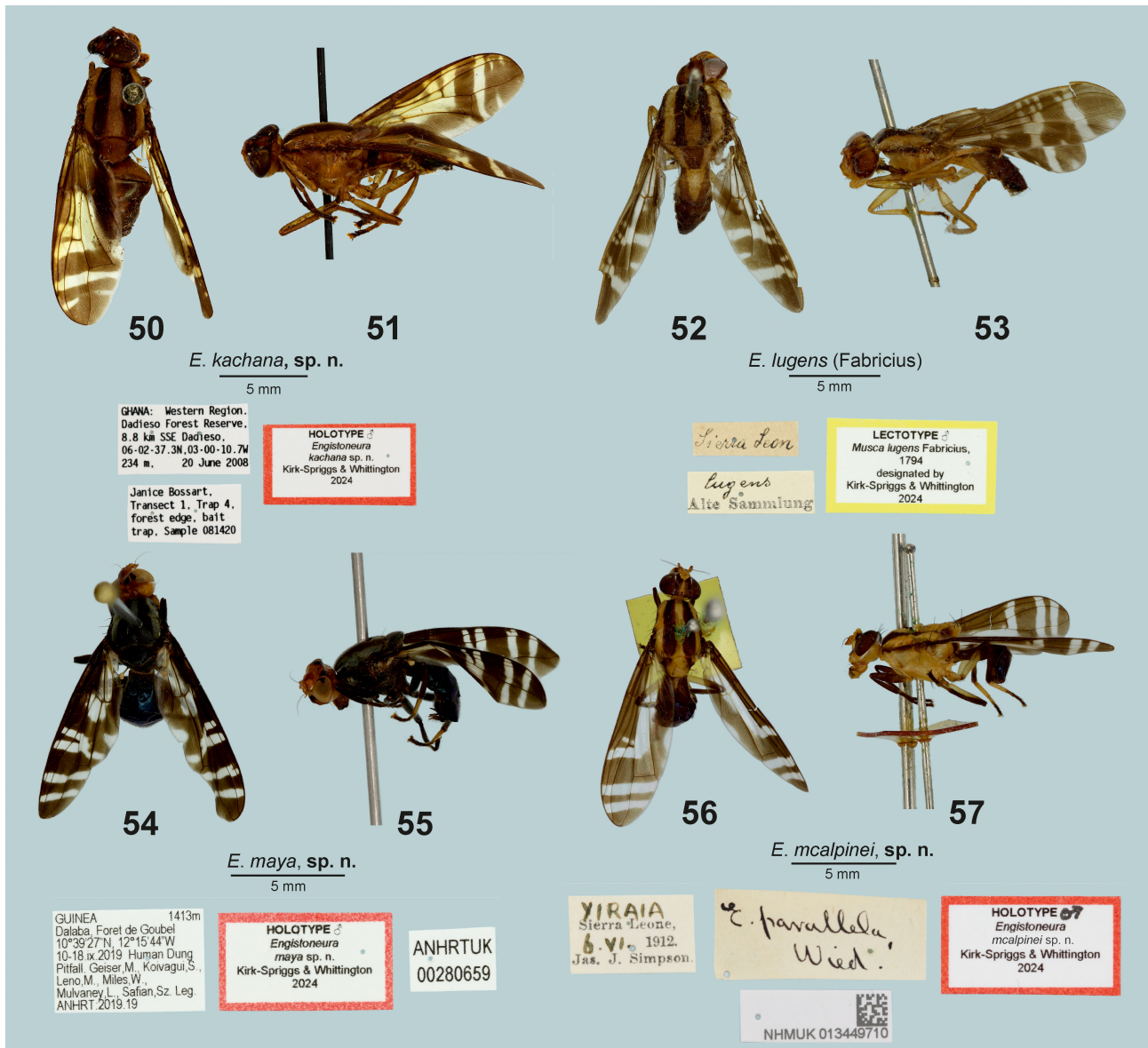
*Abdomen* (Fig. 47). White to pale brown setulae intermixed laterally with black setulae. Silver-grey microtrichia barely discernible on tergites 2–5.

*Terminalia.* Oviscape brown, aculeus with apex paler.

Male unknown.

*Variation.* Insufficient material is available to assess variation.

*Diagnosis.* Scutum (Fig. 95) predominantly pale tan-brown to orange-brown, with 2 brown vittae extend across scutoscutellar suture onto disc of scutellum and remaining separate on disc of scutellum, evanescent prior to reaching scutellar margin; wing membrane (Fig. 72) brown, with hyaline stripe (tinged orange) through basal cells *br*, *bm* and *cua* and *dm* and a single complete



**FIGURES 50–57.** Primary name-bearing types of *Engistoneura* species (left: dorsal view; right: lateral view) and associated specimen labels (below). **50–51.** *E. kachana*, **sp. nov.** (HT ♂, Dadieso Forest Reserve, Ghana, CMNH). **52–53.** *E. lugens* (Fabricius) (LT ♂, Sierra Leone, NHMV). **54–55.** *E. maya*, **sp. nov.** (HT ♂, Dalaba, Foret de Goubel, Guinea, ANHRT). **56–57.** *E. mcalpinei*, **sp. nov.** (HT ♂, Yiraia, Sierra Leone, NHMUK).

preapical hyaline band distal to crossvein *dm-m* reaching from anterior to posterior margin, apical to which is a partial wedge-shaped band reaching *M*<sub>1</sub>.

**Type material examined:** **CÔTE D’IVOIRE:** holotype ♀, “MUSEUM PARIS / Côte d’Ivoire / Abidjan, Bingerville [= 5.35, -3.88] / E. Roulaud. 1910” [blue card; printed and handwritten] // **HOLOTYPE** ♀ / *Engistoneura* / *hemifascia* **sp. nov.** / Kirk-Spriggs & Whittington / 2024 [white card with red border; printed]” (MNHN). Direct-pinned in good condition, but arista and left mid leg missing; abdomen folded in half, with distal end tucked beneath; right wing removed for imaging and glued to card pinned beneath specimen.

**Remarks.** Although this species is only known from a single female specimen, the highly distinctive wing pattern warrants the description of a new species.

**Distribution.** Côte d’Ivoire

**Bionomics.** A lowland Eastern Guinean Forest species, only recorded from Bingerville, a suburb of Abidjan, Côte d’Ivoire, at an elevation of *ca* 59 m (Fig. 148). Seasonal data are not available.

***Engistoneura hexafascia* Kirk-Spriggs & Whittington, sp. nov.**

Figs 48, 49, 77, 99, 149

**Etymology.** The specific epithet *hexafascia* is a compound Latin adjective and refers to the six brown bands on the wing membrane of the species.

**Description:** ♀ (based on field-pinned holotype) [♂ unknown].

*Measurements.* Holotype ♀ (Figs 48, 49) body length: 9.8 mm; wing length: 9.1 mm.

*Colour/vestiture.* Ground colour (Figs 48, 49) pale tan-brown to orange-brown, scutum with single broad medial brown vitta, which extends onto centre of scutellum; dorsal margin of anepisternum and proepisternum with broad dark brown vittae narrowly extending over lateral margins of scutum; subscutellum and mediotergite entirely brown. Wing membrane (Figs 77) with dark brown and hyaline bands; no stripe. Abdominal tergites and sternites dark brown, with faint sky-blue-green metallic iridescence; intersegmental membrane and sternites pale tan-brown.

*Head* (Figs 48, 49). Facial carina narrow, sharp-edged only at dorsal apex between antennal insertions, without median grooves, but with very fine transverse rugosity across width at base just dorsal to junction with face. Fine silver microtrichia limited to narrow ventral margin to compound eye and as 2 distinct triangular maculae on lateral frons adjoining parafacial. Antennal pedicel with fine black setulae clustering dorsally along seam and on ventral surface. Postpedicel brown, narrowly pale buff-yellow ventrally. Arista long, combined length of dorsal and ventral vestiture equal to width of postpedicel. Antennal groove shiny cream-white, with poorly defined brown macula at ventral apex. Gena with single black, forwardly directed seta, posterior to which is small group of finer black setulae at oral margin; genal and postgenal setulae indistinct, short, black and widely spaced. Palpus entirely dark grey-brown, with apical margin narrowly pale cream microtrichose; setulae black. Prementum and labellum brown, setulae brown on prementum and pale golden ventrally on labellum.

*Thorax* (Figs 48, 49, 99). Bullate cervical sclerite pale buff, concolorous with proepisternum. Anepisternum and katepisternum densely covered in silver-grey microtrichia (viewed obliquely). Short black setulae evenly distributed across scutum, anepisternum and scutellum. With row of long black setulae in front of mid coxae, in front of which is small patch of slightly shorter, golden setulae.

*Scutellum* (Fig. 99). Slightly flattened on dorsal surface, trapezoid, margin straight between apical scutellar setae.

*Legs* (Fig. 49). Coxae pale tan-brown; fore femur brown, mid and hind femora pale tan-brown, weakly darkening at apex; tibiae and basal tarsomeres pale tan-brown with greyish tinge; remaining tarsomeres brown. Fore femur with 2 pointed, black subapical spines on posterior ventral margin of femur. Mid coxal prong weakly developed, short, ovate. Mid coxal apophysis sharply pointed. Hind coxa with narrow posterior margin, outermost extremity developed into stout, rounded lobe.

*Wing* (Fig. 77). Crossvein *r-m* angle = 15°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.1; crossveins *r-m* : *dm-m* angle = 20°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.45. Wing membrane predominantly hyaline, with 6 brown bands extending between anterior and posterior wing margins (including apical mark); posterior cells not infuscate brown; without stripes. Ventral auxiliary sclerite shiny,

red-brown with orange-brown bulbous cap. Halter knob pale buff-brown, stem slightly darker.

*Abdomen* (Figs 48, 49). Surface of tergites clothed in silver setulae intermixed with fine black setae toward abdominal apex. Sparse silver-grey microtrichia difficult to discern.

*Terminalia.* Oviscape brown, aculeus with apex cream-white.

Male unknown.

*Variation.* Insufficient material is available to assess variation.

*Diagnosis.* Scutum (Fig. 99) dominated by single broad brown vitta, extending across scutoscutellar suture to centre of scutellar disc, contrasting with otherwise pale tan-brown to orange-brown ground colour, wing membrane (Fig. 77) without either V-shaped or L-shaped hyaline marks positioned at crossvein *r-m*, predominantly hyaline, with six brown bands extending between anterior and posterior wing margins (including apical mark); posterior cells not infuscate brown; without stripe.

*Type material examined.* **SIERRA LEONE:** holotype ♀, “NJALA [8.109752, -12.075263] / SIERRA LEONE / DATE / 17-XI-[19]46 [printed and handwritten] // Pres.By / Imp.Inst.Ent. / B.M.1938—416 [printed] // *Engistoneura* / n.sp. ? nr. *parallela* Wd. / van Emden det. 1938 [handwritten and printed] // *Engistoneura* / not in B.M. [handwritten] // **HOLOTYPE** ♀ / *Engistoneura* / *hexafascia* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with red border; printed] // NHMUK013449496 [printed with QR code]” (NHMUK). Direct-pinned in good condition, left hind leg missing; right wing removed for imaging and glued to card pinned beneath specimen.

*Remarks.* Although this species is only known from a single female specimen, the highly distinctive wing pattern warrants the description of a new species.

*Distribution.* Sierra Leone.

*Bionomics.* A Western Guinean Lowland Forest species, only recorded from Njala, Sierra Leone, at an elevation of ca 198 m (Fig. 149). Holotype label data indicates that the species is active in November.

### ***Engistoneura kachana* Kirk-Spriggs & Whittington, sp. nov.**

Figs 50, 51, 73, 96, 150

*Etymology.* The specific epithet *kachana* is a noun in apposition and is named in honour of Mary Kachana Ndopu.

*Description:* ♂ (largely based on field-pinned holotype).

*Measurements.* Holotype ♂ (Figs 50, 51) body length: 11.9 mm (range: 9.9–13.8 mm;  $\bar{x}$  = 11.7 ± 1.2 mm;  $n$  = 13); wing length: 12.2 mm (range: 10.5–13.3 mm;  $\bar{x}$  = 12.2 ± 0.7 mm;  $n$  = 13).

*Colour/vestiture.* Ground colour (Figs 50, 51, 96) pale tan-brown; scutum with 2 distinctive dark-brown dorsocentral vittae, extending across scutellum, then ventrally across anatergite (Fig. 96); dorsal margin of anepisternum and proepisternum with narrow dark brown vittae that narrowly extends onto lateral margins

of scutum. Wing membrane (Fig. 73) brown with pale orange tinge, with broadly V-shaped mark and 1 complete and 1 fragmented preapical hyaline to yellowish bands. Base of abdomen and median vitta pale tan-brown, with lateral and apical extremities darker brown with faint green metallic lustre; intersegmental membranes dark tan-brown, sternites with golden setulae.

*Head* (Figs 50, 51). Facial carina wedge-shaped, with sharp margins; surface finely rugose with 4 shallow raised ridges (barely more than lines) diverging ventrally. Frons shiny, bullate, dark brown toward ptilinal fissure, black along vertex and centrally paler brown anterior to black ocellar triangle. Compound eyes dark red-brown. Fine silver microtrichia limited to narrow ventral margin to compound eye and as 2 distinct triangular maculae on lateral frons adjoining parafacial. Antenna with fine black setae clumped along seam of pedicel dorsally and as fringe along ventral margin. Postpedicel pale buff-yellow throughout; with fine yellow microtrichose vestiture (clearly visible under certain lights). Antennal groove dull, dark cream-white, without distinct black macula at ventral extremity adjoining faint brown facial vitta. Gena with single black, forwardly directed seta, surrounded at base ventrally by group of shorter, weaker black setulae; postgena with few and sparse fine black setulae, longer around occipital foramen. Palpus entirely pale orange to tan-brown; setulae black. Prementum and labellum pale buff, setulae orange-brown to golden.

*Thorax* (Figs 50, 51, 96). Bullate cervical sclerite pale buff, concolorous with proepisternum, centrally with sparse, short, black setulae. Anepisternum and katepisternum obscurely covered in pale, silver-grey microtrichia (viewed obliquely). Short brown setulae evenly distributed across scutum, anepisternum and katepisternum, interspersed on pleura with pale golden setulae; pale longer setulae ventrally on katepisternum and anepimeron, with row of black setulae in front of mid coxae.

*Scutellum* (Fig. 96). Slightly flattened on dorsal surface, trapezoid, apex quite square between apical scutellar setae. Dorsal and marginal surfaces evenly clothed in widely spaced black setulae. Paired lateral scutellar setae evenly spaced; apical scutellar setae longer than lateral scutellar setae; insertions slightly raised.

*Legs* (Fig. 51). Coxae and femora pale tan-brown, fore tarsus brown, all tibiae and basal tarsomeres of mid and hind legs pale tan-brown, with greyish tinge; tarsomeres 2–5 of mid and hind legs brown. Fore femur with 3 evenly spaced pointed, brown subapical spines on posterior ventral margin, apical-most of which shorter than preceding 2. Mid coxal prong strongly developed, narrow, rounded at apex with cluster of whitish setulae at base. Mid coxal apophysis triangulate, pointed at apex, with black preapical setulae dorsally. Hind coxa with narrow posterior margin, outermost extremity of which developed into stout, rounded lobe.

*Wing* (Fig. 73). Crossvein *r-m* angle = 4°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.6; crossveins *r-m* : *dm-m* angle = 11°; ratio crossvein *r-m* ( $R_{4+5}$ - $M_1$ ) : wing width at crossvein *dm-m* = 0.43. Wing

membrane brown, with hyaline areas tinged yellow, darker towards base of wing, paler at apex; cells *br*, *bm* and basal  $\frac{1}{2}$  of crossvein *dm-m* yellow-hyaline, joining apex of converging bands either side of crossvein *r-m*, beyond which are 2 subparallel preapical hyaline bands, apical most of which is fragmented in cell  $r_{4+5}$ ; hind margin of wing faintly hyaline. Vein  $R_{2+3}$  slightly sinuous and vein  $R_{4+5}$  arched beyond crossvein *r-m*, causing cell  $r_{2+3}$  (which is basally narrow) to widen near *r-m*, then becoming narrow again before apex of  $R_{2+3}$ . Cell  $r_{4+5}$  narrower apically than midway along length. Ventral auxiliary sclerite shiny, orange-brown with more distinctly orange bulbous apex. Halter knob cream-white, stem slightly darker tan-brown toward base.

*Abdomen* (Figs 50, 51). Long golden setulae on lateral margins of syntergite 1 + 2, shorter than on tergites and intermingled with brown setulae towards apex of abdomen. Silver-grey microtrichia barely discernible on tergites.

*Terminalia*. Externally visible parts brown.

Female similar to male, only differing in sexual characters.

*Variation*. There is some variation in the extent of yellow markings on syntergite 1 + 2 and tergite 3. The apical hyaline wing band is also variable and may either extend from the anterior to posterior wing margin as a continuous, unbroken band, be partly intersected medially at vein  $M_1$ , or be reduced to a triangulate patch more or less confined to cells  $r_{2+3}$  and  $r_{4+5}$ . There are also slight variations in the width and shape of other hyaline wing bands, but the overall pattern is consistent.

*Diagnosis*. Scutum (Fig. 96) predominantly pale tan-brown to orange-brown, with 2 brown vittae extending across scutoscuteellar suture onto scutellar disc, continuing ventrally across anatergite; wing membrane (Fig. 73) with single complete hyaline band and 1 fragmented preapical hyaline band beyond crossvein *dm-m*; and with V-shaped hyaline mark converging in cell *dm*, level with crossvein *r-m*, joined to orange stripe through cells *bm* and *cua* and basal  $\frac{2}{3}$  of cell *dm*.

*Type material examined*. **GHANA**: holotype ♂, “GHANA: Western Region. / Dadieso Forest Reserve. / 8.8 km SSE Dadieso. / 06-02-37.3N. 03-00-10.7W [= 6.04, -3.00] / 234 m. 20 June 2008 [printed] // Janice Bossart. / Transect 1. Trap 4. / forest edge. bait / trap. Sample 081420 [printed] // **HOLOTYPE** ♂ / *Engistoneura* / *kachana* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with red border; printed]” (CMNH). Direct-pinned in good condition. Paratypes [all labelled “**PARATYPE** ♂ [or ♀] / *Engistoneura* / *kachana* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with blue border; printed]”]: 1♂, “GHANA: Western Region. / Dadieso Forest Reserve. / 8.9 km SSE Dadieso. / 06-02-34.3N. 03-00-10.9W [= 6.04, -3.00] / 238 m. 20 June 2008 [printed] // Janice Bossart. / Transect 1. Trap 5. / forest edge. bait / trap. Sample 081420 [printed]”; 3♀, “GHANA: Western Region. / Dadieso Forest Reserve. / 8.3 km SSE Dadieso. / 06-02-54.5N. 03-00-11.5W [= 6.04, -3.00] / 286 m. 18 June 2008 [printed] // Janice Bossart. / Transect 1. Trap 2. / forest edge. bait / trap. Sample 081218 [printed]”; 1♀,



“GHANA: Western Region. / Dadieso Forest Reserve. / 8.4 km SSE Dadieso. / 06-02-57N. 03-00-01.7W [= 6.05, -3.00] / 218 m. 18 June 2008 [printed] // Janice Bossart. / Transect 1. Trap 1. / forest edge. bait / trap. Sample 081118 [printed]”; 1♀, “GHANA: Western Region. / Dadieso Forest Reserve. / 8.9 km SSE Dadieso. / 06-02-34.3N. 03-00-10.9W [= 6.04, -3.00] / 238 m. 18 June 2008 [printed] // Janice Bossart. / Transect 1. Trap 5. / forest edge. bait / trap. Sample 0815118 [printed]”; 1♀, “GHANA: Western Region. / Dadieso Forest Reserve. / 8.8 km SSE Dadieso. / 06-02-37.3N. 03-00-10.7W [= 6.04, -3.00] / 234 m. 21 June 2008 [printed] // Janice Bossart. / Transect 1. Trap 4. / forest edge. bait / trap. Sample 081421 [printed]”; 1♂, 2♀, “GHANA: Western Region. / Dadieso Forest Reserve. / 8.9 km SSE Dadieso. / 06-02-34.3N. 03-00-10.9W [= 6.04, -3.00] / 238 m. 21 June 2008 [printed] // Janice Bossart. / Transect 1. Trap 5. / forest edge. bait / trap. Sample 081521 [printed]”; 1♂, 1♀, “GHANA: Western Region. / Dadieso Forest Reserve. / 8.9 km SSE Dadieso. / 06-02-34.3N. 03-00-10.9W [= 6.04, -3.00] / 238 m. 23 June 2008 [printed] // Janice Bossart. / Transect 1. Trap 5. / forest edge. bait / trap. Sample 081523 [printed]” (all CMNH).

*Distribution.* Ghana.

*Bionomics.* An Eastern Guinean Forest species, apparently restricted to Dadieso Forest Reserve, Ghana, at elevations between 218 m and 286 m (Fig. 150). The type material was sampled in hanging butterfly traps baited with fermenting fruit in a remnant forest (J.L. Bossart, pers. comm. 2025). Label data indicates that the species is active in June.

### ***Engistoneura lugens* (Fabricius, 1794)**

Figs 52, 53, 75, 103, 151

*Musca lugens* Fabricius, 1794: 348.

*Dictya lugens*: Fabricius 1805: 327.

*Ortalis lugens*: Wiedemann 1830: 459; Loew 1873: 43.

*Engistoneura lugens*: Bezzi 1908b: 131; Hendel 1914a: 152, fig. 264, 1914b: 368; Steyskal 1980: 567.

*Redescription:* ♂ (largely based on field-pinned lectotype).

*Measurements.* Lectotype ♂ (Figs 52, 53) body length: 9.8 mm (range: 8.4–10.0 mm;  $\bar{x}$  = 9.3 ± 0.6 mm;  $n$  = 7); wing length: 11.6 mm (range: 9.8–11.6 mm;  $\bar{x}$  = 10.2 ± 0.6 mm;  $n$  = 7).

*Colour/vestiture.* Ground colour (Figs 52, 53, 103) pale tan-brown to orange-brown, scutum with 2 brown vittae, which converge on centre of scutellum; dorsal margin of anepisternum and proepisternum with narrow dark brown vitta, narrowly extending onto lateral margins of scutum; pleura and legs (except brown terminal 3 tarsomeres) entirely consistent with ground colour; abdominal tergites dull brown, with faint blue metallic lustre and triangular pale tan-brown to orange-brown medial mark on tergite 1–3 and lateral margin of tergite 3. Wing membrane (Fig. 75) dark brown, with hyaline basal marks, a hyaline Y-shaped mark adjacent to crossvein *r-m*, single preapical hyaline band and triangular to rounded hyaline marks

along posterior margin of wing. Abdomen dark brown, with faint blue-violet metallic iridescence and triangular pale tan-brown to orange-brown mark on tergites 1–3 and at lateral margin of tergite 3; intersegmental membrane and sternites pale tan-brown.

*Head* (Figs 52, 53). Facial carina bell-shaped, sharp-edged and medially ridged, with fine transverse rugosity across width medially. Fine silver microtrichia not visible, due to greasy surface (present in other specimens as small triangle of silver microtrichia adjacent to antennal insertion and on frons as narrow margin to compound eye). Antennal pedicel with fine black setulae on ventral surface. Postpedicel pale buff-yellow ventrally, darker dorsally. Arista missing (combined length of dorsal and ventral vestiture equal to width of postpedicel). Antennal groove dull buff-yellow throughout, with fine, narrow U-shaped brown mark at ventral extremity. Gena with single black, forwardly directed seta, posterior to which is small group of finer black setulae at oral margin; genal and postgenal setulae indistinct (short, black and widely spaced in other specimens). Palpus with apex indistinctly brown; setulae black. Prementum and labellum consistent with ground colour, setulae brown on prementum and pale golden ventrally on labellum.

*Thorax* (Figs 52, 53, 103). Bullate cervical sclerite pale buff, distally concolorous with proepisternum, darkening to brown basally, concolorous with brown vitta along dorsal margin of anepisternum. Anepisternum and katepisternum apparently without silver-grey microtrichia (viewed obliquely). Short black setulae evenly distributed across scutum, anepisternum and scutellum. With row of long black setulae in front of mid coxae, in front of which is small patch of slightly shorter, golden setulae.

*Scutellum* (Fig. 103). Slightly flattened on dorsal surface, margin slightly swollen where scutellar setae inserted.

*Legs* (Fig. 53). Fore femur with 3 evenly spaced, pointed, black subapical spines at posterior ventral margin, decreasing in length toward apex of femur. Mid coxal prong weakly developed, short, ovate. Mid coxal apophysis sharply pointed.

*Wing* (Fig. 75). Crossvein *r-m* angle = 5°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 0.7; crossveins *r-m* : *dm-m* angle = 5°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.34. Wing membrane mostly dark brown, with 1 preapical hyaline band distal to crossvein *dm-m*; hyaline bands adjacent to crossvein *r-m* either single or comprised of multiple small disjointed hyaline marks or bands, extending to hind margin of wing (giving impression of vaguely Y-shaped mark over *r-m*); hyaline marks in cells  $r_1$  and  $r_{2+3}$  bullate (blistered); triangular to rounded hyaline marks along posterior margin of wing in cells  $m_1$ ,  $m_4$  and anal lobe. Ventral auxiliary sclerite shiny, red-brown with orange-brown bulbous cap. Halter knob darkened, stem pale buff-brown.

*Abdomen* (Figs 52, 53). Brown to bronze setulae intermixed with fine black setae at lateral margins of tergite 3 and apex of tergite 5; sparse silver-grey microtrichia difficult to discern.

*Terminalia*. Externally visible parts brown, with paler cerci and surstyli.

Female similar to male, only differing in sexual characters.

*Variation*. There is some variation in the extent of yellow markings on syntergite 1 + 2 and tergite 3. In one specimen examined, there is considerable variation between the wing pattern between the left and right wings, with the right wing having the normally dark brown, roughly Y-shaped preapical band, clearly divided into two demarcated, but narrow bands.

*Diagnosis*. Scutum (Fig. 103) predominantly pale tan-brown to orange-brown, with 2 brown vittae extending across scutoscuteellar suture onto disc of scutellum, where they converge on disc; wing membrane (Fig. 75) with 1 preapical hyaline band distal to crossvein *dm-m*; hyaline band at crossvein *r-m* extending to hind margin of wing and (in some specimens) fragmented near anterior margin into multiple short bands, given overall impression of vaguely Y-shaped mark over *r-m*; abdomen (Figs 52, 53) dark brown, with faint blue-violet metallic iridescence and with triangular pale tan-brown to orange-brown mark on tergites 1–3 and on lateral margin of tergite 3; palpus entirely pale.

*Type material examined*: **SIERRA LEONE**: lectotype ♂ (here designated): “Sierra Leon [handwritten] // *lugens* / Alte Sammlung” [printed and handwritten] // **LECTOTYPE** ♂ / *Musca lugens* Fabricius, / 1794 / designated by / Kirk-Spriggs & Whittington 2024 [white card with yellow border; printed]” (NHMV). Direct-pinned, in fair condition, but greasy and with thorax partly crushed and partly consumed by *Anthrenus*, left fore leg re-adhered to body with blob of semi-transparent adhesive and right wing partly broken; abdomen appears shrivelled and unusually narrow.

*Remarks*. Fabricius (1794: 348) noted the type information for *Musca lugens* as “Habitat in Sierra Leon Africae Dr. Pflug”. Wiedemann (1830: 459) noted the type (as *Ortalis lugens*) from Sierra Leone and Hendel (1914b: 386) recorded the type information as “1 ♂ aus West-Afrika, Sierra Leone, die Type Wiedemanns im Wiener Hofmuseum”. “Alte Sammlung” refers to the “old collection” which Hendel (1914b: 368) referred to as “Type Wiedemanns im Wiener Hofmuseum”. The syntype was examined in NHMV and as this specimen does not bear a type label is here designated as lectotype. Hendel 1914b: 368 also referred to “6 ♂♀ aus Sierra Leone, Moyamba, 26. September (J.J. Simpson, Ent. Res. Comm.)”, which are presumably the six specimens cited below, *i.e.*, 1 ♀ in NHMV and 2 ♂, 3 ♀ in NHMUK, although the date of 1 ♀ (15.ix.1912) in NHMUK does not exactly tally.

*Additional material examined* (all labelled: “*Engistoneura lugens* (Fabricius, 1794) det. A.E. Whittington 2024 or A.H. Kirk-Spriggs 2024 [♂ or ♀]”). **GUINEA**: 1 ♀, Muséum Paris, Guinée Franç, Friguigbé [= 9.98, -12.91], près Kindia, P. Prins, 1908, *Engistoneura lugens* Fab. E. Séguy det. 1932; 1 ♂, Guinée Franç, Dalaba [= 10.69, -12.25], Aout, Muséum Paris, 1937, L. Berland (both MNHN). **SIERRA LEONE**: 1 ♀, Moyamba [= 8.24, -12.44], Sierra Leone, 26.ix.1912, Jas.

S. Simpson, *Engistoneura lugens* F. det Hendel, Coll. Hendel” (NHMV); 2 ♂, 2 ♀, Moyamba [= 8.24, -12.44], Sierra Leone, 26.ix.1912, Jas. S. Simpson, Pres. by Imp. Bur. Ent. Brit. Mus. 1922—254, NHMUK013449489–013449492; 1 ♀, Mongheri [= Mongeri, 8.32, -11.74], Sierra Leone, 15.ix.1912, Jas. S. Simpson, Pres. by Imp. Bur. Ent. Brit. Mus. 1922—254, *Engistoneura lugens* F. det Hendel, NHMUK013449488; 1 ♀, Sierra Leone, Njala [= 8.10, -12.08], 26.v.[19]30, E. Hargreaves, Pres. by Imp. Inst. Ent. B.M.1938—407, *Engistoneura lugens* F. van Emden det. 1938, NHMUK013449493; 1 ♂, W. Africa, Sierra Leone, Mabile [= Magbile, 8.6, -12.7], 13.xii.1925, Major A.D. Fraser D.S.O., M.C., R.A.M.C., Brit. Mus. 1927—385, NHMUK013449494; 1 ♂, W. Africa, Sierra Leone, Babbia [= Bambaia, 8.97, -13.15], 13.xi.1926, Major A.D. Fraser D.S.O., M.C., R.A.M.C., Brit. Mus. 1927—385, NHMUK013449495 (all NHMUK).

*Distribution*. Guinea and Sierra Leone.

*Bionomics*. A species occurring in Guinean Montane Forest, Guinean Forest-Savanna Mosaic, Guinean Mangroves and Western Guinean Lowland Forest. Widely distributed in Guinea and Sierra Leone, occurring at elevations between 10 and 952 m (Fig. 151). Label data indicates that the species is active in May, September and December.

***Engistoneura maya* Kirk-Spriggs & Whittington, sp. nov.**  
Figs 54, 55, 85, 107, 120, 152

*Etymology*. The specific epithet *maya* is a noun in apposition, named in honour of the first author’s youngest daughter Maya Lucile.

*Description*: ♂ (largely based on ex ethanol holotype).

*Measurements*. Holotype ♂ (Figs 54, 55) body length: 6.8 mm (range: 6.4–8.0 mm;  $\bar{x}$  = 7.2 ± 0.5 mm; *n* = 13); wing length: 8.7 mm (range: 8.0–9.4 mm;  $\bar{x}$  = 8.7 ± 0.4 mm; *n* = 13).

*Colour/vestiture*. Ground colour (Figs 54, 55, 107, 120) dark grey-brown, abdominal tergites with metallic dark blue lustre, in contrast head orange-brown and mid and hind tarsomere 1 buff-yellow; scutum (Fig. 107) with 3 broad vittae, formed of dense pale grey microtrichia, terminating at scutoscuteellar suture (viewed obliquely) darker grey vitta between pale grey vittae may appear brown. Wing membrane (Fig. 85) dark brown, with slight metallic violet reflections in costal and radial sectors and with Y-shaped hyaline mark adjacent to crossvein *r-m* and paired parallel preapical hyaline bands. Abdominal syntergite 1 + 2 dull, tergites 3–5 metallic dark blue; intersegmental membranes dull brown, sternites brown, with green reflections.

*Head* (Figs 54, 55, 120). Orange-brown, darker on frons, facial carina yellowish; 2 large black triangular maculae on vertex, ocellar triangle black; face brown, darkest beneath antennal grooves, paler toward extreme margins, yellowish centrally. Facial carina sharp-edged between antennal insertions, but mostly with rounded margins, upper surface with 2 poorly defined divergent

grooves, but otherwise unmarked, although surface finely rugose. Face and clypeus likewise finely rugose. Frons shiny, with fine silver microtrichia forming 2 distinct maculae on lateral frons adjoining parafacial and slightly dorsal to this and third macula on gena adjacent to lower margin of compound eye. Antennal pedicel with fine black setae scattered on dorsal surface and fringe along distal margin. Postpedicel pale orange-brown, with fine, yellowish golden microtrichia (differing with angle of view). Arista with combined length of dorsal and ventral vestiture less than width of postpedicel. Antennal groove dull, dark brown at ventral extremity, merging with brown facial markings. Gena with single black, forwardly directed seta present, posterior to which is scattered group of black setulae trailing back along oral margin; genal and postgenal setulae fine, black, virtually indistinct and widely spaced, longer around occipital foramen. Palpus velvety black, with apex ash-grey; setulae black. Prementum and labellum orange-brown darkening to brown at apex, setulae black on prementum, bronze on ventral surface of labellum.

*Thorax* (Figs 54, 55, 107, 120). Notably wider basally, virtually entirely dark grey-brown to black. Bullate cervical sclerite pale orange-brown, in contrast to black proepisternum. Anepisternum and katepisternum densely covered in pale, silver-grey microtrichia (viewed obliquely). Short black setulae evenly distributed across scutum and anepisternum, longer on remaining pleura.

*Scutellum* (Fig. 107). Slightly flattened on dorsal surface; margin slightly swollen where apical scutellar setae inserted.

*Legs* (Fig. 55). Fore femur with 3 pointed, black subapical spines on posterior ventral margin; distal-most of which inserted at more acute angle than preceding 2 (left fore femur with additional smaller spine between first two). Mid coxal prong parallel-sided, round at apex. Mid coxal apophysis cone-shaped, articulating notch small.

*Wing* (Fig. 85). Crossvein *r-m* angle = 16°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.7; crossveins *r-m* : *dm-m* angle = 22°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.45. Wing membrane dark brown with hyaline marks in cells *br*, *bm*, *cua* and base of cell *dm*, paired hyaline bands either side of crossvein *r-m*, converging to form Y-shaped hyaline mark not joined to basal hyaline marks, 2 hyaline preapical bands distal to crossvein *dm-m* transecting wing margin from anterior to posterior margin, apical most of which is fragmented near to posterior margin of wing; 2 hyaline marks present along hind margin of wing in cell  $m_4$ , distal-most of which joined to Y-shaped hyaline mark at crossvein *r-m*; margin of anal lobe hyaline. Ventral auxiliary sclerite brown basally, becoming orange-brown dorsally. Halter knob cream-white, stem buff-brown.

*Abdomen* (Figs 54, 55). Tergite 3 with yellowish setulae laterally.

*Terminalia*. Externally visible parts dark brown, with cerci and surstyli buff.

Female similar to male, only differing in sexual characters.

*Variation*. There is some variation in the 2 preapical hyaline bands of the wing, which may form continuous bands from the anterior to posterior wing margins, may be slightly divided at vein  $M_1$ , or be reduced to misaligned oblong patches, sometimes to 3 patches in cell  $m_1$ , as in Fig. 85.

*Diagnosis*. Entire thorax (Fig. 120) abdomen and most of legs predominantly dark grey-brown (Figs 54, 55); scutum (Fig. 107) with vittae comprised of pale grey to silver microtrichia; wing membrane (Fig. 85) with paired hyaline bands either side of crossvein *r-m*, converging to form Y-shaped hyaline mark not joined to basal hyaline marks in cells *br*, *bm*, *cua* and base of cell *dm*, but extending to posterior margin of wing.

*Type material examined*. **GUINEA**: holotype ♂, “GUINEA 1413m/Dalaba, Foret de Goubel/10°39'27"N, 12°15'44"W [= 10.66, -12.26] / 10-18.ix.2019 Human Dung/Pitfall. Geiser, M., Koivagui, S./Leno, M.,/Miles, W.,/Mulvaney, L., Safian, Sz. Leg. / ANHRT:2019.19 [printed] // **HOLOTYPE** ♂ / *Engistoneura* / *maya* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with red border; printed] // ANHRT / 00280659 [printed]” (ANHRT). Direct-pinned in good condition. Paratypes (all labelled: “// **PARATYPE** ♂ [or ♀] / *Engistoneura* / *maya* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with blue border; printed]: 5♂, 9♀, same data as holotype, except: “// ANHRTUK / 00280656–00280658, 00280660–00280670 [printed]” (all ANHRT); 1♀, 1[unsexed], “Guinée franc / Dalaba [= 10.66, -12.26] [printed] // AOUT [printed] // MUSÉUM PARIS / 1937 / L. BERLAND [pale blue card, printed]” (both MNHN).

*Remarks*. Historical and recent material originates from Dalaba and the species appears to be restricted to Fouta Djallon plateau, being a well-known area of endemism.

*Distribution*. Guinea.

*Bionomics*. A Guinean Montane Forest species, apparently restricted to Foret de Goubel, near Dalaba, Guinea, at an elevation of 1,413 m (Fig. 152). This locality is in the Fouta Djallon, an area of high endemism (H. Takano, pers. comm. 2025). As well as recent material its restriction to this locality is supported by an historical specimen dated 1937 and labelled Dalaba (in MNHN). The type series was sampled in faeces-baited pitfall traps in indigenous forest. Label data indicate that the species is active in September.

***Engistoneura mcalpinei* Kirk-Spriggs & Whittington, sp. nov.**

Figs 56, 57, 81, 98, 153

*Etymology*. The specific epithet *mcalpinei* is a genitive case noun named in honour of the late David Kendray McAlpine (1934–2024) in recognition of his very significant contribution to the taxonomy of world Platystomatidae.

*Description*: ♂ (largely based on field-pinned holotype).

*Measurements*. Holotype ♂ (Figs 56, 57) body length: 7.5 mm (range: 7.5–8.1 mm;  $\bar{x}$  = 7.8 ± 0.4 mm;  $n$  = 2);

wing length: 8.8 mm (range: 7.8–8.8 mm;  $\bar{x}$  = 8.3 ± 0.7 mm;  $n$ : = 2).

**Colour/vestiture.** Ground colour (Figs 56, 57) pale yellowish to tan-brown; scutum with 2 distinctive dark brown dorsocentral vittae, continuous across scutellum, then ventrally across anatergite; dorsal margins of anepisternum and proepisternum with narrow, dark brown vittae that narrowly extends onto lateral margins of scutum. Wing membrane (Fig. 81) brown with L-shaped hyaline stripe ending at *r-m* and 2 parallel preapical hyaline bands beyond crossvein *dm-m*. Base of abdomen (Fig. 98) with narrow pale tan-brown median vitta, otherwise darker brown, with strong blue-violet metallic lustre; sternites brown; intersegmental membranes tan-brown, sternites with golden setulae.

**Head** (Figs 56, 57). Face pale yellow to tan-brown with poorly defined brown lateral vittae, extending from distinct black maculae at base of antennal sockets, to across clypeus; concave, epistomal margin protruding beyond antennae; facial carina narrow, with sharp margins; surface finely rugose with single median furrow. Frons brown and shiny, with median yellow to tan-brown vitta, bullate toward ptilinal fissure (ptilinum distended in holotype) ocellar triangle black. Compound eyes dark red-brown. Fine, silver microtrichia limited to narrow ventral margin of compound eye and as 2 distinct triangular maculae on lateral frons adjoining parafacial. Antennal pedicel with fine black setae clumped along seam on dorsal margin and as fringe along ventral margin. Postpedicel slightly more orange, with fine yellow microtrichose vestiture. Antennal groove shiny, cream-white with distinct black macula at ventral extremity, merging with fainter brown facial vitta. Gena with single black, forwardly directed seta, surrounded at base ventrally by 4 or 5 shorter, weaker black setulae; setulae on postgena fine, a mixture of pale, virtually indistinct setulae dorsally with black, widely spaced and slightly longer setulae ventrally and around occipital foramen. Palpus dark yellow to tan-brown; setulae black. Prementum and labellum yellow to tan-brown, labellum faintly brown at apex, setulae brown.

**Thorax** (Figs 56, 57, 98). Bullate cervical sclerite pale buff, concolorous with proepisternum, centrally with sparse, short, black setulae. Anepisternum and katepisternum obscurely covered in pale, silver-grey microtrichia (viewed obliquely). Short brown setulae evenly distributed across scutum, anepisternum and katepisternum, interspersed on pleura with pale golden setulae; pale longer setulae ventrally on katepisternum, with row of black setulae in front of mid coxae.

**Scutellum** (Fig. 98) (damaged in holotype). Slightly flattened on dorsal surface, trapezoid, margin slightly raised where marginal scutellar setae inserted. Dorsal and marginal surfaces evenly clothed in widely spaced black setulae. Paired lateral setae closer together than to apical setae, these longer than lateral setulae.

**Legs** (Fig. 57). Fore femur with 3 evenly spaced pointed, brown subapical spines on posterior ventral margin. Mid coxal prong weakly developed, narrowly spatulate. Mid coxal apophysis triangulate, sharply pointed at apex, with black preapical setulae dorsally. Hind coxa

with narrow posterior margin, outermost extremity of which developed into stout, rounded lobe.

**Wing** (Fig. 81). Crossvein *r-m* angle = 20°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.1; crossveins *r-m* : *dm-m* angle = 20°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.50. Wing membrane brown with hyaline stripe in cells *br*, *bm*, *cua* and base of cell *dm* joined to hyaline band at *r-m*, forming an L-shaped hyaline mark; paired parallel hyaline preapical bands; posterior margin with an oval hyaline mark in  $m_4$ . Vein  $R_{2+3}$  slightly sinuous and vein  $R_{4+5}$  arched beyond crossvein *r-m*, causing cell  $r_{2+3}$  which is basally narrow, to widen near *r-m*, then become narrow again before apex of  $R_{2+3}$ . Cell  $r_{4+5}$  narrower apically than midway along its length. Ventral auxiliary sclerite buff with slightly more yellow shiny bulbous apex. Halter knob cream-white, stem slightly darker brown at base.

**Abdomen** (Figs 56, 57). White to pale brown setulae intermingled with brown setulae towards apex of abdomen. Silver-grey microtrichia barely discernible.

**Terminalia.** Externally visible parts brown, with paler cerci and surstyli.

Female similar to male, only differing in sexual characters.

**Variation.** The paratype specimen aberrantly has only 4 scutellar marginal setae, the basal lateral setae being entirely absent.

**Diagnosis.** Scutum (Fig. 98) predominantly pale tan-brown to orange-brown, with 2 brown vittae extending across scutoscuteellar suture onto scutellar disc, evanescent prior to reaching scutoscuteellar apex; wing membrane (Fig. 81) with L-shaped hyaline mark and 2 narrow preapical hyaline bands beyond crossvein *dm-m*.

**Type material examined:** **SIERRA LEONE:** holotype ♂, “YIRAIA [= 9.45, -11.26] / Sierra Leone, / 6.vi.1912 / Jas. J. Simpson. [printed and handwritten] // *E. parallela* / Wied. [handwritten] // **HOLOTYPE** ♂ / *Engistoneura mcalpinei* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with red border; printed] // NHMUK013449710 [printed with QR code]” (NHMUK). Micro-pinned and staged on cellophane strip, in good condition. Paratype, 1♀ “W. Africa: / Sierra Leone [no locality] / June-July 1931. [printed] // Dr. E.S. Walls / B.M.1931—318 [printed] // **PARATYPE** ♀ / *Engistoneura mcalpinei* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with blue border; printed] // NHMUK013449711 [printed with QR code]” (NHMUK).

**Distribution.** Sierra Leone.

**Bionomics.** A Western Guinean Lowland Forest species, only recorded from Yiraia, Sierra Leone at an elevation of ca 424 m (Fig. 153). Type label data indicate that the species is active in June and July.

### ***Engistoneura moerens* (Fabricius, 1794)**

Figs 2, 16–25, 58, 59, 89, 109, 122, 129, 154

*Musca moerens* Fabricius, 1794: 349.

*Dictya moerens*: Fabricius 1805: 327.

*Ortalis moerens*: Wiedemann 1830: 457; Loew 1873: 43.

*Engistoneura moerens*: Steyskal 1980: 567.

*Engistoneura maerens*: unjustified emendation of *moerens*: Bezzi 1908b: 131; Enderlein 1912: 375; Hendel 1914a: 152, 1914b: 364; corrected Steyskal 1980: 567.

= *Trypeta albovaria* Walker, 1853: 383; Loew 1873: 43.

*Engistoneura albovaria* (as synonym of *E. moerens*): Bezzi 1908b: 131; Hendel 1914a: 152, 1914b: 364; Steyskal 1980: 567.

= *Engistoneura catogastera* var. *melanopleura* Enderlein, 1924: 139, **syn. n.**; Steyskal 1980: 567.

= *Engistoneura obscura* var. *duplicata* Enderlein, 1924: 139, **syn. n.**; (as synonym of *E. obscura* Hendel, 1914): Steyskal 1980: 567.

= *Engistoneura obscura* var. *interrupta* Enderlein, 1924: 140, **syn. n.**; (as synonym of *E. obscura* Hendel, 1914): Steyskal 1980: 567.

= *Megaglossa catogastera* Bigot, 1891: 384, **syn. n.**

*Engistoneura catogastera*: Hendel 1914a: 152; 1914b: 365; Steyskal 1980: 567.

**Redescription:** ♂ (largely based on field-pinned lectotype).

**Measurements.** Lectotype ♂ (Figs 58, 59) body length: 8.2 mm (range: 7.6–12.8 mm;  $\bar{x}$  = 10.9 ± 1.3 mm;  $n$  = 31); wing length: 7.8 mm (range: 7.5–13.0 mm;  $\bar{x}$  = 11.1 ± 1.4 mm;  $n$  = 31).

**Colour/vestiture.** Ground colour (Figs 2, 16, 17, 58, 59) dark grey-brown, abdominal tergites with dark metallic blue-green lustre, in contrast to buff-yellow on: occiput, medial triangular mark on frons, antennae, facial carina, centre of face, clypeus, gena, fore coxae, basal  $\frac{2}{3}$  of mid and hind femora and tibiae and marks on tergites. Scutum (Fig. 109) with median and 2 lateral broad vittae formed of dense pale grey microtrichia, terminating at scutoscutellar suture (viewed obliquely) darker grey vittae between grey vittae may appear brown. Wing membrane (Figs 20, 89) dark brown, with slight metallic violet reflections and with V-shaped hyaline mark and two parallel preapical hyaline bands. Abdominal syntergite 1 + 2 black basally, dark metallic blue-green in posterior  $\frac{2}{3}$ ; tergites 3–5 dark metallic blue-green; intersegmental membranes dull brown, sternites brown, with violet reflections.

**Head** (Figs 18, 19, 58, 59, 122). Facial carina with rounded margins. Fine silver microtrichia in narrow margin around compound eye, along upper margin of gena and as 2 distinct maculae on lateral frons adjoining parafacial and slightly dorsal to it. Antennal pedicel with fine ventral setae black. Postpedicel pale buff-yellow at base, tinged grey toward apex, with fine yellowish golden microtrichia on ventral margin basally, the extent of which differs with angle of view. Arista with combined length of dorsal and ventral vestiture no greater than width of postpedicel. Antennal groove shiny dark brown at ventral extremity adjoining brown facial vitta. Gena with single black, forwardly directed seta; genal and postgenal setulae fine, pale, virtually indistinct, black, widely spaced and longer around occipital foramen. Palpus with apex velvety black; setulae black. Prementum and labellum brown, setulae orange-brown to golden.

**Thorax** (Figs 16, 17, 21–23, 58, 59, 109, 122). Bullate cervical sclerite light brown, contrasting with pale buff proepisternum (Fig. 21). Anepisternum bicoloured, with

densely black median vitta contrasting strongly with pale cream anterior and posterior margins; katepisternum bicoloured dark grey-brown on anterior ventral  $\frac{1}{2}$  and pale cream on posterior dorsal  $\frac{1}{2}$ . Anepisternum and katepisternum densely covered in pale, silver-grey microtrichia (viewed obliquely). Short black setulae evenly distributed across scutum and anepisternum, longer on remaining pleura.

**Scutellum** (Fig. 109). Slightly flattened on dorsal surface.

**Legs** (Figs 17, 58, 59). Fore femur with 3 pointed, black subapical spines on posterior ventral margin. Mid coxal prong parallel-sided, round at apex (Fig. 23). Mid coxal apophysis cone-shaped.

**Wing** (Figs 20, 89). Crossvein *r-m* angle = 7°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 2.2; crossveins *r-m* : *dm-m* angle = 8°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.41. Wing membrane dark brown, with hyaline stripe in cells *br*, *bm*, *cua* and base of cell *dm* joined to hyaline band either side of *r-m* which converge to form a V-shaped hyaline mark; paired parallel hyaline preapical bands; posterior margin with oval hyaline mark in  $m_4$  and at apex of  $M_4$ . Ventral auxiliary sclerite (Fig. 22) shiny black with chestnut brown raised area. Halter knob buff-brown, stem slightly darker.

**Abdomen** (Figs 58, 59). Tergite 3 with white to pale brown setulae laterally.

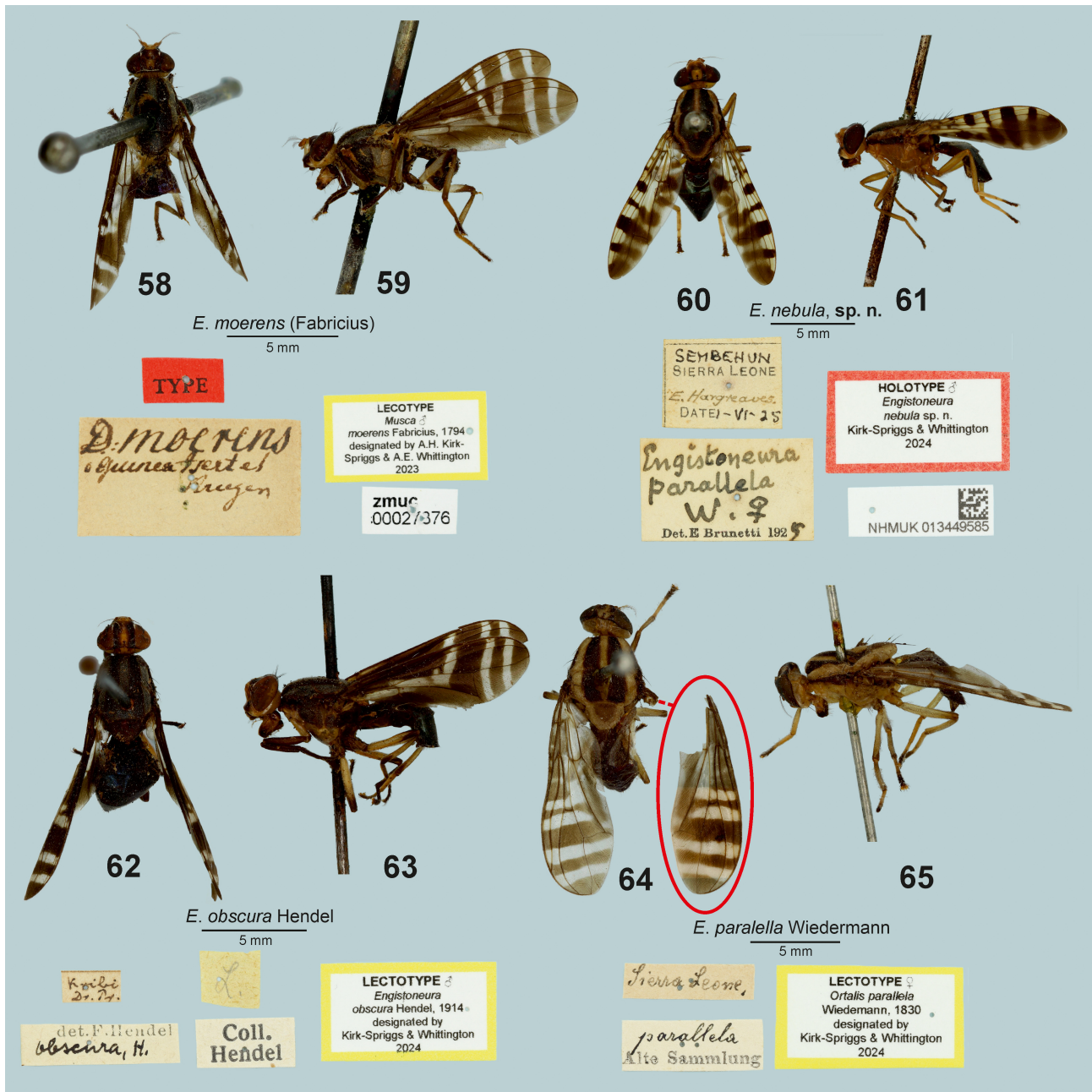
**Terminalia** (Fig. 24). Externally visible parts brown, with paler cerci and surstyli.

Female similar to male, only differing in sexual characters.

**Variation.** There is some variation in the colouration of palpus, which may be either entirely buff or have the apex darkened, to a greater or lesser degree. Variation is also apparent in the degree of pigmentation of the black vitta that transects the antennal grooves, face and clypeus, which may be very dark and clearly defined, be confined to the antennal grooves alone, or be developed to a greater or lesser extent. Both forms occur sympatrically within the same populations and this may be dependent to some extent on the age of the specimen. This variation has led to several synonyms being created, for what is here regarded as a single variable species.

**Diagnosis.** Scutum (Fig. 109) predominantly dark grey-brown, with vittae comprised of pale grey to silver microtrichia; thoracic pleura (Figs 17, 122) at least in part, concolorous with dark grey-brown scutum; anepisternum bicoloured, with black median vitta contrasting with pale cream anterior and posterior margins; dark areas pitch black, strongly contrasting with pale cream anterior and posterior margins of face, anepisternum and katepisternum; wing membrane (Figs 20, 89) brown with V-shaped hyaline mark converging in cell *dm* level with crossvein *r-m*, joined to stripe through cells *bm*, *cua* and basal  $\frac{2}{3}$  of cell *dm*; palpus with apex black; armature of fore femur consisting of uniserial pointed spines on posterior (*i.e.*, outer) ventral margin.

**Type material examined** (*Musca moerens* Fabricius, 1794). **GUINEA:** lectotype ♂ (here designated): “TYPE [red card; printed] // *M. moerens* / Guinea [Dr.] Ifert /



**FIGURES 58–65.** Primary name-bearing types of *Engistoneura* species (left: dorsal view; right: lateral view) and associated specimen labels (below). **58–59.** *E. moerens* (Fabricius) (LT ♂, Guinea, ZMUC). **60–61.** *E. nebula*, sp. nov. (HT ♂, Sembehun, Sierra Leone, NHMUK) [right wing subsequently removed for imaging]. **62–63.** *E. obscura* Hendel (LT ♂, Kribi, Cameroon, NHMV). **64–65.** *E. parallela* (Wiedemann) (LT ♀, Sierra Leone, NHMV) [red oblong = detached right wing, glued to card beneath specimen].

Meigen [handwritten] // ZMUC / 00027376 [printed] // **LECTOTYPE** / *Musca* ♂ / *moerens* Fabricius, 1794 / designated by A.H. Kirk- / Spriggs & A.E. Whittington / 2023 [white card with yellow border; printed]” (ZMUC). Direct-pinned in fair condition. Paralectotype ♀ (here designated): “TYPE [red card; printed] // ZMUC / 00027377 [printed] // **PARALECTOTYPE** / *Musca* ♀ / *moerens* Fabricius, 1794 / designated by A.H. Kirk- / Spriggs & A.E. Whittington / 2023 [printed, yellow border]” (ZMUC).

*Type material examined* (*Trypeta albovaria* Walker,

1853). ?SENEGAL: lectotype [sex unspecified] (here designated) “Type [paper disc, green border] // Holo / type [paper disc, red border] // ? Senegal / Ex Saunders / Coll. / 68.4 [on reverse] *Engistoneura* / (*Trypeta*) / *albovaria* / Type Walk. [handwritten] // ? Senegal [handwritten] // *albovaria* [handwritten] // 68.4 [printed] // **HOLOTYPE** / *Trypeta* / *albovaria* / Walker / verified by / J.E. Chainey, 2002 / BMNH(E) # / 251863 [handwritten and printed] // NHMUK013449482 [printed with QR code] // **LECTOTYPE** / *Trypeta* / *albovaria* Walker, 1853 / Kirk- / Spriggs & Whittington / 2024 [white card with yellow

border; printed]" (NHMUK). Double-mounted on card strip. In fair condition, abdomen and mid and hind legs missing.

*Type material examined (Engistoneura catogastera* var. *melanopleura* Enderlein, 1924). **TOGO**: lectotype ♂ (here designated) "Togo / Bismarckburg [= 8.18, 0.69] / 1.VI.-4.VII.[18]93 / L. Conradt S. [blue card; printed] // Type [orange card; printed] // *Engistoneura / catogastera* Big. / var. *melanopleura* / Enderl ♂ / Dr.Enderlein det.1920 [handwritten and printed] // Zool. Mus. / Berlin [printed] // **LECTOTYPE** ♂ / *Engistoneura catogastera* / var. *melanopleura* / Enderlein, 1924 / designated by / Kirk-Spriggs & Whittington / 2024 [white card with yellow border; printed]" (ZMHB). Direct-pinned in good condition.

*Type material examined (Engistoneura obscura* var. *duplicata* Enderlein, 1924). **CAMEROON**: lectotype ♂ (here designated) "Kamerun / Barombi-Stat. [=4.67, 9.38] / Preuss S. [blue card; printed] // Type [orange card; printed] // Zool. Mus. / Berlin [printed] // *Engistoneura / obscura* Hend. / var. *duplicata* / Type / Enderl ♂ / Dr.Enderlein det.1920" [handwritten and printed] // **LECTOTYPE** ♂ / *Engistoneura obscura* / var. *duplicata* / Enderlein, 1924 / designated by / Kirk-Spriggs & Whittington / 2024 [white card with yellow border; printed]" (ZMHB). Direct-pinned in good condition. Paralectotypes: 1 ♂ "Kamerun / Longji [= 3.08, 9.97] / H. Paschen S." [blue card; printed] // Type [orange card; printed] // Zool. Mus. / Berlin [printed] // **PARALECTOTYPE** ♂ / *Engistoneura obscura* / var. *duplicata* / Enderlein, 1924 / designated by / Kirk-Spriggs & Whittington / 2024 [white card with yellow border; printed]" (ZMHB). **EQUATORIAL GUINEA**: 1 ♀ "Span. Guinea / Alcu [= Alen] Benitogbt [=1.90, 10.74] / 16-31 VII [19]06 / G. Tessmann S.G [blue card; printed] // Type [orange card; printed] // Zool. Mus. / Berlin [printed] // **PARALECTOTYPE** ♂ / *Engistoneura catogastera* / var. *duplicata* / Enderlein, 1924 / designated by / Kirk-Spriggs & Whittington / 2024 [white card with yellow border; printed]" (ZMHB).

*Type material examined (Engistoneura obscura* var. *interrupta* Enderlein, 1924). **CAMEROON**: lectotype ♀ (here designated) "Kamerun / Japoma [= 4.01, 9.83] / Schäfer J.G. [blue card; handwritten] // Type [orange card; printed] // *Engistoneura / obscura* Hend. / var. *interrupta* / Type / Enderl ♀ / Dr.Enderlein det.1920" [handwritten and printed] // Zool. Mus. / Berlin [printed] // **LECTOTYPE** ♀ / *Engistoneura obscura* / var. *interrupta* / Enderlein, 1924 / designated by / Kirk-Spriggs & Whittington / 2024 [white card with yellow border; printed]" (ZMHB). Direct-pinned in good condition.

*Type material examined (Megaglossa catogastera* Bigot, 1891). **CÔTE D'IVOIRE**: lectotype ♂ (here designated): "Syn- / type [white disc, pale blue border; printed] // Assinie [= 5.14, -3.324] / Afrique oc [blue-grey card; printed] // Type / of Bigot [handwritten in red ink] // *Megaglossa / catogaster* [handwritten] // *M. catogastera* / EX COLL. BIGOT [handwritten and printed] // **LECTOTYPE** / *Megaglossa / catogastera* Bigot, 1891 ♂ / designated by A.H. Kirk- / Spriggs & A.E. Whittington / 2023 [white card with yellow border;

printed]" (OUMNH). Direct-pinned in fair condition, head collapsed, some mould present, wings broken at base. Paralectotypes: 1 ♂ (here designated) "Syn- / type [white disc, pale blue border; printed] // Assinie / Afrique oc [blue-grey card; printed] // *M. catogastera* / EX COLL. BIGOT [handwritten and printed] // **PARALECTOTYPE** / *Megaglossa / catogastera* Bigot, 1891 ♂ / designated by A.H. Kirk- / Spriggs & A.E. Whittington / 2023 [white card with yellow border; printed]" (OUMNH); Paralectotype ♀ (here designated) "Syn- / type [white disc with pale blue border; printed] // Assinie / Afrique oc [blue-grey card; printed] // *M. catogastera* / EX COLL. BIGOT [handwritten and printed] // **PARALECTOTYPE** / *Megaglossa / catogastera* Bigot, 1891 ♀ / designated by A.H. Kirk- / Spriggs & A.E. Whittington / 2023 [white card with yellow border; printed]" (OUMNH).

*Remarks.* In respect to the syntypes of *Megaglossa catogastera*; in the original description Bigot (1891: 384) refers to 2 specimens from Assinie without specifying the sexes concerned, but 3 specimens (2 ♂ and 1 ♀) bearing the labels "Assinie / Afrique oc" are present in OUMNH. As Pont *et al.* (2024: 130) pointed out "Only two of the three specimens in OUMNH can be syntypes, but it is not apparent which were the two referred to by Bigot in his description". For this reason, the three specimens present in OUMNH are here regarded as syntypes and 1 male is selected and designated as lectotype and the other two specimens (♂ and ♀) as paralectotypes. Examination of the holotypes of *Musca moerens* Fabricius, 1794 (deposited in ZMUC) and *Megaglossa catogastera* Bigot, 1891 (deposited in OUMNH) revealed that the two species are conspecific. *Musca moerens* (described in 1794) clearly has priority, so *Engistoneura catogastera* (Bigot, 1891) **syn. n.** is sunk as a junior synonym of *E. moerens*.

In similar fashion, the type specimens (ZMHB) of the varieties proposed by Enderlein (1924) have been examined and also found to be conspecific with *E. moerens*. These specimens are regarded as syntypes and lectotypes and paralectotypes (where applicable) are selected and designated here. All can be quickly and consistently diagnosed by the key characters listed above, particularly the dark grey-brown ground colour, the V-shaped hyaline mark on the wing membrane converging on crossvein *r-m* (partially lacking in the lectotype of *E. obscura* var. *interrupta*) the bicoloured anepisternum and the black velvety apex to the palpus. *Engistoneura catogastera* var. *melanopleura* Enderlein, 1924, **syn. n.**, is sunk as a junior synonym of *E. moerens* and *E. obscura* var. *duplicata* Enderlein, 1924, **syn. n.** and *E. obscura* var. *interrupta* Enderlein, 1924, **syn. n.** are sunk as a junior synonyms of *E. moerens*.

The type specimen (the lectotype of *Musca moerens* F.) is not entirely representative of a great many specimens collected in the field, being small for the species in comparison to measurements of conspecific specimens.

In respect to the syntype of *Trypeta albovaria*; in the original description Walker (1853: 383) did not designate a holotype, simply giving the locality as "Senegal?". The paper disc labels "Type" and "Holotype" and Chainey's 2002 label indicating holotype are curatorial labels that

were added later and have no bearing in nomenclature. The single specimen deposited in NHMUK bearing the label “? Senegal” is, therefore, regarded as a syntype and is here designated as lectotype.

*Additional material examined* (all labelled “*Engistoneura moerens* (Fabricius, 1794) det. A.H. Kirk-Spriggs 2023 or det. A.E. Whittington 2023 [or 2024] [♂ or ♀]”): **BENIN**: 1♂, 2♀, Benin, Niaouli Forest [= 6.74, 2.12], 22.iv.1998, G. Goergen, banana trap; 1♂, same, except: 26.vi.1998; 3♂, 2♀, same, except: 05.vii.1998, sweep netting; 4♂, 2♀, same, except: 20.vii.1998, banana trap; 6♂, 4♀, same, except: 10.viii.1998; 1♀, same, except: 24.viii.1998; 1♂, Benin, Pénésoulou [= 9.24, 1.55], forest area, x.2003, G. Goergen (all IITAB); **CAMEROON**: 2♀, Yabassi 04°30'N, 09°59'W [= 4.50, 9.97], vi.1969 (USNM). **CÔTE D’IVOIRE**: 4♂, 3♀, Côte d’Ivoire, Banco Nat. Park, N. Abidjan S. side, 05°22'N, 04°03'W [= 5.37, -4.05], 23 & 27.iv.1989, J. G.H. Londt, edges of wide track in forest [NMSA-DIP 030648, 108232–108235] (NMSA); 1♂, 1♀, Côte d’Ivoire, Bingerville [= 5.351, -3.88], viii.1961, J. Decelle; 1♀, Côte d’Ivoire, Akoupé 25 km N. Abidjan [= 5.50, -4.16], vii.1962, J. Decelle; 5♂, 1♀, Côte d’Ivoire, Zepreghé [= 6.91, -6.37], Daloa, vi.1962, J. Decelle; 2♂, same, except: v.1962; 1♂, Côte d’Ivoire, Zepreghé-Koffikro (Daloa) [= Koffikro-Afféma, 5.58, -2.98], vi.1961, J. Decelle; 1♀, same, except: ix.1961; 1♂, Côte d’Ivoire, Akoupé [= 5.48, -4.16], 1975, P.M. Elsen; 3♀, same, except: 02.xi.1975 (all RMCA); 1♀, Tabou, Elfenbeinküste [= Tabou, 4.43, -7.36], Aeberli, *Engistoneura moerens* F. ♀, *Engistoneura moerens* F., 14100, *Engistoneura catogastera* (Bigot, 1891) det. A.E. Whittington 2008 (ETHZ); 2♂, 4♀, Côte d’Ivoire, Bingerville [= 5.35, -3.88, 31.iii.1944, H. Alibert, on cacao, 225, [1♂ labelled “*Peltacanthina* sp. van Emden det. 1944”] (NHMUK013449565–013449570); 1♂, Côte d’Ivoire [no locality], Brunetti B.M.1927–184, NHMUK013449583 (all NHMUK); 1♀, Côte d’Ivoire, Kromambira village, Comoé Billim sacred forest, 08°30'36"N, 03°46'45"W [= 8.51, -3.78], 03–13.viii.2016, 220 m, M. Aristophanous, P. Moretto, S. Quattara, canopy dung pitfall, ANHRT:2017.20, ANHRTUK00244446; 1♀, Côte d’Ivoire, Parc national du Mont Sângbé (savannah) 08°07'05"N, 07°19'09"W [= 8.12, -7.32], 14–20.xi.2021, 422 m, P. Moretto, L. Mulvaney, H. Takano, human dung pitfall, ANHRT:2021.8, ANHRTUK00279349; 42♂, 47♀, Côte d’Ivoire, Abidjan, Banco Forest (Parc National du Banco) 05°23'03.8"N, 04°03'11.2"W [= 5.38, -4.05], 23–30.iv.2017, 39–48 m, A. Aristophanous, M. Aristophanous, M. Geiser, P. Moretto, P., human dung pitfall, ANHRT:2017.25, ANHRTUK00280691, 00279258–00279344; 3♀, Côte d’Ivoire, Abidjan, Banco National Park, Banco Forest, 05°23'03.8"N, 04°03'11.2"W [= 5.38, -4.05], 23–30.iv.2017, 39–48 m, A. Aristophanous, M. Aristophanous, M. Geiser, P. Moretto, canopy dung trap, ANHRT:2017.25, ANHRTUK00280671–00280673; 1♂, 2♀, Côte d’Ivoire, Banco National Park, 05°23'3.8"N, 04°03'11.2"W [= 5.38, -4.05], 29.xi–05.xii.2019, 40 m, M. Aristophanous, V. Dérozier, P. Moretto, S. Ouattara, human dung canopy pitfall, ANHRT:2019.23,

ANHRTUK00279346–00279346; 68♂, 82♀, Côte d’Ivoire, Banco National Park, 05°23'3.8"N, 04°03'11.2"W [= 5.38, -4.05], 40 m, 29.xi–05.xii.2019, human dung pitfall, M. Aristophanous, V. Dérozier, P. Moretto, S. Ouattara, S., ANHRT:2019.23, ANHRTUK00257682–00257696, 00279120–00279254; 1♂, Côte d’Ivoire, Parc national du Mont Sângbé (forest/savannah mosaic) 08°07'05"N, 07°19'09"W [= 8.12, -7.32], 422 m, 14–20.xi.2021, P. Moretto, L. Mulvaney, H. Takano, MV light trap, ANHRT:2021.8, ANHRTUK00279345; 3♀, Côte d’Ivoire, Mt Sangbe N.P., 08°08'26.5"N, 07°21'17.5"W [= 8.14, -7.35], 444 m, 10–13.xi.2015, human dung pitfall, M. Aristophanous, P. Moretto, E. Ruzzier, E., ANHRT:2017.16, ANHRTUK00280688–00280690; 1♀, Côte d’Ivoire, Station d’Ecologie de Lamto (riverine forest) 06°13'2"N, 05°1'32"W [= 6.22, -5.026], 95 m, 21–25.xi.2021, P. Moretto, L. Mulvaney, H. Takano, human dung pitfall, ANHRT:2021.8, ANHRTUK00279367; 1♂, 1♀, Côte d’Ivoire, Taï National Park, Taï Research Station, 05°49'59.8"N, 07°20'32"W [= 5.83, -7.34], 174 m, 5–10.vii.2015, M. Aristophanous, P. Moretto & E. Ruzzier, light trap, ANHRT:2017.14 (all ANHRT); 3♂, 1♀, Côte d’Ivoire, Abidjan [= 5.48, -4.16], 17.vi.1958, E.S. Ross & R.E. Leech collection, [♀ labelled: on ship], CASENT8604630–8604633; 1♀, Côte d’Ivoire, Abidjan: forêt de Banco [= 5.40, -4.05], 23.i.1991, W.J. Pulawski cllr, CASENT8604634 (all CAS); 2♂, (Côte d’Ivoire) Lamto [= 6.21, -5.01], Lisière—galerie forestier, piègea, 11 m, 30.x.1970, D. Lachaise leg [1 labelled *Englistoneura catogastera* (Bigot) d. G. Steyskal [19]71]; 2♂, 5♀, 1[unsexed], Muséum Paris, Côte d’Ivoire, Réserve du Banco [= Banco National Park, 5.40, -4.05], R. Paulian & C. Delemare; 2♀, 1[unsexed], Muséum Paris, Côte d’Ivoire, Bingerville [= 5.35, -3.88], G. Melou, 1916; 1♀, Muséum Paris, Côte d’Ivoire [no locality], A. Du Guiny, 1906; 1♀, Muséum Paris, Côte d’Ivoire, Bingerville [= 5.35, -3.88], Darou Joupa Jackville, Assinie, forêt de l’indenie jusqu’au t lat. N (Limiten Zaranou) Dr. Bouet, 1907; 1♂, Côte d’Ivoire, Taï [= 5.87, -7.45], 14.ix.1978, G. Couturier leg, forêt dense sempervirente; 3♂, 1♀, same data, except: 15.ix.1978; 1♀, same data, except: 15–20.viii.1978; 5♀, Côte d’Ivoire, Taï [= 5.87, -7.45], ± 20.i.1978, G. Couturier leg; 1♂, 1♀, Côte d’Ivoire, Forêt du Banco [= 5.40, -4.056], 15.x.1963; 1♀, Côte d’Ivoire, Abengourou [= 6.725, -3.50]; 3♂, Côte d’Ivoire, Bingerville [= 5.35, -3.88], iii.1962, E. Lavabre rec., Test Cacaoyer; 1♂, Côte d’Ivoire, Lamto [= 6.21, -5.01], 17.v.1989, H. Perrin rec., Muséum Paris, s / *Ficus*; 1♂, Côte d’Ivoire, Bouaké [= 7.70, -5.04], F.- Foro, 27.v.[19]74, G. Couturier leg., piège coloré transect A; 1♀, Muséum Paris, Côte d’Ivoire, Sampleu [7.559019, -8.405941], A. Chevalier 1910, *Engistoneura moerens* W. E. Séguéy det. 1932; 1♀, Muséum Paris, Haute Côte d’Ivoire, Bassins de la Haute-Nuon et du Haut-Cavally, Danané [= 7.26, -8.16] et environs, A. Chevalier, Avril 1910; 1♂, Muséum Paris, Côte d’Ivoire, Bingerville, Oabou, Toupa, Jackville, Assinie, [= 5.12, -3.28], forêt de l’Indenie jusqu’au, 7 lat N. (Limiten Zaranou) Dr Bouet, 1907; 1♂, Ifan 21, forêt de Tiapleu prés. Danané [= 7.26, -8.16], (Côte d’Ivoire) xii.1958, B. Fay et R. Roy, forêt secondaire; 1♂, Muséum



Paris, Lamto [= 6.21, -5.01] (Côte d'Ivoire) Antoine leg; 1♀, Côte d'Ivoire, [no locality] 27.vi.1984, C. Couturier leg, Sous bois forêt primaire (all MNHN). **GHANA:** 1♂ Addah, Goldküste [= Ada Foah, 5.79, 0.61], 1882 (NHMV); 1♂, Obuasi [= 6.20, -1.69], Ashanti, Reg. 27. iv.1907, [W.M.] Graham, in forest 5 pm, *Engistoneura catagastera* Hend. det. F. Hendel (CUMZ); 1♂, 4♀, Ghana: 28 km N. Accra, Aburi Botanical Gardens [= 5.85, -0.17], 01.x.1998 (2 glas) [W.] Barkemeyer [NMSA-DIP 112795–112799]; 1♀, Ghana: N. Cape Coast, Kakum National Park [= 5.35, -1.385], 13.x.1998, [W.] Barkemeyer [NMSA-DIP 112794] (all NMSA); 1♀, Ghana, Tafo [= Kumasi, 6.67, -1.62], 3.v.1957, V.E. Eastop, light, B.M.1957—525, NHMUK013449526; 2♂, same, except: 4.v.1957, NHMUK013449521, 013449523; 1♂, 1♀, same, except: 6.v.1957, NHMUK013449517, 013449524; 1♂, same, except: 7.v.1957, NHMUK013449519; 1♂, same, except: 9.v.1957, NHMUK013449520; 1♂, 4♀, same, except: 10.v.1957, NHMUK013449515, 013449516, 013449518, 013449522, 013449525; 3♂, 4♀, [Ghana], Gold Coast, Aburi [= 5.86, -0.23], 1912–13, W.H. Patterson, 1913—561, NHMUK013449548, 013449553, 013449556, 013449571–013449574; 1♂, [Ghana], Gold Coast, Dunkwa [= 5.78, -2.53], 3.v.1913, 1912–13, W.H. Patterson, 1913—561, NHMUK013449536; 1♂, [Ghana], Ashanti, Obuasi [= 6.20, -1.69], W.M. Graham, 1907—74, NHMUK013449543; 1♀, same, except: W. Africa, 18.vii.1907, 1908—245, caught on leaf in bush, NHMUK013449575; 1♂, [Ghana], Gold Coast [no locality], W. Africa, from Janson, C.J. Wainwright collection, B.M. 1948—488, NHMUK013449578; 1♀, [Ghana], Kumasi [= 6.657, -1.62], Ashanti, W. Africa, 20.x.1907, Dr. W.M. Graham, 1908—245, caught on veranda, NHMUK013449577; 1♂, 1♀, [Ghana], Sunyani [= 7.34, -2.32], W. Ashanti, 20–25.vii.1911, T.E. Fell, *Engistoneura albovaria* Walk., NHMUK013449559, 013449560; 1♀, [Ghana], Gold Coast, Ashanti, Sunyani [= 7.34, -2.324], 19.viii.1915, Dr. A. Ingram, pres. by Imp. Inst. Ent., Brit. Mus. 1931—56, NHMUK013449484; 1♀, [Ghana], Gold Coast, Ashanti [= Kumasi, 6.67, -1.62], 1915, Dr. A. Ingram, pres. By Imp. Inst. Ent., Brit. Mus. 1931—56, NHMUK013449510; 1♂, [Ghana], Ashanti, Juabin [6.79, -1.47], A.E. Evans, pres. By Imp. Inst. Ent., Brit. Mus. 1931—56, *Engistoneura catagastera* Big. Frey det., NHMUK013449483; 1♂, 1♀, [Ghana], Gold Coast, Ashanti, Fufu [= Fufuo, 6.85, -1.78], 11.vi.1913, 1913—561, Jas. J. Simpson, NHMUK013449555, 013449558; 1♀, [Ghana], Gold Coast, Ashanti, Nsuta [= 7.01, -1.38], 10.vi.1913, 1913—561, Jas. J. Simpson, NHMUK013449557; 1♀, [Ghana], Ashanti, Obuasi [= 6.20, -1.69], 12.xi.1907, W.M. Graham, 1907—74, caught on window, NHMUK013449576; 1♂, [Ghana], C.P. Ashanti, on road between Agogo and Kumawu [= 6.86, -1.18], 6.iii.1912, M. Wade, NHMUK013449511; 1♂, [Ghana], Ashanti, Jamase [= Gyamase, 6.97, -1.48], Central Province [= 6.86, -1.18], 26.iii.1912, M. Wade, NHMUK013449513 (all NHMUK); 1♂, 1♀, Ghana, Pra River [= 5.67, -1.53], 4.iv.2000, sweep netting, forest, G. Goergen (both IITAB); 1♀, Ghana, 7 mi. NW of Kade [= 6.08, -0.83], 16.v.1971, J.A. Oruwel, USNM, *Engistoneura moerens* (Fabricius, 1794) det. A.E. Whittington 2020 (USNM); 1♂, Ghana, Ashanti Reg., Kumasi [= 6.67, -1.62], K.N.U.S.T., 13.iii.[19]65, cocoa plantation, I.K.B. Acheamping, *Engistoneura* sp. ♂, det. A.E. Whittington 1993, MZLU 2022 1049, MZLU00131462; 1♀, same, except: 17–20.vi.1965, *Engistoneura* sp. ♀, det. A.E. Whittington 1993, MZLU 2022 1045, MZLU00131463 (both MZLU); 1♂, GOLD COAST [no locality], 1913 / A.E. EVANS [printed] // [http://id.luomus.ni/HT.38733/GHANA Gold Coast \[no locality\]/1913/Evan, A.E. leg. \[printed with QR code\]//http://id.luomus.fi/HT.38733/Engistoneura catogastera / \(Bigot, 1891\) / R. ?Frey det. \[printed with QR code\] \(MZH\)](http://id.luomus.ni/HT.38733/GHANA%20Gold%20Coast%20%5Bno%20locality%5D/1913/Evan,A.E.%20leg.%20%5Bprinted%20with%20QR%20code%5D//http://id.luomus.fi/HT.38733/Engistoneura%20catogastera%20%28Bigot,%201891%29/R.%20Frey%20det.%20%5Bprinted%20with%20QR%20code%5D%28MZH%29;); 3♂, 1♀, Ghana, Ashanti Region, Kona Sacred Grove, 23.6 km NNE Kumasi, 06°52'24.6"N, 01°31'28.9"W [= 6.87, -1.52], 301 m, 25.viii.2005, J. Antwi, S. Kuudaar & JF418. Lewile, transect 1, trap 4, 240 m from forest edge, bait trap, sample 0714532A; 2♂, same, except: 08.ix.2005, sample 0714533A; 4♂, 1♀, same, except: 22.ix.2005, sample 0714534A; 2♂, 3♀, same, except: 23.ix.2005, sample 0714534B; 2♂, same, except: 06.x.2005, sample 0714535A; 2♂, 1♀, same, except: 07.x.2005, sample 0714535B; 1♂, 1♀, same, except: 09.iii.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0714543A; 1♀, same, except: 17. ii.2006, sample 0714542B, Carnegie Museum specimen number CMNH-440,415; 2♀, same, except: 21.iv.2006, sample 0714545B; 1♀, Ghana, Ashanti Region, Kona Sacred Grove, 23.7 km NNE Kumasi, 06°52'18.3"N, 01°31'11.4"W [= 6.87, -1.52], 320 m, 08.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 2, forest interior, bait trap, sample 0722533A; 2♀, same, except: 07.x.2005, sample 0722535B; 1♂, same, except: 09. iii.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0722543A; 1♂, same, except: 11.v.2006, sample 0722546A; 1♂, Ghana, Ashanti Region, Kona Sacred Grove, 23.6 km NNE Kumasi, 06°52'25.6"N, 01°31'28.9"W [= 6.87, -1.53], 294 m, 25.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 3, 160 m from forest edge, bait trap, sample 0713532A, Carnegie Museum specimen number CMNH-440,383; 1♂, 1♀, same, except: 26.viii.2005, sample 0713532B; 1♂, same, except: 09.ix.2005, sample 0713533B; 2♂, same, except: 22.ix.2005, sample 0713534A; 3♂, same, except: 23. ix.2005, sample 0713534B; 2♀, same, except: 07.x.2005, sample 0713535B; 1♀, same, except: 26.i.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0713541A, Carnegie Museum specimen number CMNH-440,226; 1♀, same, except: 17.ii.2006, sample 0713542B, Carnegie Museum specimen number CMNH-440,357; 1♂, same, except: 09.iii.2006, sample 0713543A; 2♂, same, except: 12.iv.2006, sample 0713546B; 1♂, same, except: 20. iv.2006, sample 0713545A; 2♂, same, except: 21.iv.2006, sample 0713545B; 1♂, same, except: 11.v.2006, sample 0713546A; 3♀, Ghana, Ashanti Region, Kona Sacred Grove, 23.8 km NNE Kumasi, 06°52'30.6"N, 01°31'25.5"W [= 6.88, -1.528], 287 m, 25.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 3, trap 2, 80 m from forest edge, bait trap, sample 0732532A; 1♂, same,

except: 26.viii.2005, sample 0732532B; 2♂, 2♀, same, except: 07.ix.2005, sample 0732535B; 2♂, same, except: 08.ix.2005, sample 0732533A; 1♂, 2♀, same, except: 22.ix.2005, sample 0732534A; 2♂, 5♀, same, except: 23.ix.2005, sample 0732534B; 1♂, same, except: 06.x.2005, sample 0732535A; 1♂, same, except: 27.i.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0732541B; 1♀, same, except: 09.iii.2006, sample 0732543A; 1♀, same, except: 21.iv.2006, sample 0732545B; 7♂, 2♀, Ghana, Ashanti Region, Kona Sacred Grove, 23.8 km NNE Kumasi, 06°52'32"N, 01°31'27.1"W [= 6.88, -1.52], 281 m, 25.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 3, trap 1, forest edge, bait trap, sample 0731532A; 1♂, 4♀, same, except: 26.viii.2005, sample 0731532B; 3♂, 1♀, same, except: 08.ix.2005, sample 0731533A; 1♂, 1♀, same, except: 09.ix.2005, sample 0731533B; 5♂, 1♀, same, except: 22.ix.2005, sample 0731534A; 4♂, 2♀, same, except: 23.ix.2005, sample 0731534B; 2♂, 1♀, same, except: 06.x.2005, sample 0731535A [1♂ labelled Carnegie Museum specimen number CMNH-440,449]; 1♂, 1♀, same, except: 07.x.2005, sample 0731535B; 1♂, same, except: 27.i.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0731541B; 1♂, same, except: 16.ii.2006, sample 0731542A; 1♀, same, except: 17.ii.2006, sample 0731542B; 1♂, same, except: 09.iii.2006, sample 0731543A; 1♂, same, except: 12.iv.2006, sample 0731546B; 1♂, same, except: 21.iv.2006, sample 0731545B; 1♂, same, except: 11.v.2006, sample 0731546A; 1♀, Ghana, Ashanti Region, Kona Sacred Grove, 23.7 km NNE Kumasi, 06°52'18.6"N, 01°31'11.4"W [= 6.87, -1.52], 318 m, 09.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 1, forest interior, bait trap, sample 0721533B; 1♂, same, except: 22.ix.2005, sample 0721534A; 1♀, same, except: 07.x.2005, sample 0721535B; 1♂, same, except: 17.ii.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0721542B; 1♀, same, except: 09.iii.2006, sample 0721543A, Carnegie Museum specimen number CMNH-440,978; 1♀, same, except: 20.iv.2006, sample 0721545A; 1♂, same, except: 21.iv.2006, sample 0721545B; 1♀, same, except: 12.v.2006, sample 0721546B, Carnegie Museum specimen number CMNH-440,465; 1♀, Ghana, Ashanti Region, Kona Sacred Grove, 23.7 km NNE Kumasi, 06°52'27.6"N, 01°31'28.7"W [= 6.87, -1.53], 289 m, 26.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 2, 80 m from forest edge, bait trap, sample 0712532B; 2♂, same, except: 07.ix.2005, sample 0712535B; 2♂, 1♀, same, except: 08.ix.2005, sample 0712533A; 1♀, same, except: 09.ix.2005, sample 0712533B; 5♂, same, except: 22.ix.2005, sample 0712534A; 3♀, same, except: 23.ix.2005, sample 0712534B; 1♀, same, except: 26.i.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0712541A; 5♀, same, except: 16.ii.2006, sample 0712542A; 1♂, same, except: 31.iii.2006, sample 0712544B; 1♀, same, except: 21.iv.2006, sample 0712545B, Carnegie Museum specimen number CMNH-440,772; 1♂, same, except: 11.v.2006, same, except: sample 0712546A; 1♂, 2♀, Ghana, Ashanti Region, Kona Sacred Grove, 23.8 km NNE

Kumasi, 06°52'29"N, 01°31'24.6"W [= 6.88, -1.528], 289 m, 25.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 3, trap 3, 160 m from forest edge, bait trap, sample 0733532A; 2♀, same, except: 26.viii.2005, sample 0733532B; 1♂, 1♀, same, except: 09.ix.2005, sample 0733533B [♂ labelled Carnegie Museum specimen number CMNH-440,884]; 1♂, 1♀, same, except: 22.ix.2005, sample 0733534A; 1♂, 1♀, same, except: 23.ix.2005, sample 0733534B; 1♂, same, except: 06.x.2005, sample 0733535A; 2♂, same, except: 07.x.2005, sample 0733535B; 1♂, same, except: 16.ii.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0733542A, Carnegie Museum specimen number CMNH-440,803; 1♂, same, except: 12.iv.2006, sample 0733546B; 1♂, same, except: 24.iv.2006, sample 0733545B; 1♀, same, except: 11.v.2006, sample 0733546A, Carnegie Museum specimen number CMNH-440,623; 2♂, 3♀, Ghana, Ashanti Region, Kona Sacred Grove, 23.7 km NNE Kumasi, 06°52'30"N, 01°31'28.9"W [= 6.88, -1.53], 281 m, 25.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 1, forest edge, bait trap, sample 0711532A [1♀ labelled Carnegie Museum specimen number CMNH-440,958]; 1♂, 2♀, same, except: 26.viii.2005, sample 0711532B; 2♂, 3♀, same, except: 07.ix.2005, sample 0711535B; 1♂, same, except: 08.ix.2005, sample 0711533A; 1♂, 2♀, same, except: 22.ix.2005, sample 0711534A; 4♂, 4♀, same, except: 23.ix.2005, sample 0711534B; 1♂, 4♀, same, except: 06.x.2005, sample 0711535A; 1♀, same, except: 26.i.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0711541A; 1♂, same, except: 27.i.2006, sample 0711541B; 1♀, same, except: 16.ii.2006, sample 0711542A; 2♂, same, except: 09.iii.2006, sample 0711543A; 1♀, same, except: 31.iii.2006, sample 0711544B; 1♀, same, except: 21.iv.2006, sample 0711545B; 1♀, same, except: 11.v.2006, sample 0711546A; 1♂, Ghana, Ashanti Region, Kona Sacred Grove, 23.7 km NNE Kumasi, 06°52'28.5"N, 01°31'25.7"W [= 6.88, -1.52], 292 m, 22.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 3, trap 4, 240 m from forest edge, bait trap, sample 0734534A; 1♂, same, except: 09.iii.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0734543A; 1♂, same, except: 20.iv.2006, sample 0734545A; 1♂, same, except: 11.v.2006, sample 0734546A; 2♂, 4♀, Ghana, Ashanti Region, Kona Sacred Grove, 23.5 km NNE Kumasi, 06°52'14.6"N, 01°31'16"W [= 6.87, -1.52], 328 m, 23.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 4, forest interior, bait trap, sample 0724534B; 1♂, same, except: 06.x.2005, sample 0724535A; 1♀, same, except: 17.ii.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0724542A; 1♀, same, except: 10.iii.2006, sample 0724543A, Carnegie Museum specimen number CMNH-440,341; 1♂, same, except: 21.iv.2006, sample 0724545B; 1♀, same, except: 12.v.2006, sample 0724546A; 1♀, Ghana, Ashanti Region, Kona Sacred Grove, 23.5 km NNE Kumasi, 06°52'14"N, 01°31'14"W [= 6.87, -1.52], 321 m, 26.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 3, forest interior, bait trap, sample 0723532B; 1♂, same, except: 09.ix.2005, sample 0723533B; 3♂, 1♀, same, except: 23.ix.2005, sample 0723534B; 1♀, same,

except: 09.iii.2006, J. Antwi, S., Kuudaar, J. Lewile & D. Amankwaa, sample 0723543A, Carnegie Museum specimen number CMNH-440,678; 1♀, same, except: 21.iv.2006, sample 0723545B; 1♂, 7♀, Ghana: Ashanti Region, Gyakye Sacred Grove, 16.9 km SE Kumasi, 06°33'45.3"N, 01°31'28.8"W [= 6.56, -1.53], 244 m, 30.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 3, trap 2, 80 m from forest edge, bait trap, sample 0632532A; 1♂, 2♀, same, except: 31.viii.2005, sample 0632532B; 2♂, same, except: 13.ix.2005, sample 0632533A; 5♂, 2♀, same, except: 14.ix.2005, sample 0632533B; 4♂, same, except: 27.ix.2005, sample 0632534A; 1♂, 5♀, same, except: 28.ix.2005, sample 0632534B; 1♀, same, except: 31.i.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0632541A; 1♀, same, except: 01.ii.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0632541B; 1♀, same, except: 21.ii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0632542A, Carnegie Museum specimen number CMNH-440,418; 1♂, same, except: 14.iii.2006, sample 0632543A; 1♀, same, except: 26.iv.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0632545B; 1♀, same, except: 16.v.2006, sample 0632546A; 1♂, 1♀, Ghana: Ashanti Region, Gyakye Sacred Grove, 17.0 km SE Kumasi, 06°33'43.7"N, 01°31'27.8"W [= 6.56, -1.52], 241 m, 30.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 1, forest edge, bait trap, sample 0621532A; 1♂, same, except: 31.viii.2005, sample 0621532B; 3♂, 2♀, same, except: 14.ix.2005, sample 0621533B; 3♀, same, except: 27.ix.2005, sample 0621534A; 2♀, same, except: 28.ix.2005, sample 0621534B; 1♀, same, except: 31.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0621541A; 1♂, 1♀, same, except: 21.ii.2006, sample 0621542A; 1♀, same, except: 22.ii.2006, sample 0621542B; 1♀, same, except: 14.iii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0621543A, Carnegie Museum specimen number CMNH-440,274; 1♂, same, except: 15.iii.2006, sample 0621543B; 1♂, same, except: 04.iv.2006, sample 0621544A; 1♂, same, except: 05.iv.2006, sample 0621544B, Carnegie Museum specimen number CMNH-440,254; 2♂, 3♀, Ghana: Ashanti Region, Gyakye Sacred Grove, 16.9 km SE Kumasi, 06°33'48.6"N, 01°31'28.1"W [= 6.56, -1.53], 248 m, 30.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 2, 80 m from forest edge, bait trap, sample 0612532A; 2♂, 1♀, same, except: 31.viii.2005, sample 0612532B; 1♂, same, except: 13.ix.2005, sample 0612533A; 3♂, 2♀, same, except: 14.ix.2005, sample 0612533B [1♀ labelled Carnegie Museum specimen number CMNH-440,779]; 3♂, 2♀, same, except: 27.ix.2005, sample 0612534A; 2♂, 2♀, same, except: 28.ix.2005, sample 0612534B; 1♀, same, except: 31.i.2006, J. Antwi, S. Kuudaar & D. Amankwaa, sample 0612541A; 1♀, same, except: 01.ii.2006, sample 0612541B, Carnegie Museum specimen number CMNH-440,261; 1♀, same, except: 22.ii.2006, sample 0612542B; 1♂, same, except: 14.iii.2006, sample 0612543A; 1♂, 2♀, same, except: 15.iii.2006, sample 0612543B; 1♂, same, except: 04.iv.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0612544A; 2♂, 1♀, same, except: 26.iv.2006, sample 0612545B [♀ labelled

Carnegie Museum specimen number CMNH-440,733]; 1♂, 1♀, Ghana: Ashanti Region, Gyakye Sacred Grove, 16.9 km SE Kumasi, 06°33'49"N, 01°31'26.1"W [= 6.56361111, -1.52391667], 246 m, 13.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 1, forest edge, bait trap, sample 0611533A; 2♂, same, except: 28.ix.2005, sample 0611534B; 2♂, 2♀, same, except: 27.ix.2005, sample 0611534A; 1♀, same, except: 01.ii.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0611541B; 1♂, same, except: 14.iii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0611543A; 2♀, same, except: 15.iii.2006, same, except: sample 0611543B, Carnegie Museum specimen number CMNH-440,282 & 901; 1♂, 1♀, same, except: 26.iv.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0611545B; 1♀, same, except: 16.v.2006, J. Antwi, S. Kuudaar & J. Lewile, sample 0611546A; 2♂, 1♀, Ghana: Ashanti Region, Gyakye Sacred Grove, 16.9 km SE Kumasi, 06°33'44.4"N, 01°31'31"W [= 6.56, -1.53], 241 m, 30.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 3, trap 1, forest edge, bait trap, sample 0631532A; 3♂, 2♀, same, except: 31.viii.2005, sample 0631532B; 3♀, same, except: 14.ix.2005, sample 0631533B; 2♀, same, except: 27.ix.2005, sample 0631534A [1♀ labelled Carnegie Museum specimen number CMNH-440,432]; 2♂, 4♀, same, except: 28.ix.2005, sample 0631534B; 1♂, same, except: 31.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0631541A; 1♂, 1♀, same, except: 21.ii.2006, sample 0631542A; 1♀, same, except: 22.ii.2006, sample 0631542B; 1♂, same, except: 04.iv.2006, sample 0631544A; 1♀, same, except: 17.v.2006, J. Antwi, S. Kuudaar & J. Lewile, sample 0631546B; 2♂, 2♀, Ghana: Ashanti Region, Gyakye Sacred Grove, 17.0 km SE Kumasi, 06°33'45.3"N, 01°31'27.8"W [= 6.56, -1.52], 247 m, 30.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 2, 80 m from forest edge, bait trap, sample 0622532A; 1♀, same, except: 31.viii.2005, sample 0622532B; 2♂, 1♀, same, except: 14.ix.2005, sample 0622533B; 1♂, 6♀, same, except: 27.ix.2005, sample 0622534A; 2♂, 4♀, same, except: 30.ix.2005, sample 0622534B; 1♀, same, except: 31.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0622541A; 1♂, 1♀, same, except: 22.ii.2006, sample 0622542B; 1♂, same, except: 14.iii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0622543A; 1♂, 1♀, same, except: 15.iii.2006, sample 0622543B; 1♀, same, except: 26.v.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0622545B; 2♂, 2♀, Ghana: Ashanti Region, Gyakye Sacred Grove, 16.9 km SE Kumasi, 06°33'46.3"N, 01°31'28.9"W [= 6.56, -1.53], 251 m, 30.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 3, at least 80 m from forest edge, bait trap, sample 0613532A; 2♂, 3♀, same, except: 31.viii.2005, sample 0613532B; 2♂, 2♀, same, except: 13.ix.2005, sample 0613533A; 1♂, 2♀, same, except: 14.ix.2005, sample 0613533B; 1♂, 5♀, same, except: 28.ix.2005, sample 0613534B; 1♂, same, except: 19.x.2005, sample 0613535B; 1♀, same, except: 14.iii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0613543A; 1♂, 1♀, same, except: 15.iii.2006, sample 0613543B; 1♂, 1♀, same, except: 04.iv.2006, J.

Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0613544A; 1♀, same, except: 26.iv.2006, sample 0613545B; 1♀, same, except: 16.v.2006, J. Antwi, S. Kuudaar & J. Lewile, sample 0613546A; 2♀, Ghana: Ashanti Region, Gyakye Sacred Grove, 16.9 km SE Kumasi, 06°33'43.5"N, 01°31'32.1"W [= 6.56, -1.53], 239 m, 31.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 3, at least 80 m from forest edge, bait trap, sample 0623532B; 1♀, same, except: 13.ix.2005, sample 0623533A, Carnegie Museum specimen number CMNH-440,396; 2♂, 1♀, same, except: 14.ix.2005, sample 0623533B; 3♂, 3♀, same, except: 27.ix.2005, sample 0623534A; 1♂, 3♀, same, except: 28.ix.2005, sample 0623534B; 1♂, 1♀, same, except: 09.x.2005, sample 0623536B; 1♀, same, except: 31.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0623541A; 1♂, same, except: 01.ii.2006, sample 0623542A; 1♀, same, except: 21.ii.2006, sample 0623541B; 1♂, same, except: 14.iii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0623543A; 2♀, same, except: 15.iii.2006, sample 0623543B; 1♀, same, except: 04.iv.2006, sample 0623544A, Carnegie Museum specimen number CMNH-440,176; 1♀, same, except: 05.iv.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0623544B; 1♂, same, except: 26.iv.2006, sample 0623545B; 1♂, same, except: 16.v.2006, J. Antwi, S. Kuudaar & J. Lewile, sample 0623546A; 1♀, Ghana: Ashanti Region, Bobiri Forest Reserve, 2.5 km NNE Kubeasi, 06°41'14.6"N, 01°21'26.9"W [= 6.69, -1.36], 242 m, 23.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 4, trap 3, forest interior, bait trap, sample 0143532A; 2♂, same, except: 06.ix.2005, sample 0143533A; 1♂, same, except: 07.ix.2005, sample 0143533B; 2♂, same, except: 20.ix.2005, sample 0143534A; 1♂, same, except: 21.ix.2005, sample 0143534B; 2♂, same, except: 04.x.2005, sample 0143535A; 7♀, 3♀, same, except: 05.x.2005, sample 0143535B; 1♀, same, except: 25.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0143542B; 1♂, same, except: 14.ii.2006, sample 0143543A; 1♂, same, except: 15.ii.2006, sample 0143543B; 1♀, same, except: 29.iii.2006, sample 0143545B; 2♀, same, except: 18.iv.2006, sample 0143546A; 1♂, 1♀, Ghana: Ashanti Region, Bobiri Forest Reserve, 2.6 km NNE Kubeasi, 06°41'20.5"N, 01°21'39.6"W [= 6.69, -1.36], 297 m, 06.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 1, forest edge, bait trap, sample 0111533A; 1♂, same, except: 07.ix.2005, sample 0111533B; 1♂, 1♀, same, except: 21.ix.2005, sample 0111534B; 6♂, 1♀, same, except: 04.x.2005, sample 0111535A; 2♂, 4♀, same, except: 05.x.2005, sample 0111535B; 1♂, same, except: 24.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0111542A; 1♀, same, except: 14.ii.2006, sample 0111543A; 1♀, same, except: 15.ii.2006, sample 0111543B; 1♂, same, except: 28.iii.2006, sample 0111545A; 1♂, 1♀, same, except: 18.iv.2006, sample 0111546A; 1♀, same, except: 19.iv.2006, sample 0111546B; 1♂, same, except: 09.v.2006, sample 0111547A; 1♂, 1♀, same, except: 25.v.2006, sample 0111542B; 2♂, 2♀, Ghana: Ashanti Region, Bobiri Forest Reserve, 2.6 km NNE Kubeasi, 06°41'21.6"N, 01°21'35.1"W [= 6.69, -1.36], 300 m, 03.x.2004, J. Bossart, transect 1, trap 3, 160 m from forest edge, bait trap, sample 0113511A; 2♂, same, except: 23.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, sample 0113532A; 1♀, same, except: 24.viii.2005, sample 0113532B; 1♀, same, except: 21.ix.2005, sample 0113534B; 1♀, same, except: 04.x.2005, sample 0113535A; 2♂, 1♀, same, except: 05.x.2005, sample 0113535B; 1♀, same, except: 25.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0113542B; 1♂, same, except: 14.ii.2006, sample 0113543A; 1♀, same, except: 15.ii.2006, sample 0113543B; 1♀, same, except: 08.iii.2006, sample 0113544B; 1♂, same, except: 28.iii.2006, sample 0113545A; 1♀, same, except: 18.iv.2006, sample 0113546A; 1♂, same, except: 10.v.2006, sample 0113547B; 2♂, Ghana: Ashanti Region, Bobiri Forest Reserve, 4.1 km NNE Kubeasi, 06°41'26.8"N, 01°20'21.1"W [= 6.69, -1.34], 265 m, 04.x.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 2, forest interior, bait trap, sample 0122535A; 1♀, same, except: 05.x.2005, sample 0122535B; 1♂, same, except: 24.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0122542A; 1♂, 1♀, same, except: 07.iii.2006, sample 0122544A; 1♀, same, except: 29.iii.2006, sample 0122545B; 1♂, same, except: 09.v.2006, sample 0122547A; 1♂, Ghana: Ashanti Region, Bobiri Forest Reserve, 2.7 km NNE Kubeasi, 06°41'23.6"N, 01°21'31.9"W [= 6.69, -1.36], 299 m, 07.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 4, 240 m from forest edge, bait trap, sample 0114533B; 2♀, same, except: 20.ix.2005, sample 0114534A; 2♀, same, except: 21.ix.2005, sample 0114534B; 1♀, same, except: 04.x.2005, sample 0114535A; 2♂, same, except: 15.ii.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0114543B; 1♂, 1♀, same, except: 08.iii.2006, sample 0114544B; 1♂, same, except: 28.iii.2006, sample 0114545A; 2♂, same, except: 18.iv.2006, sample 0114546A; 1♂, same, except: 09.v.2006, sample 0114547A, Carnegie Museum specimen number CMNH-440,265; 1♂, Ghana: Ashanti Region, Bobiri Forest Reserve, 2.6 km NNE Kubeasi, 06°41'20.6"N, 01°21'39.8"W [= 6.69, -1.36], 299 m, 24.viii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 2, 80 m from forest edge, bait trap, sample 0112532B; 1♀, same, except: 07.ix.2005, sample 0112533B; 3♂, same, except: 20.ix.2005, sample 0112534A; 2♂, 1♀, same, except: 04.x.2005, sample 0112535A; 3♀, 1♀, same, except: 05.x.2005, sample 0112535B; 1♀, same, except: 24.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0112542A, Carnegie Museum specimen number CMNH-440,736; 1♂, same, except: 07.iii.2006, sample 0112544A; 1♀, same, except: 08.iii.2006, sample 0112544B; 1♂, same, except: 14.iii.2006, sample 0112543A; 1♀, same, except: 28.iii.2006, sample 0112545A; 2♀, same, except: 29.iii.2006, sample 0112545B; 1♀, same, except: 09.v.2006, sample 0112547A; 1♂, 1♀, Ghana: Ashanti Region, Bobiri Forest Reserve, 2.6 km NNE Kubeasi, 06°41'17"N, 01°21'31"W [= 6.69, -1.36], 263 m, 20.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 4, trap 1, forest interior, bait trap, sample 0141534A; 1♂, same, except: 21.ix.2005, sample

0141534B; 5♂, 3♀, same, except: 04.x.2005, sample 0141535A; 2♂, 2♀, same, except: 05.x.2005, sample 0141535B; 1♂, same, except: 24.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0141542A; 1♂, same, except: 14.ii.2006, sample 0141543A; 1♀, same, except: 15.ii.2006, sample 0141543B; 1♂, 1♀, same, except: 08.iii.2006, sample 0141544B; 1♂, same, except: 28.iii.2006, sample 0141545A; 1♀, same, except: 29.iii.2006, sample 0141545B; 1♂, 1♀, same, except: sample 0141546A; 1♂, same, except: 04.v.2006, sample 0141547A; 1♂, Ghana: Ashanti Region, Bobiri Forest Reserve, 2.6 km NNE Kubeasi, 06°41'15.8"N, 01°21'27.9"W [= 6.69, -1.36], 244 m, 08.iii.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 4, trap 2, forest interior, bait trap, sample 0142544B; 2♂, same, except: 23.viii.2005, sample 0142532A; 1♀, same, except: 06. ix.2005, sample 0142533A, Carnegie Museum specimen number CMNH-440,974; 2♂, same, except: 20.ix.2005, sample 0142534A; 1♀, same, except: 21.ix.2005, sample 0142534B; 2♀, same, except: 04.x.2005, sample 0142535A; 5♂, same, except: 05.x.2005, sample 0142535B; 1♀, same, except: 25.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0142542B; 1♀, same, except: 14.ii.2006, sample 0142543A; 1♀, same, except: 15.ii.2006, sample 0142543B; 1♂, same, except: 28.iii.2006, sample 0142545A; 1♀, same, except: 18.iv.2006, sample 0142546A; 1♂, same, except: 09. v.2006, sample 0142547A; 1♀, Ghana: Ashanti Region, Bobiri Forest Reserve, 2.5 km NNE Kubeasi, 06°41'13.7"N, 01°21'25.1"W [= 6.69, -1.36], 241 m, 07.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 4, trap 4, forest interior, bait trap, sample 0144533B; 1♂, same, except: 20.ix.2005, sample 0144534A; 1♀, same, except: 04. x.2005, sample 0144535A; 1♂, 4♀, same, except: 05. x.2005, sample 0144535B [1♀ labelled: Carnegie Museum specimen number CMNH-440,751]; 1♂, same, except: 14.ii.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0144543A; 1♀, same, except: 15. ii.2006, sample 0144543B; 1♂, same, except: 08.iii.2006, sample 0144544B; 1♂, same, except: 28.iii.2006, sample 0144545A; 1♂, same, except: 29.iii.2006, sample 0144545B; 1♂, same, except: 18.iv.2006, sample 0144546A; 1♀, same, except: 09.v.2006, sample 0144547A; 1♂, 1♀, Ghana: Ashanti Region, Bobiri Forest Reserve, 4.6 km NNE Kubeasi, 06°42'19.9"N, 01°21'12.7"W [= 6.71, -1.35], 256 m, 04.x.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 3, trap 2, 80 m from forest edge, bait trap, sample 0132535A; 1♂, 1♀, same, except: 05.x.2005, sample 0132535B; 1♀, Ghana: Ashanti Region, Bobiri Forest Reserve, 2.6 km NNE Kubeasi, 06°42'21.3"N, 01°21'15.4"W [= 6.71, -1.35], 258 m, 04. x.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 3, trap 1, forest edge, bait trap, sample 0131535A; 1♂, Ghana: Ashanti Region, Bobiri Forest Reserve, 4.2 km NNE Kubeasi, 06°41'34"N, 01°20'22.3"W [= 6.69, -1.34], 264 m, 06.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 1, forest interior, bait trap, sample 0124533A; 1♂, same, except: 04.x.2005, sample 0124535A; 1♀, Ghana: Ashanti Region, Bobiri Forest Reserve, 4.6 km NNE Kubeasi, 06°42'20.3"N, 01°21'14.6"W [= 6.71, -1.35],

252 m, 16.ii.2005, J. Bossart, transect 3, trap 3, 160 m from forest edge, bait trap, sample 0133521A; 1♀, Ghana: Ashanti Region, Bobiri Forest Reserve, 4.1 km NE Kubeasi, 06°41'26.5"N, 01°20'21.3"W [= 6.69, -1.34], 264 m, 20.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 1, forest interior, bait trap, sample 0124534A; 1♀, same, except: 18.iv.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0124546A; 1♂, Ghana: Ashanti Region, Bobiri Forest Reserve, 4.1 km NE Kubeasi, 06°41'30.9"N, 01°20'23.1"W [= 6.69, -1.34], 265 m, 08.iii.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, transect 2, trap 3, forest interior, bait trap, sample 0123544B; 2♂, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11.2 km NW Kumasi, 06°44'54"N, 01°41'37.4"W [= 6.75, -1.69], 250 m, 09. viii.2005, Richard Olu, transect 1, trap 2, 80 m from forest edge, bait trap, sample 0212533A; 1♂, same, except: 10. viii.2005, sample 0212533B; 1♂, 1♀, same, except: 16.viii.2005, sample 0212534A; 1♂, same, except: 17. viii.2005, sample 0212534B; 1♀, same, except: 31. viii.2005, sample 0212535A; 1♂, same, except: 01. ix.2005, sample 0212535B; 1♀, same, except: 28.ix.2005, sample 0212537A; 1♀, same, except: 01.vi.2006, sample 0212551B; 2♂, 3♀, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11.3 km NW Kumasi, 06°44'55.7"N, 01°41'37.5"W [= 6.75, -1.69], 249 m, 09.viii.2005, Richard Olu, transect 1, trap 1, forest edge, bait trap, sample 0211533A; 1♂, 2♀, same, except: 10.viii.2005, sample 0211533B; 2♂, 1♀, same, except: 15.viii.2005, sample 0211536B [1♀ labelled: Carnegie Museum specimen number CMNH-440,428]; 5♀, same, except: 16.viii.2005, sample 0211534A; 1♀, same, except: 17. viii.2005, sample 0211534B; 2♀, same, except: 31. viii.2005, sample 0211535A; 1♂, same, except: 28. ix.2005, sample 0211537A; 1♂, 1♀, same, except: 29. ix.2005, sample 0211537B; 1♂, same, except: 05.i.2006, sample 0211541B; 1♂, same, except: 26.i.2006, sample 0211542B; 1♀, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11.1 km NW Kumasi, 06°44'46.5"N, 01°41'39.3"W [= 6.75, -1.69], 240 m, 10.viii.2005, Richard Olu, transect 2, trap 3, forest interior, bait trap, sample 0223533B; 1♂, same, except: 16.viii.2005, sample 0223534A; 1♀, same, except: 01.ix.2005, sample 0223535B; 2♂, same, except: 28.ix.2005, sample 0223537A; 1♀, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11.3 km NW Kumasi, 06°44'10"N, 01°42'11.6"W [= 6.74, -1.70], 259 m, 11.viii.2005, Richard Olu, transect 4, trap 4, forest interior, bait trap, sample 0244533B; 1♂, 1♀, same, except: 16.viii.2005, sample 0244534A; 1♀, same, except: 31.viii.2005, sample 0244535A; 2♀, same, except: 15.ix.2005, sample 0244536B; 2♀, same, except: 28.ix.2005, sample 0244537A; 1♀, same, except: 04.i.2006, sample 0244541A; 1♂, same, except: 05.i.2006, sample 0244541B; 1♂, same, except: 26.i.2006, sample 0244542B; 1♀, same, except: 31.v.2006, sample 0244551A; 3♀, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11.3 km NW Kumasi, 06°44'14.1"N, 01°42'11.4"W [= 6.74, -1.70], 260 m, 10.viii.2005, Richard Olu, transect 4, trap 2, forest interior, bait trap,

sample 0242533A; 1♂, same, except: 11.viii.2005, sample 0242533B; 2♂, same, except: 16.viii.2005, sample 0242534A; 1♂, 1♀, same, except: 17.viii.2005, sample 0242534B; 2♂, 1♀, same, except: 31.viii.2005, sample 0242535A; 1♀, same, except: 25.i.2006, sample 0242542A; 1♂, same, except: 26.i.2006, sample 0242542B; 1♂, same, except: 15.ii.2006, sample 0242543A; 1♂, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 10.9 km NW Kumasi, 06°44'54.8"N, 01°41'23.3"W [= 6.75, -1.69], 256 m, 09.viii.2005, Richard Olu, transect 3, trap 1, forest edge, bait trap, sample 0231533A; 1♂, same, except: 15.viii.2005, sample 0231536B; 1♂, 2♀, same, except: 16.viii.2005, sample 0231534A; 1♂, 2♀, same, except: 17.viii.2005, sample 0231534B; 1♂, 3♀, same, except: 29.viii.2005, sample 0231537B; 1♂, 1♀, same, except: 31.viii.2005, sample 0231535A; 6♂, 3♀, same, except: 28.ix.2005, sample 0231537A [1♂ labelled: Carnegie Museum specimen number CMNH-440,353]; 1♀, same, except: 04.i.2006, sample 0231541A; 1♂, same, except: 26.i.2006, sample 0231542B; 1♀, same, except: 25.i.2006, sample 0231542A, Carnegie Museum specimen number CMNH-440,696; 1♀, same, except: 15.ii.2006, sample 0231543A; 1♀, same, except: 16.ii.2006, sample 0231543B; 1♂, same, except: 09.iii.2006, sample 0231544B; 1♀, same, except: 29.iii.2006, sample 0231545A; 1♂, 1♀, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11.2 km NW Kumasi, 06°44'51.4"N, 01°41'37.6"W [= 6.75, -1.69], 253 m, 09.viii.2005, Richard Olu, transect 1, trap 3, 160 m from forest edge, bait trap, sample 0213533A; 1♂, same, except: 15.viii.2005, sample 0213536B; 1♂, same, except: 31.viii.2005, sample 0213535A; 1♀, same, except: 28.ix.2005, sample 0213537A; 3♀, same, except: 29.ix.2005, sample 0213537B; 1♀, same, except: 04.i.2006, sample 0213541A; 1♀, same, except: 25.i.2006, sample 0213542A; 2♀, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11.4 km NW Kumasi, 06°44'15.1"N, 01°42'13.4"W [= 6.74, -1.70], 254 m, 11.viii.2005, Richard Olu, transect 4, trap 1, forest interior, bait trap, sample 0241533B; 1♂, same, except: 16.viii.2005, sample 0241534A; 1♂, 1♀, same, except: 31.viii.2005, sample 0241535A; 2♂, same, except: 28.ix.2005, sample 0241537A; 1♀, same, except: 26.i.2006, sample 0241542B; 1♀, same, except: 15.ii.2006, sample 0241543A; 1♂, same, except: 16.ii.2006, sample 0241543B; 1♂, same, except: 08.iii.2006, sample 0241544A; 2♂, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11.1 km NW Kumasi, 06°44'48.9"N, 01°41'37.2"W [= 6.75, -1.69], 250 m, 01.viii.2005, Richard Olu, transect 1, trap 4, 240 m from forest edge, bait trap, sample 0214535B; 1♂, same, except: 10.viii.2005, sample 0214533B; 1♀, same, except: 16.viii.2005, sample 0214534A; 1♂, same, except: 17.viii.2005, sample 0214534B; 1♀, same, except: 28.ix.2005, sample 0214537A, Carnegie Museum specimen number CMNH-440,503; 1♀, same, except: 09.iii.2006, sample 0214544B; 1♀, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11.1 km NW Kumasi, 06°44'47"N, 01°41'38.6"W [= 6.75 -1.69], 245 m, 09.viii.2005, Richard Olu, transect 2, trap 4, forest interior, bait trap, sample 0224533A; 1♂, 1♀, same, except: 10.viii.2005, sample 0224533B; 1♂, same, except: 17.viii.2005, sample 0224534B; 1♀, same, except: 29.ix.2005, sample 0224537B; 1♀, same, except: 26.i.2006, sample 0224542B; 1♂, 1♀, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11 km NW Kumasi, 06°44'42.8"N, 01°41'36.9"W [= 6.75, -1.69], 238 m, 16.viii.2005, Richard Olu, transect 2, trap 1, forest interior, bait trap, sample 0221534A; 3♀, same, except: 28.ix.2005, sample 0221537A; 1♀, same, except: 31.v.2006, sample 0221551A; 4♂, 2♀, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 10.9 km NW Kumasi, 06°44'53"N, 01°41'22.5"W [= 6.75, -1.69], 252 m, 09.viii.2005, Richard Olu, transect 3, trap 2, forest edge, bait trap, sample 0232533A; 1♂, same, except: 10.viii.2005, sample 0232533B; 1♂, 1♀, same, except: 16.viii.2006, sample 0232534A; 1♀, same, except: 17.viii.2005, sample 0232534B; 1♂, 1♀, same, except: 31.viii.2005, sample 0232535A; 1♂, 1♀, same, except: 28.ix.2005, sample 0232537A; 1♀, same, except: 29.ix.2005, sample 0232537B; 1♂, same, except: 25.i.2006, sample 0232542A, Carnegie Museum specimen number CMNH-440,451; 1♂, same, except: 26.i.2006, sample 0232542B; 1♂, same, except: 16.ii.2006, sample 0232543B, Carnegie Museum specimen number CMNH-440,350; 1♂, same, except: 09.iii.2006, sample 0232544B; 1♂, same, except: 10.v.2006, sample 0232547A; 1♀, same, except: 31.v.2006, sample 0232551A; 1♂, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 10.8 km NW Kumasi, 06°44'47.3"N, 01°41'23"W [= 6.75 -1.69], 256 m, 09.iii.2006, Richard Olu, transect 3, trap 4, 240 m from forest edge, bait trap, sample 0234544B; 1♂, same, except: 31.viii.2005, sample 0234535A; 1♀, same, except: 01.ix.2005, sample 0234535B; 1♀, same, except: 28.ix.2005, sample 0234537A; 1♂, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11.3 km NW Kumasi, 06°44'12"N, 01°42'10.3"W [= 6.74, -1.70], 255 m, 01.viii.2005, Richard Olu, transect 4, trap 3, forest interior, bait trap, sample 0243535B; 1♀, same, except: 16.viii.2005, sample 0243534A; 2♀, same, except: 31.viii.2005, sample 0243535A; 1♀, same, except: 29.ix.2005, sample 0243537B; 1♂, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 10.8 km NW Kumasi, 06°44'49.9"N, 01°41'23.5"W [= 6.75, -1.69], 242 m, 10.viii.2005, Richard Olu, transect 3, trap 3, 160 m from forest edge, bait trap, sample 0233533B; 1♂, same, except: 28.ix.2005, sample 0233537A; 1♀, same, except: 04.i.2006, sample 0233541A; 1♂, same, except: 05.i.2006, sample 0233541B; 1♀, same, except: 26.i.2006, sample 0233542B; 1♂, 1♀, same, except: 09.iii.2006, sample 0233544B; 1♂, Ghana: Ashanti Region, Owabi Wildlife Sanctuary, 11.1 km NW Kumasi, 06°44'44.3"N, 01°41'39.6"W [= 6.75, -1.69], 236 m, 16.viii.2005, Richard Olu, transect 2, trap 2, forest edge, bait trap, sample 0222534A; 1♀, same, except: 17.viii.2005, sample 0222534B; 1♀, same, except: 28.viii.2005, sample 0222537A; 2♂, 1♀, Ghana, Ashanti Region, Kajease Sacred Grove, 5.8 km SW Kumasi, 06°38'41.3"N, 01°39'04.4"W [= 6.65, -1.65], 234 m, 01.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 2, 80 m

from forest edge, bait trap, sample 0322531A; 1♀, same, except: 02.ix.2005, sample 0322531B; 2♀, same, except: 15.ix.2005, sample 0322532A; 2♀, same, except: 23.x.2005, sample 0322536B; 1♂, same, except: 30.ix.2005, sample 0322533B; 1♂, same, except: 21.iii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0322544A; 1♂, 1♀, same, except: 22.iii.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0322544B [♀ labelled: Carnegie Museum specimen number CMNH-440,347]; 1♂, same, except: 11.iv.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0322545A; 1♀, same, except: 02.v.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0322546A; 2♂, 1♀, Ghana, Ashanti Region, Kajease Sacred Grove, 5.7 km SW Kumasi, 06°38'43.7"N, 01°39'03.1"W [= 6.65, -1.65], 234 m, 01.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 3, less than 160 m from forest edge, bait trap, sample 0323531A; 1♀, same, except: 15.ix.2005, sample 0323532A; 1♂, same, except: 16.ix.2005, sample 0323532B; 1♀, same, except: 07.ii.2006, J. Antwi, S. Kuudaar & J. Lewile, sample 0323542A, Carnegie Museum specimen number CMNH-440,710; 1♂, same, except: 08.ii.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0323542B; 1♂, same, except: 22.iii.2006, sample 0323544B; 1♀, same, except: 11.iv.2006, sample 0323545A; 1♂, same, except: 02.v.2006, J. Antwi, S. Kuudaar & J. Lewile, sample 0323546A; 1♂, 3♀, Ghana, Ashanti Region, Kajease Sacred Grove, 5.9 km SW Kumasi, 06°38'36.7"N, 01°39'07.8"W [= 6.64, -1.65], 239 m, 01.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 4, less than 160 m from forest edge, bait trap, sample 0314531A; 3♂, 4♀, same, except: 30.ix.2005, sample 0314533B; 2♂, same, except: 02.x.2005, sample 0314535B; 1♀, same, except: 20.i.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0314541B; 1♀, same, except: 08.ii.2006, sample 0314542B; 1♀, same, except: 28.ii.2006, sample 0314543A, Carnegie Museum specimen number CMNH-440,281; 1♀, same, except: 01.iii.2006, sample 0314543B, Carnegie Museum specimen number CMNH-440,551; 1♂, same, except: 21.iii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0314544A; 1♂, Ghana, Ashanti Region, Kajease Sacred Grove, 5.8 km SW Kumasi, 06°38'39.6"N, 01°39'05.9"W [= 6.64, -1.65], 231 m, 02.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 2, trap 1, forest edge, bait trap, sample 0321531B; 1♂, 2♀, same, except: 29.ix.2005, sample 0321533A; 1♂, 1♀, same, except: 30.ix.2005, sample 0321533B; 1♀, same, except: 07.ii.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0321542A; 1♂, same, except: 21.iii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0321544A; 1♀, same, except: 22.iii.2006, sample 0321544B, Carnegie Museum specimen number CMNH-440,658; 1♀, same, except: 11.iv.2006, sample 0321545A; 1♀, Ghana, Ashanti Region, Kajease Sacred Grove, 6.2 km SW Kumasi, 06°38'31.5"N, 01°39'08.5"W [= 6.64, -1.65], 233 m, 01.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 2, 80 m from forest edge, bait trap, sample 0312531A; 1♀, same, except: 01.iii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0312543B; 1♀, same, except: 22.iii.2006, sample 0312544B; 1♂,

Ghana, Ashanti Region, Kajease Sacred Grove, 6.2 km SW Kumasi, 06°38'29.4"N, 01°39'09.7"W [= 6.64, -1.65], 229 m, 01.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 1, forest edge, bait trap, sample 0311531A; 1♀, same, except: 16.ix.2005, sample 0311532A; 1♀, same, except: 21.iii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0311544A; 2♀, same, except: 11.iv.2006, sample 0311545A; 1♂, Ghana, Ashanti Region, Kajease Sacred Grove, 16.9 km SE Kumasi, 06°33'44.4"N, 01°31'31"W [= 6.56, -1.53], 241 m, 05.iv.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, transect 3, trap 1, forest edge, bait trap, sample 0631544B; 1♂, Ghana, Ashanti Region, Kajease Sacred Grove, 6.0 km SW Kumasi, 06°38'33.4"N, 01°39'07.3"W [= 6.64, -1.65], 229 m, 29.ix.2005, J. Antwi, S. Kuudaar & J. Lewile, transect 1, trap 3, less than 160 m from forest edge, bait trap, sample 0313533A; 2♂, same, except: 30.ix.2005, sample 0313533B; 1♂, same, except: 08.ii.2006, J. Antwi, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0313542B, Carnegie Museum specimen number CMNH-440,468; 1♂, same, except: 28.ii.2006, sample 0313543A; 1♀, same, except: 21.iii.2006, S. Kuudaar, J. Lewile & D. Amankwaa, sample 0313544A; 1♂, same, except: 22.iii.2006, sample 0313544B; 1♀, Ghana, Western Region, Dadieso Forest Reserve, 8.9 km SSE Dadieso, 06°02'34.3"N, 01°00'10.9"W [6.04, -1.00], 239 m, 21.vi.2008, Janise Bossart, transect 1, trap 5 forest edge, bait trap, sample 081521; 1♂, Ghana, Ashanti Region, Bonwire Sacred Grove, 18.8 km ENE Kumasi, 06°46'18.2"N, 01°28'20"W [6.77, -1.47], 311 m, 19.viii.2005, Jacob Asare, transect 1, trap 1, forest edge, bait trap, sample 0411534B; 1♂, same, except: 22.ix.2005, sample 0411537B; 1♂, same, except: 11.i.2006, sample 0411541A; 1♂, same, except: 01.ii.2006, sample 0411542B; 1♂, same, except: 11.viii.2005, sample 0422533A; 1♀, same, except: 19.viii.2005, sample 0422534B; 1♂, same, except: 24.viii.2005, sample 0422535A; 1♂, same, except: 25.viii.2005, sample 0422535B; 1♂, same, except: 26.iv.2006, sample 0422546A; 1♀, same, except: 21.ix.2005, sample 0422537A; 1♀, Ghana, Ashanti Region, Bonwire Sacred Grove, 18.8 km ENE Kumasi, 06°46'20.5"N, 01°28'21.4"W [= 6.77, -1.47], 304 m, 19.viii.2005, Jacob Asare, transect 1, trap 2, 80 m from forest edge, bait trap, sample 0412534B; 1♂, 1♀, same, except: 22.ix.2005, sample 0412537B; 1♂, same, except: 05.iv.2006, sample 0412545A; 1♂, Ghana, Ashanti Region, Bonwire Sacred Grove, 18.8 km ENE Kumasi, 06°46'21.3"N, 01°28'23.6"W [= 6.77, -1.47], 303 m, 11.viii.2005, Jacob Asare, transect 2, trap 3, 160 m from forest edge, bait trap, sample 0423533A; 1♂, same, except: 18.viii.2005, sample 0423534A; 1♀, same, except: 24.viii.2005, sample 0423535A; 1♂, 1♀, Ghana, Ashanti Region, Bonwire Sacred Grove, 18.7 km ENE Kumasi, 06°46'16.8"N, 01°28'24.1"W [= 6.77, -1.47], 311 m, 11.viii.2005, Jacob Asare, transect 2, trap 1, forest edge, bait trap, sample 0421533A; 1♀, same, except: 07.ix.2005, sample 0421536A; 1♀, same, except: 22.ix.2005, sample 0421537A; 1♀, Ghana, Ashanti Region, Bonwire Sacred Grove, 18.9 km ENE Kumasi, 06°46'21.5"N, 01°28'21.3"W

[= 6.77, -1.47], 305 m, 11.viii.2005, Jacob Asare, transect 1, trap 3, 80 m from forest edge, bait trap, sample 0413533A; 1♂, same, except: 22.ix.2005, sample 0413537B; 1♀, Ghana, Ashanti Region, Bonwire Sacred Grove, 18.9 km ENE Kumasi, 06°46'26.1"N, 01°28'22.1"W [= 6.77, -1.47], 303 m, 11.viii.2005, Jacob Asare, transect 1, trap 4, forest edge, bait trap, sample 0414533A; 2♂, 1♀, same, except: 18.viii.2005, sample 0414534A; 1♂, same, except: 07.ix.2005, sample 0414536A; 1♂, 1♀, same, except: 08.ix.2005, sample 0414536B; 1♂, same, except: 03.vi.2006, sample 0414551A; 1♀, same, except: 26.iv.2006, sample 0414546A; 1♂, same, except: 17.v.2006, sample 0414547A; 1♂, 2♀, Ghana, Ashanti Region, Bonwire Sacred Grove, 18.9 km ENE Kumasi, 06°46'26.9"N, 01°28'24.4"W [= 6.77, -1.47], 301 m, 11.viii.2005, Jacob Asare, transect 2, trap 4, at least 160 m from forest edge, bait trap, sample 0424533A; 1♀, same, except: 12.viii.2005, sample 0424533B; 1♂, same, except: 19.viii.2005, sample 0424534B; 1♀, same, except: 01.ii.2006, sample 0424542B; 1♀, same, except: 16.iii.2006, sample 0424544B; 1♀, same, except: 27.iv.2006, sample 0424546B (all CMNH). **GUINEA:** 1♀, Mus. Westerm., *O. moerens*, *Dictya moer.* Fab. Guinea, *Enistoneura moerens* (Fabricius, 1794) ♀ det. A.E. Whittington 1993, NHMD918666; 2♀, same, except: NHMD918652 & NHMD918638 (all ZMUC); 2♀, Guinea, Coll. Winthem., “*moerens*” (NHMV); 1♀, *Ortalis (Dictya) moerens* Fab. Wester, Guinea, 78, [green disc] (MNHN). **NIGERIA:** 1♀, Nigeria: Ibadan [= 7.37, 3.95], 18.v.[19]66, J. Phipps [NMSA-DIP 030649] (NMSA); 1♀, Lagos, 70 m. E., forest 1 m. E. of Oni [= Ebute Oni, 6.53, 4.23]. Wet Seas, c Mch. 15–Dec. 8, W.A. Lamborn, on top leaf; 1♂, 1♀, Lagos, 70 m. E., forest ½ m. fr. Oni [Ebute Oni: 6.53, 4.23], Wet S c.mid, Mch. –Dec.8.1911, W.H. Hayman, A in cop B [and B in cop A], Apr. early 1911, 1911 4663 [and 1911 4664]; 1♂, Lagos, 70 m. E., forest ½ m. fr. Oni [Ebute Oni: 6.53, 4.23]. Wet S., from Mch 23, W.A. Lamborn, Jun. 1.1912; 1♂, 1♀, same, except: Mch 23, W.A. Lamborn, A in cop B [and B in cop A] June 26.1912; 2♀, same, except: Dry S., c Dec. 8.1911 to Mch. 23.1912, Wet f. Mch 23, W.A. Lamborn, May 29 1912; 2♂, same, except: Wet S.mid, Mch–Dec. 8.1911 W.A. Lamborn, 25 Oct. 1911 (all labelled *Engistoneura catogastera* (Bigot, 1891) Det. A.E. Whittington 2020 [♂ or ♀]”, all OUMNH); 1♀, Nigeria, Ibadan [= 7.37, 3.95], 03.v.[19]23, F.D. Golding (CUMZ). **TOGO:** 2♂, 3♀, Togo, Kloto [= 6.95, 0.71], 02.vii.1995, sweep netting, forest, G. Goergen (2♂, 2♀ IITAB; 1♀, NMWC); 1♂, 3♀, same, except: forest area, iv.2004; 1♀, same, except: iv.1995; 1♂, 2♀, Togo, Kloto forest [= 6.95, 0.71], 01.vii.1995, G. Goergen, sweep netting forest; 1♂, same, except: 02.viii.1995; 1♂, same, except: 03.viii.1996; 1♀, Togo, Mt Agou [= 6.87, 0.77], 21.vi.2019, forest area, G. Goergen; 1♂, 2♀, Togo, Sodo [= 7.31, 0.81], vi.2003, forest area, G. Goergen (all IITAB); **COUNTRY UNKNOWN:** 1♀, E. Ind ?, W (OUMNH).

**Distribution.** Benin, Cameroon, Côte d’Ivoire, Equatorial Guinea, Ghana, Guinea, Nigeria and Togo. Walker (1853: 383) gave the type locality of *Trypeta albovaria* (a junior synonym of *E. moerens*) as “Senegal

?”, but no additional confirmed specimens from Senegal have been examined and given the distribution of the species the record for Senegal is clearly an error.

**Bionomics.** The most widespread species of the genus, occurring in ten different ecoregions (Fig. 154). Mainly sampled in faeces-baited pitfall traps in indigenous forests (including the forest canopy), but also in banana traps, by sweeping and at UV light. Sampled in a cocoa plantation and on cocoa in Cote d’Ivoire. Specimen label data indicate that the species is active throughout the year.

***Engistoneura nebula* Kirk-Spriggs & Whittington, sp. nov.**

Figs 60, 61, 78, 104, 117, 155

**Etymology.** The specific epithet *nebula* is a Latin noun and refers to the clouded mark on the apex of the wing membrane of the species.

**Description:** ♂ (based on field-pinned holotype) [♀ unknown].

**Measurements.** Holotype ♂ (Figs 60, 61) body length: 9.4 mm; wing length: 9.5 mm.

**Colour/vestiture.** Ground colour (Figs 60, 61) pale tan-brown to orange-brown; scutum (Fig. 104) with 2 broad brown vittae (separated by narrow median vitta of ground colour obscured by dense grey microtrichia) extending onto and converging on centre of scutellum; dorsal margin of proepisternum and anepisternum (Fig. 117) with broad dark brown vitta narrowly extending over lateral margins of scutum; subscutellum and mediotergite brown, with median vitta of ground colour. Wing membrane (Fig. 78) hyaline and brown banded with hyaline areas tinged yellow basally and as a dense brown cloud along posterior margin toward apex of wing, with 4 brown bands transecting anterior and (almost) posterior wing margins (including apical mark). Abdominal tergites and sternites (Figs 60, 61) dark red-brown, with darker distal margins and green metallic iridescence; intersegmental membrane and sternites pale tan-brown.

**Head** (Figs 60, 61, 117). Facial carina narrow, sharp-edged only at dorsal apex between antennal insertions beyond which round-edged, without median grooves, but with coarse transverse rugosity across width at base just dorsal to junction with face. Fine silver microtrichia limited to narrow ventral margin of compound eye and as 2 distinct triangular maculae on lateral frons adjoining parafacial. Antenna with fine black setulae clustering dorsally along seam and on ventral surface of pedicel. Postpedicel brown, narrowly pale buff-yellow ventrally. Arista long, combined length of dorsal and ventral vestiture greater than width of postpedicel. Antennal groove shiny cream, with triangular shaped dark brown macula at ventral apex, between which is broad median dull brown vitta on face. Gena with single black, forwardly directed seta, posterior to which is small group of finer black setulae at oral margin; genal and postgenal setulae indistinct, short, black and widely spaced. Palpus entirely dark grey-brown, with apical margin narrowly pale cream microtrichose; setulae black. Prementum and labellum tan-brown, black



toward apex, setulae brown on prementum and paler ventrally on labellum.

**Thorax** (Figs 60, 61, 104, 117). Bullate cervical sclerite pale buff, concolorous with proepisternum. Anepisternum and katepisternum densely covered in silver-grey microtrichia (viewed obliquely). Short black setulae evenly distributed across scutum, anepisternum and scutellum. With row of long black setulae in front of mid coxae, in front of which is small patch of progressively shorter black setulae.

**Scutellum** (Fig. 104). Strongly flattened on dorsal surface, trapezoid, margin straight between apical scutellar setae; posterior lateral scutellar setae slightly closer to apical scutellar setae than to anterior lateral scutellar setae.

**Legs** (Fig. 61). Entirely tan-brown to orange-brown, except apical 2 or 3 tarsomeres brown. Fore femur with single pointed, black subapical spine on posterior ventral margin of femur. Mid coxal prong strongly developed, but short and ovate. Mid coxal apophysis conical, bluntly pointed. Hind coxa with narrow posterior margin, outermost extremity of which developed into stout, rounded lobe.

**Wing** (Fig. 78). Crossvein *r-m* angle = 15° ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.2; crossveins *r-m* : *dm-m* angle = 20°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.40. Wing membrane predominantly hyaline, with 4 brown bands that transect anterior and (almost) posterior wing margins (including apical mark); posterior cells clouded brown; cells *br*, *bm*, *cua* and base of cell *dm* mostly hyaline loosely forming a stripe. Ventral auxiliary sclerite shiny, red-orange, with orange-brown bulbous cap. Halter knob and stem orange-brown.

**Abdomen** (Figs 60, 61). Silver setulae intermixed with fine black setae towards abdominal apex. Sparse silver-grey microtrichia difficult to discern.

**Terminalia**. External parts brown.

Female unknown.

**Variation**. Insufficient material is available to assess variation.

**Diagnosis**. Scutum (Fig. 104) predominantly dark grey-brown, with vittae comprised of pale grey to silver microtrichia; thoracic pleura (Fig. 117) entirely orange-brown in contrast to dark grey-brown scutum; wing membrane (Fig. 78) without either V- or L-shaped hyaline marks positioned at crossvein *r-m*, wing membrane with 4 brown bands, transecting anterior and posterior wing margins (including apical mark); posterior cells and cell *dm* clouded brown; cells *br*, *bm*, *cua* and base of cell *dm* mostly hyaline; abdominal intersegmental membrane entirely orange-brown; legs (Figs 61, 117) pale orange-brown with tarsomeres 4 and 5 contrastingly dark brown.

**Type material examined**. **SIERRA LEONE**: holotype ♂, “SEMBEHUN [= 7.78, -11.73] / SIERRA LEONE / E. Hargreaves / DATE 1-IV-[19]25 [printed and handwritten] // *Engistoneura* / *parallela* / W. ♀ / Det. E. Brunetti 1925 [printed and handwritten] // **HOLOTYPE** ♂ / *Engistoneura* / *nebula* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with red border; printed] //

NHMUK013449585 [printed with QR code]” (NHMUK). Direct-pinned in good condition; right wing removed for imaging and glued to card pinned beneath specimen.

**Distribution**. Sierra Leone.

**Bionomics**. A Western Guinean Lowland Forest species, only recorded from Sembahun, Sierra Leone at an elevation of ca 18 m (Fig. 155). Holotype label data indicate that the species is active in April.

### ***Engistoneura obscura* Hendel, 1914**

Figs 3, 4, 8, 62, 63, 82, 106, 156

*Engistoneura obscura* Hendel 1914a: 152, 1914b: 365; Steyskal 1980: 567.

= *Engistoneura obscura* var. *simplex* Enderlein, 1924: 140, **syn. n.**; Steyskal 1980: 567.

**Redescription**: ♀ (largely based on field-pinned lectotype).

**Measurements**. Lectotype ♀ (Figs 62, 63) body length: 10.7 mm (range: 6.6–12.5 mm;  $\bar{x}$  = 9.3 ± 1.3 mm;  $n$  = 30); wing length: 10.0 mm (range: 7.7–11.9 mm;  $\bar{x}$  = 9.8 ± 1.1 mm;  $n$  = 30)

**Colour/vestiture**. Ground colour (Figs 4, 8, 62, 63, 82, 106) dark grey-brown, abdominal tergites with dark metallic blue-green lustre, in contrast to buff-yellow on: occiput, medial linear mark at centre of frons, antennae, facial carina, centre of face, clypeus, gena, fore coxae, basal  $\frac{4}{5}$  of mid and hind femora and tibiae and posterodorsal  $\frac{1}{2}$  of katepisternum. Scutum (Fig. 106) with median and 2 lateral broad vittae, formed of dense pale grey microtrichia, terminating at scutoscutellar suture (viewed obliquely) darker grey vitta between pale grey vittae may appear brown. Wing membrane (Fig. 82) dark brown, with hyaline stripe terminating at crossvein *r-m* forming L-shaped mark; paired parallel preapical hyaline bands. Abdomen (Figs 62, 63) black-brown with strong metallic blue reflections; intersegmental membrane dull brown, slightly paler basally; sternites brown, with faint violet reflections.

**Head** (Figs 62, 63). Facial carina sharp-edged. Fine silver microtrichia in narrow margin around compound eye, slightly wider along upper margin of gena and as 2 distinct maculae on lateral frons adjoining parafacial and slightly dorsal to it. Antennal pedicel with fine, black ventral setae. Postpedicel pale buff-yellow at base, progressively darker brown toward apex, with fine yellowish golden microtrichia on ventral margin basally (extent of which differs with angle of viewing). Arista with combined length of dorsal and ventral vestiture no greater than width of postpedicel. Antennal groove shiny buff-yellow throughout, ventral to which is shiny, dark brown mark. Gena with single black, forwardly directed seta; genal and postgenal setulae fine, short and black, virtually indistinct and widely spaced, longer around occipital foramen. Palpus with apex dull black; setulae black. Prementum and labellum brown, setulae orange-brown to golden.

**Thorax** (Figs 62, 63, 106). Bullate cervical sclerite brown with thin ventral buff mark consistent with pale

buff proepisternum. Anepisternum virtually entirely dull black; katepisternum bicoloured dark grey-brown on anterior ventral  $\frac{1}{2}$  and pale cream on posterior dorsal  $\frac{1}{2}$ . Anepisternum and katepisternum densely covered in pale, silver-grey microtrichia (viewed obliquely). Short brown setulae, difficult to discern, evenly distributed across scutum and anepisternum, longer and paler on remaining pleura.

*Scutellum* (Fig. 106). Slightly flattened on dorsal surface.

*Legs* (Fig. 63). Fore femur with 4 evenly spaced, pointed, black subapical spines on posterior ventral margin. Mid coxal prong parallel-sided, round at apex, slightly broader subapically. Mid coxal apophysis conical and somewhat blunt apically.

*Wing* (Fig. 82). Crossvein *r-m* angle =  $12^\circ$ ; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 2; crossveins *r-m* : *dm-m* angle =  $12^\circ$ ; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.45. Wing membrane dark brown, dull ventrally; with single short hyaline band at crossvein *r-m* joined to stripe through basal cells and basal  $\frac{1}{2}$  of cell *dm*, forming L-shaped pattern, beyond which are 2 parallel hyaline bands beyond crossvein *dm-m*; faint hyaline marks present along hind margin of wing on anal lobe and cell  $m_4$ . Ventral auxiliary sclerite shiny, dark brown. Halter knob pale buff-brown, stem slightly darkened.

*Abdomen* (Figs 62, 63). Silver setulae consistent across abdominal tergites. Sparse silver-grey microtrichia only apparent on lateral parts of tergite 3, difficult to discern.

*Terminalia*. External parts black-brown with surstyli slightly paler brown.

Female similar to male, only differing in sexual characters.

*Variation*. While the female paralectotype agrees with the male lectotype, the markings on the scutum are less pronounced, while the metallic sheen on the abdominal tergites is slightly more obvious. A few specimens examined have a second hyaline mark across wing cell  $r_{2+3}$  and  $\frac{1}{2}$  way across cell  $r_{4+5}$  (usually only one side of the specimen). This may be either reduced (as in Fig. 82) or more extensive, merging with the main hyaline band adjacent to the *r-m* crossvein. Despite this, in the most extreme cases it does not form a distinct Y-shaped mark.

*Diagnosis*. Scutum (Fig. 106) predominantly dark grey-brown, with vittae comprised of pale grey to silver microtrichia; thoracic pleura (Fig. 63) at least in part, concolorous with dark grey-brown scutum; anepisternum finely rugose; katepisternum partially yellowish, brown ventrally (varying in extent), but never entirely dark brown or black throughout; wing membrane (Fig. 82) with band at crossvein *r-m* (or if 2 hyaline bands then separate, these not converging to form V-shape) joined to hyaline stripe through cells *br*, *bm*, *cua* and base of cell *dm*, resulting in L-shaped hyaline mark.

*Type material examined* (*Engistoneura obscura* Hendel, 1914b). **CAMEROON**: lectotype ♂ (here designated) “Kribi [= 2.94, 9.91] / Dr. Tr. Tr. [? illegible] [handwritten] // det. F. Hendel / *obscura*, H. [printed and

handwritten] // L. [in pencil] // Coll. / Hendel [printed] // **LECTOTYPE** ♂ / *Engistoneura obscura* Hendel, 1914 / designated by / Kirk-Spriggs & Whittington 2024 [white card with yellow border; printed]” (NHMV). Direct-pinned in good condition. Paralectotype ♀ (here designated) “Buea [= 4.16, 9.26] / P. Preuss S. [blue card; printed] // det. F. Hendel / *obscura*, H. [printed and handwritten] // L. [in pencil] // Coll. / Hendel [printed] // *Engistoneura* [folded cabinet label, handwritten and framed by fine border line printed and beveled at corners] // **PARALECTOTYPE** ♀ / *Engistoneura obscura* Hendel, 1914 / designated by / Kirk-Spriggs & Whittington 2024 [white card with yellow border; printed]” (NHMV).

*Type material examined* (*Engistoneura obscura* var. *simplex* Enderlein, 1924). **CAMEROON**: lectotype ♀, (here designated) “Neu-Kamerun / No. 146–153 / Tessmann S.G [pale blue card; printed and handwritten] // Type [orange card; printed] // *Engistoneura obscura* Hend. / var. *simplex* / Type / Enderl. ♀ / Dr Enderlein 1920 [handwritten and printed] // Zool. Mus. / Berlin [printed] // **LECTOTYPE** ♀ / *Engistoneura obscura* var. *simplex* Enderlein, 1924 / designated by / Kirk-Spriggs & Whittington 2024 [white card with yellow border; printed]” (ZMHB). Direct-pinned, in good condition. Paralectotypes (here designated) (all labelled: “// **PARALECTOTYPE** ♀ / *Engistoneura obscura* var. *simplex* Enderlein, 1924 / designated by / Kirk-Spriggs & Whittington 2024 [white card with yellow border; printed]”): 1♀, same labels as lectotype, but without Enderlein’s determination label (ZMHB); 1♀, same labels as lectotype, except: “No. 139–145” and without Enderlein’s determination label; 1♀, “Kamerun / Barombi-Stat. [= 4.67, 9.38] / Preuss S. [pale blue card; printed] // Type [printed on orange card] // Zool. Mus. / Berlin [printed]” (ZMHB).

*Remarks*. In the original description of *E. obscura*, Hendel (1914b: 365) cited the following material on which the description was based: “♂♀ aus W.-Afrika, Kribi und Buea, in der Sammlung des Herrn B. Lichtwardt”. These specimens (deposited in NHMV) were examined here and as neither of the two specimens bears Hendel’s type label are both regarded as syntypes. The male specimen from “Kribi” (Figs 62, 63) is here selected and designated as lectotype and the female specimen from “Buea” as paralectotype.

In the original description of *Engistoneura obscura* var. *simplex*, Enderlein (1924: 140) cited the following material on which the description was based: “Neu Kamerun. 1♂ 2♀ gesammelt von G. Tessmann”. As none of the specimens were originally designated as holotype and all bear a label “Type”, these are here regarded as syntypes. The female from “Neu-Kamerun”, which bears Enderlein’s determination label is selected and designated as lectotype and the remaining female specimens as paralectotypes. The lectotype of *E. obscura* var. *simplex*, **syn. n.** is here found to be conspecific with *E. obscura* Hendel, 1914 and is sunk as a junior homonym.

*Additional material examined* (all labelled “*Engistoneura obscura* ♂ [or ♀] Hendel, 1914 det. A.H. Kirk-Spriggs or det. A.E. Whittington 2024”). **CAMEROON**: 2♂, 2♀, Edéa [= 3.80, 10.14], Cameroon,

J.A. Reis (1♂ with additional labels “*Engistoneura simplex interrupta* Enderl. Det. C.H. Curran” and “*Engistoneura obscura* Hendl. d. G. Steyskal [19]64”; 1♂ with additional label “*Engistoneura simplex* Enderl. Det. C.H. Curran”) (all AMNH); 1♀, Cameroon, 10 km SW Messamena, Maleuleu [= 3.33, 12.97], moist primary forest, at light, 08.i.1978, Loc. No. 20, Lund Univ. Syst. Dept. Sweden Cameroon Exp. Dec-Jan 1977–78. Gärdenfors-Hall-Samuelsson, MZLU 2022 1050. MZLU 00131461 (MZLU); 1♂, 3♀, Cameroun, Pres Bidou [= 3.01, 10.08], 1, 6.xi.1970, plantation eaux et forêts, L. Matile rec. (MNHN). **EQUATORIAL GUINEA:** 1♀, Span. Guinea, Nkolentangan [= 1.88, 10.75], xi.[19]07–v.[19]08, G. Teßmann S.G, Type, Zool. Mus. Berlin” (ZMHB); 1♀, Muséum Paris, San-Benito [= Mbini, 1.58, 9.62], Cuiral, 1885 (MNHN). **GABON:** 1♂, Muséum Paris, Ogooué, Lambaréné [= -0.70, 10.24], R. Ellenberger, 1913 (MNHN); 1♀, Gabon, Makokou [= -0.57, 12.86]—Colline Mission biologique, 14.xi.[19]67, G. Bernardi, Muséum Paris; 1♀, Muséum Paris, Congo Franç., Ogooué, N’Kogo [= Nkogo, -0.29, 10.54], J. Bouysson, 1901; 1♂, Muséum Paris, Congo Franç., N’Kogo [= Nkogo, -0.29, 10.54], H. Bonnet, 1903; 1♂, 2♀, 1 [unsexed], Muséum Paris, Congo Français, N’gomo [= Ngomo, -0.83, 9.98], Bas Ogooué, E. Haug, 1906 (all MNHN). **REPUBLIC OF CONGO:** 2♂, 1♀, Sangha, Bomassa [= 2.204, 16.19], Dr. Renault (MNHN); 16♂, 41♀, REPUBLIC OF CONGO, 372m, Sangha Prov., Nouabalé-Ndoki National Park, Mbeli camp (*Gilbertiodendron* forest) 02°14'23.8"N, 16°23'52.1"E [= 2.24, 16.40], 03–10.x.2022, banana bait, Dérozier, V., Fouka, B., Kirk-Spriggs, A., Takano, H. leg., ANHRT:2022.14; ANHRTUK00278277–00278333; 6♂, 6♀, same data, except: human dung pitfall, ANHRTUK00278852–00278863; 1♀, same data, except: 01–10.x.2022, LepiLED light trap, Dérozier, ANHRTUK00278648; 1♂, 4♀, same data, except: 02–10.x.2022, Malaise trap, ANHRTUK00278651, 00280169–00280171, 00280174; 1♀, REPUBLIC OF CONGO, 352 m, Sangha Prov., Nouabalé-Ndoki National Park, Ndoki formation (secondary forest) 02°12'47.7"N, 16°23'45.8"E [= 2.21, 16.40], 29.ix–01.x.2022, Malaise trap, Dérozier, V., Fouka, B., Kirk-Spriggs, A., Takano, H. leg., ANHRT:2022.14, ANHRTUK00278483; 1♂, 1♀, REPUBLIC OF CONGO, 349 m, Likouala Prov., Nouabalé-Ndoki National Park, Makao forest (secondary forest) 02°36'42.5"N, 17°09'23.8"E [= 2.61, 17.16], 24–28.ix.2022, human dung pitfall. Dérozier, V., Fouka, B., Kirk-Spriggs, A., Takano, H. leg., ANHRT:2022.14, ANHRTUK00278870, 00278871; 1♂, same data, except: 15–21.v.2023, fruit bait trap, Dérozier, V., Kirk-Spriggs, A., László, G., Mvouende, S. leg., ANHRT:2023.6, ANHRTUK00311491; 1♀, REPUBLIC OF CONGO, 365 m, Nouabalé-Ndoki National Park, Mondika camp, 02°21'50.63"N, 16°16'25.82"E [= 2.36, 16.27], 07–14.ii.2023, Malaise trap, Bakala, N., M., Dérozier, V., Kirk-Spriggs, A., László, G. leg., ANHRT:2023.3, ANHRTUK00283861; 1♂, same data, except: general coll., ANHRTUK00283867; 2♀, same data, except: banana bait, ANHRTUK00283874, 00283875; 9♂, 8♀, REPUBLIC OF CONGO 365m, Nouabalé-Ndoki National

Park, Mondika camp, 02°21'50.63"N, 16°16'25.82"E [= 2.36, 16.27], 28.iv–04.v.2023, Malaise trap, Dérozier, V., Kirk-Spriggs, A., László, G., Mvouende, S. leg., ANHRT:2023.6, ANHRTUK00310487–00310503; 2♂, same data, except: 27.iv–06.v.2023, carrion bait trap, ANHRTUK00311654, 00311655; 2♂, same data, except: general coll., ANHRTUK00311666, 00311667; 30♂, 42♀, same data, except: fruit bait trap, ANHRTUK00311681–00311752; 1♂, 4♀, same data, except: 30.iv–03.v.2023, gorilla dung pitfall, ANHRTUK00347021–00347024 (all ANHRT). **SENEGAL:** 1♂, Dakar [= 14.72 -17.46], Senegal, W. Afri., 17.x. [19]34, *Engistoneura obscura* Hendl., d. G. Steyskal [19]’61 (USNM). **COUNTRY UNKNOWN:** 1♀, no data (MNHN).

*Distribution:* Cameroon, Equatorial Guinea, Gabon and Republic of Congo.

*Bionomics.* A widely distributed species, recorded from five ecoregions (Atlantic Equatorial Coastal Forest, Cross-Sanaga-Bioko Coastal Forest, Mount Cameroon and Bioko Montane Forest, Northwestern Congolian Lowland Forest and West Sudanian Savanna) from elevations ranging from *ca* 10 to 700 m (Fig. 156). The single record for Senegal (Dakar) is more than 4,380 km west of the nearest specimen record in Cameroon and almost certainly represents a mislabelled specimen. Adults have mainly been sampled in butterfly traps baited with fermenting fruit (banana) and carrion (shrimp), but also in pitfall traps baited with faeces and gorilla dung, in Malaise traps and at light. Specimen label data indicate that the species is active in April and May and from September–November.

### *Engistoneura parallela* (Wiedemann, 1830)

Figs 64, 65, 76, 101, 115, 157

*Ortalis parallela* Wiedemann, 1830: 458; Loew 1873: 43.

*Engistoneura parallela:* Bezzi 1908b: 131; Hendel 1914a: 152, fig. 264, 1914b: 368; Steyskal 1980: 567.

*Redescription:* ♀ (largely based on field-pinned lectotype).

*Measurements.* Lectotype ♀ (Figs 64, 65) body length: 10.2 mm (range: 7.3–10.9 mm;  $\bar{x}$  = 8.9 ± 1.1 mm; *n* = 19); wing length: 10.6 mm (range: 9.1–10.7 mm;  $\bar{x}$  = 9.9 ± 0.4 mm; *n* = 19).

*Colour/vestiture.* Ground colour (Figs 64, 65, 115) pale tan-brown to orange-brown; scutum (Fig. 101) with 2 brown vittae, converging at centre of scutellum and brown lateral margins; pleura (Fig. 115) and legs (Figs 65, 115), except brown terminal 3 tarsomeres, entirely consistent with ground colour; abdominal tergites dull brown with faint violet metallic lustre. Wing membrane (Fig. 76) brown with 3 subparallel hyaline bands (two subapical and one beyond crossvein *r-m*); stripe through basal cells joining a further band positioned before crossvein *r-m* to form L-shaped mark. Abdomen (Fig. 64) dull brown, with violet metallic iridescence; intersegmental membrane and sternites pale tan-brown, more yellowish basally.

*Head* (Figs 64, 65, 115). Facial carina with rounded margins and weakly developed medial groove between

antennal insertions, but otherwise with generally smooth surface. Centre of frons paler than margins. Fine silver macula on lateral frons where joining parafacial. Antennal pedicel with fine, black setulae on dorsal surface and along apical and ventral margins. Postpedicel pale buff-yellow ventrally. Arista with combined length of dorsal and ventral vestiture greater than width of postpedicel. Antennal groove dull buff-yellow, with shiny dark brown apical macula. Gena with single black, forwardly directed seta, posterior to which is small group of finer black setulae at oral margin; genal and postgenal setulae short, black and widely spaced, longest around occipital foramen. Palpus with apex dull black; setulae black. Prementum and labellum consistent with ground colour, but apex of labellum densely black; setulae brown on prementum and pale golden ventrally on labellum.

**Thorax** (Figs 64, 65, 101, 115). Bullate cervical sclerite pale buff, consistent with pale buff proepisternum. Anepisternum and katepisternum apparently devoid of silver-grey microtrichia (viewed obliquely). Short black setulae evenly distributed across scutum, anepisternum and scutellum. With row of long black setulae in front of mid coxa, in front of which is small patch of slightly shorter, black setulae.

**Scutellum** (Fig. 101). Slightly convex on dorsal surface, margin slightly swollen at insertion of apical scutellar setae.

**Legs** (Figs 65, 115). Fore femur with 3 evenly spaced, pointed, black subapical spines on posterior ventral margin, decreasing in length and thickness toward apex of femur. Mid coxal prong weakly developed, short, club-shaped curving toward posterior. Mid coxal apophysis sharply pointed and slightly hooked at apex.

**Wing** (Fig. 76). Crossvein *r-m* angle = 7°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 1.3; crossveins *r-m* : *dm-m* angle = 9°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.44. Wing membrane mostly dark brown, with 3 subparallel hyaline bands (two subapical and one beyond crossvein *r-m*); stripe through basal cells *br*, *bm* and basal  $\frac{1}{2}$  of *dm-m* joining further band positioned before crossvein *r-m* to form L-shaped mark; hyaline marks in cell  $r_{2+3}$  bullate (blistered); hind margin hyaline, joining radial band near apex of  $M_4$ . Ventral auxiliary sclerite shiny yellow-brown, markedly yellow at widest point. Halter knob yellow, stem pale buff-brown.

**Abdomen** (Figs 64, 65). Tergites 3 with long pale setae at lateral margins and fine black setae at apex of tergite 5; sparse silver-grey microtrichia difficult to discern.

**Terminalia**. Oviscape brown, aculeus with apex paler.

Male similar to female, only differing in sexual characters. External parts of terminalia black-brown, with cerci and surstyli paler tan-brown.

**Variation**. The dark stripe over the marginal wing cells is normally expressed as a more or less solid or partially broken stripe (as in Fig. 76) or more rarely as clearly defined maculae. There is also some variation in the width, shape and angle of the hyaline bands on the wing and in a few cases, there is an additional faint hyaline mark on the membrane preapically.

**Diagnosis**. Scutum (Fig. 101) predominantly pale tan-brown to orange-brown, with 2 brown vittae extending across scutoscutellar suture onto disc of scutellum where they converge; thoracic pleura (Fig. 115) entirely orange-brown, consistent with colour of scutum; wing membrane (Fig. 76) brown with 3 subparallel hyaline bands (two subapical and one beyond crossvein *r-m*); stripe through basal cells joining further band positioned before crossvein *r-m* to form L-shaped mark.

**Type material examined**: **SIERRALEONE**: lectotype ♀ (here designated): “Sierra Leone” [handwritten] // *parallela* / Alte Sammlung [handwritten and printed] // **LECTOTYPE** ♀ / *Ortalis parallela* / Wiedemann, 1830 / designated by / Kirk-Spriggs & Whittington / 2024 [white card with yellow border; printed]” (NHMV). Direct-pinned in fair condition, scutum partly crushed, some resin attached to right wing base, right wing detached and glued to card beneath specimen and left fore leg missing.

**Remarks**. In the original description, Wiedemann (1830: 458) cited 1 female specimen from Sierra Leone on which the description was based. The “Alte Sammlung” on the specimen label refers to the “old collection”, which Hendel (1914b: 367) referred to as “1 ♀ aus Sierra Leone, West-Afrika, die Type Wiedemanns im Wiener Hofmuseum.”. This specimen deposited in NHMV, was examined here and as the specimen was not designated as holotype by Wiedemann is here regarded as a syntype and is selected and designated as lectotype. Hendel (1914a: [152]) provided a figure of the wing in dorsal view (fig. 264).

**Additional material examined** (all labelled “*Engistoneura parallela* ♂ [or ♀] (Wiedemann, 1830) det. A.E. Whittington 2024”). **SIERRA LEONE**: 2♀, Sierra Leone, Njala [= 8.12, -12.08], 04.vi.[19]32, E. Hargreaves, NHMUK013449641, 013449642; 1♂, 2♀, same data, except: 24.v.[19]26, Pres. by Imp. Bur. Ent. Brit. Mus. 1926—359, NHMUK013449643—013449645 (1♀, with additional label “*Engistoneura parallela* (W) ♀ Det. E. Brunetti 1926”); 2♀, 1[unsexed; abdomen missing], same data, except: 23.v.[19]26 (2♀, labelled “Pres. by Imp. Bur. Ent. Brit. Mus. 1926—279”); 1♀, labelled “*Engistoneura parallela* Wd.”) NHMUK013449646—013449648; 1♂, Sierra Leone, Sengema [= 8.49, -10.70], 01.x.[19]24, E. Hargreaves, Pres. by Imp. Bur. Ent. Brit. Mus. 1925—98, *Engistoneura parallela* Wied. Det. G.E. Bryant, NHMUK013449649; 1♂, Sierra Leone, Maramu [= 8.32, -12.71], 04.x.[19]24, E. Hargreaves, Pres. by Imp. Bur. Ent. Brit. Mus. 1925—98, NHMUK013449650; 1♀, Sierra Leone, [no locality], 10.ix.[19]24, E. Hargreaves, Pres. by Imp. Bur. Ent. Brit. Mus. 1925—98, NHMUK013449651; 1♀, Sierra Leone, Rokell [= Rokel, 8.60, -12.69], 16.x.1912, Jas. J. Simpson, NHMUK013449652; 1♀, Sierra Leone, Njala [= 8.11, -12.08], in flight, 19.x.[19]61, M.P. Rushton, 37, C.I.E. Coll. No. 17998, Pres. by Com. Inst. Ent. B.M.1962—1, *Engistoneura parallela* Wied. R.W. Crosskey det. 1961, NHMUK013449653; 1♀, Sierra Leone, Regent, Freetown [= 8.494, -13.23], 13.ix.1899, E.E. Austen, NHMUK013449654; 1♂, Karina District [= 9.17, -12.02], Sierra Leone Protectorate, W. Africa, x-xi.1906, Dr. H.E. Arbuckle, 1907.16, NHMUK013449655;

1♂, 1♀, Sierra Leone [no locality], J. Foxcroft, 1858, 58-116, *Engistoneura (Ortalis) parallela* Wied., 58.166, Sierra Leone, NHMUK013449656, 013449657; 1♂, Sierra Leone, [no locality], bought off W.F.H. Rosenberg, C.J. Wainwright Collection B.M.1948—488, NHMUK013449658; 1♀, Moy [= Moyamba, 8.16, -12.43], 20.v.[19]02, bought off W.F.H. Rosenberg, C.J. Wainwright Collection B.M.1948—488, NHMUK013449659 (all NHMUK). **COUNTRY UNKNOWN:** 2♀, [no data], NHMUK013449660, 13449661 (all NHMUK).

*Distribution.* Sierra Leone.

*Bionomics.* A species recorded from Western Guinean Lowland Forest, Guinean Forest-Savanna Mosaic and Guinean Mangroves in Sierra Leone, occurring from elevations between 23 and 248 m (Fig. 157). Specimen label data indicate that the species is active in May and June and from September–November.

***Engistoneura smithi* Kirk-Spriggs & Whittington, sp. nov.**  
Figs 5, 66, 67, 86, 92, 158

*Etymology.* The specific epithet *smithi* is a genitive case noun in honour of Richard Smith, Chairman of the Board of Trustees of ANHRT.

*Description:* ♂ (largely based on field-pinned holotype).

*Measurements.* Holotype ♂ (Figs 66, 67) body length: 8.7 mm (range: 8.2–10.7 mm;  $\bar{x}$  = 9.2 ± 0.7 mm;  $n$  = 27; wing length: 9.8 mm (range: 9.6–11.7 mm;  $\bar{x}$  = 10.4 ± 0.6 mm;  $n$  = 27).

*Colour/vestiture.* Ground colour (Figs 5, 66, 67, 92) pale tan-brown to orange-brown; scutum (Fig. 92) with 2 brown vittae evanescent before reaching scutoscuteellar suture; dorsal margin of anepisternum and proepisternum with narrow dark brown vittae that narrowly extends over lateral margins of scutum. Wing membrane (Fig. 86) dark brown, with hyaline V-shaped mark at crossvein *r-m* and two parallel preapical hyaline bands. Abdominal tergites (Figs 66, 67) bright metallic blue-violet, sternites brown and similarly marked with metallic lustre; intersegmental membrane creamy white, grading to grey-brown; sternites brown, with faint blue metallic reflections.

*Head* (Figs 66, 67). Facial carina narrow, sharp-edged, medially longitudinally grooved and rugose, with fine transverse rugosity across width medially. Fine silver microtrichia in narrow margin around compound eye, along upper margin of gena and as 2 distinct maculae on lateral frons, where this joins parafacial and slightly dorsal to it. Antennal pedicel with fine black setulae on ventral surface. Postpedicel pale buff-yellow ventrally, faintly darker apicodorsally. Arista with combined length of dorsal and ventral vestiture equivalent to width of postpedicel. Antennal groove dull buff-yellow throughout, with well-defined apical shiny brown macula. Gena with single black, forwardly directed seta, posterior to which is small group of finer black setulae at oral margin; genal and postgenal setulae indistinct short, black and widely spaced. Palpus dark tan-brown, setulae black. Prementum and labellum consistent with ground colour, setulae brown on prementum and pale golden ventrally on labellum.

*Thorax* (Figs 66, 67, 92). Bullate cervical sclerite pale buff, concolorous with proepisternum. Anepisternum, katepisternum and anepimeron covered in dense silver-grey microtrichia (viewed obliquely). Short black setulae evenly distributed across scutum, anepisternum and scutellum, intergrading with short silver setulae ventrally on katepisternum. With row of long black setulae in front of mid coxae, in front of which is small patch of slightly shorter, silver setulae.

*Scutellum* (Fig. 92). Slightly flattened on dorsal surface, margins straight between insertions of marginal scutellar setae.

*Legs* (Fig. 67). Coxae pale cream; fore legs otherwise dark brown (except pale yellowish oval mark ventrally on femur) mid and hind femora pale cream with dark brown apices extending ventrally to  $\frac{1}{3}$  femur length; mid and hind tibiae mostly pale cream, indistinctly darkened brown at base and more distinctly brown apically at  $ca \frac{1}{5}$  femur length; mid and hind tarsi tan-brown, with brown apical rings on each segment. Fore femur with 3 evenly spaced, pointed, black subapical spines on posterior ventral margin of equal length with apical-most pair closer together and inset at steeper angle than more basal spine. Mid coxal prong well-developed, short, spatulate. Mid coxal apophysis triangulate, bluntly pointed at apex. Hind coxa with narrow posterior margin, outermost extremity of which developed into stout, rounded lobe.

*Wing* (Fig. 86). Crossvein *r-m* angle = 18°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 2.3; crossveins *r-m* : *dm-m* angle = 21°; ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.40. Wing membrane dark brown with hyaline stripe through basal cells and basal  $\frac{1}{2}$  of cell *dm*, narrowly joined to two hyaline bands converging at crossvein *r-m* to form a V-shaped mark; 2 preapical parallel hyaline bands; anal lobe and posterior margin of  $m_4$  hyaline. Ventral auxiliary sclerite shiny, red-brown with orange-brown bulbous cap. Halter knob cream-white, stem buff-brown with base slightly darker.

*Abdomen* (Figs 66, 67). Tergites with white setulae intermingled with brown setulae towards apex of abdomen. Silver-grey microtrichia difficult to discern.

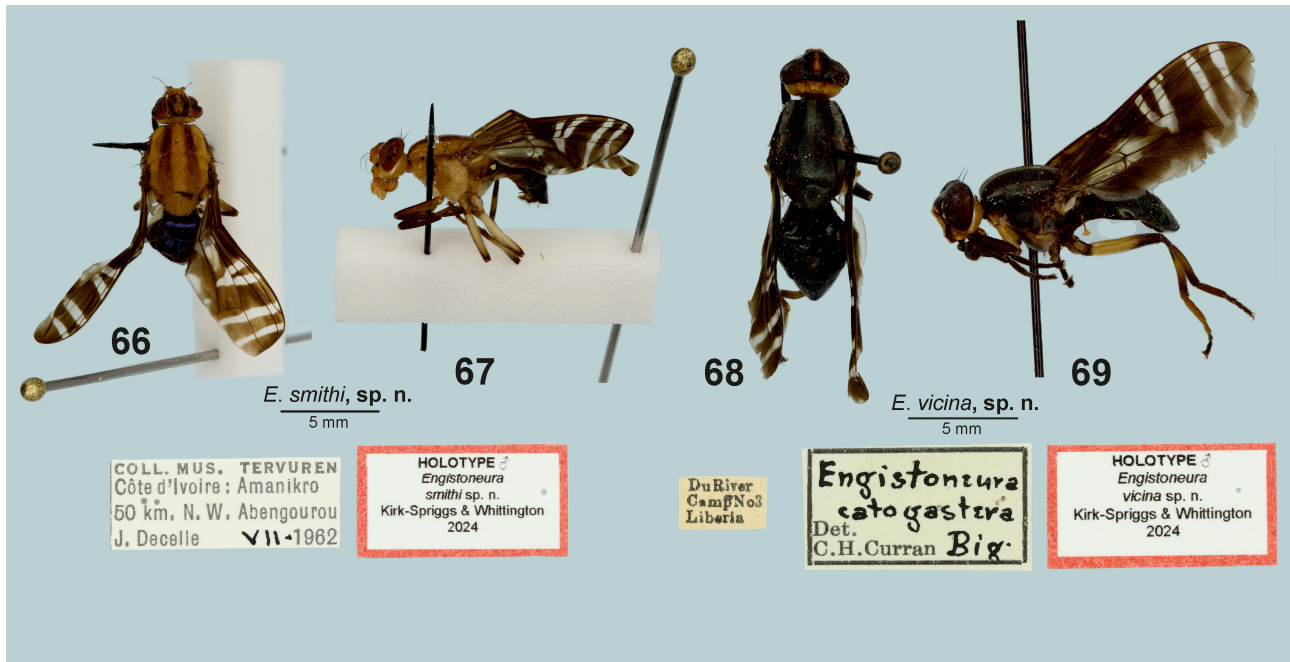
*Terminalia.* External parts yellow to tan-brown, with brown vitta across epandrium; with long brown setulae.

Female similar to male, only differing in sexual characters.

*Variation.* The vittae on the scutum are somewhat variable and may be wide and clearly demarcated or narrow and weakly defined; being occasionally subdivided before the scutoscuteellar suture.

*Diagnosis.* Scutum (Figs 5, 92) predominantly pale tan-brown to orange-brown, with 2 brown vittae evanescent before reaching scutoscuteellar suture; wing membrane (Fig. 86) predominantly dark brown, with hyaline stripe through basal cells *br*, *bm* and *cua* narrowly joined to V-shaped hyaline mark at crossvein *r-m*; 2 faint hyaline marks on posterior margin of cell  $m_4$ .

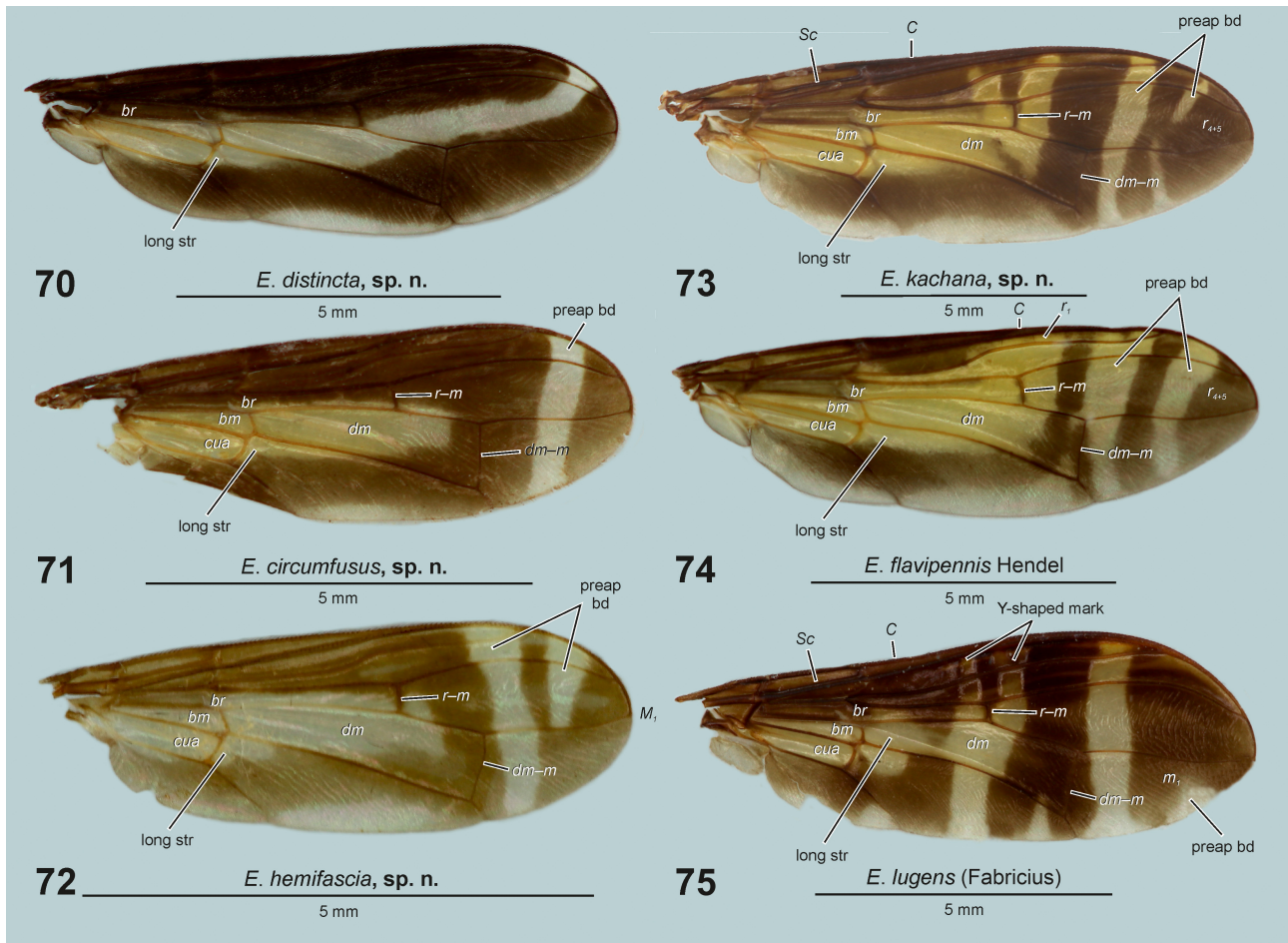
*Type material examined:* CÔTE D'IVOIRE: holotype ♂, "COLL. MUS. TERVUREN / Côte d'Ivoire : Amanikro [= 7.02, -3.87] / 50 km. N. W. Abengourou / J.



**FIGURES 66–69.** Primary name-bearing types of *Engistoneura* species (left: dorsal view; right: lateral view) and associated specimen labels (below). **66–67.** *E. smithi*, sp. nov. (HT ♂, Amanikro, Côte d’Ivoire, RMCA). **68–69.** *E. vicina*, sp. nov. (HT ♂, Du River, Liberia, AMNH).

Decelle VII-1962 [printed and handwritten] // **HOLOTYPE** ♂ / *Engistoneura* / *smithi* sp. nov. / Kirk-Spriggs & Whittington / 2023 [white card with red border; printed] (RMCA). Staged on nu-poly strip (specimen glued to pin) in good condition. Paratypes (all labelled: “// **PARATYPE** ♂ [or ♀] / *Engistoneura* / *smithi* sp. nov. / Kirk-Spriggs & Whittington / 2023 [white card with blue border; printed]”): **CÔTE D’IVOIRE:** 1♂, 1♀, same label as holotype; 4♂, 1♀, “Récolté sur / cacaoyer [pale blue card with black border; printed] // COLL. MUS. TERVUREN / Côte d’Ivoire : Amanikro [= 7.76, -5.05] / 50 km. N. W. Abengourou / J. Decelle V/VI.1961 [printed] (all RMCA). **GHANA:** 1♂, 1♀, “GHANA/ Pra River [= 5.69, -1.53] / sweepnetting: forest / 4. May. 2000 / Leg. G. Goergen” [printed] (both IITAB). 1♂, “Ghana, Ashanti Reg. / Kumasi [= 6.67, -1.61, K.N.U.S.T. / 17-20.VI.1965 / I.K.B. Acheamping // [printed] // cocoa plantation [printed] // MZLU / 2022 / 1048 [printed green paper] // MZLU / 00131464 [printed yellow card]”; 1♀, same data, except: MZLU / 2022 / 1046 [printed green paper] // MZLU / 00131465 [printed yellow card]”; 1♀, same data, except: “13.iii.[19]65 [handwritten] // MZLU / 2022 / 1047 [green card; printed] // MZLU / 00131466 [yellow card; printed]” (all MZLU); 1♀, “GOLD COAST [no locality] / 1913 / A.E. EVANS [printed] // Pres.by / Imp. Inst.Ent. / 1931—56. [printed] // NHMUK013449530 [printed with QR code]”; 1♀, same data, except: “NHMUK013449531 [printed with QR code]”; 1♀, same data, except: “NHMUK013449532 [printed with QR code]”; 1♀, same data, except: “NHMUK013449533 [printed with QR code]”; 1♀, “Bompata, [= 6.63, -1.06] / Ashanti. / A.E. Evans [printed] // 1916—259 [printed] // NHMUK013449499 [printed with QR code]”; 1♀, same

data, except: “NHMUK013449502 [printed with QR code]”; 1♀, same data, except: “NHMUK013449497 [printed with QR code]”; 1♀, same data, except: “Pres by / Imp. Inst. Ent. Brit. Mus. / 1931—56 [printed] / *Engistoneura* / *moerens* / Fabr. Frey det. [printed and handwritten] // NHMUK013449529 [printed with QR code]”; 1♂, “Ashanti Dist. [= 6.83, -1.53] / 7.5.[19]13 / A.E. Evans. [printed] // 1916—259 [printed] // NHMUK013449500 [printed with QR code]”; 1♀, “same data, except: “NHMUK013449498 [printed with QR code]”; 1♂, “GOLD COAST / Kumasi [= 6.67, -1.61] / 8.v.1947 / J. Bowden / old cola / plot. [printed and handwritten] // IMP. INST. ENT. / COLL.NO. 10631 [printed] // G.R.128 [handwritten] // Pres.by / Com.Inst. Ent. / B.M.1950—322. [printed] // *Peltacanthina* / sp. nov. ? (not in B.M.) / van Emden det. 1947 [printed and handwritten] // NHMUK013449579 [printed with QR code]”; 1♀, “Kumasi, [= 6.67, -1.61] / Ashanti, / W. Africa. / 18.x.1907. / Dr. W. M. Graham / 1908—245 [printed and handwritten] // “caught on roadside” [handwritten] // NHMUK013449580 [printed with QR code]”; 1♂, same data, except: “21.X.1907” // “Caught on bush / path” [handwritten] // NHMUK013449582 [printed with QR code]”; 1♂, same data, except: “21.X.1907” // “Caught on leaf / in bush” [handwritten] // A colour variety of fore- / going (*Engistoneura albo- / varia*, Walk.): cf. pleura, / & pectus. E.E.A. 15.x.[19]08 [handwritten] // NHMUK013449581 [printed with QR code]” (all NHMUK); 1♂, “GOLD COAST / 1913 / A. E. EVANS [printed] // http://id.luomus.n//HT.38735 / GHANA Gold Coast [no locality] / 1913 / Evan, A.E. leg. [printed with QR code] // http://id.luomus.fi//HT.38735 / *Engistoneura moerens* / (Fabricius, 1794) / R. ?Frey det. [printed with



**FIGURES 70–75.** Wings of *Engistoneura* species, dorsal views. **70.** *E. distincta*, **sp. nov.** (PT, Loma Mountains, Sierra Leone, ANHRT). **71.** *E. circumfusus*, **sp. nov.** (PT, N’Zérékoré, Guinea, MZLU). **72.** *E. hemifascia*, **sp. nov.** (HT, Bingerville, Côte d’Ivoire, MNHN). **73.** *E. kachana*, **sp. nov.** (PT, Dadieso Forest Reserve, Ghana, CMNH). **74.** *E. flavipennis* Hendel (N-T, Bobiri, Ghana, CMNH). **75.** *E. lugens* (Fabricius) (N-T, Mabila, Sierra Leone, NHMUK). Abbreviations: *bm*—basal medial cell; *br*—basal radial cell; *C*—costal vein; *cua*—anterior cubital cell; *dm*—discal medial cell; *dm-m*—discal medial crossvein; long str—longitudinal stripe; *M*<sub>1</sub>—first branch of media; *m*<sub>1</sub>—first medial cell; preap bd—preapical band(s); *r*<sub>1</sub>—first radial cell; *r*<sub>4+5</sub>—fourth + fifth radial cells; *r-m*—radial-medial crossvein; *Sc*—subcostal vein.

QR code]”; 1♀, same data, except: “HT.38736” (both MZH); 1♀, GHANA: Ashanti Region. / Gyakye Sacred Grove. / 16.9 km SE Kumasi. / 06-33-49N, 01-31-26.1W [= 6.56, -1.52] / 246m. 28 Sept 2005 [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 1 / Trap 1 forest / edge. bait trap. / Sample 0611534B [printed]”; 1♂, same, except: “21 Feb 2006” // “Sample 0611542A”; 1♂, same, except: “14 March 2006” // “Sample 0611543A”; 1♀, same, except: “15 March 2006” // “Sample 0611543B”; 1♀, same, except: “26 April 2006” // “Sample 0611545B”; 1♂, GHANA: Ashanti Region. / Gyakye Sacred Grove. / 16.9 km SE Kumasi. / 06-33-48.6N, 01-31-28.1W [= 6.56, -1.53] / 248m. 14 Sept 2005 [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 1. / Trap 2. 80m from / forest edge. bait / trap. Sample 0612533B [printed]”; 1♀, same, except: “27 September 2005” // “Sample 0612534A”; 2♀, same, except: “28 September 2005” // “Sample 0612534B”; 1♀, same, except: “19 October 2005” // “Sample 0612535B”; 1♂, same, except: “21 February 2006” // “Sample 0612542B [printed] // Carnegie

Museum / Specimen Number / CMNH-440,812 [printed]”; 1♀, same, except: “14 March 2006” // “Sample 0612543A”; 1♀, same, except: “15 March 2006” // “Sample 0612543B”; 1♀, same, except: “4 April 2006” // “Sample 0612544A”; 1♀, same, except: “5 April 2006” // “Sample 0612544B”; 1♂, same, except: “26 April 2006” // “Sample 0612545B”; 2♂, 1♀, GHANA: Ashanti Region. / Gyakye Sacred Grove. / 17.0 km SE Kumasi. / 06-33-45.3N, 01-31-27.8W [= 6.56, -1.52] / 247m. 14 September 2005 [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 2. / Trap 2. 80m from / forest edge. bait / trap. Sample 0622533B [printed]”; 1♀, same, except: “28 September 2005” // “Sample 0622534B”; 1♀, same, except: “14 March 2006” // “Sample 0622543A // Carnegie Museum / Specimen Number / CMNH-440,837 [printed]”; 1♀, same, except: “15 March 2006” // “Sample 0622543B”; 1♂, same, except: “4 April 2006” // “Sample 0622544A”; 1♀, same, except: “5 April 2006” // “Sample 0622544B”; 1♀, same, except: “17 May 2006” // “Sample 0622546B”; 1♂, GHANA: Ashanti Region. / Gyakye

Sacred Grove. / 16.9 km SE Kumasi. / 06-33-46.3N, 01-31-28.9W [= 6.56286111, -1.52469444] / 251m. 13 September 2005 [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 1. / Trap 3. at least 80m / from forest edge. bait / trap. Sample 0613533A [printed]"; 2♂, same, except: "14 September 2005" // "Sample 0613533B"; 2♂, same, except: "27 September 2005" // "Sample 0613534A // Carnegie Museum / Specimen Number / CMNH-440,202 [printed]"; 1♂, same, except: "28 September 2005" // "Sample 0613534B"; 1♂, same, except: "21 Feb / 2006" // "Sample 0613542A"; 1♂, same, except: "5 Apr / 2006" // "Sample 0613544B"; 1♀, same, except: "26 Apr / 2006" // "Sample 0613545B"; 1♂, same, except: "17 May 2006" // "Sample 0613546B"; 1♂, 1♀, GHANA: Ashanti Region. / Gyakye Sacred Grove. / 16.9 km SE Kumasi. / 06-33-45.3N, 01-31-28.8W [= 6.56, -1.53] / 244m. 30 August 2005 [printed] // J. Antwi. S. Kuudaar / J. Lewile. Transect 3. / Trap 2. 80m from / forest edge. bait / trap. Sample 0632532A [printed]"; 1♂, same, except: "14 September 2005" // "Sample 0632533B"; 1♂, same, except: "28 September 2005" // "Sample 0632534B"; 2♀, same, except: "19 October 2005" // "Sample 0632535B"; 1♂, same, except: "21 February 2006" // "Sample 0632542A"; 1♀, same, except: "22 February 2006" // "Sample 0632542B"; 2♂, same, except: "15 March 2006" // "Sample 0632543B"; 1♂, same, except: "4 April 2006" // "Sample 0632544A"; 1♀, same, except: "25 April 2006" // "Sample 0632545A"; 1♂, same, except: "26 April 2006" // "Sample 0632545B"; 1♂, GHANA: Ashanti Region. / Gyakye Sacred Grove. / 17.0 km SE Kumasi. / 06-33-43.7N, 01-31-27.8W [= 6.56, -1.52] / 241m. 1 February 2006 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. D. Amankwaa. / Transect 2. Trap 1. / forest edge. bait / trap. Sample 0621541B [printed]"; 1♀, same, except: "14 March 2006" // "Sample 0621543A"; 2♀, same, except: "15 March 2006" // "Sample 0621543B"; 1♂, same, except: "4 April 2006" // "Sample 0621544A"; 1♀, same, except: "26 April 2006" // "Sample 0621545B"; 1♂, same, except: "16 May 2006" // "Sample 0621546A"; 1♂, same, except: "17 May 2006" // "Sample 0621546B"; 1♂, GHANA: Ashanti Region. / Gyakye Sacred Grove. / 16.9 km SE Kumasi. / 06-33-44.4N, 01-31-31W [= 6.56, -1.53] / 241m. 5 April 2006 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. D. Amankwaa. / Transect 3. Trap 1. / forest edge. bait / trap. Sample 0631544B [printed]"; 1♀, same, except: "26 April 2006" // "Sample 0631545B // Carnegie Museum / Specimen Number / CMNH-440,327 [printed]"; 1♀, GHANA: Ashanti Region. / Gyakye Sacred Grove. 16.9 / km SE Kumasi. 06-33-46.5N. / 01-31-32.1W. [= 6.56, -1.53] 239m. 5 Apr / 2006. J. Antwi. S. Kuudaar [printed] // J. Lewile. D. Amankwaa / Transect 2. Trap 3. at / least 80m from forest / edge. bait trap. / Sample 0623544B [printed]"; 1♂, GHANA: Ashanti Region. / Gyakye Sacred Grove. / 16.9 km SE Kumasi. / 06-33-43.5N, 01-31-32.1W [= 6.56, -1.53] / 239m. 13 September 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 2 / Trap 3. at least 80m / from forest edge. bait / trap. Sample 0623533A [printed]"; 1♂, same, except: "14 September 2005" // "Sample 0623533B"; 1♂, same, except: "14 March 2006" // "Sample 0623543A"; 1♂, 1♀, GHANA: Ashanti Region. / Bobiri Forest Reserve / 4.2 km NE Kubeasi. / 06-41-34N, 01-20-22.3W [= 6.69, -1.34] / 264 m. 24 August 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 2 / Trap 4. forest / interior. bait trap. / Sample 0124532B [printed]"; 1♂, same, except: "6 Sept 2005" // "Sample 0124533A"; 3♂, 3♀, same, except: "4 October 2005" // "Sample 0124535A"; 3♂, 2♀, same, except: "5 October 2005" // "Sample 0124535B"; 1♀, same, except: "24 January 2006" // "Sample 0124542A"; 1♂, same, except: "14 February 2006" // "Sample 0124543A"; 1♀, same, except: "15 Feb 2006" // "Sample 0124543B"; 1♂, same, except: "8 March 2006" // "Sample 0124544B"; 1♀, same, except: "28 March 2006" // "Sample 0124545A"; 1♂, 1♀, same, except: "29 March 2006" // "Sample 0124545B"; 1♀, same, except: "18 April 2006" // "Sample 0124546A // Carnegie Museum / Specimen Number / CMNH-440,702 [printed]"; 1♂, 1♀, same, except: "9 May 2006" // "Sample 0124547A"; 1♂, 1♀, GHANA: Ashanti Region. / Bobiri Forest Reserve / 4.1 km NE Kubeasi. / 06-41-26.5N, 01-20-21.3W [= 6.69, -1.34] / 264 m. 20 September 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 2 / Trap 1. forest / interior. bait trap. / Sample 0124534A [printed]"; 1♂, same, except: "28 March 2006" // "Sample 0121545A"; 1♂, same, except: "29 March 2006" // "Sample 0121545B"; 1♂, 1♀, GHANA: Ashanti Region. / Bobiri Forest Reserve / 4.1 km NE Kubeasi. / 06-41-26.8N, 01-20-21.1W [= 6.69, -1.34] / 265 m. 7 September 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 2 / Trap 2. forest / interior. bait trap. / Sample 0122533B [printed]"; 1♂, same, except: "20 September 2005" // "Sample 0122534A"; 1♀, same, except: "21 September 2005" // "Sample 0122534B"; 3♀, same, except: "4 October 2005" // "Sample 0122535A"; 1♂, 2♀, same, except: "5 October 2005" // "Sample 0122535B"; 1♂, same, except: "28 March 2006" // "Sample 0122545A"; 1♂, same, except: "18 April 2006" // "Sample 0122546A // Carnegie Museum / Specimen Number / CMNH-440,425 [printed]"; 1♀, same, except: "19 April 2006" // "Sample 0122546B // Carnegie Museum / Specimen Number / CMNH-440,386 [printed]"; 2♀, GHANA: Ashanti Region. / Bobiri Forest Reserve / 4.1 km NE Kubeasi. / 06-41-30.9N, 01-20-23.1W [= 6.69, -1.34] / 265 m. 7 September 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 2 / Trap 3. forest / interior. bait trap. / Sample 0123533B [printed]"; 2♂, 1♀, same, except: "4 October 2005" // "Sample 0123535A"; 1♂, 4♀, same, except: "5 October 2005" // "Sample 0123535B"; 1♀, same, except: "14 February 2006" // "Sample 0123543A"; 1♂, same, except: "28 March 2006" // "Sample 0123545A"; 1♀, same, except: "29 March 2006" // "Sample 0123545B"; 1♂, same, except: "18 April 2006" // "Sample 0123546A"; 1♀, same, except: "9 May 2006" // "Sample 0123547A"; 1♂, GHANA: Ashanti Region. / Bobiri Forest Reserve / 4.5 km NNE Kubeasi. / 06-41-13.7N, 01-21-25.1W [= 6.69, -1.36] / 241 m. 4 October 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 4 / Trap 4. forest / interior. bait trap. / Sample 0144535A [printed]"; 1♀, same, except: "9 May 2006" // "Sample 0144547A"; 1♂, same,



except: “10 May 2006” // “Sample 0144547B”; 2♀, GHANA: Ashanti Region. / Bobiri Forest Reserve / 2.5 km NNE Kubeasi. / 06-41-14.6N, 01-21-26.9W [= 6.69, -1.36] / 242 m. 4 October 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 4 / Trap 3. forest / interior. bait trap. / Sample 0143535A [printed]”; 1♀, same, except: “28 March 2006” // “Sample 0143545A // Carnegie Museum / Specimen Number / CMNH-440,424 [printed]”; 1♀, same, except: “18 April 2006” // “Sample 0143546A // Carnegie Museum / Specimen Number / CMNH-440,424 [printed]”; 2♂, same, except: “9 May 2006” // “Sample 0143547A”; 1♀, GHANA: Ashanti Region. / Bobiri Forest Reserve / 2.6 km NNE Kubeasi. / 06-41-21.6N, 01-21-35.1W [= 6.69, -1.36] / 300 m. 5 October 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 1 / Trap 3. forest / interior. bait trap. / Sample 0113535B [printed]”; 1♀, GHANA: Ashanti Region. / Bobiri Forest Reserve / 2.6 km NNE Kubeasi. / 06-42-19.9N, 01-21-12.7W [= 6.71, -1.35] / 256 m. 4 October 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 3 / Trap 2. forest / interior. bait trap. / Sample 0132535A [printed]”; 1♂, GHANA: Ashanti Region. / Bobiri Forest Reserve / 2.6 km NNE Kubeasi. / 06-41-20.6N, 01-21-39.8W [= 6.69, -1.36] / 299 m. 18 April 2006 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. D. Amankwaa. / Transect 1. Trap 2. 80m / from forest edge. bait / trap. Sample 0112546A”; 1♀, same, except: “10 May 2006” // “Sample 0112547B”; 1♂, GHANA: Ashanti Region. / Bobiri Forest Reserve / 2.6 km NNE Kubeasi. / 06-41-17N, 01-21-31W [= 6.69, -1.36] / 263 m. 4 October 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 4 / Trap 1. forest / interior. bait trap. / Sample 0141535A [printed]”; 1♂, same, except: “18 April 2006” // “Sample 0141546A”; 1♂, same, except: “9 May 2006” // “Sample 0141547A”; 1♂, GHANA: Ashanti Region. / Bobiri Forest Reserve / 2.6 km NNE Kubeasi. / 06-42-19.4N, 01-21-11.7W [= 6.71, -1.35] / 255 m. 28 March 2006 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. D. Amankwaa. / Transect 3. Trap 4. 240m / from forest edge. bait / trap. Sample 0134545A”; 1♂, same, except: “10 May 2006” // “Sample 0134547B”; 1♂, GHANA: Ashanti Region. / Bobiri Forest Reserve / 2.6 km NNE Kubeasi. / 06-41-15.8N, 01-21-27.9W [= 6.69, -1.36] / 244 m. 18 April 2006 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. D. Amankwaa. / Transect 4. Trap 2. / forest interior. bait / trap. Sample 0142546A // Carnegie Museum / Specimen Number / CMNH-440,387 [printed]”; 1♂, same, except: “9 May 2006” // “Sample 0142547A”; 1♀, GHANA: Ashanti Region. / Bonwire Sacred Grove / 18.9 km ENE Kumasi. / 06-46-26.1N, 01-28-22.1W [= 6.78, -1.47] / 303 m. 18 May 2006 [printed] // Jakob Asare. Transect / 1. Trap 4. forest / edge. bait trap. / Sample 0414547B”; 1♂, GHANA: Ashanti Region. / Bonwire Sacred Grove / 18.7 km ENE Kumasi. / 06-46-16.8N, 01-28-24.1W [= 6.77, -1.47] / 311 m. 18 May 2006 [printed] // Jakob Asare. Transect / 2. Trap 1. forest / interior. bait trap. / Sample 0421547B”; 1♂, GHANA: Ashanti Region. / Bonwire Sacred Grove / 18.8 km ENE Kumasi. / 06-46-21.3N, 01-28-23.6W [= 6.77, -1.47] / 303 m. 19 Aug 2005 [printed] // Jakob Asare. Transect / 2. Trap 3. 160m from / forest / edge. bait / trap. Sample 0423534B”; 1♀, same, except: “26 Aug 2005” // “Sample 0423532B // Carnegie Museum / Specimen Number / CMNH-440,391 [printed]”; 1♀, same, except: “7 Sep 2005” // “Sample 0423536A”; 1♀, GHANA: Ashanti Region. / Bonwire Sacred Grove / 18.9 km ENE Kumasi. / 06-46-26.9N, 01-28-24.4W [= 6.77, -1.47] / 301 m. 11 Aug 2005 [printed] // Jakob Asare. Transect 2 / Trap 4. at least 160m / from forest edge. bait. / trap. Sample 0424533A”; 1♀, GHANA: Ashanti Region. / Bonwire Sacred Grove / 18.8 km ENE Kumasi. / 06-46-18.2N, 01-28-20W [= 6.77, -1.47] / 311 m. 12 Aug 2005 [printed] // Jakob Asare. Transect / 1. Trap 1. forest / edge. bait trap. / Sample 0411533B”; 1♀, GHANA: Ashanti Region. / Bonwire Sacred Grove / 18.8 km ENE Kumasi. / 06-46-18.9N, 01-28-23.8W [= 6.77, -1.47] / 306 m. 26 April 2006 [printed] // Jakob Asare. Transect / 2. Trap 2. 80m from / forest edge. bait / trap. Sample 0422546A”; 1♂, GHANA: Western Region. / Dadieso Forest Reserve / 8.3 km SSE Dadieso. / 06-02-54.5N, 03-00-11.5W [= 6.05, -3.00] / 286 m. 18 June 2008 [printed] // Janise Bossart. / Transect 1. Trap 2. / forest edge. bait / trap. Sample 081218”; 1♂, 1♀, GHANA: Western Region. / Dadieso Forest Reserve / 8.8 km SSE Dadieso. / 06-02-37.3N, 03-00-10.7W [= 6.04, -3.00] / 234 m. 20 June 2008 [printed] // Janise Bossart. / Transect 1. Trap 4. / forest edge. bait / trap. Sample 081420”; 1♀, same, except: “19 June 2008” // “Sample 081419”; 2♂, GHANA: Western Region. / Dadieso Forest Reserve / 8.4 km SSE Dadieso. / 06-02-58.6N, 02-59-59.5W [= 6.05, -3.00] / 215 m. 23 June 2008 [printed] // Janise Bossart. / Transect 1. Trap 6. / forest edge. bait / trap. Sample 081623”; 1♂, same, except: “19 June 2008” // “Sample 081619”; 1♂, GHANA: Western Region. / Dadieso Forest Reserve / 8.9 km SSE Dadieso. / 06-02-34.3N, 03-00-10.9W [= 6.04, -3.00] / 238 m. 18 June 2008 [printed] // Janise Bossart. / Transect 1. Trap 5. / forest edge. bait / trap. Sample 081518”; 1♀, same, except: “20 June 2008” // “Sample 081520”; 2♀, same, except: “21 June 2008” // “Sample 081521”; 1♂, same, except: “23 June 2008” // “Sample 081523”; 2♂, GHANA: Western Region. / Dadieso Forest Reserve / 8.6 km SSE Dadieso. / 06-02-43.9N, 03-00-11.1W [= 6.05, -3.00] / 291 m. 21 June 2008 [printed] // Janise Bossart. / Transect 1. Trap 3. / forest edge. bait / trap. Sample 081321”; 1♂, 1♀, GHANA: Western Region. / Dadieso Forest Reserve / 8.8 km SSE Dadieso. / 06-02-43.9N, 03-00-10.7W [= 6.05, -3.00] / 234 m. 22 June 2008 [printed] // Janise Bossart. / Transect 1. Trap 4. / forest edge. bait / trap. Sample 081422”; 1♀, GHANA: Western Region. / Dadieso Forest Reserve / 8.5 km SSE Dadieso. / 06-02-49.4N, 03-00-11.8W [= 6.05, -3.00] / 266 m. 22 June 2008 [printed] // Janise Bossart. / Transect 1. Trap 7. / forest edge. bait / trap. Sample 081722”; 1♀, same, except: “23 June 2008” // “Sample 081723”; 1♀, GHANA: Ashanti Region. / Kona Sacred Grove. / 23.6 km NNE Kumasi. / 06-52-25.6N, 01-31-28.9W [= 6.87, -1.53] / 294 m. 17 February 2006 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. D. Amankwaa. / Transect 1. Trap 3. 160m / from forest edge. bait / trap. Sample 0713542B // Carnegie Museum / Specimen Number / CMNH-440,478”; 1♂, GHANA: Ashanti Region. / Kajease Sacred Grove. / 5.7

km SW Kumasi. / 06-38-43.7N, 01-39-03.1W [= 6.65, -1.65] / 234 m. 11 April 2006 [printed] // S. Kuudaar. J. Lewile / D. Amankwaa. Transect 2. / Trap 3. less than 60m / from forest edge. bait / trap. Sample 0323545A // Carnegie Museum / Specimen Number / CMNH-440,775"; 1♂, GHANA: Ashanti Region. / Kajease Sacred Grove. 5.9 / km SW Kumasi. 06-38-36.7N / 01-39-07.8W. [= 6.64, -1.65] 239m. 2 May / 2006 [printed] / J. Antwi. S. Kuudaar [printed] / J. Lewile / D. Amankwaa. / Transect 1. Trap 4. / less than 160 m from / forest edge. bait / trap. Sample 0314546A"; 1♀, GHANA: Ashanti Region. / Kajease Sacred Grove. / 6.0 km SW Kumasi. / 06-38-33.4N. 01-39-07.3W [= 6.64, -1.65] / 229m. 21 March 2006 [printed] // S. Kuudaar. J. Lewile. / D. Amankwaa. Transect 1 / Trap 3. / less than 160 m / from forest edge. bait / trap. Sample 0313544A"; 1♀, GHANA: Ashanti Region. / Kajease Sacred Grove. / 6.2km SW Kumasi. / 06-38-31.5N. 01-39-08.5W [= 6.64, -1.65] / 233 m. 2 May 2006 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. D. Amankwaa. / Transect1. Trap 3. 80m / from forest edge. bait / trap. Sample 0312546A; 2♂, 2♀, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.5km SSE / Kumasi. 06-28-48.1N. / 01-33-52.6W. [= 6.48, -1.57] 235 m. / 31 August 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 3. / Trap 1. forest / interior. bait trap. / Sample 0531532B [printed]" [1♀ labelled "// Carnegie Museum / Specimen Number / CMNH-440,894 [printed]"; 1♂, 1♀, same, except: "13 September 2005" // "Sample 0531533A"; 1♂, same, except: "24 February 2006" // "Sample 0531542B"; 1♂, same, except: "16 March 2006" // "Sample 0531543A // Carnegie Museum / Specimen Number / CMNH-440,188 [printed]"; 1♂, 1♀, same, except: "7 April 2006" // "Sample 0531544B"; 1♀, same, except: "28 April 2006" // "Sample 0531545B"; 1♂, 1♀, same, except: "18 May 2006" // "Sample 0531546A" [♀ labelled: "// Carnegie Museum / Specimen Number / CMNH-440,781 [printed]"; 1♂, same, except: "19 May 2006" // "Sample 0531546B"; 3♂, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.5km SSE / Kumasi. 06-28-48.5N. / 01-33-51.6W. [= 6.48, -1.56] 233 m. / 31 August 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 3 / Trap 2. forest / interior. bait trap. / Sample 0532532B [printed]"; 2♀, same, except: "30 August 2005" // "Sample 0532532A"; 2♀, same, except: "20 October 2005" // "Sample 0532535A"; 1♀, same, except: "28 April 2006" // "Sample 0532545B"; 1♀, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.6km SSE / Kumasi. 06-28-46.9N. / 01-33-43.1W. [= 6.48, -1.56] 218 m. / 30 August 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 1 / Trap 4. 240m from / forest edge. bait / trap. Sample 0514532A [printed]"; 3♂, 2♀, same, except: "14 September 2005" // "Sample 0514533B"; 2♀, same, except: "28 September 2005" // "Sample 0514534B"; 1♀, same, except: "23 December 2005" // "Sample 0514538B"; 1♀, same, except: "17 March 2006" // "Sample 0514543B"; 1♂, same, except: "6 April 2006" // "Sample 0514544A"; 1♀, same, except: "7 April 2006" // "Sample 0514544B"; 1♀, same, except: "28 April 2006" // "Sample 0514545B // Carnegie Museum / Specimen Number / CMNH-440,545 [printed]"; 1♂, 1♀, same, except: "18 May 2006" // "Sample 0514546A"; 1♂, 1♀, same, except: "19 May 2006" // "Sample 0514546B"; 1♂, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.6km SSE / Kumasi. 06-28-49.4N. / 01-33-35.5W. [= 6.48, -1.56] 212 m. / 31 August 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 2. / Trap 4. 240m from / forest edge. bait / trap. Sample 0524532B [printed]"; 1♂, 1♀, same, except: "14 September 2005" // "Sample 0524533B"; 3♀, same, except: "27 September 2005" // "Sample 0524534A"; 2♂, 1♀, same, except: "28 September 2005" // "Sample 0524534B"; 1♂, same, except: "23 February 2006" // "Sample 0524542A"; 2♂, same, except: "16 March 2006" // "Sample 0524543A"; 1♀, same, except: "7 April 2006" // "Sample 0524544B"; 1♀, same, except: "27 April 2006" // "Sample 0524545A"; 1♂, same, except: "19 May 2006" // "Sample 0524546B"; 1♂, 2♀, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.5km SSE / Kumasi. 06-28-51.6N. / 01-33-35.5W. [= 6.48, -1.56] 208 m. / 31 August 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 2 / Trap 3. 160m from / forest edge. bait / trap. Sample 0523532B [printed]"; 2♂, same, except: "14 September 2005" // "Sample 0523533B"; 2♂, same, except: "27 September 2005" // "Sample 0523534A"; 1♂, same, except: "28 September 2005" // "Sample 0523534B"; 1♀, same, except: "23 December 2005" // "Sample 0523538B // Carnegie Museum / Specimen Number / CMNH-440,286 [printed]"; 1♂, same, except: "23 February 2006" // "Sample 0523542A"; 1♂, same, except: "24 February 2006" // "Sample 0523542B"; 1♂, same, except: "16 March 2006" // "Sample 0523543A"; 1♀, same, except: "7 April 2006" // "Sample 0523544B"; 1♂, same, except: "19 May 2006" // "Sample 0523546B"; 1♀, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.5km SSE / Kumasi. 06-28-45.5N. / 01-33-51.6W. [= 6.48, -1.56] 233m. / 13 September 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 3 / Trap 2. forest / interior. bait trap. / Sample 0532533A [printed]"; 1♂, 1♀, same, except: "14 September 2005" // "Sample 0532533B"; 1♀, same, except: "2 December 2005" // "Sample 0532537B"; 2♂, same, except: "23 February 2006" // "Sample 0532542A"; 1♀, same, except: "18 May 2006" // "Sample 0532546A // Carnegie Museum / Specimen Number / CMNH-440,708 [printed]"; 1♂, same, except: "19 May 2006" // "Sample 0532546B"; 1♀, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.4km SSE / Kumasi. 06-28-54.4N. / 01-33-37.1W. [= 6.48177778,

-1.56030556] 210m. / 30 August 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 2 / Trap 2. 80m from / forest edge. bait / trap. Sample 0522532A [printed]"; 1♂, same, except: "14 September 2005" // "Sample 0522533B // Carnegie Museum / Specimen Number / CMNH-440,224 [printed]"; 1♂, same, except: "27 September 2005" // "Sample 0522534A"; 1♂, 2♀, same, except: "28 September 2005" // "Sample 0522534B"; 1♂, same, except: "2 February 2006" // "Sample 0522541A"; 1♂, same, except: "3 February 2006" // "Sample 0522541B"; 1♂, same, except: "23 February 2006" // "Sample 0522542A"; 1♂, same, except: "24 February 2006" // "Sample 0522542B"; 1♂, same, except: "7 April 2006" // "Sample 0522544B"; 1♂, same, except: "27 April 2006" // "Sample 0522545A"; 1♂, 1♀, same, except: "18 May 2006" // "Sample 0522546A"; 1♂, same, except: "19 May 2006" // "Sample 0522546B"; 1♂, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.7km SSE / Kumasi. 06-28-41.8N. / 01-33-44.3W. [= 6.48, -1.56] 208m. / 30 August 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 1 / Trap 2. 80m from / forest edge. bait / trap. Sample 0512532A [printed]"; 2♂, same, except: "31 August 2005" // "Sample 0512532B"; 1♂, 1♀, same, except: "14 September 2005" // "Sample 0512533B"; 1♂, same, except: "27 September 2005" // "Sample 0512534A"; 1♀, same, except: "20 October 2005" // "Sample 0512535A"; 1♂, same, except: "2 February 2006" // "Sample 0512541A"; 1♂, same, except: "24 February 2006" // "Sample 0512542B"; 1♀, same, except: "27 April 2006" // "Sample 0512545A"; 1♀, same, except: "28 April 2006" // "Sample 0512545B"; 1♂, same, except: "18 May 2006" // "Sample 0513546A"; 2♀, same, except: "19 May 2006" // "Sample 0512546B"; 1♂, GHANA: Ashanti Region. / Asantemanso Sacred Forest / 23.3km SSE Kumasi. / 06-28-56.8N. / 01-33-35.7W. [= 6.48, -1.56] / 211m. / 14 September 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. D. Amankwaa. / Transect 2. Trap 1. / forest edge. bait / trap. Sample 0521533B [printed]"; 1♀, same, except: "28 September 2005" // "Sample 0521534B"; 1♀, same, except: "20 October 2005" // "Sample 0521535A"; 1♂, same, except: "2 February 2006" // "Sample 0521541A"; 1♀, same, except: "23 February 2006" // "Sample 0521542A"; 1♀, same, except: "6 April 2006" // "Sample 0521544A"; 1♂, same, except: "18 May 2006" // "Sample 0521546A"; 2♀, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.8km SSE / Kumasi. 06-28-39.3N. / 01-33-42.1W. [= 6.48, -1.56] 202m [printed] // 30 Aug 2005. J. Antwi / S. Kuudaar. J. Lewile / Transect 1. Trap 1. / forest edge. bait / trap. Sample 0511532A [printed]"; 1♀, same, except: "13 Sep 2005" // "Sample 0511533A"; 2♂, 1♀, same, except: "14 Sep 2005" // "Sample 0511533B"; 1♂, same, except: "28 Sept 2005" // "Sample 0511534B"; 1♂, same, except: "23 February 2006" // "Sample 0511542A"; 1♀, same, except: "16 March 2006" // "Sample 0511543A"; 1♂, same, except: "7 April 2006" // "Sample 0511544B"; 1♂, same, except: "27 April 2006" // "Sample 0511545A"; 1♂, same, except: "28 April 2006" // "Sample 0511545B // Carnegie Museum / Specimen Number / CMNH-

440,547 [printed]"; 2♀, same, except: "18 May 2006" // "Sample 0511546A"; 2♂, 1♀, GHANA: Ashanti Region. / Asantemanso Sacred / Forest. 23.7km SSE / Kumasi. 06-28-43.8N. / 01-33-43.9W. [= 6.48, -1.56] 213 m. / 14 September 2005 [printed] // J. Antwi. S. Kuudaar. / J. Lewile. Transect 1. / Trap 3. 160m from / forest edge. bait / trap. Sample 0513533B [printed]"; 2♂, 1♀, same, except: "28 September 2005" // "Sample 0513534B"; 1♀, same, except: "24 February 2006" // "Sample 0513542B"; 1♂, same, except: "7 April 2006" // "Sample 0513544B // Carnegie Museum / Specimen Number / CMNH-440,753 [printed]"; 1♂, same, except: "27 April 2006" // "Sample 0513545A"; 1♂, same, except: [no date] // "Sample 0513532A"; 1♀, same, except: [no date] // "Sample 0513535A"; 1♀, same, except: [no date] // "Sample 0513537A" (all CMNH).

*Distribution.* Côte d'Ivoire and Ghana.

*Bionomics.* A species restricted to the Eastern Guinean Forest at elevations between *ca* 202 and 306 m (Fig. 158) more strictly to the forests east of the Bandama River in Côte d'Ivoire (H. Takano, pers. comm. 2025). Label data indicate the species was collected from a cocoa tree and in a cocoa plantation, swept in forest, caught on roadside, on bush and on leaf in bush. A long series of specimens from Ghana were sampled in hanging butterfly traps baited with fermenting fruit (J.L. Bossart, pers. comm. 2025). Specimen label data indicate that the species is active all months of the year, except November.

***Engistoneura vicina* Kirk-Spriggs & Whittington, sp. nov.**

Figs 1, 68, 69, 90, 111, 124, 127, 128, 159

*Etymology.* The specific epithet *vicina* is derived from the Latin adjective *vicinus*, meaning near or neighbouring, referring to the close similarity between representatives of the *E. moerens* species-group.

*Description:* ♂ (largely based on field-pinned holotype).

*Measurements.* Holotype ♂ (Figs 68, 69) body length: 11.6 mm (range: 7.6–11.6 mm;  $\bar{x}$  = 9.1 ± 0.9 mm; *n* = 30); wing length: 11.3 mm (range: 8.2–11.3 mm;  $\bar{x}$  = 10.1 ± 0.8 mm; *n* = 30).

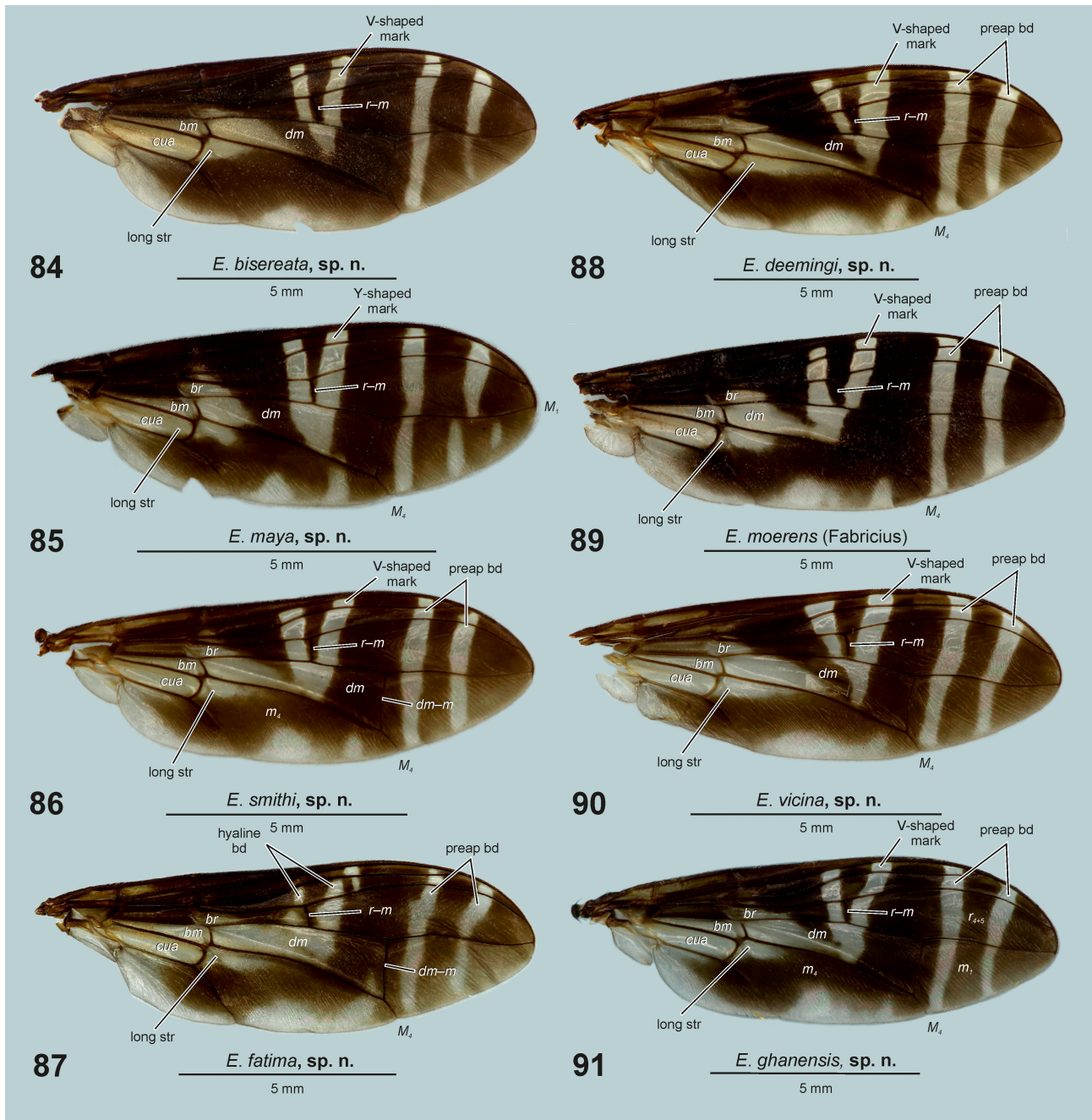
*Colour/vestiture.* Ground colour dark grey-brown (Figs 1, 68, 69) abdominal tergites with dark metallic blue-green lustre, in contrast to buff-yellow on: occiput, medial linear mark on frons, antennae, facial carina, centre of face and clypeus, gena, postgena, posteromedial area of katapisternum, fore coxae, basal  $\frac{2}{3}$  of mid and hind femora. Scutum and scutellum (Fig. 111) with faint metallic green lustre (under certain angles of light) with 3 broad vittae formed of dense pale grey microtrichia, terminating at scutoscutellar suture. Wing membrane (Fig. 90) predominately dark brown, with hyaline stripe through cells *br*, *bm* and basal  $\frac{1}{2}$  of cell *dm* not joined to distinctive V-shaped hyaline mark located at crossvein *r-m* and 2 parallel hyaline preapical bands. Abdomen (Fig. 69) dark brown with metallic blue-green lustre; intersegmental membranes buff-brown, sternites brown, with blue-green metallic reflections.



**FIGURES 76–83.** Wings of *Engistoneura* species, dorsal views. **76.** *E. parallela* Hendel (N-T, Njala, Sierra Leone, NMHUK). **77.** *E. hexafascia*, **sp. nov.** (HT, Njala, Sierra Leone, NHMUK). **78.** *E. nebula*, **sp. nov.** (HT, Sembahun, Sierra Leone, NMHUK). **79.** *E. currani* Steyskal (PT, Du River, Liberia, AMNH). **80.** *E. elvillah*, **sp. nov.** (PT, Dalaba, Guinea, ANHRT). **81.** *E. mc Alpinei*, **sp. nov.** (PT, Sierra Leone, NHMUK). **82.** *E. obscura* Hendel (N-T., Mondika Camp, Republic of Congo, ANHRT). **83.** *E. ankasa*, **sp. nov.** (PT ♀, Ankasa Forest Reserve, Ghana, CMNH). Abbreviations: bd—band; *bm*—basal medial cell; *br*—basal radial cell; *C*—costal vein; *cua*—anterior cubital cell; *dm*—discal medial cell; *dm-m*—discal medial crossvein; long str—longitudinal stripe; *m*<sub>1</sub>—first medial cell; *M*<sub>4</sub>—fourth branch of media; *m*<sub>4</sub>—fourth medial cell; preap bd—preapical band(s); *R*<sub>1</sub>—anterior branch of radius; *r-m*—radial-medial crossvein.

**Head** (Figs 68, 69, 124, 127, 128). Facial carina with rounded margins and smooth surface, especially dorsal extremity between antennae. Fine silver microtrichia in narrow margin around compound eye, along upper margin of gena and as 2 distinct maculae on lateral frons, where this joins parafacial and slightly dorsal to it. Antennal pedicel with fine black setae dorsally and apically. Postpedicel pale buff-yellow at base, tinged brown dorsally and toward apex, with fine yellowish golden microtrichia on ventral margin basally (extent of

which differs with angle of light and viewing). Arista with combined length of dorsal and ventral vestiture no greater than width of postpedicel. Antennal groove shiny dark brown at ventral extremity, where this joins brown facial vitta. Gena with single black, forwardly directed seta, posterior to which is small patch of black setulae at oral margin; genal and postgenal setulae fine, pale, virtually indistinct and widely spaced, black and longer around occipital foramen. Palpus with apex dull black with ash grey microtrichia, especially at apex on



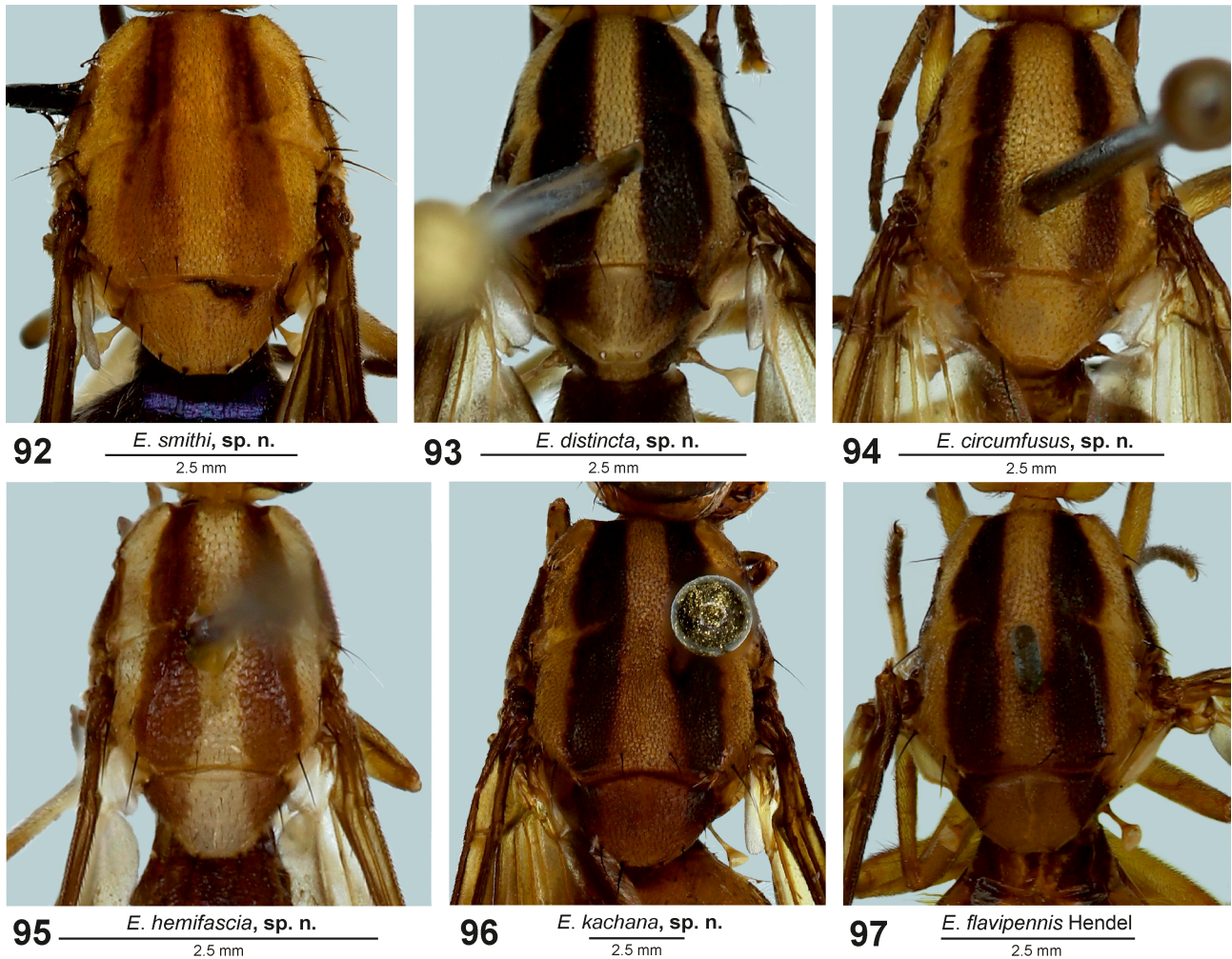
**FIGURES 84–92.** Wings of *Engistoneura* species, dorsal views. **84.** *E. biseriata*, **sp. nov.** (PT, Taï National Park, Côte d’Ivoire, ANHRT). **85.** *E. maya*, **sp. nov.** (PT, Dalaba, Guinea, ANHRT). **86.** *E. smithi*, **sp. nov.** (PT, Kumasi, Ghana, NHMUK). **87.** *E. fatima*, **sp. nov.** (PT, Loma Mountains, Sierra Leone, ANHRT). **88.** *E. deemingi*, **sp. nov.** (PT, Taï National Park, Côte d’Ivoire, ANHRT). **89.** *E. moerens* (N-T, Banco National Park, Côte d’Ivoire, ANHRT). **90.** *E. vicina*, **sp. nov.** (PT, Kpaine, Liberia, NHMUK). **91.** *E. ghanensis*, **sp. nov.** (PT ♀, Asantemanso Sacred Forest, Ghana, CMNH). Abbreviations: bd—band; bm—basal medial cell; br—basal radial cell; cua—anterior cubital cell; dm—discal medial cell; dm-m—discal medial crossvein; long str—longitudinal stripe;  $M_1$ —first branch of media;  $m_1$ —first medial cell;  $M_4$ —fourth branch of media;  $m_4$ —fourth medial cell; preap bd—preapical bands;  $r_{4+5}$ —fourth + fifth radial cells; r-m—radial-medial crossvein.

dorsal margin; setulae black. Prementum buff-yellow; labellum brown, darker at apex; setulae orange-brown to golden.

**Thorax** (Figs 68, 69, 111, 124). Thoracic pleura dark brown, except posteromedial area of katepisternum buff-yellow. Bullate cervical sclerite dark tan-brown, progressively darker dorsally, contrasting with pale buff

proepisternum. Anepisternum and katepisternum, anterior  $\frac{1}{2}$  of anepimeron and entire anatergite densely covered in pale, silver-grey microtrichia (viewed obliquely). Short brown setulae evenly distributed across scutum and anepisternum, longer on remaining pleura.

**Scutellum** (Fig. 111). Slightly convex on dorsal surface.



**FIGURES 92–97.** Scutum and scutellum of *Engistoneura* species, dorsal views. **92.** *E. smithi*, sp. nov. (HT, Amanikro, Côte d’Ivoire, RMCA). **93.** *E. distincta*, sp. nov. (HT, Loma Mountains, Sierra Leone, ANHRT). **94.** *E. circumfusus*, sp. nov. (HT, N’Zérékoré, Guinea, MZLU). **95.** *E. hemifascia*, sp. nov. (HT, Bingerville, Côte d’Ivoire, MNHN). **96.** *E. kachana*, sp. nov. (HT, Dadieso Forest Reserve, Ghana, CMNH). **97.** *E. flavipennis* Hendel, 1914 (LT, Kumasi, Ghana, NHMUK).

*Legs* (Fig. 69). Fore femur with 3 pointed, black subapical spines on posterior ventral margin. Mid coxal prong narrow, parallel-sided, rounded at apex. Mid coxal apophysis triangulate, with black setulae dorsally. Hind coxa with narrow posterior margin, the outermost extremity developed into stout, rounded lobe.

*Wing* (Fig. 90). Crossvein *r-m* angle = 8°; ratio minimum width cell  $r_{2+3}$  : length crossvein *r-m* = 2.0; crossveins *r-m* : *dm-m* angle = 0° (i.e., parallel); ratio crossvein *r-m* ( $R_{4+5}-M_1$ ) : wing width at crossvein *dm-m* = 0.48. Wing membrane dark brown with broad hyaline stripe through basal cells and basal 1/2 of cell *dm* not joined to 2 hyaline bands either side of crossvein *r-m* converging to form V-shaped mark; 2 narrow parallel preapical hyaline bands; faint hyaline marks present along hind margin of anal lobe and cell  $m_4$ . Ventral auxiliary sclerite shiny, black basally with orange-brown bulbous cap. Halter knob buff-brown, stem slightly darker.

*Abdomen* (Figs 68, 69). Tergites with white setulae, long at lateral margins and silver-grey microtrichia apparent on tergites 2–5.

*Terminalia.* External parts with epandrium pale buff, cerci and surstyli paler.

Female similar to male, only differing in sexual characters.

*Variation.* There is some variation in the extent of the pale marking on the posteromedial area of the katepisternum. The two hyaline wing bands that form the V-shaped mark do not join one another in some specimens and the extent of hyaline areas at the margin of wing in cell  $m_4$  are also variable.

*Diagnosis.* Scutum (Fig. 111) predominantly dark grey-brown, with vittae comprised of pale grey to silver microtrichia; thoracic pleura (Fig. 124) at least in part, concolorous with dark grey-brown scutum; anepisternum unicoloured, entirely dark brown to black, without pale anterior and posterior margins; wing membrane (Fig. 90) with V-shaped hyaline mark converging in cell *dm* level with crossvein *r-m*, joined to stripe through cells *bm*, *cua* and basal 2/3 of cell *dm*; frontal carina narrow, triangular, lateral margins straight and evenly converging between antennal sockets; armature of fore femur consisting of uniserial



98 *E. mcalpinei*, sp. n.  
2.5 mm



99 *E. hexafascia*, sp. n.  
2.5 mm



100 *E. fatima*, sp. n.  
2.5 mm



101 *E. parallela* Hendel  
2.5 mm



102 *E. currani* Steyskal  
2.5 mm



103 *E. lugens* (Fabricius)  
2.5 mm

**FIGURES 98–103.** Scutum and scutellum of *Engistoneura* species, dorsal views. **98.** *E. mcalpinei*, sp. nov. (PT, Sierra Leone, NHMUK) [wing removed for imaging]. **99.** *E. hexafascia*, sp. nov. (HT, Njala, Sierra Leone, NHMUK) [wing removed for imaging]. **100.** *E. fatima*, sp. nov. (PT, Loma Mountains, Sierra Leone, ANHRT) [wing removed for imaging]. **101.** *E. parallela* Hendel (N-T, Njala, Sierra Leone, NMHUK). **102.** *E. currani* Steyskal (HT, Du River, Liberia, AMNH). **103.** *E. lugens* (Fabricius) (N-T, Moyanba, Sierra Leone, NHMUK).

pointed spines on posterior (*i.e.*, outer) ventral margin.

*Type material examined:* **LIBERIA:** holotype ♂, “Du River [= Dukwia River, 6.343710, -10.356163] / Camp No3 / Liberia” [printed] // *Engistoneura / catogastera* Big. / Det. C.H. Curran [handwritten and printed] // **HOLOTYPE** ♂ / *Engistoneura / vicina* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with red border; printed]” (AMNH). Direct-pinned in good condition, left mid leg missing. Paratypes (all labelled: “// **PARATYPE** ♂ [or ♀] / *Engistoneura / vicina* sp. nov. / Kirk-Spriggs & Whittington / 2024 [white card with blue border; printed]”: **CAMEROON:** 3♂, 3♀, “CAMEROUN, 14 mi. / E Douala [4.05, 9.683333], 80 m. / 20.XI.1966 / E.S. Ross & / K. Lorenzen [printed] // collection of the / CALIFORNIA ACADEMY / OF SCIENCES, San / Francisco, Calif. [printed] // CASENT / 8604639–8604644 [printed with QR code]” (all CAS); 4♂, 3♀, “CAMEROUN: 36 mi. / N. Kribi [= 2.94,

9.91], 100 m. / 19-X-1966 / E.S. Ross & / K. Lorenzen / // collection of the / CALIFORNIA ACADEMY / OF SCIENCES, San / Francisco, Calif. [printed] // CASENT / 8604645–8604649 [printed with QR code]” (all CAS, except 1♂ AEWG); 1♀, “near Douala [4.04, 9.76] / Fr. Cameroon / V-23, VI-17.[19]36 [handwritten] // swept in / forest clearing [handwritten] // van Zwaluven / berg / & McGough [printed] // Sp.121 [yellow paper; handwritten] // “*Engistoneura / sp.* (near *obscura* / Hend.)” [yellow paper; handwritten]” (USNM); 1♀, “Congo Franc. [no locality] / Cap. Cottes [pale blue card; printed and handwritten]” (MNHN). **CÔTE D’IVOIRE:** 2♂, 5♀, “Yanlé [printed] [= Yéalé, 7.53, -8.42] / MUSÉUM PARIS / Nimba (Guinée) / M. Lamotte 11.vi.[19]42 [blue card, printed]” (all MNHN); 1♀, “Ivory Coast. / Lamto [= 6.21, -5.01], / 11–29.xi.1988, / J.S. Noyes” (NMWC); 1♂, “Côte d’Ivoire: Man, Mt. / Tonkoui, 1200 m, piège / Malaise, 03–10.xi.2019 / 07°27’15”N, 07°38’14”W [= 7.45, -7.64] /



104 *E. nebula*, sp. n.  
2.5 mm



105 *E. elvillah*, sp. n.  
2.5 mm



106 *E. obscura* Hendel  
2.5 mm



107 *E. maya*, sp. n.  
2.5 mm



108 *E. biseriata*, sp. n.  
2.5 mm



109 *E. moerens* (Fabricius)  
2.5 mm

**FIGURES 104–109.** Scutum and scutellum of *Engistoneura* species, dorsal views. **104.** *E. nebula*, sp. nov. (HT, Sembehun, Sierra Leone, NMHUK). **105.** *E. elvillah*, sp. nov. (HT, Dalaba, Foret de Goubel, Guinea, ANHRT). **106.** *E. obscura* Hendel (N-T, Mbeli Camp, Republic of Congo, ANHRT). **107.** *E. maya*, sp. nov. (PT, Dalaba, Foret de Goubel, Guinea, ANHRT). **108.** *E. biseriata*, sp. nov. (PT, Tai Research Station, Côte d’Ivoire, ANHRT). **109.** *E. moerens* (Fabricius) (N-T, Banco National Park, Côte d’Ivoire, NMSA).

Rec. Y. Braet & A. Gué [printed]”; 1♀, same date, except: “28.x–06.x.2019” (both AEWC); 2♂, 3♀, “IVORY COAST 380m / Yéalé Village, Mt. Nimba / 07°31'35.3"N, 08°25'20.1"W [= 7.54, -8.42] / 18–29.iv.2016 Human Dung / Pitfall. Aristophanous, M., / Geiser, M., Moretto, P. Leg. / ANHRT:2017.17 [printed] // ANHRT / 00244448, 00244449, 00244451, 00280677, 00280678 [printed]”; 2♀, same data, except: “/ 07°32'18.8"N, 08°25'23.8"W [= 7.54, -8.42], 18–29.iv.2016 [printed] // ANHRT / 00244450, 00244452 [printed]”; 2♂, 1♀, “IVORY COAST 1171 m / Mt. Tonkoui Peak / 07°27'15.2"N, 07°38'12.5"W [= 7.45, -7.64] / 9–16.iv.2016 Human dung / pitfall. Aristophanous, M., / Geiser, M. / Moretto, P. Leg. / ANHRT:2017.17 [printed] // ANHRT / 00244443–00244445 [printed]”; 3♀, same data, except: “/ 16–21.vii.2016, Aristophanous, M., / Moretto, P., Ouattara, S. Leg. / ANHRT:2017.20 [printed] // ANHRTUK / 00280674–00280676 [printed]”; 1♀, same data, except: “/ 12–18.vii.2015 Malaise Trap / Aristophanous, M., / Moretto, P., / Ruzzier, E. Leg. / ANHRT:2017.14 [printed] // ANHRTUK / 00279990

[printed]; 1♂, 2♀, same data, except: “/ 1–8.xi.2015 // ANHRTUK / 00280683–00280685 [printed]”; 1♀, same data, except: “/ 19–27.xi.2019 / Aristophanous, M., / Dérozier, V., Moretto, P., / Ouattara, S. Leg. / ANHRT:2019.23 [printed] // ANHRTUK / 00279366 [printed]; 1♂, “IVORY COAST 801m / Mount Nimba Camp (Closed forest) / 07°35'07.7"N, 08°25'08.6"W [= 7.59, -7.592] / 28.iv–8.v.2016 Human dung / Pitfall. Aristophanous, M., / Geiser, M., Moretto, P. Leg. / ANHRT:2017.17 [printed] // ANHRTUK / 00244447 [printed]”; 3♂, 1♀, “IVORY COAST 453m / Biémasso village / (Plantation / Sudanian forest / Mosaic with Gallery forest) / 08°04'9.2"N, 07°33'2.94"W [= 8.07, -7.55] / 4–5.vi.2018 General Coll. / Aristophanous, M., Miles, W., / Moretto, P., Ouattara, Y. Leg. / ANHRT:2018.28 [printed] // ANHRTUK / 00280692–00280695 [printed]” (all ANHRT); 1♀, “MUSÉUM PARIS / HAUT-CAVALLY / PAYS DYOLA / ONA [= Oua, 7.447375, -8.165520] / A. CHEVALIER 1910 [pale blue card, printed]” (MNHN). **EQUATORIAL GUINEA:** 1♂, “MUSÉUM PARIS /





**110** *E. deemingi* sp. n.  
2.5 mm



**111** *E. vicina*, sp. n.  
2.5 mm



**112** *E. ankasa*, sp. n.  
2.5 mm

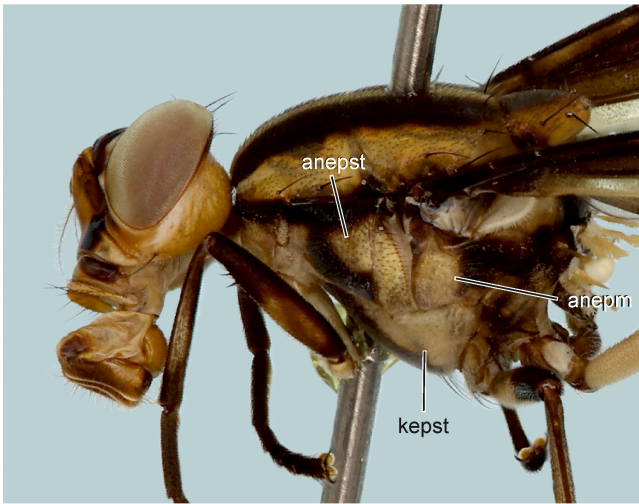


**113** *E. ghanensis*, sp. n.  
2.5 mm

**FIGURES 110–113.** Scutum and scutellum of *Engistoneura* species, dorsal views. **110.** *E. deemingi*, sp. nov. (HT, Between Owa and Ozi R., Nigeria, NHMUK). **111.** *E. vicina*, sp. nov. (HT ♂, Du River, Liberia, AMNH). **112.** *E. ankasa*, sp. nov. (PT ♂, Ankasa Forest Reserve, Ghana, CMNH). **113.** *E. ghanensis*, sp. nov. (HT ♂, Asantemanso Sacred Forest, Ghana, CMNH).

CONGO / RIV. SAN BENITO [= Mbini, 1.58, 9.62] / Cuiral, 1885 [printed] // *Engistoneura parallela* W. / E. Séguy vid. [19]48 [printed and handwritten] // 5375 / 85 [on reverse of blue disk, handwritten]" (MNHN). **GUINEA:** 2♂, "Camp 2 (1000 m) [printed] [= 7.63, -8.40] / MUSÉUM PARIS / Nimba (Guinée) / M. Lamotte 11.vi.[19]42 [blue card, printed]"; 1♂, "Nion [printed] [= 7.62, -8.48] / MUSÉUM PARIS / Nimba (Guinée) / M. Lamotte 11.vi.[19]42 [blue card, printed]"; 1♂, 1♀, "Guinée / M' Nimba / C. Girard [blue card, handwritten] // Fôret galerie / du Zié 1300m [7.71, -8.36] / 2.VI.1991 [handwritten] // battage / strate / arbustive [handwritten]"; 1♂, "GUINÉE—NIMBA / C. GIRARD COLL. [printed] // Piste Forestière / du Zougé [= 7.71, -8.40] / 30.V.1991 [handwritten]; 1♂, "GUINÉE-MT NIMBA [= 7.62, -8.42] / C. GIRARD, COL. [pale blue card, printed] // Piste / Forestière du / Zougé [= 7.71, -8.40] / 14.V.1991 [handwritten]; 1♀, "IFAN / NIMBA [= 7.623, -8.42] (Guinée) / Lamotte et Roy / VII-XII [19]51 [pale blue card, printed] // 72Gd [handwritten]; 1♀, 1[unsexed] "Guinée franc / Dalaba [printed] [= Fouta

Djallon, 11.32, -12.29] // AOUT [printed] / MUSÉUM PARIS / 1937 / L. BERLAND [blue card, printed]" (all MNHN). **LIBERIA:** 1♂, 2♀, same locality labels as holotype; 1♀, "Bendu / Robertsport [= 6.75, -11.37] / Liberia [printed] // X.31. 1943 / F.M. Snyder [printed and handwritten]" (all AMNH); 1♀, "Mt. Coffee [= 6.49, -10.65] Liberia / Mrs Sharp / 1896 [handwritten] // *ENGISTONEURA* / *CATOGASTERA* / (Big.) / d. G. Steyskal '64" [handwritten and printed]" (USNM); 22♂, 29♀, "LIBERIA: / Mt. Nimba. / Grassfield, [= 7.49, -8.57] / 16-25.ix.1979. [white card with pale blue line; printed] // lowland / forest 500m / fish trap [printed] // I. Hanski / B.M.1980—85. [printed] // (1♂, labelled: "*Engistoneura* / ? *moerens* Fab. / det. J.E. Chainey 1994 [handwritten and printed]; 2♀, labelled "*Engistoneura* / *moerens* (Fab.) / det. B.R. Pitkin [handwritten]" // NMHUK013449561–013449563, 013449586–013449633 [printed with QR code]" (NHMUK); 1♂, 3[sex unknown; *Anthrenus* damage], same data, except: " / GV.47120–47123 [white paper with QR code]" (MZH); 2♂, 1♀, "LIBERIA: / Mt. Nimba. [= 7.56, -8.56] / 7-800m. / 27.ix.1979.



114

*E. fatima*, sp. n.  
2.5 mm



115

*E. parallela* (Wiedemann)  
2.5 mm



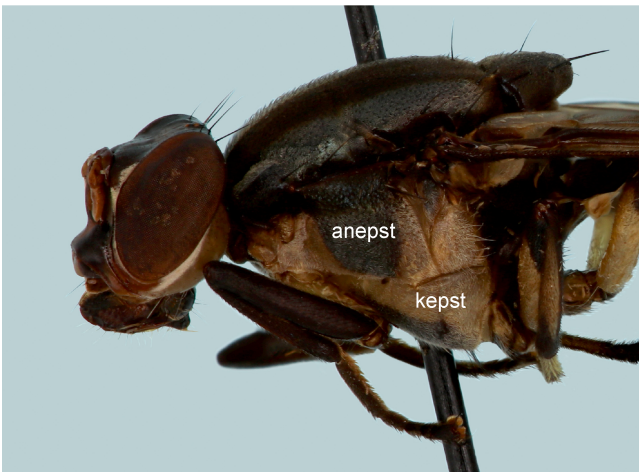
116

*E. elvillah*, sp. n.  
2.5 mm



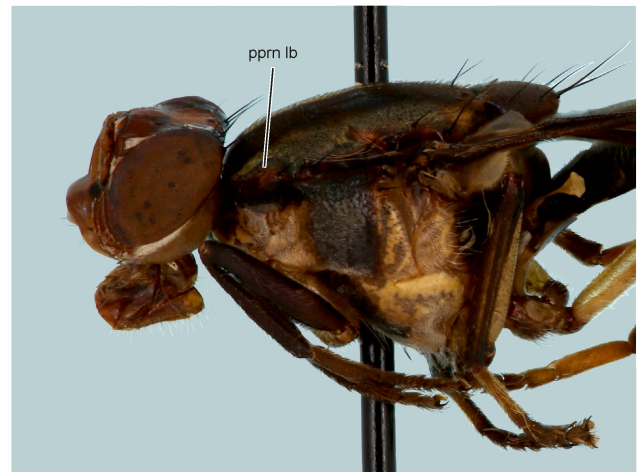
117

*E. nebula*, sp. n.  
2.5 mm



118

*E. ankasa*, sp. n.  
2.5 mm



119

*E. ghanensis*, sp. n.  
2.5 mm

**FIGURES 114–119.** Heads and thoracic pleura of *Engistoneura* species, lateral views. **114.** *E. fatima*, sp. nov. (HT, Loma Mountains, Sierra Leone, ANHRT) [abdomen removed for dissection]. **115.** *E. parallela* (Wiedemann) (N-T, Njala, Sierra Leone, NHMUK). **116.** *E. elvillah*, sp. nov. (HT, Dalaba, Foret de Goubel, Guinea, ANHRT). **117.** *E. nebula*, sp. nov. (HT, Sembehun, Sierra Leone, NHMUK). **118.** *E. ankasa*, sp. nov. (PT ♂, Ankasa Forest Reserve, Ghana, CMNH). **119.** *E. ghanensis*, sp. nov. (HT ♂, Asantemanso Sacred Forest, Ghana, CMNH). Abbreviations: anepst—anepesternum; kepst—katepisternum; pprn lb—postpronotal lobe.



120

*E. maya*, sp. n.  
2.5 mm



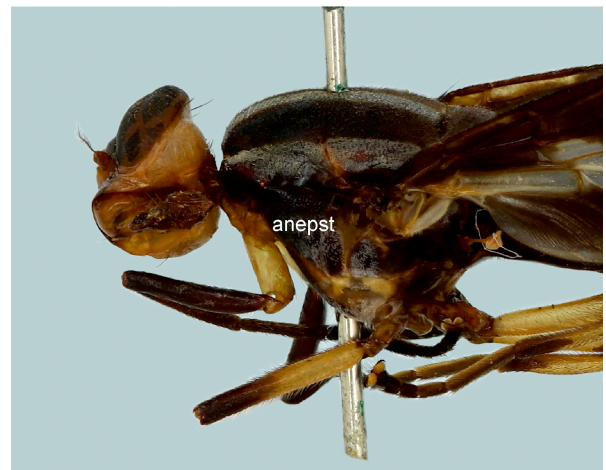
121

*E. biseriata*, sp. n.  
2.5 mm



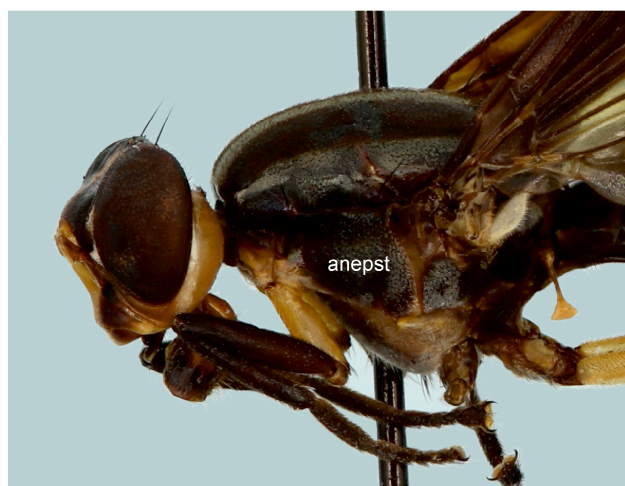
122

*E. moerens* (Fabricius)  
2.5 mm



123

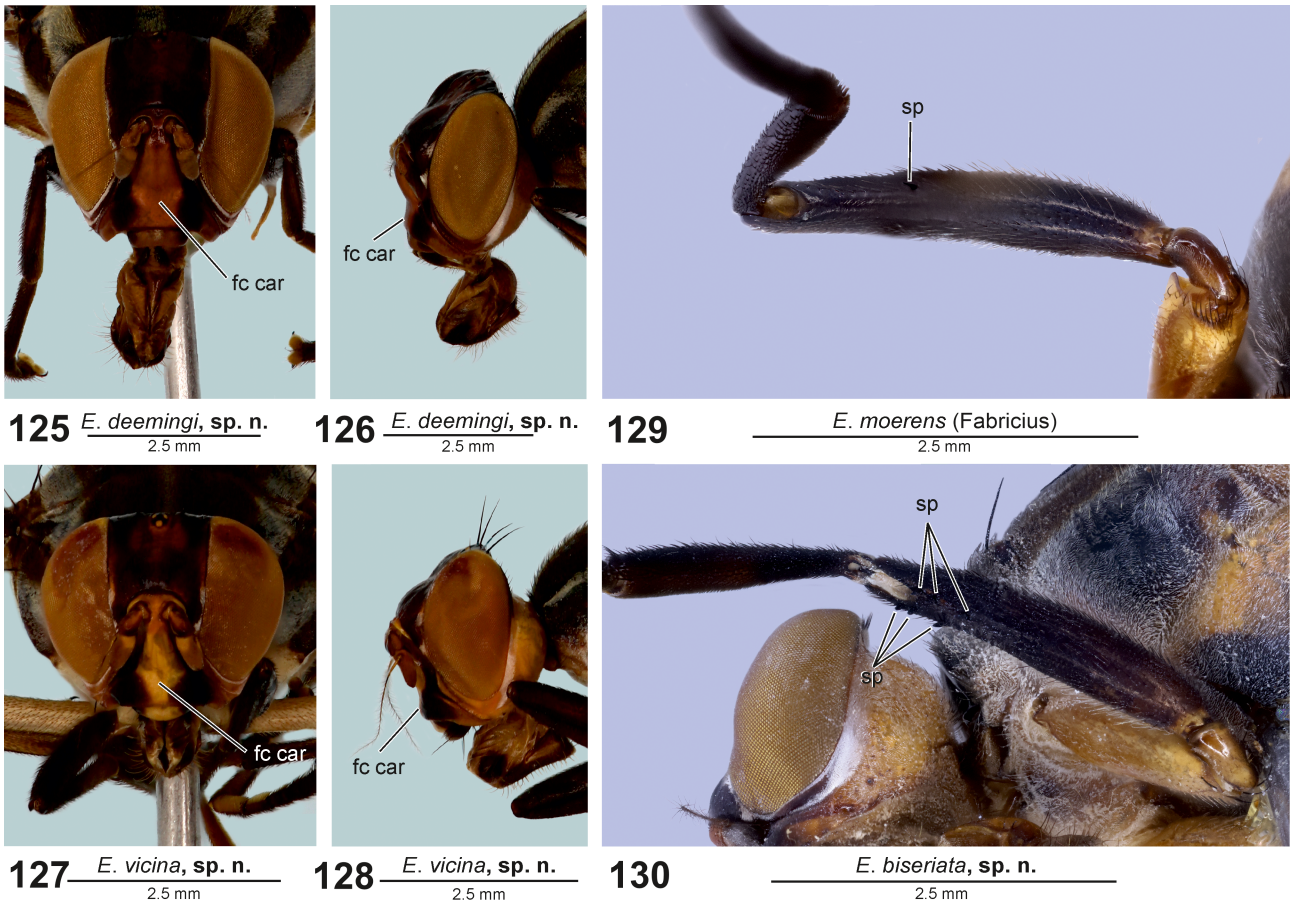
*E. deemingi*, sp. n.  
2.5 mm



124

*E. vicina*, sp. n.  
2.5 mm

**FIGURES 120–124.** Heads and thoracic pleura of *Engistoneura* species, lateral views. **120.** *E. maya*, sp. nov. (HT, Dalaba, Foret de Goubel, Guinea, ANHRT). **121.** *E. biseriata*, sp. nov. (HT, Taï Research Station, Côte d'Ivoire, ANHRT). **122.** *E. moerens* (Fabricius) (N-T, Banco National Park, Côte d'Ivoire, NMSA). **123.** *E. deemingi*, sp. nov. (HT, Between Owa and Ozi R., Nigeria, NHMUK). **124.** *E. vicina*, sp. nov. (HT ♂, Du River, Liberia, AMNH). Abbreviations: anepst—anepesternum; kepst—katepisternum; pprn lb—postpronotal lobe.



**FIGURES 125–130.** Head and leg features of *Engistoneura* species. **125.** Head of *E. deemingi*, **sp. nov.**, frontal view (PT, Taï National Park, Côte d’Ivoire, ANHRT). **126.** Same, lateral view. **127.** Head of *E. vicina*, **sp. nov.**, frontal view (N-T, Mt Tonkoui Peak, Côte d’Ivoire, ANHRT). **128.** Same, lateral view. **129.** Fore femur of *E. moerens* (Fabricius) ventrolateral view (N-T, Banco National Park, Côte d’Ivoire, NMSA). **130.** Same, *E. biseriata*, **sp. nov.** (PT, Taï National Park, Côte d’Ivoire, ANHRT). Abbreviations: fc car—facial carina; sp—spine(s).

[white card with pale blue line; printed] // I. Hanski / B.M.1980–85. [printed] // NHMUK013449634–013449636 [printed with QR code]”; 1♂, 1♀, “KPAINE [= Kpein, 7.10, -9.08] 1400ft. / LIBERIA / (7 10’N. 9 7’W.) / 24.9.1953 / No. L103 [and L104] / Dr.W. Peters [printed and handwritten] // Pres. Dr.W. Peters. / B.M.1954–410 [printed] // NHMUK013449639, 013449640 [printed with QR code]”; 1♂, “LIBERIA: / Kpaine [= Kpein, 7.10, -9.08] / 23.viii.1953 / BM.1953.127 [handwritten] // NHMUK013449637 [printed with QR code]; 1♂, “LIBERIA: / Kpaine. [= Kpein, 7.10, -9.08] / W. Peters / BM.1953–127 [handwritten] // NHMUK013449638 [printed with QR code] (all NHMUK); 2♂, LIBERIA : 9mi. NE. / Totota [= 6.82, -9.94] / 11-VIII-1966 / E. S. Ross & / K. Lorenzen [printed] // collection of the / CALIFORNIA ACADEMY / OF SCIENCES, San / Francisco, Calif. [printed] // CASENT / 8604635 [printed with QR code]”; 1♂, 2♀, LIBERIA : 10mi. / NE. / Gbanka [7.00, -9.47] / 11-VIII-1966 / E. S. Ross & / K. Lorenzen [printed] // collection of the / CALIFORNIA ACADEMY / OF SCIENCES, San / Francisco, Calif. [printed] // CASENT / 8604636–8604638 [printed with QR code]” (all CAS). **COUNTRY UNKNOWN:** 1♂, 3♀, no data, 1♀ labelled “yb” [?] [handwritten in pencil]

// *Engistoneura / albovaria / (Ortaliidae)* [handwritten]” (all MNHN).

*Distribution.* Cameroon, Côte d’Ivoire, Equatorial Guinea, ?Gabon, Guinea and Liberia.

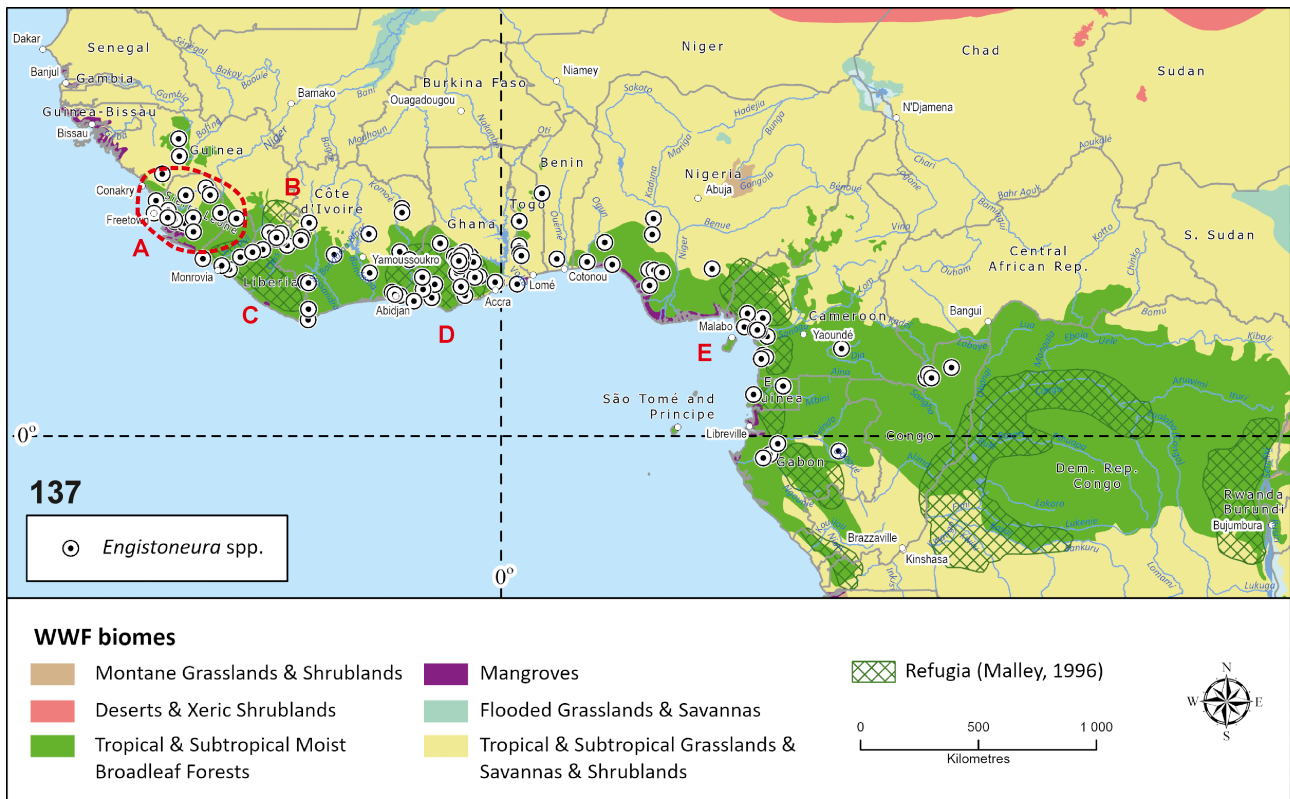
*Bionomics.* A species with a disjunct distribution, occurring in Atlantic Equatorial Coastal Forest, Central African Mangroves, Eastern Guinean Forest, Guinean Montane Forest and Western Guinean Lowland Forest at elevations between 13 and 1,413 m (Fig. 159). Mostly sampled in faeces-baited pitfall traps in Côte d’Ivoire, with a long series of specimens sampled in a “fish trap” in Liberia (presumably a carrion-baited pitfall trap). Specimens have also been swept from forest clearings and sampled in a Malaise trap. Specimen label data indicate that the species is active from April–November.

### Intuitive species-groups

Intuitive groupings of species and derivation of species pairs were preferred to a phylogenetic analysis, because attempts at phylogenetic analysis, did not provide a satisfactory classification. Nevertheless, intuitive species groupings and pairs are tangible and make it easier for



**FIGURES 131–136.** Examples of forest habitats of *Engistoneura* species. **131.** Guinea Montane Forest in the Loma Mountains of Sierra Leone at an elevation of 1,050 m (type locality of *E. distincta*, **sp. nov.** and *E. fatima*, **sp. nov.**) (© Will Miles). **132.** Guinea Montane Forest in Dalaba, Foret de Goubel, Guinea at an elevation of 1,413 m (type locality of *E. elvillah*, **sp. nov.** and *E. maya*, **sp. nov.**) (© Will Miles). **133.** Same locality, understory forest foliage, with resting *E. elvillah*, **sp. nov.** (red circle) (© Will Miles). **134.** Northwestern Congolian lowland forest at Mbeli forest, Republic of Congo, at an elevation of 372 m (habitat of *E. obscura* Hendel) (© V. Dérozier). **135.** Eastern Guinean forest at Banco National Park, Côte d'Ivoire, at an elevation of 40 m (habitat of *E. moerens* (Fabricius)) (© V. Dérozier). **136.** Guinea Montane Forest at Mt. Tonkoui Peak, Côte d'Ivoire, at an elevation of 1,171 m (habitat of *E. vicina*, **sp. nov.**) (© V. Dérozier). All reproduced with permission.



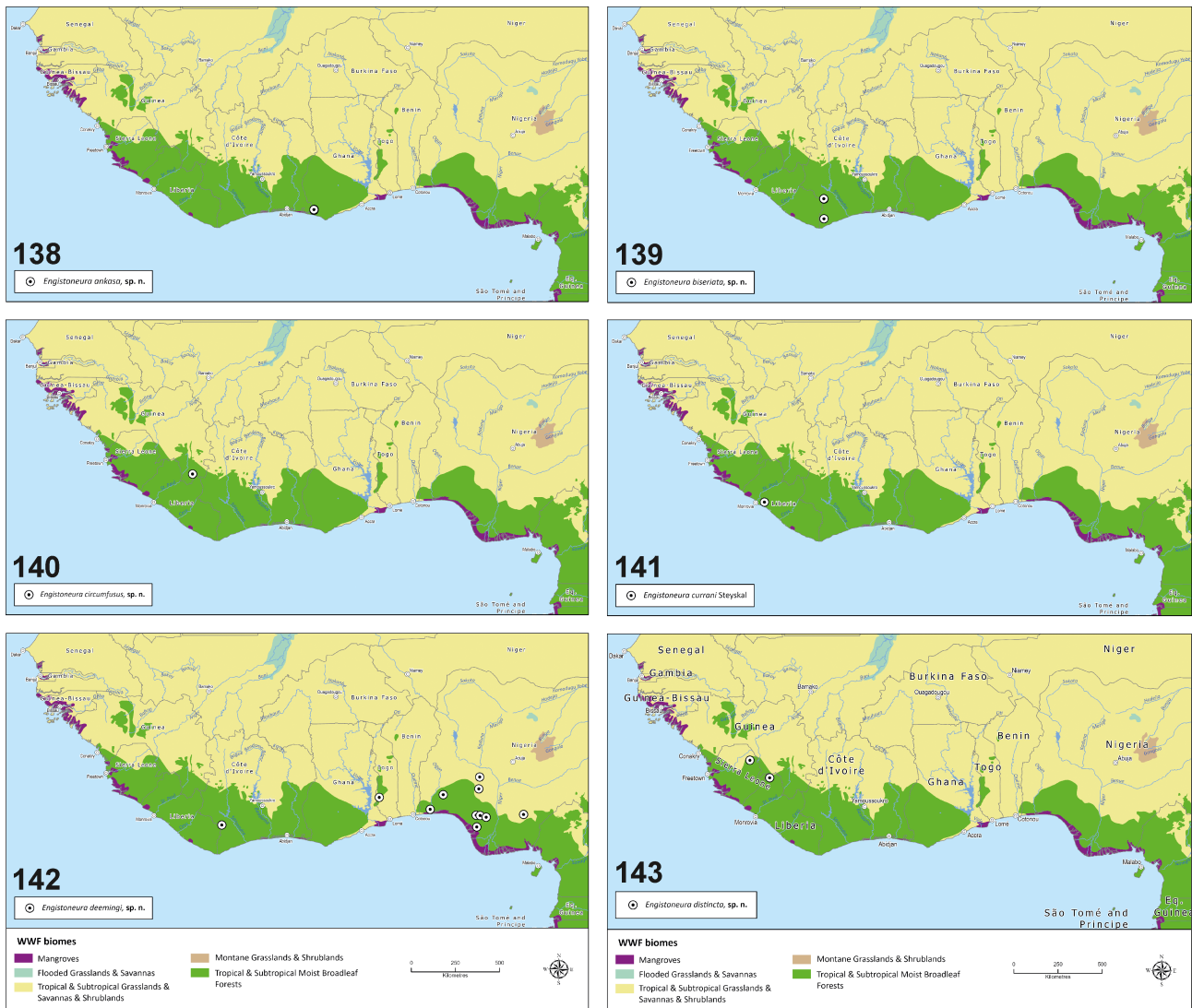
**FIGURE 137.** Overall coverage of records (all *Engistoneura* species and records) mapped against biomes and perceived forest refugia (after Maley 1996, fig. 5).

the user to interpret. An initial grouping based on ground colour separates the species into two groups: Group A (scutum with tan vittae) (Fig. 15, red border) and Group B (scutum with grey vittae) (Fig. 15, blue border).

Group A have the thoracic ground colour tan, superimposed over which are brown vittae (Figs 92–104, 114, 115, 117). The width of the brown vittae on the scutum varies from narrow, with clearly-defined margins in *E. lugens* (Fig. 103) through narrow with irregular margins in *E. circumfusus*, **sp. nov.** (Fig. 94) or weakly developed in *E. smithi*, **sp. nov.** (Fig. 92), for example, to broad and dark brown in *E. currani*, *E. fatima*, **sp. nov.**, *E. hexafascia*, **sp. nov.** and *E. parallela* (Figs 99–102). The extent to which the brown vittae on the scutum continue across the scutoscuteellar suture is also variable. In *E. smithi*, **sp. nov.** (Fig. 92) the brown vittae are evanescent before reaching the scutoscuteellar suture and the scutellum is entirely tan coloured. In *E. circumfusus*, **sp. nov.** (Fig. 94) and *E. mcalpinei*, **sp. nov.** (Fig. 98) the brown vittae continue across the scutoscuteellar suture, but are evanescent at the base of the scutellum, leaving most of the scutellum tan coloured. In *E. distincta*, **sp. nov.**, *E. flavipennis*, *E. hemifascia*, **sp. nov.** and *E. kachana*, **sp. nov.** (Figs 93, 95–97) the vittae on the scutellum are developed along the lateral margin, resulting in a medial tan coloured vitta from base to apex. In species with broad, dark brown vittae on the scutum, these merge prior to crossing the scutoscuteellar suture (as in *E. currani* and *E. parallela*, Figs 101, 102) or after crossing the scutoscuteellar suture (as in *E. fatima*, **sp. nov.** and *E. nebula*, **sp. nov.**, Figs 100,

104). A further state is that *E. hexafascia*, **sp. nov.** bears a medial grey microtrichose vitta reminiscent of species in Group B. The Group A arrangement of vittae gives the impression that the scutum and scutellum are bordered by a continuous narrow tan coloured vitta. The pleura of Group A are mostly tan, being entirely so in all species in the group, except *E. distincta*, **sp. nov.**, *E. fatima*, **sp. nov.** and *E. hemifascia*, **sp. nov.**, which have a dark brown anterior margin to the anepisternum and a near parallel brown vitta over the katatergite and meron (Figs 37, 41, 47).

Group B have the ground colour grey superimposed over which are brown vittae, giving the impression that the scutum is dark brown with grey bands, with the notable exception of *E. ghanensis*, **sp. nov.**, in which this is dense golden-green (Fig. 113) an autapomorphic character state. The strength of this pattern varies from somewhat blurred in *E. ankasa*, **sp. nov.** and *E. maya*, **sp. nov.** (Figs 112, 107, respectively) to bold and sharply defined in *E. biseriata*, **sp. nov.** and *E. deemingi*, **sp. nov.** (Figs 108, 110). In all species in Group B the scutellum is entirely dark brown, with a vague reddish apical margin in *E. biseriata*, **sp. nov.** and *E. elvillah*, **sp. nov.** (Figs 108, 105, respectively). The medial microtrichose vitta is narrow in *E. biseriata*, **sp. nov.**, *E. moerens* and *E. vicina*, **sp. nov.** (Figs 108, 109, 111) and broadest in *E. maya*, **sp. nov.** (Fig. 107). In lateral view, the pleura of Group B are mostly with a barred pattern comprised of two vertical pale cream to tan vittae on the proepisternum and over the posterior margin of the anepisternum and the anterior half of the



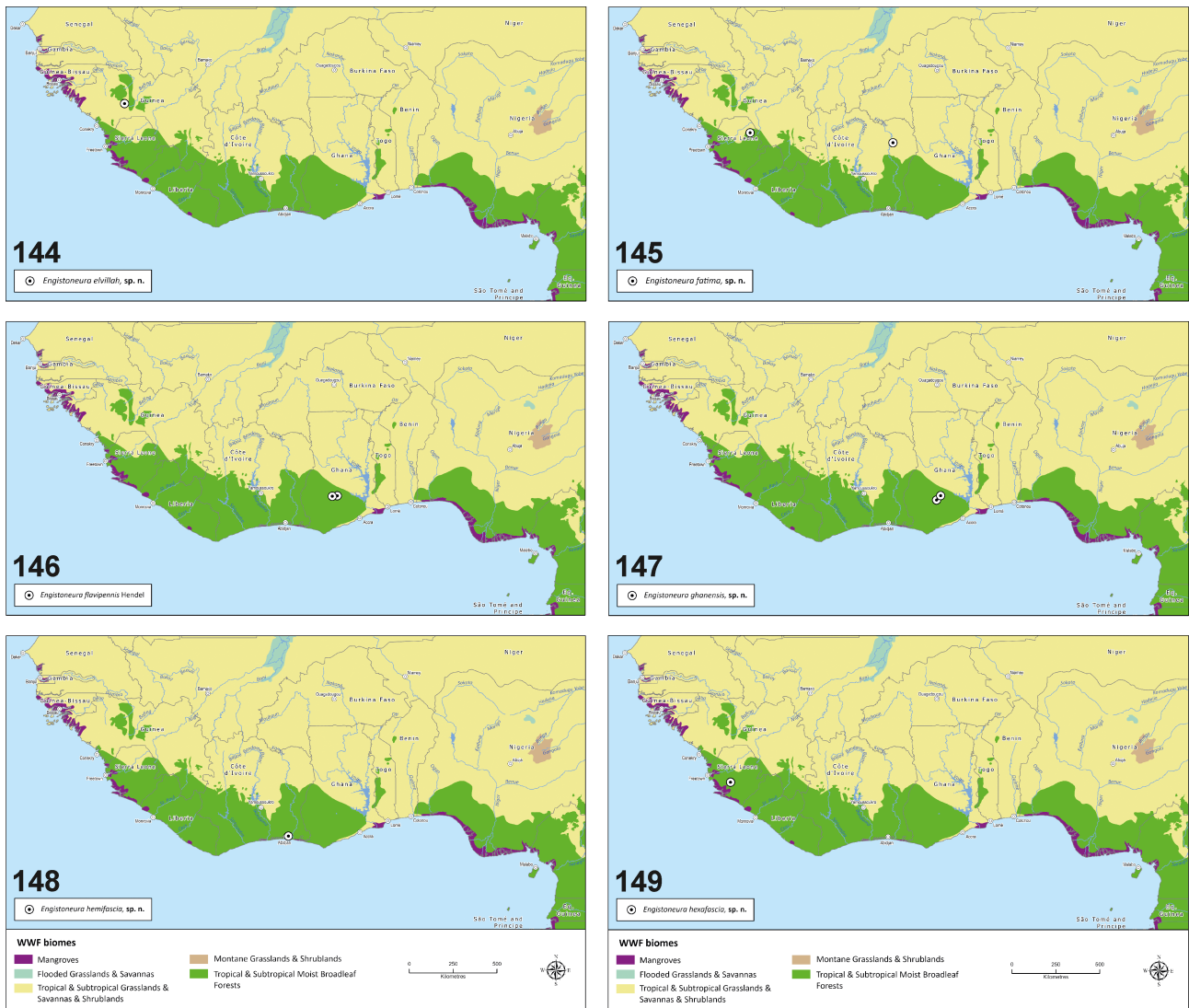
**FIGURES 138–143.** Distribution maps of individual *Engistoneura* species (mapped against biomes and rivers). **138.** *E. ankasa*, **sp. nov.** **139.** *E. biseriata*, **sp. nov.** **140.** *E. circumfusus*, **sp. nov.** **141.** *E. currani* Steyskal. **142.** *E. deemingi*, **sp. nov.** **143.** *E. distincta*, **sp. nov.**

anepimeron, contrasting with a vertical dark brown vitta over the anterior margin (or half) of the anepisternum and near parallel brown vitta over the katatergite and meron. In addition, the anterior margin of the katepisternum is dark brown. This pattern is most pronounced in *E. ankasa*, **sp. nov.**, *E. ghanensis*, **sp. nov.** and *E. moerens* (Figs 118, 119, 122) while it is least defined in *E. elvillah*, **sp. nov.** (Fig. 116) in which the thoracic pleurae are entirely tan coloured and in *E. maya*, **sp. nov.** (Fig. 120) in which the thoracic pleurae are entirely dark brown. In this sense, at least in lateral view, *E. elvillah*, **sp. nov.** appears better matched to Group A, except for the dark coloured scutum. In *E. deemingi*, **sp. nov.** and *E. vicina*, **sp. nov.** (Figs 123, 124) virtually the entire anepisternum is dark brown with a very narrow margin of tan pigment along the suture, between the anepisternum and anepimeron.

While thoracic colour patterns indicate a clear grouping (perhaps two distinct lineages within the genus) no further constructive grouping could be established

within the two groups. The wing patterns were, therefore, examined to provide intuitive species pairs, some of which are supported by proximity and shared biotypes. The wing pattern in the genus is dominated by a dark brown membrane that has various areas hyaline (Fig. 15) (although in reality this represents dark brown banding on a hyaline membrane, it is more appropriate to discuss the wing pattern in terms of the patterns formed by the hyaline portions). Most species have paired preapical hyaline parallel bands and many have an additional L- or V-shaped (Figs 3, 4 and 1, 5, respectively) hyaline mark comprised of a stripe through cells *br*, *bm*, *cua* and *dm* joined to (or almost joined to) a band a little beyond crossvein *r-m* (L-shaped) or converging bands either side of *r-m* (V-shaped). There is a tendency for the wing pattern to be paler brown in Group A than in Group B and for the hyaline areas to be tinged orange to pale brown. In group B, if the membrane is other than hyaline, it tends to be dark brown.

Within Group A, *E. distincta*, **sp. nov.** is the only



FIGURES 144–149. Distribution maps of individual *Engistoneura* species (mapped against biomes and rivers). 144. *E. elvillahi*, sp. nov. 145. *E. fatima*, sp. nov. 146. *E. flavipennis* Hendel. 147. *E. ghanensis*, sp. nov. 148. *E. hemifascia*, sp. nov. 149. *E. hexafascia*, sp. nov.

species that has no distinct species pair and has a wing pattern that is remarkably similar to that of an undescribed species of *Mezona* Speiser, 1910. *Engistoneura distincta*, sp. nov. is apparently confined to Guinea Montane Forests at elevations above 1,000 m, where it presumably evolved in isolation (see Discussion below) while the undescribed species in *Mezona* is restricted to locations below 500 m in forest in central Democratic Republic of Congo—the similarity between the wing patterns clearly representing convergence. The wing of *E. distincta*, sp. nov. is narrow with a wing width ratio (crossvein *r-m* : wing width at crossvein *dm-m*) of 0.52 (compared to the mean of the genus 0.43) (Table 1) and the pattern is comprised of one central hyaline stripe from the wing base to apex and an irregular hyaline mark along the posterior wing margin (Fig. 70) in cell  $m_1$  (narrowly) and  $m_4$ .

There then appears to be a trend of increasing complexity through the group and between pairs (Fig. 15), although this by no means implies phylogenetic

relationships in these pairings. In the *E. circumfusius*, sp. nov./*mcalpinei*, sp. nov. species pair, there is a shortening of the central hyaline stripe to midway through cell *dm* and the addition of one preapical band (*E. circumfusius*, sp. nov.) or two preapical bands of more or less equal width (*E. mcalpinei*, sp. nov.) and the irregular hyaline mark along the posterior wing margin is restricted to cell  $m_4$ . An undescribed species from Côte d’Ivoire known only from a photograph (Fig. 6) appears to be transitional between these two species, with the central hyaline stripe similar to *E. circumfusius*, sp. nov. and the paired preapical bands of more or less equal width, similar to *E. mcalpinei*, sp. nov.

In the *E. currani*/*hexafascia*, sp. nov. species pair the central hyaline stripe is more complex than in the previous pair. In the case of *E. currani*, the development of a hyaline band beyond crossvein *r-m* and a rounded mark before *r-m*, together with increased hyaline marks along the posterior wing margin in the anal lobe suggests increased complexity from the *E. circumfusius*, sp. nov. pattern. Likewise, in *E.*



**TABLE 1.** Morphometrics of *Engistoneura* wings (measurements outlined diagrammatically in Figs 11–14).

Species	Crossvein <i>r-m</i> angle (degrees)	Ratio minimum width cell $r_{4+5}$ : length crossvein <i>r-m</i> (mm)	Crossveins <i>r-m</i> : <i>dm-m</i> angle (degrees)	Ratio crossvein <i>r-m</i> ( $R_{4+5-M_1}$ ) : wing width at crossvein <i>dm-m</i>
<i>E. ankasa</i> , <b>sp. nov.</b>	10	2.3	6	0.37
<i>E. biseriata</i> , <b>sp. nov.</b>	10	2	12	0.42
<i>E. circumfusus</i> , <b>sp. nov.</b>	12	1.7	12	0.44
<i>E. currani</i> Steyskal	15	1.3	15	0.34
<i>E. deeming</i> , <b>sp. nov.</b>	6	2.5	8	0.41
<i>E. distincta</i> , <b>sp. nov.</b>	20	1.8	22	0.52
<i>E. elvillah</i> , <b>sp. nov.</b>	3	1.8	11	0.40
<i>E. fatima</i> , <b>sp. nov.</b>	22	2.7	17	0.40
<i>E. flavipennis</i> Hendel	17	2.3	16	0.50
<i>E. ghanensis</i> , <b>sp. nov.</b>	11	1.8	12	0.50
<i>E. hemifascia</i> , <b>sp. nov.</b>	10	1.1	20	0.46
<i>E. hexafascia</i> , <b>sp. nov.</b>	15	1.1	20	0.45
<i>E. kachina</i> , <b>sp. nov.</b>	4	1.6	11	0.43
<i>E. lugens</i> (Fabricius)	5	0.7	5	0.34
<i>E. maya</i> , <b>sp. nov.</b>	16	1.7	22	0.45
<i>E. mcalpinei</i> , <b>sp. nov.</b>	20	1.1	20	0.50
<i>E. moerens</i> (Fabricius)	7	2.2	8	0.41
<i>E. nebula</i> , <b>sp. nov.</b>	15	1.2	20	0.40
<i>E. obscura</i> Hendel	12	2.0	12	0.45
<i>E. parallela</i> (Wiedemann)	7	1.3	9	0.44
<i>E. smithi</i> , <b>sp. nov.</b>	18	2.3	21	0.40
<i>E. vicina</i> , <b>sp. nov.</b>	8	2.0	0	0.48
$\bar{x}$	<b>12.1</b>	<b>1.7</b>	<b>13.8</b>	<b>0.43</b>

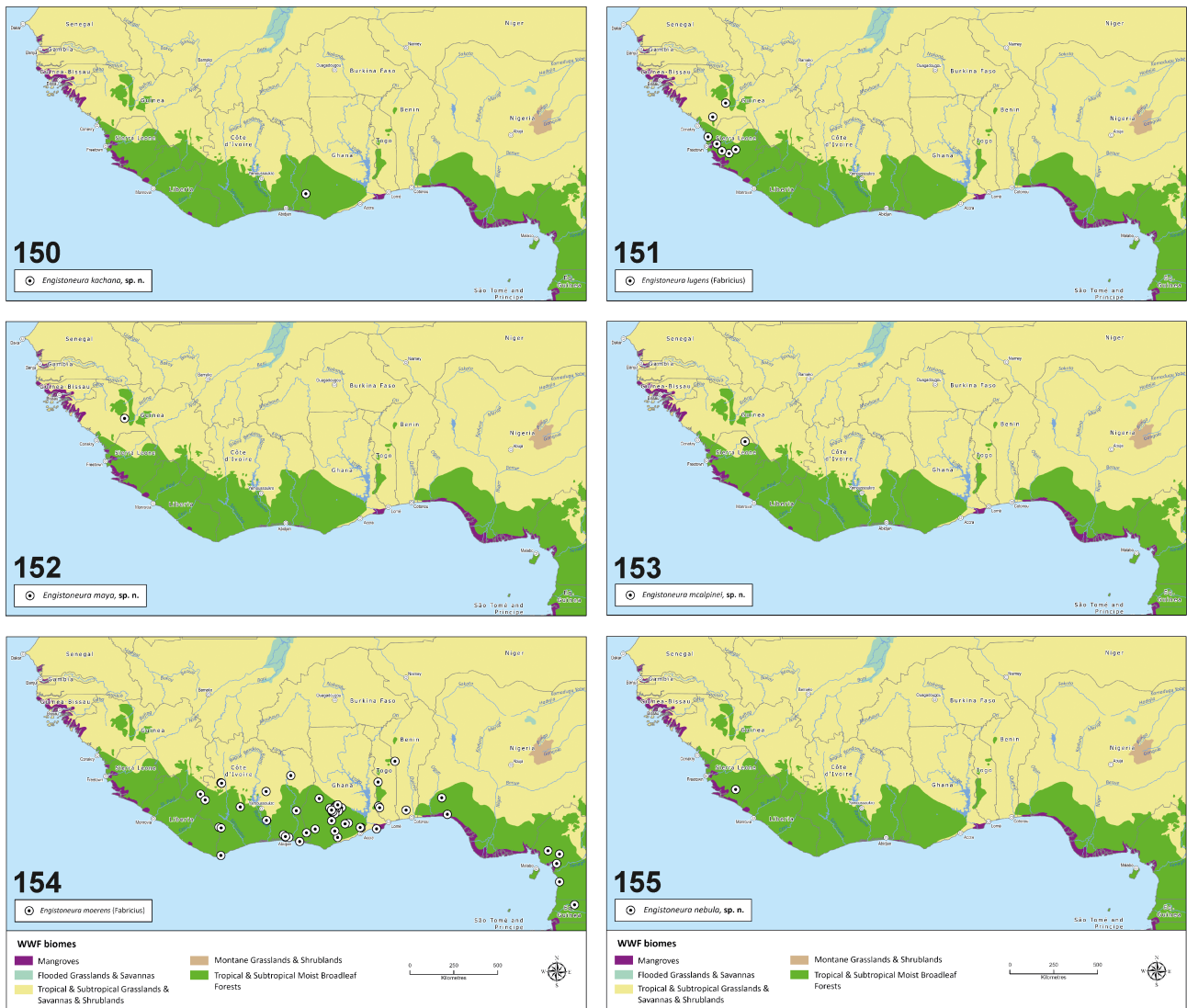
*hexafascia*, **sp. nov.** a small ventral hyaline band occurs beyond *r-m*, but more distinctively is a partial preapical band beyond the complete preapical band. *Engistoneura hexafascia*, **sp. nov.**, however, lacks the hyaline marking on the anal lobe that is present in *E. currani*.

Refinement of the hyaline mark (which is orange tinged) either side of crossvein *r-m* to form a distinctive V-shape occurs in *E. kachana*, **sp. nov.**, coupled with a fragmented preapical band beyond the complete preapical band. In *E. flavipennis*, the brown centre of the V-shape is replaced with hyaline, resulting in a wedged-shaped orange-tinged hyaline mark over *r-m*, in addition to which the apical-most preapical band is complete and the irregular mark along the posterior margin of cell  $m_4$  extends forward into cell *dm* at the posterior base of crossvein *dm-m*, not quite linking with the basal-most of the preapical hyaline band. The irregular hyaline mark along the posterior wing margin is joined to the mark in the anal lobe in both species in this pair. Both species are known only from Ghana.

The association of the *E. lugens*/*E. parallela* species pair is tentative at best. The wing width ratio in *E. lugens* is 0.34 and the wing appears somewhat spatulate and much broader at the level of crossvein *dm-m* than all its

congeners. The pattern comprises a Y-shaped mark at crossvein *r-m*, comprised from a linking of the V-shaped mark straddling *r-m* to a continuous band through cell *dm* to the posterior wing margin. A single broad preapical hyaline band is present that is not parallel with crossvein *dm-m* and there are three small rounded to triangular marks in each of cells  $m_1$  and  $m_4$  and the anal lobe. The wing width ratio in *E. parallela* (0.44) is closer to the average for the genus (0.43), but the wing lacks the spatulate shape. The linkage between the hyaline band beyond *r-m* and a forward extension through *dm-m* of the cell  $m_1$  marginal mark remains, but is separated from the mark *dm* and the hyaline band before *r-m*. In addition, there are paired preapical hyaline bands parallel to *dm-m*. The hyaline mark on the anal lobe is similar to that in *E. flavipennis*. Both *E. lugens* and *E. parallela* are known from Sierra Leone and *E. lugens* also occurs in Guinea.

The two species *E. hexafascia*, **sp. nov.** and *E. nebula*, **sp. nov.** appear to form a natural species pair, both with banding only (without stripes). *Engistoneura hexafascia*, **sp. nov.** has five distinct hyaline bands and a mark at the wing base, indicating a fragmented sixth band. The apical-most pair and the middle two bands are distinctly separated by a broader brown band. This



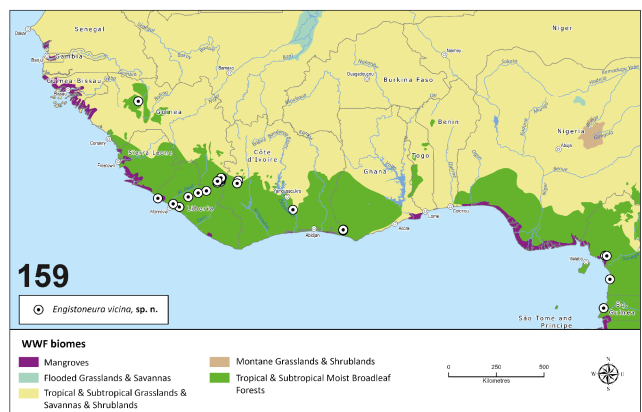
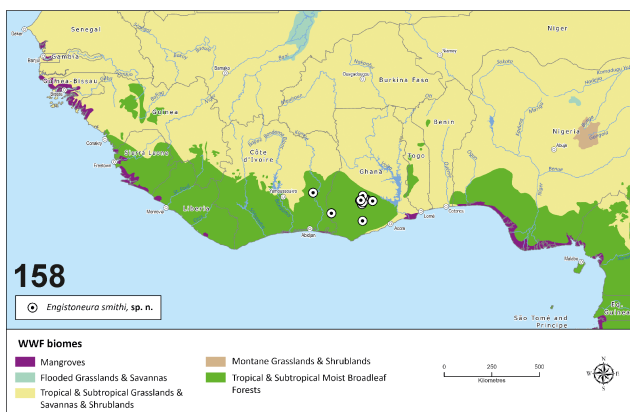
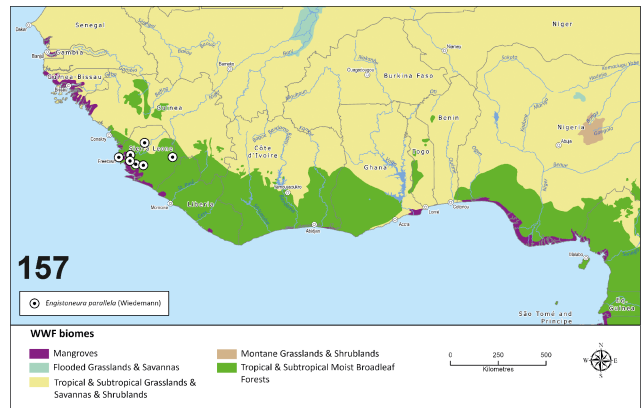
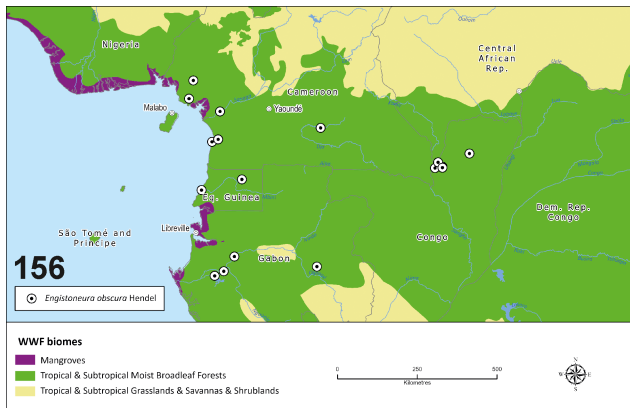
**FIGURES 150–155.** Distribution maps of individual *Engistoneura* species (mapped against biomes and rivers). **150.** *E. kachana*, sp. nov. **151.** *E. lugens* (Fabricius). **152.** *E. maya*, sp. nov. **153.** *E. mcalpinei*, sp. nov. **154.** *E. moerens* (Fabricius) **155.** *E. nebula*, sp. nov.

broader brown band is evident in *E. nebula*, sp. nov., but the banding basal to crossvein *r-m* is fragmented and less distinct. In addition, the hyaline and brown bands along the posterior margin become increasingly blurred toward the apex of the wing, forming a posterior cloud of brown superimposed over the banding. Both species are known only from Sierra Leone.

Finally in Group A, the darkening of the brown pattern on the wing, with the V-shaped hyaline mark and paired preapical hyaline bands reminiscent of most species in Group B occurs in the *E. fatima*, sp. nov./*smithi*, sp. nov. species pair. Potentially, this may have evolved from the *E. kachana*, sp. nov. pattern. The preapical paired hyaline bands are complete, but narrow and the V-shaped mark straddling crossvein *r-m* is narrowly joined to the hyaline stripe through cells *br*, *bm*, *cua* and *dm* in *E. smithi*, sp. nov., but broadly so in *E. fatima*, sp. nov. The basal arm of the V-shaped mark straddling *r-m* is fragmented in *E. fatima*, sp. nov., not extending to the costal vein (C) and

the mark beyond *r-m* is fragmented as it crosses cell  $r_{2+3}$ . The hyaline marks along the posterior margin of the wing are more restricted in *E. smithi*, sp. nov. and extend along the margin of the anal lobe in both species. Both *E. fatima*, sp. nov. and *E. smithi*, sp. nov. are known from Côte d'Ivoire, while *E. fatima*, sp. nov. also occurs in Sierra Leone and *E. smithi*, sp. nov. also occurs in Ghana.

It would appear then, that the *E. fatima*, sp. nov./*smithi*, sp. nov. species pair may be transitional between Group A and Group B, but the pattern may equally well have evolved separately in the two groups. There is no way of knowing if the L-shaped hyaline pattern in the *E. elvillah* sp. nov./*obscura* species pair in Group B arose independently from the similar pattern in the *E. circumfusus*, sp. nov./*mcalpinei*, sp. nov. species pair, with which it bears many similarities (Fig. 15) and then led to development of the V-shaped hyaline marks in the remainder of Group B. Either way, the pairing in Group B is much less easily determined.



**FIGURES 156–159.** Distribution maps of individual *Engistoneura* species (mapped against biomes and rivers). **156.** *E. obscura* Hendel. **157.** *E. parallela* (Wiedemann). **158.** *E. smithi*, sp. nov. **159.** *E. vicina*, sp. nov.

Except for the L-shaped hyaline mark straddling crossvein *r-m* in the *E. elvillah*, sp. nov./*obscura* species pair, the remainder of the species in the group all share a V-shaped hyaline mark straddling *r-m*. The hyaline stripe through cells *br*, *bm*, *cua* and *dm* is only narrowly joined to the base of the V-shaped mark in *E. biseriata*, sp. nov., *E. deemingi*, sp. nov., *E. ghanenis*, sp. nov., *E. moerens* and *E. vicina*, sp. nov. There is little difference between the wing patterns of *E. elvillah*, sp. nov. and *E. obscura*, but the former has a distinctive oval, brown macula on the abdominal pleural membrane.

In *E. maya*, sp. nov., the hyaline stripe does not join to the base of the V-shaped mark, ending short at the base of cell *dm* and the hyaline mark in cell *m*<sub>4</sub> is bilobed. *Engistoneura maya*, sp. nov. is here paired with *E. ankasa*, sp. nov., because, although the hyaline stripe through cells *br*, *bm*, *cua* and base of cell *dm* is longer in *E. ankasa*, sp. nov., it is partially obscured by a brownish cloud in the base of *dm*. The hyaline mark along the hind margin of cell *m*<sub>4</sub> is bilobed. The apical-most of the paired preapical hyaline bands is fragmented at the posterior wing margin in *E. maya*, sp. nov., but not in *E. ankasa*, sp. nov. The apical-most mark on the posterior margin of cell *m*<sub>4</sub> in *E. maya*, sp. nov. is aligned in such a way that, if extended toward the anterior margin of the wing, it would join with the base of the V-shaped mark. In *E. ankasa*, sp. nov., the basal-most mark along the posterior margin of cell

*m*<sub>4</sub> is joined to the V-shaped mark straddling crossvein *r-m*, consequentially forming a Y-shaped mark (as in *E. lugens*). Both species have a relatively broad median grey microtrichose vitta on the scutum.

*Engistoneura biseriata*, sp. nov. is treated as unpaired, even though the wing pattern generally resembles that found in the *E. deemingi*, sp. nov./*vicina*, sp. nov. species pair, because *E. biseriata*, sp. nov. has the distinct autapomorphy of the fore femur armature biseriate. In *E. biseriata*, sp. nov. the hyaline stripe through cells *br*, *bm*, *cua* and *dm* narrows to a point, but does not join with the base of the V-shaped mark straddling crossvein *r-m*. In *E. vicina*, sp. nov. the two marks just join, although the position of the join is blurred by a brownish tinge over the hyaline bands. In *E. deemingi*, sp. nov. the join is clear, albeit narrowly expressed. The hyaline mark along the posterior margin of cell *m*<sub>4</sub> is bilobed in *E. deemingi*, sp. nov., while being continuous in *E. vicina*, sp. nov. and the hyaline mark along the posterior margin of the anal lobe is narrow in both species, almost joining in *E. deemingi*, sp. nov., but broad in *E. biseriata*, sp. nov. This further sets *E. biseriata*, sp. nov. apart, which also has a more limited hyaline mark along the posterior margin of cell *m*<sub>4</sub> and has narrower preapical paired hyaline bands.

By contrast to the *E. deemingi*, sp. nov./*vicina*, sp. nov. species pair, in which the basal arm of the V-shaped hyaline mark at crossvein *r-m* is angled toward the wing

base, the same arm of the V-shaped hyaline mark in the *E. ghanensis*, **sp. nov./moerens** species pair is more perpendicular. The hyaline stripe through cells *br*, *bm*, *cua* and *dm* is joined to the apex of the V-shaped mark at *r-m* and the hyaline mark along the posterior margin of the anal lobe is broad, while that in cell *m*<sub>4</sub> is bilobed in both species of the *E. ghanensis*, **sp. nov./moerens** species pair.

## Names no longer assigned to *Engistoneura*

### *Engistoneura albolineata* Bezzi, 1908

*Engistoneura albolineata* Bezzi, 1908a: 385.

*Peltacanthina albolineata*: Hendel 1914a: 152 (synonymy).

*Peltacanthina bezzii*: Hendel 1914b: 393 (replacement name); Steyskal 1980: 569.

*Type information*. “Un ♂ du Congo (Mayumbe ?) (CABRA) dans le Musée du Congo”.

*Current status*. Junior synonym.

*Valid name*. *Peltacanthina* (*Engistoneuroides*) *bezzii* (Hendel, 1914b).

*Distribution*. Democratic Republic of Congo (Steyskal 1980: 569).

*Type material examined*. **DEMOCRATIC REPUBLIC OF CONGO**: lectotype ♂ (here designated) “= Bezzi Hol / TYPE / *albolineata* Bz [red card with black border line; printed and handwritten] // MUSÉE / DU CONGO BELGE / MAYUMBE / Cabra [printed] // R. DÉT. / u / 343 [printed and handwritten] // *Engistoneura* / *albolineata* / ♀ ? **sp. nov.** [handwritten] // RMCA ENT / 000016333 [printed with QR code] // **LECTOTYPE** ♂ / *Engistoneura* / *albolineata* Bezzi, 1908 / [designated by] Kirk-Spriggs & / Whittington / 2024 [white card with yellow border; printed]” (RMCA).

*Remarks*. Images of the syntype ♂ were supplied by RMCA and as the specimen clearly has the marginal scutellar setae inserted into tubules, the surface of the disc of the scutellum with punctuation denser and more pronounced than in *Engistoneura* and the distinctive wing pattern, is here confirmed as *Peltacanthina*. As Bezzi did not designate a holotype in the original publication the examined syntype is here selected and designated as lectotype.

### *Engistoneura bicolor* Bezzi, 1908

*Engistoneura bicolor* Bezzi, 1908a: 385.

*Peltacanthina bicolor*: Hendel 1914a: 152 (synonymy) 1914b: 391; Steyskal 1980: 569.

*Type information*. “Deux ♂ et deux ♀ de Banana (F. BLUSSCHODTS)”.

*Current status*. Changed combination.

*Valid name*. *Peltacanthina* (*Engistoneuroides*) *bicolor* (Bezzi, 1908).

*Distribution*. Democratic Republic of Congo; Congo basin and Uganda (Steyskal 1980: 569).

*Type material examined*. **[DEMOCRATIC REPUBLIC OF CONGO]**: lectotype ♂ (here designated) “Banana / F. Busschodts [printed] // M. Bezzi det., 1908: / *Engistoneura* / *bicolor* Bezzi [printed and handwritten] // Ex-Typis [printed in red ink with black line; printed] // cf. Ann. Soc. Ent. Belg. / V.52 (1908) p. 385 [handwritten] // *Engistoneura* / *bicolor* / ♂♀ n / sp. [handwritten] // Syntype [printed in red ink with black line; printed] // **LECTOTYPE** ♂ / *Engistoneura* / *bicolor* Bezzi, 1908 / [designated by] Kirk-Spriggs & / Whittington / 2024 [white card with yellow border; printed]” (RBINS). Paralectotypes (all labelled “**PARALECTOTYPE** ♂ [or ♀] / *Engistoneura* / *bicolor* Bezzi, 1908 / Kirk-Spriggs & / Whittington / 2024 [white card with yellow border; printed]”): 1♀, 1[sex unknown], same labels as lectotype (RBINS).

*Remarks*. Images of the syntype ♂ were supplied by RBINS and as the specimen clearly has the marginal scutellar setae inserted into tubules, the surface of the disc of the scutellum with punctuation denser and more pronounced than in *Engistoneura* and the distinctive wing pattern, is here confirmed as *Peltacanthina*. Although Bezzi (1908a) cited four syntypes in the type series (2♂ and 2♀) only three syntypes are represented in RBINS; i.e., 1♂, 1♀ and one sex unknown (abdomen missing). The whereabouts of the fourth syntype cited by Bezzi remains unknown. As Bezzi did not allocate a holotype in the original publication, the male syntype is here selected and designated as lectotype and the remaining 2 syntypes as paralectotypes. Although the country of origin of the type material was not indicated by Bezzi in the original description, Steyskal (1980: 569) gives the type locality as “Zaire” (= Democratic Republic of Congo).

### *Engistoneura cohaesa* Speiser, 1911

*Engistoneura cohaesa* Speiser, 1911: 256.

*Peltacanthina cohaesa*: Hendel 1914a: 152 (synonymy) 1914b: 386; Steyskal 1980: 570.

*Type information*. “1 ♀ im meiner Sammlung, ebenfalls von Herrn Dr. Chr. Schröder bei Muhesa in Deutsch Ost-Afrika gefangen, am 3. XII. 1905.”

*Current status*. Changed combination.

*Valid name*. *Peltacanthina* (*Peltacanthina*) *cohaesa* (Speiser, 1911).

*Distribution*. Kenya and Tanzania (Steyskal 1980: 570).

*Type material*. Destroyed.

*Remarks*. The type material could not be located in NHRS and “im meiner Sammlung” indicates that the type was deposited in Speiser’s private collection, which was purportedly destroyed during WWII (M. Forshage, pers. comm. 2024). The collection likely went down with Speiser on the ill-fated MV *Wilhelm Gustloff* (N. Evenhuis, pers. comm. 2024) a German military transport ship which was sunk on 30 January 1945 by Soviet submarine S-13 in the Baltic Sea while evacuating civilians and military personnel from East Prussia.

### *Engistoneura concolor* Bezzi, 1908

*Engistoneura concolor* Bezzi, 1908: 385.

*Peltacanthina concolor*: Hendel 1914a: 152 (synonymy) 1914b: 391; Steyskal 1980: 569.

*Type information*. “Une ♀ de Boma Sundi (P. ROLIN)”.

*Current status*. Changed combination.

*Valid name*. *Peltacanthina* (*Engistoneuroides*) *concolor* (Bezzi, 1908).

*Distribution*. Democratic Republic of Congo and Equatorial Guinea (Steyskal 1980: 569).

*Type material examined*. [DEMOCRATIC REPUBLIC OF CONGO]: holotype ♀, “♀ [printed] // Boma Sundi / P. Rolin [printed] // M. Bezzi det., 1908 / *Engistoneura* / *concolor* Bezzi [printed and handwritten] // TYPE [pink card with black border around word; printed] // cf. Ann. Soc. Ent. Belg. / V.52 (1908) p. 385 [handwritten] // *Engistoneura* / *concolor* / ♀ n. / sp. [handwritten] // holotype [pink card with black border around word; printed] // *Engistoneura* ♀ / *concolor* Bezzi, 1908 / vidit Kirk-Spriggs & / Whittington / 2024 [white card with yellow border; printed]” (RBINS).

*Remarks*. Images of the holotype ♀ were supplied by RBINS and as the specimen clearly has the marginal scutellar setae inserted into tubules, the surface of the disc of the scutellum with punctation denser and more pronounced than in *Engistoneura* and the distinctive wing pattern, is here confirmed as *Peltacanthina*. Although the country of origin of the type material was not indicated by Bezzi in the original description, Steyskal (1980: 569) gives the type locality as “Zaire” (= Democratic Republic of Congo).

### *Engistoneura guttata* Bezzi, 1908

*Engistoneura guttata* Bezzi, 1908: 385.

*Peltacanthina guttata*: Hendel 1914a: 152 (synonymy); 1914b: 393; Steyskal 1980: 569.

*Type information*. “Un ♂ du Congo belge dans le Musée du Congo”.

*Current status*. Changed combination.

*Valid name*. *Peltacanthina* (*Engistoneuroides*) *guttata* (Bezzi, 1908).

*Distribution*. Democratic Republic of Congo.

*Type material examined*. DEMOCRATIC REPUBLIC OF CONGO: lectotype ♂ (here designated) “TYPE [red card with black border; printed] // MUSÉE / DU CONGO BELGE / CONGO BELGE [printed] // R. DÉT. / s / 243 [printed and handwritten] // *Engistoneura* / *guttata* / ♂ sp. nov. [handwritten] // RMCA ENT / 000016334 [printed with QR code] // LECTOTYPE ♂ / *Engistoneura* / *guttata* Bezzi, 1908 / [designated by] Kirk-Spriggs & / Whittington / 2024 [white card with yellow border; printed]” (RMCA)

*Remarks*. Images of the syntype ♂ were supplied by RMCA and as the specimen clearly has the marginal scutellar setae inserted into tubules, the surface of the

disc of the scutellum with punctation denser and more pronounced than in *Engistoneura* and the distinctive wing pattern, is here confirmed as *Peltacanthina*. As Bezzi (1908) did not designate a holotype in the original publication, the specimen labelled “TYPE” in RMCA is here selected and designated as lectotype.

### *Engistoneura octodecim* Speiser, 1911

*Engistoneura octodecim* Speiser, 1911: 254.

*Peltacanthina octodecim*: Hendel 1914a: 152 (synonymy) 1914b: 390; Steyskal 1980: 569.

*Type information*. “1 ♂ aus Kamerun in der Sammlung des Entomologischen National- museums zu Berlin-Dahlem, von Conrad t gesammelt”.

*Current status*. Changed combination.

*Valid name*. *Peltacanthina* (*Engistoneuroides*) *octodecim* (Speiser, 1911).

*Distribution*. Cameroon (Steyskal 1980: 569).

*Type material examined*. CAMEROON: lectotype ♀ (here designated) “Kamerun / Conradt [printed] // coll.Liechtwardt [printed] // *Engistoneura* / *octodecim* / P. Speiser det. / Typa! [printed and handwritten] // Holotype [red card; printed] // DEI Müncheberg / Dip—01010 [green card; printed] // LECTOTYPE ♀ / *Engistoneura* / *octodecim* Speiser, 1911 / designated by / Kirk-Spriggs & Whittington / 2025 [white card, yellow border; printed]” (SDEI). Paralectotypes (here designated): 2♂, 3♀, “Kamerun / Conradt [printed] // DEI Müncheberg / Dip—01012–01016 [green card; printed] // PARALECTOTYPE ♂ [or ♀] / *Engistoneura* / *octodecim* Speiser, 1911 / designated by / Kirk-Spriggs & Whittington / 2025 [white card, yellow border; printed]”; 1♂, “N.Kamerun / Joh: Albrechtshöhe / 27.V.-3.VI.96 / L. Conradt S [pale blue card; printed] // <sup>27/5-3/6</sup> 96 [handwritten] // Road from Bovc [?] [handwritten] // coll.Oldenbergl [printed] // DEI Müncheberg / Dip—01011 [green card; printed] // PARALECTOTYPE ♂ / *Engistoneura* / *octodecim* Speiser, 1911 / designated by / Kirk-Spriggs & Whittington / 2025 [white card, yellow border; printed]”; 1♀ [abdomen now missing], “N.Kamerun / Joh: Albrechtshöhe / I.96 / L. Conradt S [pale blue card; printed] // *Peltacanthina* / *octodecim* / (Speiser 1911) ♀ / Dr.Enderlein det. 1919 [handwritten & printed] // DEI Müncheberg / Dip—01017 [green card; printed] // PARALECTOTYPE ♀ / *Engistoneura* / *octodecim* Speiser, 1911 / designated by / Kirk-Spriggs & Whittington / 2025 [white card, yellow border; printed]” (all SDEI).

*Remarks*. There are eight specimens (3♂, 5♀) standing as *E. octodecim* in the SDEI collection, all of which bear the labels “Kamerun”, collected by L. Conradt. As Speiser (1911) did not designate a holotype in the original publication, these specimens are here regarded as syntypes. One female specimen bearing the additional labels “*Engistoneura octodecim* ♂. / P. Speiser det. / Typa! // Holotype” is here selected and designated as lectotype and the remaining seven specimens as paralectotypes.

The label “Holotype” is a curatorial label that was added later. The lectotype clearly has the marginal scutellar setae inserted into tubules, the surface of the disc of the scutellum with punctation denser and more pronounced than in *Engistoneura* and the distinctive wing pattern, are here confirmed as *Peltacanthina*.

### *Engistoneura surniipennis* Speiser, 1911

*Engistoneura surniipennis* Speiser, 1911: 255.

*Peltacanthina surniipennis*: Hendel 1914a: 152 (synonymy) 1914b: 385; Steyskal 1980: 570.

*Type information*. “1 ♀ in meiner Sammlung, am 11. XII. 1905 von Herrn Dr. Schröder bei Bomole in Deutsch Ost-Afrika gefangen; ferner ein recht schlecht erhaltenes zweites Exemplar in meinem Besitz, das derselbe am 13. XI. 1905 bei Muhesa erbeutete.”

*Current status*. Changed combination.

*Valid name*. *Peltacanthina* (*Peltacanthina*) *surniipennis* (Speiser, 1911).

*Distribution*. Tanzania (Steyskal 1980: 570).

*Type material*. Destroyed.

*Remarks*. The type material could not be located in NHRS and “im meiner Sammlung” indicates that the type was deposited in Speiser’s private collection, which was purportedly destroyed during WWII (M. Forshage, pers. comm. 2024). The collection likely went down with Speiser on the ill-fated MV *Wilhelm Gustloff* (N. Evenhuis, pers. comm. 2024) a German military transport ship which was sunk on 30 January 1945 by Soviet submarine S-13 in the Baltic Sea while evacuating civilians and military personnel from East Prussia.

### *Engistoneura unilineata* Bezzi, 1914

*Engistoneura unilineata* Bezzi, 1914: 297.

*Engistoneura unilineata*: Steyskal 1980: 567.

*Type information*. “Thies, Senegal”.

*Current status*. New combination.

*Valid name*. *Peltacanthina* (*Peltacanthina*) *unilineata* (Bezzi, 1914) **comb. n.**

*Distribution*. Senegal.

*Type material examined*. **SENEGAL**: lectotype ♀ (here designated) “Thies / Africa occ. / 1912 [handwritten] // *Engistoneura* / *unilineata* n. [handwritten] // **LECTOTYPE** ♀ / *Engistoneura* / *unilineata* Bezzi, 1908 / Kirk-Spriggs & / Whittington / 2024 [white card with yellow border; printed]” (MSNM).

*Remarks*. Steyskal (1980: 567) included the species *unilineata* Bezzi in the genus *Engistoneura*, but apparently did not examine the name-bearing types in preparation of his catalogue. Bezzi’s original description clearly states that the marginal scutellar setae are inserted in tubules and examination of images of the syntype ♀ supplied by MSNM clearly indicate this to be the case. In addition, the surface of the disc of the scutellum also has the punctation

denser and more pronounced than in *Engistoneura* and the distinctive wing pattern leave no doubt as to its identity with *Peltacanthina*. The species is, therefore, removed from the genus *Engistoneura* and placed in new combination with *Peltacanthina* (*Peltacanthina*). As Bezzi did not allocate a holotype and no type labels of any kind are appended to it, the examined syntype is here selected and designated as lectotype.

## Discussion

### Geographical coverage

A total of 286 location points from which the genus *Engistoneura* is recorded are plotted on Fig. 137. Examination of the overall coverage of records, indicates that the genus is virtually confined to Tropical and Subtropical Moist Broadleaf Forests of Central and West Africa. The most westerly confirmed record is for *E. lugens* from Friguigbé, Guinea and the most easterly confirmed record for *E. obscura* from Makao Forest, Republic of Congo (Fig. 156). The genus is mainly distributed in West Africa, with a few species extending into Cameroon, Gabon and Equatorial Guinea in Central Africa (*sensu* Kirk-Spriggs 2017: 6) and *E. obscura* extending farthest eastwards into the Congo Basin. Despite the presence of contiguous Tropical and Subtropical Moist Broadleaf Forests that extend south eastwards across the Congo River, widely in Democratic Republic of Congo, the genus does not occur there and the Congo River appears to have acted as a boundary for gene flow.

Three major diversification mechanisms have been proposed in the literature to explain species diversity in the tropics (Allen *et al.* 2021). The Riverine Barriers Hypothesis (RBH) in which species and populations diverged across riverine barriers (*e.g.*, Ayres & Clutton-Brock 1992; Bates 1863; Mayr 1942; Sick 1967; Wallace 1852); the Refuge Hypothesis (RH) in which forests fragmented during the cold, dry Pleistocene glaciation cycles, causing isolation and divergence in small forest fragments (either lowland or montane forest refugia) (*e.g.*, Haffer 1969, 1974, 1982; Hugué & Lévêque 1994; Mayr & O’Hara 1986; Prance 1982; Vanzolini 1973; Vanzolini & Williams 1970); and an amalgamate Riverine/Refuge Hypothesis (RRH) in which speciation was promoted by a combination of river barriers and climate-driven vegetation changes (*e.g.*, Gascon *et al.* 2000; Haffer 2008; Patton & Silva 2005; Richardson *et al.* 2001; Weir 2006). These three hypotheses are examined here, both in terms of the range of the genus *Engistoneura* as a whole and whether the known distributions of individual species can be explained in relation to the three hypotheses.

### River Barrier Hypothesis

The Riverine Barriers Hypothesis (RBH) posits that tropical rivers can represent effective barriers to gene flow, in cases where range boundaries coincide with river

barriers (Voelker *et al.* 2013) (although other vicariance forces, such as tectonic events are also implicated as factors promoting lineage diversification and distributions that appear to support the RBH). This concept was first postulated by Wallace (1852) based on a study of primates in the Amazon Basin and in that paper, Wallace also mentioned that he had observed similar phenomena in insects in the Amazon. Since then, studies of RBH have largely focused on molecular studies of birds (*e.g.*, Aleixo 2006; Bates *et al.* 2004; Ribas *et al.* 2012) and other vertebrates (*e.g.*, Lampert *et al.* 2003; Pellegrino *et al.* 2005; Vallinoto *et al.* 2006) in Amazonia, although Hall & Harvey (2002), for example, indicated that rivers have acted as barriers to dispersal in Amazonian butterflies.

Studies of RBH in the Congo Basin have been fewer and again have focused on molecular studies of mammals and birds (and their lice) (*e.g.*, Anthony *et al.* 2007; Kennis *et al.* 2011; Nicolas *et al.* 2011; Querouil *et al.* 2003; Telfer *et al.* 2003; Voelker *et al.* 2013). In a study conducted in Republic of Congo, Takano (2024) attributed the Sangha River Interval as a barrier to dispersal in tropical butterflies and noted that in the case of small, forest-dwelling butterflies, perhaps even smaller rivers, such as the Sangha River (a tributary of the Congo River) may have acted as barriers to gene flow. He noted that there is also a growing body of recent work where similar distributional patterns have been observed in other groups of Lepidoptera (*e.g.*, László & Volynkin 2023; Taberer 2024; Takano & László 2024) and in the Orthoptera (*e.g.*, Massa 2023).

The Congo River, with a length of 4,374 km, is the second longest river on the African continent, after the River Nile and one of the longest in the world (Runge 2022). Its vast drainage basin covers 3,747,320 km<sup>2</sup> and includes the modern states of Democratic Republic of Congo, parts of Angola, Zambia, Tanzania, Burundi, Central African Republic, Cameroon and Republic of Congo. The width of the river ranges from between 5.75 km to 11.3 km and is *ca* 38 km wide at its widest point. The Congo River certainly appears to have acted as a barrier to dispersal of *E. obscura* (the only species of the genus that occurs in the forests of the Congo Basin) and for the genus as a whole, but as all other species are of West African origin this is less significant than would be expected. Although the limited distribution of some species appears to be bounded by rivers for West African species, examination of collective patterns indicate that forest refugia rather than rivers have driven diversification and speciation in the genus (see below). The modern-day distribution of the genus suggest that the genus has dispersed in an easterly direction based on the major lineages found in West Africa.

## Refuge Hypothesis

The vast radiation of acalyprate flies in general probably took place in the Eocene (*e.g.*, Hennig 1965) and modern genera evolved by the Early Miocene (Arillo & Ortuño 2005). Unfortunately, the family Platystomatidae are very

poorly represented in the fossil record and only two fossils are known: *Ceroxys ethiopia* Meunier, 1908, in copal of Zanzibar, Tanzania (of Pliocene age, *i.e.*, 5.33–2.58 Ma) and *Scholastes foordi* Cockerell, 1921, from amber inclusions found in Norfolk, England (which may be of Pliocene age, if the medium is found to be true amber, or Pleistocene to Holocene in age) (Evenhuis 1997). These geologically recent fossils give the only indication of the evolutionary origin of the family. Paleoenvironmental data suggest that vegetation of the early Miocene was dominated by tropical and subtropical forests (*e.g.*, Maley 1996; Zachos *et al.* 2008) with even the land covered by the present-day Sahara Desert afforested (*e.g.*, Coetzee 1993; Jacobs 2004; Micheels *et al.* 2009; Plana 2004) and the ancestors of modern *Engistoneura* may have been more widely distributed across Africa in these putative ancient pantropical forests. Drastic global cooling in the mid-Miocene, triggered by the closure of the Tethys Sea and associated changes in tropical oceanic currents (*e.g.*, Zachos *et al.* 2001; Zhang *et al.* 2011) favoured grassland expansion and contraction of dense canopy forests (*e.g.*, Jacobs 2004; Micheels *et al.* 2009; Senut *et al.* 2009) (see Kirk-Spriggs & Muller 2017, fig. 9.25). This transformed the continent into a mosaic of isolated refugial forests separated by savanna (*e.g.*, Jacobs 2004; Maley 1996; Plana 2004). Consequently, rainforests in Africa were mostly fragmented into relatively small patches in upland and lowland watersheds (*e.g.*, Coetzee 1993; Plana 2004). Numerous plants and animal species presumably went extinct, if they were unable to tolerate or adapt to the new, drastically cooler temperatures and associated biomes nor disperse to climatically favourable areas (Morley & Richards 1993). Modern and paleofloras provide evidence that many plant groups in tropical Africa became taxonomically depauperate compared to those in more climatically buffered regions (Aduse-Poku *et al.* 2022). In a study of butterfly genus *Bicyclus*, Aduse-Poku *et al.* (2022) hypothesised that the early, rapid divergences of the genus resulted from fragmentation of ancestral populations into forest refugia in the early to mid-Miocene. In a study of the cryptic arachnid order Ricinulei in Central and West Africa, Murienne *et al.* (2013) suggested that refugia may have acted as “museums” conserving ancient diversity rather than as engines generating diversity during successive episodes of climatic fluctuation in Africa. The only dipterological study that explored distribution related to forest refugia in the Afrotropics appears to be that of Sæther & Ekrem (2023) for the family Chironomidae.

All species of *Engistoneura* are mapped over forest refugia (*sensu* Maley 1996) in Fig. 137 and when these collective distributions are examined a number of clear patterns are evident. A group of five species are centred on the lowland forests of Sierra Leone (namely: *E. hexafascia*, **sp. nov.**, *E. lugens*, *E. mcalpinei*, **sp. nov.**, *E. nebula*, **sp. nov.** and *E. parallela*). This area (marked A, with red dotted line on Fig. 137) was not identified as a forest refugium by Maley (1996), but microrefugia were indicated in this area by Ernst *et al.* (2025, fig. 4).

*Engistoneura circumfusus*, **sp. nov.** is apparently

confined to the forest refugium in northern Liberia (marked **B** on Fig. 137) and *E. biseriata*, **sp. nov.** and *E. currani* to the forest refugium in southern Liberia (marked **C** on Fig. 137).

By far the most significant forest refugium for the genus is that centred in southeastern Côte d'Ivoire and southern Ghana (marked **D** on Fig. 137) with six species confined to this area (namely: *E. ankasa*, **sp. nov.**, *E. flavipennis*, *E. ghanensis*, **sp. nov.**, *E. hemifascia*, **sp. nov.**, *E. kachana*, **sp. nov.** and *E. smithi*, **sp. nov.**). This refugium is clearly an area of high endemism and speciation in the group. Although considerably more widely distributed in the region, the highest concentration of records for *E. moerens* are also centred in this area.

As the only species recorded from the Congo Basin forests of Central Africa, the refugial origins of *E. obscura* are less certain. It seems most likely that the species dispersed from one or both refugia centred in Cameroon (marked **E** on Fig. 137) or perhaps from other refugia in Equatorial Guinea or Gabon and future genetic studies may better determine this.

Distribution patterns for three species, namely: *E.*

*deemingi*, **sp. nov.** (Fig. 142) *E. moerens* (Fig. 154) and *E. vicina*, **sp. nov.** (Fig. 159) are more difficult to interpret and the disjunct distribution of these three species may indicate sibling species, requiring more detailed genetic studies across their ranges.

### Elevational distribution

As noted above, the majority of *Engistoneura* species appear to occur in low to mid elevation Tropical and Subtropical Moist Broadleaf Forests (Fig. 137), but a few species are of considerable biogeographical interest, as they are apparently confined to Guinea Montane Forests at elevations above 1,000 m, where they presumably evolved in isolation. Two species, *E. distincta*, **sp. nov.** and *E. fatima*, **sp. nov.**, occur in the Loma Mountains of Sierra Leone at an elevation of 1,050 m (Fig. 131) and two species, *E. elvillah*, **sp. nov.** and *E. maya*, **sp. nov.**, are confined to Fouta Djallon at an elevation of 1,413 m (Figs 132, 133). Three predominantly low to mid elevation species also extent into higher elevations,

**TABLE 2.** Summary of sampled relict sacred forests and forest reserves in Ghana, using hanging traps baited with fermenting banana bait, from 2005–2006 and site details (partly after Bossart & Antwi 2016).

Site	Size (ha <sup>2</sup> )	Coordinates	Total traps	Trap days <sup>1</sup>
<sup>2</sup> Bobiri Forest Reserve	5,000	06°41'N, 01°21'W	16	224
Owabi Wildlife Sanctuary	1,200	06°44'N, 01°41'W	16	288
Kona Sacred Grove	130	06°52'N, 01°31'W	12	168
Asantemanso Sacred Grove	100	06°28'N, 01°33'W	11	154
Gyakye Sacred Grove	11.5	06°33'N, 01°31'W	8	122
Bonwire Sacred Grove	8	06°46'N, 01°28'W	8	128
Kajease Sacred Grove	6	06°38'N, 01°39'W	7	91
<sup>3</sup> Dadieso Forest Reserve	16,228	06°02'N, 03°00'W	< 10	?
<sup>3</sup> Ankasa Forest Reserve	49,000	05°16'N, 02°38'W	< 10	?

<sup>1</sup>Trap days calculated as the number of traps at a site multiplied by the number of different days the site was sampled. <sup>2</sup>The single specimen record of *E. ghanensis*, **sp. nov.** from Bobiri Forest Reserve is here regarded as a mislabelled specimen and is not listed.

<sup>3</sup>Sampling in Ankasa and Dadieso Forest Reserves did not form part of the main survey and the accurate number of traps deployed and trap days cannot be provided.

**TABLE 3.** Summary of *Engistoneura* species sampled in relict sacred forests and forest reserves in Ghana, using hanging traps baited with fermenting banana bait, from 2005–2006, based on material deposited in CMNH.

<i>Engistoneura</i> species	Bobiri Forest Reserve	Owabi Wildlife Sanctuary	Kona Sacred Grove	Asantemanso Sacred Grove	Gyakye Sacred Grove	Bonwire Sacred Grove	Kajease Sacred Grove	Dadieso Forest Reserve	Ankasa Forest Reserve
<i>E. moerens</i> (Fabricius)	×	×	×	-	×	×	×	×	-
<i>E. smithi</i> , <b>sp. nov.</b>	×	-	×	×	×	×	×	-	-
<i>E. flavipennis</i> Hendel	×	-	-	-	-	-	-	-	-
<i>E. ghanensis</i> , <b>sp. nov.</b>	-	-	-	×	-	-	-	-	-
<i>E. kachana</i> , <b>sp. nov.</b>	-	-	-	-	-	-	-	×	-
<i>E. ankasa</i> , <b>sp. nov.</b>	-	-	-	-	-	-	-	-	×



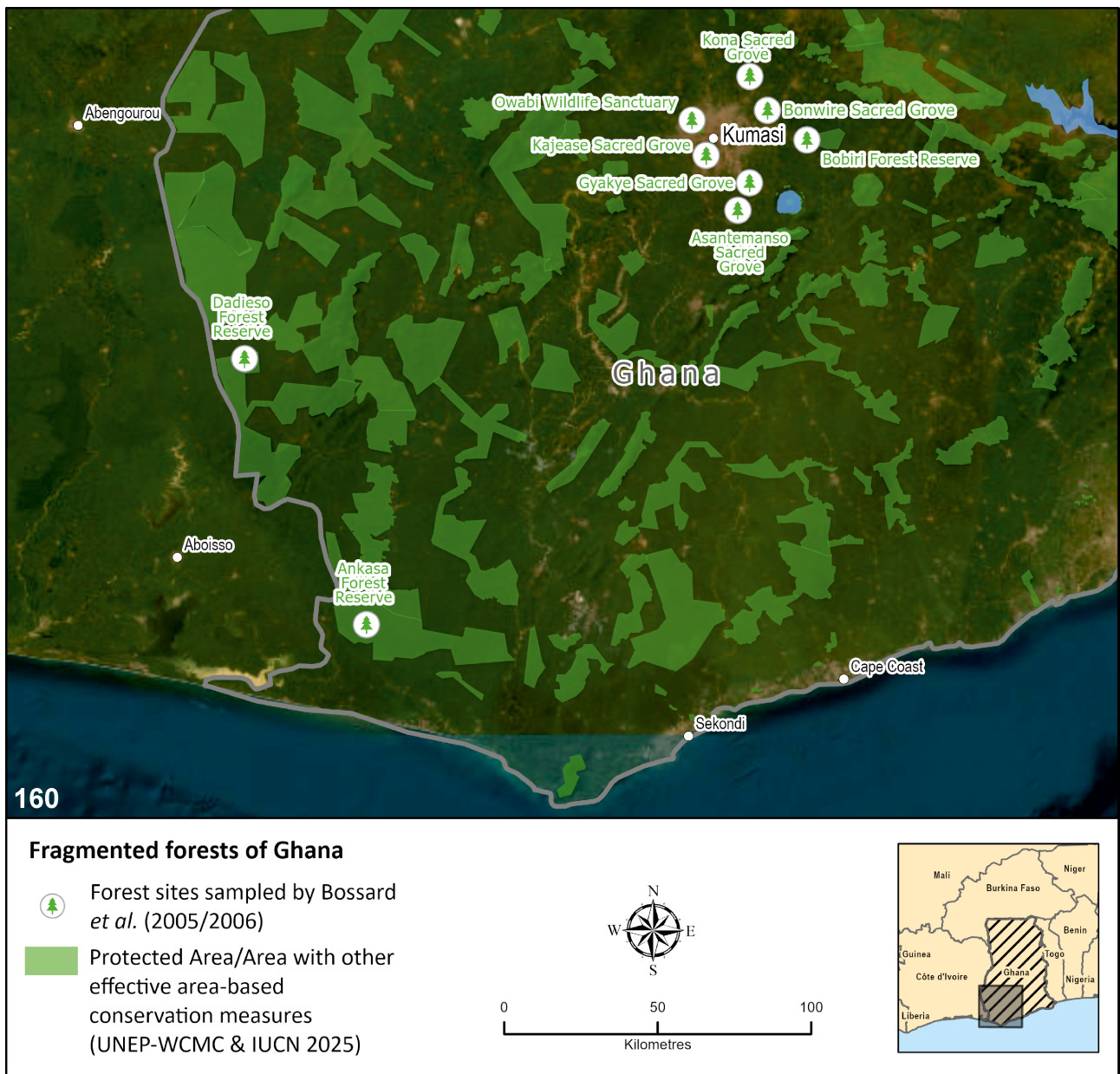
namely: *Engistoneura lugens* from ca 10 and 952 m; *E. obscura* from ca 10 to 700 m and *E. vicina*, **sp. nov.** from ca 13 and 1,413 m (Mt. Tonkouï Peak, Côte d'Ivoire).

### Forest fragmentation and conservation

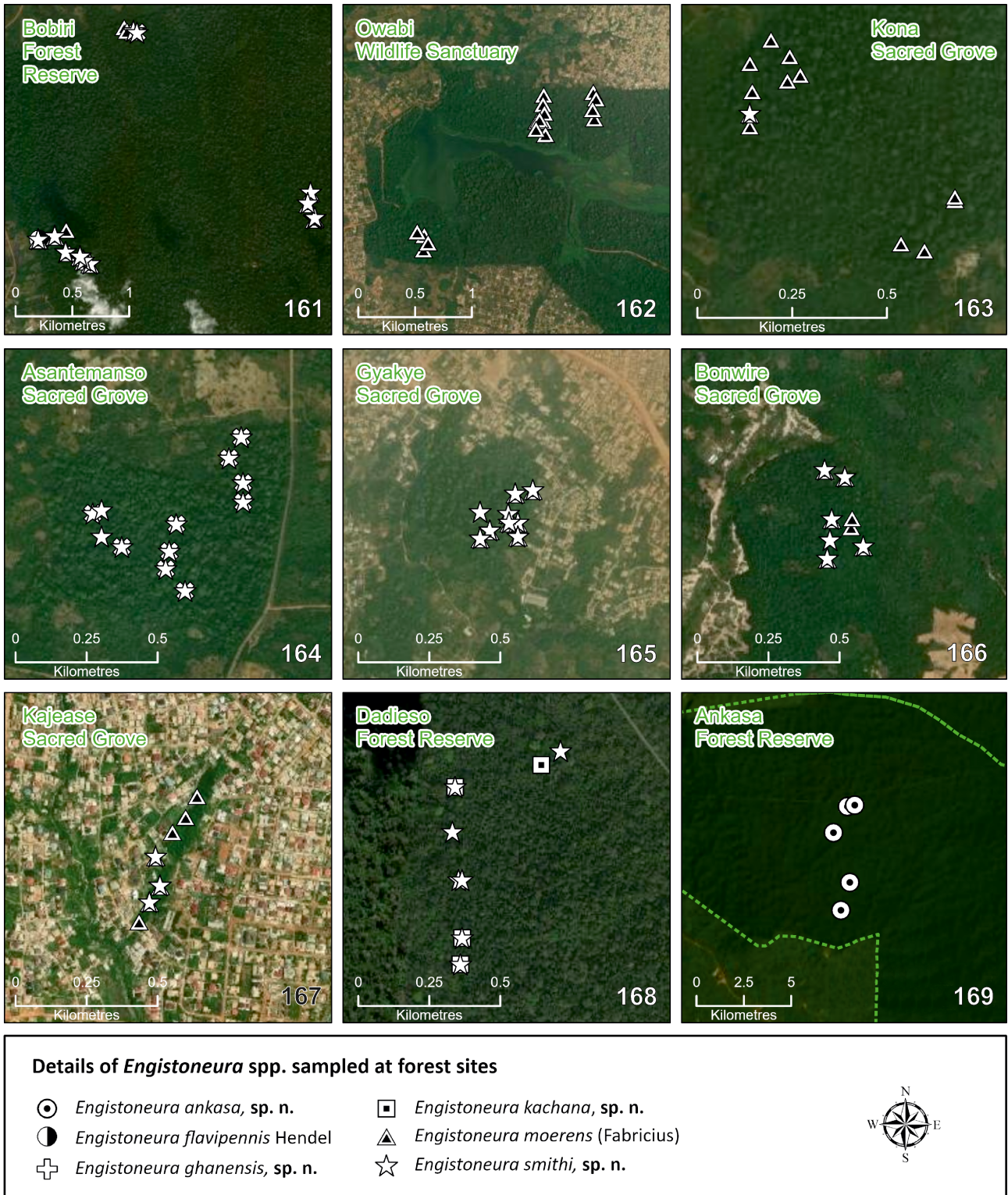
Most maps that indicate perceived rainforest cover in West Africa give the impression of continuous forest cover over the equatorial parts of the region (with the exception of the Dahoney gap) (e.g., Fig. 137). The reality today is quite different, however, and the Upper Guinean forests of Ghana, for example, are now recognized as among the most depleted and fragmented in the world (Fig. 160), despite being among the most biologically unique and being recognized as one of Africa's Biodiversity Hotspots (e.g., Bossart *et al.* 2006; Hall & Swain 1981; Myers *et al.* 2000).

It has been estimated that 80–90% of the original high canopy forest in Ghana has been destroyed and virtually all forests that have not been designated as forest reserves have gone, most probably within the past 30 years (Hawthorne 1988; Hawthorne & Abu-Juam 1995). External pressures in the form of residential and agricultural development, bush fires, illegal logging, mining, and consumption of forest products, threaten remaining forest tracts and some formal reserves are virtually devoid of trees as a result (Bossart *et al.* 2006; Hawthorne & Abu-Juam 1995).

Only ca 1% of forest cover in Ghana remains outside gazetted reserves and sacred forest groves account for most of this (Bossart *et al.* 2006). Sacred forest groves in Ghana are centuries old protected areas that were once part of continuous forest cover, but now mostly exist as relict forest patches embedded in an agropastoral landscape (Bossart *et al.* 2006). Sacred groves are small forests (some less than a hectare in size) that have persisted due



**FIGURE 160.** Location map of sacred forest groves, forest reserves and sanctuary sampled by J. Bossart *et al.* in Ghana (2005–2006) and referred to in the text.



**FIGURE 161–169.** Details of *Engistoneura* species sampled in each of the nine fragmented forests in Ghana by J. Bossard *et al.* in (2005/2006). **161.** Bobiri Forest Reserve. **162.** Owabi Wildlife Sanctuary. **163.** Kona Sacred Grove. **164.** Asantemanso Sacred Grove. **165.** Gyakye Sacred Grove. **166.** Bonwire Sacred Grove. **167.** Kajease Sacred Grove. **168.** Dadieso Forest Reserve. **169.** Ankasa Forest Reserve.



**FIGURES 170–175.** Examples of vegetation of sacred forest groves, forest reserves and sanctuaries in the Kumasi area of Ghana: **170.** Bobiri Forest Reserve. **171.** Bonwire Sacred Grove. **172.** Owabi Wildlife Sanctuary. **173.** Kona Sacred Grove. **174.** Bonwire Sacred Grove. **175.** Kajease Sacred Grove. All images courtesy of J. Bossart (reproduced with permission).

to community-based, traditional belief systems that have restricted access and use (Lebbie & Freudenberger 1996; Ntiemoa-Baidu 2001; UNESCO 2003). Bossart & Antwi (2016) noted that the value of such reduced fragmented forests may only be understood when the biodiversity of multiple groves is considered collectively, to determine whether they harbour relict populations of rare or declining species, or when they facilitate gene flow and connectivity of fragmented forest populations across the broader landscape.

A recent review of studies investigating the biodiversity of fragmented forest (Sinthumule 2024) identified only two studies that focused on insects as indicator species in West Africa. In a comparative study of Jachie Sacred Grove and Nkrabea Forest Reserve in Ghana, which mainly dealt with the flora, Boadi *et al.* (2017) included a very preliminary study of various insects sampled in pitfall traps at the two sites. Larsen (2006) studied the butterfly fauna of 23 protected areas in Ghana and Bossart *et al.* (2006) conducted a comparative survey using a passive trapping methodology to sample fruit-feeding butterflies in seven sacred forest groves, reserves and sanctuaries in the Kumasi area of Ghana (see Table 2). Fortunately, the *Engistoneura* material resulting from this last named study, that was sampled as by-catch in hanging traps baited with fermenting banana bait, was

retained and deposited in CMNH as voucher specimens. This includes material from the seven fragmented forest patches studied in Bossart's main survey (*i.e.*, Bobiri Forest Reserve (Figs 161, 170), Owabi Wildlife Sanctuary (Figs 162, 172) and Asantemanso (Fig. 164), Bonwire (Figs 166, 171, 174), Gyakye (Fig. 165), Kajease (Figs 167, 175) and Kona (Figs 163, 173) sacred groves), plus material from two additional larger fragmented forest sites (Ankasa (Fig. 169) and Dadieso (Fig. 168) forest reserves). Retention and examination of this material has enabled a first empirical investigation of Diptera species associated with such forest fragments and an assessment of their potential conservation status.

The *Engistoneura* material deposited in CMNH comprised 1,356 specimens in total and represents six species of the genus, two of which are described (*E. flavipennis* and *E. moerens*) and four that are described as new to science herein (*E. ankasa*, **sp. nov.**, *E. ghanensis*, **sp. nov.**, *E. kachana*, **sp. nov.** and *E. smithi*, **sp. nov.**). *Engistoneura moerens* is the commonest and most widely distributed species in West Africa, recorded from Benin, Cameroon, Côte d'Ivoire, Equatorial Guinea, Ghana, Guinea, Nigeria and Togo (Fig. 154). The species was sampled in all fragmented forest patches, except Ankasa Forest Reserve and Asantemanso Sacred Grove. It occurred sympatrically with *E. smithi*, **sp. nov.** in six of

the nine fragmented forests (*i.e.*, Bobiri, Kona, Gyakye, Bonwire and Kajease) and also with *E. flavipennis* in Bobiri and occurred sympatrically with *E. kachana*, **sp. nov.** in Dadieso Forest Reserve (Table 3). *Engistoneura flavipennis* is only known from Ghana (Fig. 146) and was represented by a single specimen from Bobiri Forest Reserve, where it occurred sympatrically with *E. moerens* and *E. smithi*, **sp. nov.** (Table 3). The species was previously only known from three historical specimens collected in 1907 and labelled “Kumasi” in NHMUK. *Engistoneura smithi*, **sp. nov.** is recorded from Ghana, with one record across the border in Côte d’Ivoire (Fig. 158). The species is the second most widely distributed species resulting from the study, occurring in six of the nine fragmented forests (*i.e.*, Bobiri, Kona, Asantemanso, Gyakye, Bonwire and Kajease) (Table 3). In Ghana the species is also recorded from Pra River, Kumasi, Bompata and Ashanti (Fig. 158). Three species are restricted to three different fragmented forest patches: *E. ankasa*, **sp. nov.** to Ankasa Forest Reserve (where it occurs allopatrically) (Fig. 138); *E. ghanensis*, **sp. nov.** to Asantemanso Sacred Grove (where it occurs sympatrically with *E. smithi*, **sp. nov.**) (Fig. 147); and *E. kachana*, **sp. nov.** to Dadieso Forest Reserve (where it occurs sympatrically with *E. moerens*) (Fig. 150).

There does not appear to be a direct correlation between the number of species of *Engistoneura* present in each fragmented forest relative to its size. Although the largest forest in the Kumasi area (Bobiri Forest Reserve, 5,000 ha<sup>2</sup>) has three species the second largest (Owabi Wildlife Sanctuary, 1,200 ha<sup>2</sup>) has only one, while two species are present in all other fragmented forests in the Kumasi area, ranging from 6–130 ha<sup>2</sup> in size. The two largest and farthest removed forests (Ankasa Forest Reserve, 50,000 ha<sup>2</sup> and Dadieso Forest Reserve, 16,228 ha<sup>2</sup>) have only one (endemic) species each.

This study indicates that four species have highly restricted ranges in Ghana (*E. ankasa*, **sp. nov.**, *E. flavipennis*, *E. ghanensis*, **sp. nov.** and *E. kachana*, **sp. nov.**) and *E. smithi*, **sp. nov.** with a single record from Côte d’Ivoire, indicating not only that these fragmented forests represent “museums”, retaining described species that were once more widely distributed when forests were more expansive, but are also rich sources of undescribed species, even in the case of large, brightly marked, conspicuous flies, such as the genus *Engistoneura*. These forest fragments are, therefore, immensely important sources of both described and undescribed species and more extensive sampling of the insect fauna are required to further assess the assemblages of species and their value in conservation biology.

## Conclusion

Prior to this study, the genus *Engistoneura* was thought to be a small genus of only eight described species confined to West Africa, but is now known to comprise at least 22 species, distributed widely in the Tropical and Subtropical Moist Broadleaf Forests of Central and

West Africa, with its range limited by the barrier of the Congo River. Despite 16 new species being described in this paper, additional new species surely await discovery and description (as evidenced by the photographed, but undescribed species from Côte d’Ivoire illustrated in Fig. 6) especially from the largely untapped fragmented forests of West Africa and from under-sampled montane forest habitats. The phylogenetic relationship of the genus *Engistoneura* in respect to other platystomatine genera is currently unresolved, but a molecular phylogeny of the Platystomatidae as a whole is currently in preparation, that shall include two species of *Engistoneura* (Bayless *et al.* in prep.). The overall similarity and lack of taxonomic characters of the male terminalia of the genus is a major stumbling block in separating closely-related species. The most widespread species, *E. moerens* is here regarded as a single variable species, but a detailed molecular study of recent material sampled across the range of the species may reveal that more than one sibling species is involved. The same applies to the *E. deemingi*, **sp. nov.**/*vicina*, **sp. nov.** species pair. The restriction of many species to limited geographical ranges highlights the need for conservation of West and Central Africa’s remaining forests, especially the importance of Sacred Forest Groves and other forest reserves in the regions.

## Acknowledgements

Loans of specimens (including type material) or imaging of type specimens were kindly facilitated by the following institutions and individuals: (AMNH): David Grimaldi and Agnieszka Anna Pierwola; (CAS): the late Norman Penny and Christopher C. Grinter; (CMNH): Chen Young and Jim Fetzner; (CUMZ): William Foster and Edgar Turner; (ETHZ): Michael Greef; (IITAB): Georg Goergen; (MHNG): the late Bernard Merz; (MNHN): Jeanne Charbonnel; (MSNM): Carlo Monari, Fabrizio Rigato and Michele Zilioli; (MZH): Jere Kahanpää; (MZLU): Rune Bygebjerg; (NHMUK): Duncan Sivell and Keita Matsumoto; (NHMV): Michaela Brojer and Alessandro Camargo; (NHRS): Mattias Forshage; (NMSA): Kirstin Williams and Mandisa Ndlovu; (NMWC): Kirsty Lloyd and John Deeming; (OUMNH): Robert Douglas; (RBINS): Wouter Dekoninck, Tim Laebens and Pol Limbourg; (RMCA): Stéphane Hanot, Marc De Meyer and Kurt Jordaens; (SDEI): Frank Menzel; (USNM): Allen Norrbom; (ZMHB): Jenny Pohl; (ZMUC): Thomas Pape. Philippe Moretto supplied specimens through Association *Catharsius* from Côte d’Ivoire. Tabitha Taberer kindly hand-carried a returned loan to OUMNH. Hitoshi Takano supplied information on ANHRT collaborators and read a draft of the manuscript, which greatly improved the final product. Neal Evenhuis helped with advice on matters related to the *International Code of Zoological Nomenclature* and supplied some literature. Janice Bossart provided valuable information on sampling techniques in Ghana and kindly provided images of the Ghanaian forests sampled in 2006/2006. Catherine Goodwin and Molly Bashford assisted with

labels and the processing of incoming and outgoing loans. The following individuals kindly gave permission to reproduce images of living flies: Regis Babin, Ehoarn Bidault, Violette Dérozier, Regine Hakenbeck, Will Miles and John Vallender. Images of specimens deposited in NHMUK are reproduced by permission of the Trustees of the Natural History Museum, London. The African Natural History Research Trust acknowledges the following institutions and organisations that facilitated research in Cote d'Ivoire, Guinea, Republic of Congo and Sierra Leone: Ministère de l'Enseignement Supérieur et de la Recherche Scientifique, Office Ivoirien des Parcs et Réserves (OIPR) and Société de Développement des Forêts (SODEFOR) in Côte d'Ivoire; Ministry of Agriculture, Fisheries and Food Security, and Njala University in Sierra Leone; Centre de Gestion de l'Environnement du Nimba et du Simandou, Centre Forestière de N'zérékoré, and Guinée Ecologie in Guinea; Direction de la Faune et des aires protégées (DFAP) Institut National de Recherche en Sciences Exactes et Naturelles (IRSEN) Ministère de la Recherche scientifique et de l'Innovation Technologique, Université Marien Ngouabi and Wildlife Conservation Society (WCS) in Republic of Congo. Richard Smith (Chairman of the Board of Trustees, ANHRT) is thanked for funding expeditions that generated recent material and for supporting the first author's research. Marc de Meyer and Valery Korneyev are thanked for their useful comments and suggestions that greatly improved the manuscript.

## References

- Aduse-Poku, K., van Bergen, E., Sáfián, S., Collins, S.C., Etchangienne, R.S., Herrera-Alsina, H., Brakefield, P.M., Brattström, O., Lohman, D.J. & Wahlberg, N. (2022) Miocene climate and habitat change drove diversification in *Bicyclus*, Africa's largest radiation of satyrine butterflies. *Systematic Biology*, 71, 570–588. <https://doi.org/10.1093/sysbio/syab066>
- Aleixo, A. (2006) Historical diversification of floodplain forest specialist species in the Amazon: a case study with two species of the avian genus *Xiphorhynchus* (Aves: Dendrocolaptidae). *Biological Journal of the Linnean Society*, 89, 383–395. <https://doi.org/10.1111/j.1095-8312.2006.00703.x>
- Allen, K.E., Greenbaum, E., Hime, P.M., Tapondjou, N.W.P., Sterkhova, V.V., Kusamba, C., Rödel, M.-O., Penner, J., Townsend Peterson, A. & Brown, R.M. (2021) Rivers, not refugia, drove diversification in arboreal sub-Saharan African snakes. *Ecology and Evolution*, 11, 6133–6152. <https://doi.org/10.1002/ece3.7429>
- Anthony, N.M., Johnson-Bawe, M., Jeffery, K., Clifford, S.L., Abernethy, K.A., Tutin, C.E., Lahm, S.A., White, L.J.T., Utley, J.F., Wickings, E.J. & Bruford, M.W. (2007) The role of Pleistocene refugia and rivers in shaping gorilla genetic diversity in Central Africa. *Proceedings of the National Academy of Sciences*, 104, 20432–20436. <https://doi.org/10.1073/pnas.0704816105>
- Arillo, A. & Ortuño, V.M. (2005) Catalogue of fossil insect species described from Dominican amber (Miocene). *Stuttgarter Beiträge zur Naturkunde, Serie B*, 352, 1–68.
- Ayres, J.M.C. & Clutton-Brock, T.H. (1992) River boundaries and species range size in Amazonian primates. *American Naturalist*, 140, 531–537. <https://doi.org/10.1086/285427>
- Bates, H.W. (1863) *The naturalist on the river Amazons. A record of adventures, habits of animals, sketches of Brazilian and Indian life, and aspects of nature under the Equator, during eleven years of travel*. London: John Murray, Albemarle Street.
- Bates, J.M., Haffer, J. & Grismer, E. (2004) Avian mitochondrial DNA sequence divergence across a headwater stream of the Rio Tapajós, a major Amazonian River. *Journal of Ornithology*, 145, 199–205. <https://doi.org/10.1007/s10336-004-0039-4>
- Bezzi, M. (1908a) Diagnoses d'espèces nouvelles de Diptères d'Afrique. *Bulletin et Annales de la Société entomologique de Belgique*, 52, 374–388. [<https://www.biodiversitylibrary.org/item/47476>]
- Bezzi, M. (1908b) Ditteri eritrei raccolti dal Dott. Andreini e dal Prof. Tellini. Parte seconda. Diptera cyclorrhapha. *Bollettino Società Entomologia Italiana*, 39 (1907), 3–199.
- Bezzi, M. (1914) Ditteri raccolti dal Prof. F. Silvestri durante il suo viaggio in Africa del 1912–13. *Bollettino del Laboratorio di zoologia generale e agraria della R. Scuola superiore d'agricoltura*, 8, 279–308.
- Bigot, J.M.F. (1891) Voyage de M. Ch. Alluaud dans le territoire d'Assinie. 8e mémoire (Afrique occidentale) en juillet et août 1886. Diptères. *Annales de la Société entomologique de France*, 60, 365–386. [<https://www.biodiversitylibrary.org/item/101300#page/371/mode/1up>]
- Boadi, S., Nsor, C.A., Yakubu, D.H., Acquah, E. & Antobre, O.O. (2017) Conventional and indigenous biodiversity conservation approach: a comparative study of Jachie Sacred Grove and Nkrabea Forest Reserve. *International Journal of Forestry Research*, 2017, 1–8. <https://doi.org/10.1155/2017/1721024>
- Bossart, J.L. & Antwi, J.B. (2016) Limited erosion of genetic and species diversity from small forest patches: sacred forest groves in an Afrotropical biodiversity hotspot have high conservation value for butterflies. *Biological Conservation*, 198, 122–134. <https://doi.org/10.1016/j.biocon.2016.03.029>
- Bossart, J.L., Opuni-Frimpong, E., Kuudaar, S. & Nkrumah, E. (2006) Richness, abundance, and complementarity of fruit-feeding butterfly species in relict sacred forests and forest reserves of Ghana. In: Hawksworth, D.L. & Bull, A.T. (Eds), *Arthropod diversity and conservation. Topics in biodiversity and conservation. Volume 1*. Springer, Dordrecht. [https://doi.org/10.1007/978-1-4020-5204-0\\_20](https://doi.org/10.1007/978-1-4020-5204-0_20)
- Cockerell, T.D.A. (1921) An ortalid fly in British amber. *Entomologist*, 54, 30.
- Coetzee, J. (1993) *African flora since the terminal Jurassic*. New Haven: Yale University Press.
- Cumming, J.M. & Wood, D.M. (2017) 3. Adult morphology and terminology. In: Kirk-Spriggs, A.H. & Sinclair, B.J. (Eds),

- Manual of Afrotropical Diptera. Volume 1. Introductory chapters and keys to Diptera families. Suricata 4.* South African National Biodiversity Institute, Pretoria, pp. 89–133.
- Enderlein, G. (1912) Zur Kenntnis orientalischer Ortalinien und Loxoneurinen. *Zoologische Jahrbücher*, 33, 363–378.
- Enderlein, G. (1924) Beiträge zur Kenntnis der Platystominen. *Mitteilungen aus dem Zoologischen Museum in Berlin*, 11, 99–153.
- Ernst, M., Rödel, M.O. & Blom, M.P.K. (2025) Towards a comprehensive view on evolutionary refugia in West African rainforests. *Frontiers of Biogeography*, 18, e139537. <https://doi.org/10.21425/fob.18.139537>
- Evenhuis, N.L. (1997) Family Platystomatidae. *Catalog of the fossil flies of the world (Insecta: Diptera) website*. Available from: <https://hbs.bishopmuseum.org/fossilcat/fossplatystom.html> (Version 2.0, 17 February 1997) (accessed 8 June 2025).
- Fabricius, J.C. (1794) *Entomologia systematica emendata et aucta. Secundum classes, ordines, genera, species adjectis synonymis, locis, observationibus, descriptionibus*. C.G. Proft, Hafniae [= Copenhagen], 6 pp. <https://doi.org/https://archive.org/details/entomologiasyst04fabr/page/n3/mode/2up>
- Fabricius, J.C. (1805) *Systema antliatorum secundum ordines, genera, species, adiectis synonymis, locis, observationibus, descriptionibus*. Reichard, Brunsvigae. [<https://www.biodiversitylibrary.org/item/53432#page/9/mode/1up>]
- Fallén, C.F. (1810) *Specim. entomolog. novam Diptera disponendi methodum exhibens*. Berlingianis, Lund. [<https://www.biodiversitylibrary.org/item/188591#page/1/mode/1up>]
- Gascon, C., Malcolm, J.R., Patton, J.L., da Silva, M.N.F., Bogart, J.P., Loughheed, S.C., Peres, C.A., Neckel, S. & Boag, P.T. (2000) Riverine barriers and the geographic distribution of Amazonian species. *Proceedings of the National Academy of Sciences of the United States of America*, 97, 13672–13677. [<https://www.pnas.org/doi/pdf/10.1073/pnas.230136397>]
- Goloboff, P.A. & Morales, M.E. (2023) TNT version 1.6, with a graphical interface for MacOS and Linux, including new routines in parallel. *Cladistics*, 39, 144–153. <https://doi.org/10.1111/cla.12524>
- Haffer, J.R. (1969) Speciation in Amazonian forest birds: most species probably originated in forest refuges during dry climatic periods. *Science*, 165, 131–137. [<https://www.science.org/doi/abs/10.1126/science.165.3889.131>]
- Haffer, J.R. (1974) Avian speciation in tropical South America. *Publications of the Nuttall Ornithological Club*, 14, 1–390. <https://doi.org/10.1080/01650529009360816>
- Haffer, J.R. (1982) General aspects of the refuge theory. In: Prance, G.T., (Ed.), *Biological diversification in the tropics*. Columbia University Press, pp. 6–24.
- Haffer, J.R. (2008) Hypotheses to explain the origin of species in Amazonia. *Brazilian Journal of Biology*, 68, 917–947. <https://doi.org/10.1590/s1519-69842008000500003>
- Hall, J.B. & Swain, M.D. (1981) *Distribution and ecology of vascular plants in a tropical rainforest: forest vegetation of Ghana*. W. Junk Publishers, The Hague.
- Hall, J.P.W. & Harvey, D.J. (2002) The phylogeography of Amazonia revisited: new evidence from riordinid butterflies. *Evolution*, 56, 1489–1497. <https://doi.org/10.1111/j.0014-3820.2002.tb01460.x>
- Hawthorne, W.D. (1988) The flora and vegetation of Ghana's forests. In: *Ghana forest inventory proceedings*. Overseas Development Agency/Ghana Forestry Dept, Accra, pp. 8–13.
- Hawthorne, W.D. & Abu-Juam, M. (1995) *Forest protection in Ghana with particular reference to vegetation and plant species*. IUCN, Gland, Switzerland.
- Hendel, F. (1914a) Diptera. Fam. Muscaridae, Subfam. Platystominae. *Genera Insectorum*, 157, 1–179 + 15 plates. [<https://www.biodiversitylibrary.org/item/223809#page/165/mode/1up>]
- Hendel, F. (1914b) Die Arten der Platystominen. *Abhandlungen der Kaiserlich-Königlichen Zoologisch-botanischen Gesellschaft in Wien*, 8, 1–409 + 4 plates. [<https://www.biodiversitylibrary.org/item/28240#page/31/mode/1up>]
- Hennig, W. (1965) Die Acalyprtratae des Baltischen Bernsteins und ihre Bedeutung für die Erforschung der phylogenetischen Entwicklung dieser Dipteren-Gruppe. *Stuttgarter Beiträge zur Naturkunde*, 145, 1–215. [<https://www.biodiversitylibrary.org/part/241980>]
- Hugueny, B. & Lèvéque, C. (1994) Freshwater fish zoogeography in West Africa: faunal similarities between river basins. *Environmental Biology of Fishes*, 39, 365–380.
- International Commission on Zoological Nomenclature (1925) Opinion 82. Suspension of rules for *Musca* Linnaeus, 1758A, type of *M. domestica*. *Smithsonian miscellaneous collections*, 73, 1–7. [<https://www.biodiversitylibrary.org/page/8911029>]
- Jacobs, B.F. (2004) Palaeobotanical studies from tropical Africa: relevance to the evolution of forest, woodland and savannah biomes. *Philosophical Transactions of the Royal Society of London. B. Biological Sciences*, 359, 1573–83. <https://doi.org/10.1098/rstb.2004.1533>
- Kennis, J., Nicolas, V., Hulselmans, J., Katuala, P.G.B., Wendelen, W., Verheyen, E., Dudu, A.M. & Leirs, H. (2011) The impact of the Congo River and its tributaries on the rodent genus *Praomys*: speciation origin or range expansion limit? *Zoological Journal of the Linnean Society*, 163, 983–1002. <https://doi.org/10.1111/j.1096-3642.2011.00733.x>
- Kirk-Spriggs, A.H. (2017) 1. Introduction and brief history of Afrotropical dipterology. In: Kirk-Spriggs, A.H. & Sinclair, B.J. (Eds), *Manual of Afrotropical Diptera. Volume 1. Introductory chapters and keys to Diptera families. Suricata 4*. Pretoria: South African National Biodiversity Institute, pp. 1–67.
- Kirk-Spriggs, A.H. & Muller, B.S. (2017) 9. Biogeography of Diptera. In: Kirk-Spriggs, A.H. & Sinclair, B.J. (Eds), *Manual of Afrotropical Diptera. Volume 1. Introductory chapters and keys to Diptera families. Suricata 4*. Pretoria: South African National Biodiversity Institute, pp. 203–238.
- Lampert, K.P., Rand, A.S., Mueller, U.G. & Ryan, M.J. (2003) Fine-scale genetic pattern and evidence for sex-biased dispersal in the tungara frog, *Physalaemus pustulosus*. *Molecular Ecology*, 12, 3325–3334. <https://doi.org/10.1046/j.1365-294X.2003.02016.x>

- Larsen, T.B. (2006) *The Ghana butterfly fauna and its contribution to the objectives of the protected areas system*. Wildlife Division Support Project (WDSP) Report No. 63. [https://abdb-africa.org/library/bibliography/2006%20Ghana%20Report%20complete%201.5MB.pdf]
- László, G.M. & Volynkin, A.V. (2023) Review of the genus *Neomardara* Hering, 1926 with descriptions of two new species and updated information on the distribution of the genus (Lepidoptera: Erebidae: Lymantriinae). *Ecologica Montenegrina*, 68, 103–126.  
https://doi.org/10.37828/em.2023.68.11
- Lebbie, A.R. & Freudenberger, M.S. (1996) Sacred groves in Africa: forest patches in transition. In: Schelhas, J. & Greenberg, R. (Eds), *Forest patches in tropical landscapes*. Island Press, Washington, pp. 300–326.
- Linnaeus, C. (1758) *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. Tomus I. Editio decima, reformata. L. Salvii, Holmiae [= Stockholm]. [https://www.biodiversitylibrary.org/item/10277#page/1/mode/1up]
- Loew, H. (1873) Monographs of the Diptera of North America. Part III. *Smithsonian Miscellaneous Collections*, 11 (No. 256), vii + 1–351 + xiii + 4 plates. [https://repository.si.edu/handle/10088/23107]
- Maley, J. (1996) The African rainforest – main characteristics of changes in vegetation and climate from the Upper Cretaceous to the Quaternary. *Proceedings of the Royal Society of Edinburgh*, 104b, 31–73.  
https://doi.org/10.1017/S0269727000006114
- Massa, B. (2023) Biodiversity hotspot in the Sangha Trinational Protected Area revealed through Orthoptera Tettigoniidae. *Zootaxa*, 5331, 1–67.  
https://doi.org/10.11646/zootaxa.5331.1.1
- Mayr, E. (1942) *Systematics and the origin of species from the viewpoint of a zoologist*. Columbia University Press, New York, NY.
- Mayr, E. & O'Hara, R.J. (1986) The biogeographic evidence supporting the Pleistocene forest refuge hypothesis. *Evolution*, 40, 55–67.  
https://doi.org/10.2307/2408603
- McAlpine, D.K. (1994) Review of the species of *Achias* (Diptera: Platystomatidae). *Invertebrate Taxonomy*, 8, 117–281.
- Meigen, J.W. (1803) Versuch einer neuen Gattungseintheilung der europäischen zweiflügligen Insekten. *Magazin für Insektenkunde*, 2, 259–281. [https://www.biodiversitylibrary.org/item/137736#page/4/mode/1up]
- Meunier, F. (1908) Sur quelques diptères (Muscinae, Ortalinae, Helomyzinae) du copal récent de Zanzibar. *Annales de la Société scientifique de Bruxelles*, 32, 252–257. [https://www.biodiversitylibrary.org/part/198315]
- Micheels, A., Eronen, J. & Mosbrugger, V. (2009) The Late Miocene climate response to a modern Sahara Desert. *Global and Planetary Change*, 67, 193–204.  
https://doi.org/10.1016/j.gloplacha.2009.02.005
- Moretto, P., Cosson, B., Takano, H., Basquin, P., Bordat, P., Boucher, S., Bouyer, T., Danflous, S., Dérozier, V., Eitscheberger, U. & Juhel, P. (2021) Un refuge forestier menacé: la forêt d'altitude à Parinari du Mont Tonkouï en Côte d'Ivoire: évaluation de la biodiversité entomologique, botanique et ornithologique, valeurs de conservation du site. *Catharsius La Revue, Hors-série*, 1, 1–123.
- Morley, R.J. & Richards, K. (1993) Graminae cuticle – a key indicator of late Cenozoic climatic-change in the Niger Delta. *Review of Palaeobotany and Palynology*, 77, 119–127. [https://www.sciencedirect.com/science/article/abs/pii/0034666793900608]
- Murienne, J., Benavides, L.R., Prendini, L., Hormiga, G. & Giribet, G. (2013) Forest refugia in Western and Central Africa as 'museums' of Mesozoic biodiversity. *Biology Letters*, 23, 9(1): 20120932.  
https://doi.org/10.1098/rsbl.2012.0932
- Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B. & Kent, J. (2000) Biodiversity hotspots for conservation priorities. *Nature*, 403, 853–858.  
https://doi.org/10.1038/35002501
- NASA (2023) *IMERG grand average climatology (11 km resolution): Average annual precipitation (mm/year) June 2000–May 2023* [Spatial data]. NASA. Available from: https://gpm.nasa.gov/data/imerg/precipitation-climatology (accessed 18 June 2025).
- Nicolas, V., Missou, A.D., Denys, C., Peterhans, J.K., Katuala, P., Couloux, A. & Colyn, M. (2011) The roles of rivers and Pleistocene refugia in shaping genetic diversity in *Praomys misonnei* in tropical Africa. *Journal of Biogeography*, 38, 191–207.  
https://doi.org/10.1111/j.1365-2699.2010.02399.x
- Ntiamao-Baidu, T. (2001) Indigenous versus introduced biodiversity conservation strategies: the case of protected area systems in Ghana. In: Weber, W., White, L.J.T., Vedder, A. & Naughton-Treves, L. (Eds), *African rain forest ecology and conservation*. Yale University Press, New Haven & London, pp. 385–394.
- Olson, D.M., Dinerstein, E., Wikramanayake, E.D., Burgess, N.D., Powell, G.V.N., Underwood, E.C., D'Amico, J.A., Itoua, I., Strand, H.E., Morrison, J.C., Loucks, C.J., Allnutt, T.F., Ricketts, T.H., Kura, Y., Lamoreux, J.F., Wettengel, W.W., Hedao, P. & Kassem, K.R. (2001) Terrestrial ecoregions of the world: a new map of life on Earth: a new global map of terrestrial ecoregions provides an innovative tool for conserving biodiversity. *BioScience*, 51, 933–938.  
https://doi.org/10.1641/0006-3568(2001)051[0933:TEOTWA]2.0.CO;2
- Patton, J.L. & Silva, M.F. (2005) The history of Amazonian mammals: mechanisms and timing of diversification. In: Bermingham, E., Dick, C.W. & Moritz, C. (Eds.), *Tropical rainforests: past, present and future*. The University of Chicago Press, pp. 107–126.
- Pellegrino, K.C.M., Rodrigues, M.I., Waite, A.N., Morando, M., Yassuda, Y.Y. & Sites, J.W. (2005) Phylogeography and species limits in the *Gymnodactylus darwini* complex (Gekkonidae, Squamata): genetic structure coincides with river systems in the Brazilian Atlantic Forest. *Biological Journal of the Linnean Society*, 85, 13–26.  
https://doi.org/10.1111/j.1095-8312.2005.00472.x
- Plana, V. (2004) Mechanisms and tempo of evolution in the African Guineo-Congolian rainforest. *Philosophical Transactions of the Royal Society of London. B. Biological*

- Sciences*, 359, 1585–1594.  
<https://doi.org/10.1098/rstb.2004.1535>
- Pont, A.C., Chainey, J.E. & Evenhuis, N.L. (2024) *The types of Diptera (Insecta) described by J.-M.-F. Bigot*. Privately published, Hilo, Hawai'i, ii-x + 1–658 pp. [<https://archive.org/details/bigot-diptera-types/page/n13/mode/2up?view=theatre>]
- Prance, G.T. (1982) *Biological diversification in the tropics: Proceedings of the Fifth International Symposium of the Association for Tropical Biology, held at Macuto Beach, Caracas, Venezuela, February 8–13, 1979*. Columbia University Press, New York, NY.
- Querouil, S., Verheyen, E., Dillen, M. & Colyn, M. (2003) Patterns of diversification in two African forest shrews: *Sylvisorex johnstoni* and *Sylvisorex ollula* (Soricidae, Insectivora) in relation to paleo-environmental changes. *Molecular Phylogenetics and Evolution*, 28, 24–37. [<https://www.sciencedirect.com/science/article/abs/pii/S1055790303000277>]
- Ribas, C.C., Aleixo, A., Nogueira, A.C.R., Miyaki, C.Y. & Cracraft, J. (2012) A palaeobiogeographic model for biotic diversification within Amazonia over the past three million years. *Proceedings of the Royal Society B*, 279, 681–689. <https://doi.org/10.1098/RSPB.2011.1120>
- Richardson, J.E., Pennington, R.T., Pennington, T.D. & Hollingsworth, P.M. (2001) Rapid diversification of a species-rich genus of Neotropical rain forest trees. *Science*, 293, 2242–2245. <https://doi.org/10.1126/science.1061421>
- Runge, J. (2022) Chapter 15. The Congo River, Central Africa. In: Gupta, A. (Ed.) *Large rivers. Geomorphology and management. Second Edition*. John Wiley & Sons, pp. 433–456. <https://doi.org/10.1002/9781119412632.ch15>
- Sæther, O.A. & Ekrem, T. (2023) Biogeography of Afrotropical Chironomidae (Diptera) with special reference to Gondwanaland. *Cimbebasia*, 19, 123–139.
- Senut, B., Pickford, M. & Segalen, L. (2009) Neogene desertification of Africa. *Comptes Rendus Geoscience*, 341, 591–602. <https://doi.org/10.1016/j.crte.2009.03.008>
- Sick, H. (1967) Rios e enchentes na Amazônia como obstáculo para a avifauna. *Atas do Simpósio Sobre a Biota Amazônica*, 5, 495–520.
- Sinthumule, N.I. (2024) Sacred forests as repositories of local biodiversity in Africa: a systematic review. *Forest Science and Technology*, 20, 337–348. <https://doi.org/10.1080/21580103.2024.2397522>
- Speiser, P. (1910) 5. Cyclorhapha, Aschiza. In: Sjöstedt, Y. (Ed.) *Wissenschaftliche Ergebnisse der schwedischen zoologischen Expedition nach dem Kilimandjaro, dem Meru und den umgebenden Massaistepfen, Deutsch-Ostafrikas 1905–1906 unter Leitung von Prof. D. Yngve Sjöstedt*. P. 2. Band. [Abteilung] 10. P. Palmquist, Stockholm, pp. 113–198.
- Speiser, P. (1911) Zur Kenntnis aussereuropäischer Dipteren. *Jahrbücher des Nassauischen Vereins für Naturkunde*, 64, 237–261. [<https://archive.org/details/jahrbcherdesna64nass>]
- Steyskal, G.C. (1965a) Records and descriptions of African Otitidae and Platystomatidae (Diptera). *Annals of the Natal Museum*, 18, 171–178. [[https://archive.org/details/aja03040798\\_767](https://archive.org/details/aja03040798_767)]
- Steyskal, G.C. (1965b) Family Sciomyzidae (Tetanoceridae). In: Stone, A., Sabrosky, C.W., Wirth, W.W., Foote, R.H. & Coulson, J.R., *A catalog of the Diptera of America north of Mexico*. United States Department of Agriculture, Agricultural Handbook 276, pp. 685–695.
- Steyskal, G.C. (1980) 43. Family Platystomatidae. In: Crosskey, R.W. (Ed.) *Catalogue of the Diptera of the Afrotropical Region*. British Museum (Natural History) London, pp. 563–574.
- Taberer, T.R. (2024) A new species of *Delorhachis* Karsch, 1896 from Nouabalé-Ndoki National Park, Republic of Congo. *Journal of Natural History*, 58, 639–644. <https://doi.org/10.1080/00222933.2024.2354483>
- Takano, H. (2024) Descriptions of three new species of Lycaenidae (Lepidoptera: Papilionoidea) from Parc National de Nouabalé-Ndoki, Republic of Congo with additional notes on little-known species. *Zootaxa*, 5496, 214–230. <https://doi.org/10.11646/zootaxa.5496.2.4>
- Takano, H. & László, G.M. (2024) Descriptions of new *Hypotrabala* Holland, 1893 (Lepidoptera: Lasiocampidae: Lasiocampinae: Selenepherini) in the collections of the African Natural History Research Trust, with notes on allied genera and the description of a new genus. *Ecologica Montenegrina*, 72, 19–63. <https://doi.org/10.37828/em.2024.72.4>
- Telfer, P.T., Souquière, S., Clifford, S.L., Abernethy, K.A., Bruford, M.W., Disotell, T.R., Sterner, K.N., Roques, P., Marx, P.A. & Wickings, E.J. (2003) Molecular evidence for deep phylogenetic divergence in *Mandrillus sphinx*. *Molecular Ecology*, 12, 2019–2024. <https://doi.org/10.1046/j.1365-294x.2003.01877.x>
- UNEP-WCMC & IUCN (2025) *Protected Planet: The World Database on Protected Areas (WDPA) and World Database on Other Effective Area-based Conservation Measures (WD-OECM)* [Spatial data]. UNEP-WCMC and IUCN. Available from: [www.protectedplanet.net](http://www.protectedplanet.net) (accessed 18 June 2025)
- UNESCO (2003) The importance of sacred natural sites for biodiversity conservation. In: Lee, K. & Schaaf, T. (Eds), *Proceedings of the international workshop, UNESCO (Division of Ecological Sciences) Paris*.
- USDA (n.d.) *World 30m DEM* [Spatial data]. USDA Foreign Agricultural Service. Available from: [https://geo.fas.usda.gov/arcgis1/services/G\\_Elevation/WorldElevation\\_30m/ImageServer](https://geo.fas.usda.gov/arcgis1/services/G_Elevation/WorldElevation_30m/ImageServer) (accessed 18 June 2025)
- Vallinoto, M., Araripe, J., do Rego, P.S., Tagliaro, C.H., Sampaio, I. & Schneider, H. (2006) Tocantins River as an effective barrier to gene flow in *Saguinus niger* populations. *Genetic and Molecular Biology*, 29, 215–219. <https://doi.org/10.1590/S1415-47572006000200005>
- Vanzolini, P.E. (1973) Paleoclimates, relief, and species multiplication in equatorial forests. In: Meggers, B.J., Ayensu, E.S. & Duckworth, W.D. (Eds), *Tropical forest ecosystems in Africa and South America: a comparative review*. Smithsonian Press, Washington D.C., pp. 255–258.



- Vanzolini, P.E. & Williams, E.E. (1970) South American anoles: geographic differentiation and evolution of the *Anolis chrysolepis* species group (Sauria, Iguanidae). *Arquivos de Zoologia*, 19, 291–298. <https://doi.org/10.11606/issn.2176-7793.v19i3-4p125-298>
- Voelker, G., Marks, B.D., Kahindo, C., A'genonga, U., Bapeamoni, F., Duffie, L.E., Huntley, J.W., Mulotwa, E., Rosenbaum, S.A. & Light, J.E. (2013) River barriers and cryptic biodiversity in an evolutionary museum. *Ecology and Evolution*, 3, 536–545. <https://doi.org/10.1002/ece3.482>
- Walker, F. (1853) Diptera (part IV). In: Saunders, W.W. (Ed.), *Insecta saundersiana: or characters of undescribed insects in the collection of William Wilson Saunders, Esq., F.R.S., F.L.S., &c.* 1. Van Voorst, London, pp. 253–474 + plates 7–8. [<https://www.biodiversitylibrary.org/bibliography/5112>]
- Wallace, A.R. (1852) On the monkeys of the Amazon. *Proceedings of the Zoological Society of London*, 20, 107–110. [[https://digitalcommons.wku.edu/dlps\\_fac\\_arw/3/](https://digitalcommons.wku.edu/dlps_fac_arw/3/)]
- Weir, J.T. (2006) Divergent timing and patterns of species accumulation in lowland and highland Neotropical birds. *Evolution*, 60, 842–855. <https://doi.org/10.1111/j.0014-3820.2006.tb01161.x>
- Westwood (1840) *Synopsis of the genera of British insects as appendix of Westwood: an introduction to the modern classification of insects*. Longman, Orme, Brown, Green & Longmans, London.
- Whittington, A.E. & Kirk-Spriggs, A.H. (2021) 70. Platystomatidae (signal flies). In: Kirk-Spriggs, A.H. & Sinclair, B.J. (Eds), *Manual of Afrotropical Diptera. Volume 3. Brachycera–Cyclorrhapha, excluding Calyptratae. Suricata* 8. Pretoria: South African National Biodiversity Institute, pp. 1619–1667.
- Wiedemann, C.R.W. (1830) *Aussereuropäische zweiflügelige Insekten*. Als Fortsetzung des Meigenschen Werks. Zweiter Theil. Schulz, Hamm. [<https://www.biodiversitylibrary.org/item/88495>]
- Wiley, E.O. (1981) *Phylogenetics: the theory and practice of phylogenetic systematics*. New York: Wiley.
- WWF & The Nature Conservancy. (2001) *Terrestrial Ecoregions of the World (TEOW) v2* [Shapefile]. World Wildlife Fund. Available from: <https://www.worldwildlife.org/publications/terrestrial-ecoregions-of-the-world> (accessed 18 June 2025).
- Zachos, J.C., Dickens, G.R. & Zeebe, R.E. (2008) An early Cenozoic perspective on greenhouse warming and carbon-cycle dynamics. *Nature*, 451, 279–283. <https://doi.org/10.1038/nature06588>
- Zachos, J., Pagani, M., Sloan, L., Thomas, E. & Billups, K. (2001) Trends, rhythms, and aberrations in global climate 65 Ma to present. *Science*, 292, 686–693. [<https://www.science.org/doi/10.1126/science.1059412>]
- Zhang, Z., Nisancioglu, K.H., Flatoy, F., Bentsen, M., Bethke, I. & Wang, H. (2011) Tropical seaways played a more important role than high latitude seaways in Cenozoic cooling. *Climate of the Past*, 7, 801–813. <https://doi.org/10.5194/cp-7-801-2011>