

***Congodictya taymansii* gen. et sp. nov., a new genus and species of Afrotropical lanternfly related to *Coelodictya* Jacobi, 1910 (Hemiptera: Fulgoromorpha: Fulgoridae)**

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Abstract

A new genus of Afrotropical Fulgoridae, *Congodictya* gen. nov. is described to accommodate a new species, *Congodictya taymansii* sp. nov., from the Democratic Republic of the Congo, based on a series of specimens collected in 1904. It is compared to the genus *Coelodictya* Jacobi, 1910 and placed in the tribe Aphaenini. Specimens and genitalia are comprehensively illustrated for the new species as well as for *Coelodictya sjoestedti* Jacobi, 1910 for the first time to allow comparison. A distribution map for the two species is provided. The latter species is recorded for the first time from Malawi and Zimbabwe.

Keywords: Africa, Lanternbug, Fulgoroidea, Planthopper

Introduction

The Afrotropical fauna of Fulgoridae (Madagascar excluded) counts 18 genera and more than one hundred species (FENNAH, 1958; LALLEMAND, 1959; BOURGOIN, 2018). Since the publications of the most recent major works of FENNAH (1958) on the Fulgoroidea of the Congo and of LALLEMAND (1959) with his revision of the Afrotropical species, only one species was described, *Benamatapa hecate* by LINNAVUORI (1973).

A recent visit to the MNHN collections allowed the discovery of a new species from the Democratic Republic of the Congo, which furthermore appeared to represent an undescribed genus somewhat similar to *Coelodictya* Jacobi, 1910, and also, but less closely, to *Holodictya* Gerstaecker, 1895. The series of specimens was collected more than a hundred years ago.

The present paper aims to describe a new genus to accommodate the new species and to compare it with the most closely resembling genus, *Coelodictya*. An update of the distribution of *Coelodictya sjoestedti* Jacobi, 1910 with new country records is also provided and illustrated with a distribution map.

Material and methods

The male genitalia were dissected as follows: the pygofer was cut from the abdomen of the softened specimen with a needle blade, then boiled several minutes in a 10% solution of potassium hydroxide (KOH). The phallic complex was dissected with a needle blade and all pieces examined in ethanol, the whole placed in glycerine for preservation. The metatibiotarsal formula gives the number of spines on (side of metatibia) apex of metatibia/apex of first metatarsus/apex of second metatarsus. Observations were done with a Leica MZ8 stereomicroscope. Pictures of the specimens were taken with a Canon EOS 700 D

camera with Sigma DG Macro lens, these of the genitalia with a Leica EZ4W stereomicroscope with an integrated camera, stacked with CombineZ software and optimized with Adobe Photoshop CS3. For the transcription of the labels of the types, the wording on each single label is delimited by square brackets. The distribution map was produced with SimpleMappr (SHORTHOUSE, 2010). The terminology of the wings venation follows BOURGOIN *et al.* (2015).

The measurements were taken following CONSTANT (2004) and the following abbreviations are used:

BF = maximum breadth of the frons.
 BTg = maximum breadth of the tegmen.
 BV = maximum breadth of the vertex.
 LF = length of the frons in midline.
 LTg = length of the tegmen.
 LV = length of the vertex in midline.
 TL = total length.

Acronyms used for the collections

BMNH	=	Natural History Museum, London, U.K.
MFNB	=	Museum für Naturkunde, Berlin, Germany.
MNHN	=	Muséum National d'Histoire Naturelle, Paris, France.
NHRS	=	Naturhistoriska riksmuseet, Stockholm, Sweden.
NMNW	=	National Museum of Namibia, Windhoek, Namibia.
RBINS	=	Royal Belgian Institute of Natural Sciences, Brussels, Belgium.
SANC	=	South African National Collection of Insects, Pretoria, South Africa.

Results

Taxonomy

Order **Hemiptera** Linnaeus, 1758
 Suborder **Auchenorrhyncha** Duméril, 1806
 Infra-order **Fulgoromorpha** Evans, 1946
 Superfamily **Fulgoroidea** Latreille, 1807
 Family **Fulgoridae** Latreille, 1807
 Subfamily **Aphaeninae** Blanchard, 1847
 Tribe **Aphaenini** Blanchard, 1847

Genus ***Coelodictya*** Jacobi, 1910

Coelodictya JACOBI, 1910: 101 [described].

Type species: *C. sjoestedti* Jacobi, 1910 by original designation.

Coelodictya – SCHMIDT, 1912: 70 [compared with *Holodictya* Gerstaecker, 1895 and *Polydictya* Guérin-Méneville, 1844]. — METCALF, 1947: 159 [catalogued]. — LALLEMAND, 1959: 63 [keyed], 76 [described].

NOTE:

LALLEMAND (1959) erroneously stated that *Coelodictya* specimens show a carina on the frons.

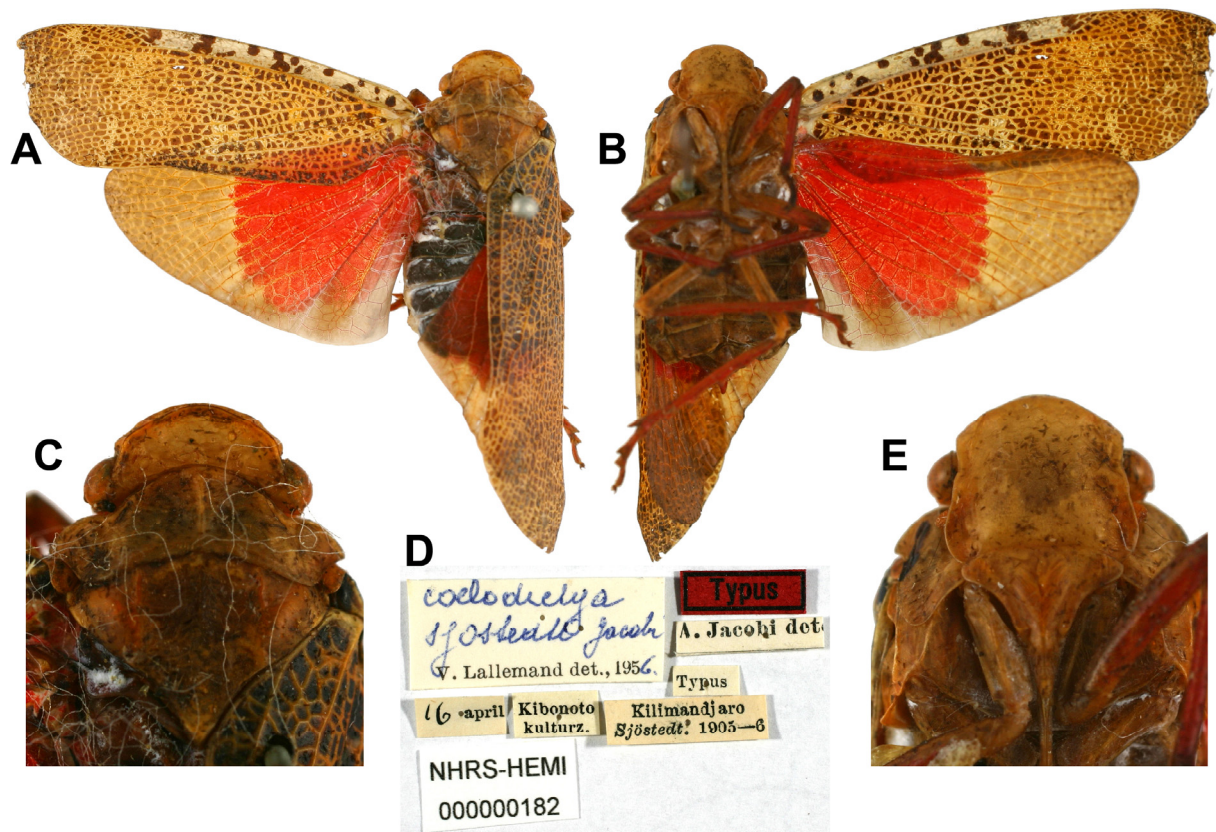


Fig. 1. *Coelodictya sjoestedti* Jacobi, 1910, female syntype (NHRS). A, habitus, dorsal view. B, habitus, ventral view. C, head, pro and mesonotum, dorsal view. D, labels. E, frons, normal view.

***Coelodictya sjoestedti* Jacobi, 1910**

Figs 1–5

Coelodictya sjoestedti JACOBI, 1910: 101 [described], pl. 1, figs 37, 37a [habitus and frons illustrated].

Coelodictya sjoestedti – SCHMIDT, 1912: 70 [comparative notes]. — METCALF, 1947: 159 [catalogued]. — LALLEMAND, 1959: 63 [keyed], 76 [described].

MATERIAL EXAMINED.

TYPE MATERIAL. TANZANIA: syntype ♀ (Fig. 1): [Kilimandjaro, Sjöstedt. 1905–6] [Kibonoto kulturz.] [16 april] [Typus] [Typus] [A. Jacobi det.] [*Coelodictya sjoestedti* Jacobi, V. Lallemand det., 1956] [NHRS-HEMI 000000182] (NHRS) coordinates: 3°11'S 37°06'E.

ADDITIONAL MATERIAL. MALAWI: 1♀ (Fig. 2): North Malawi, Chitipa District, Mughese Forest Reserve, 9°39'S 33°32'E, 6000 ft, 9–16.I.2002, R.J. Murphy, I.G.: 31.908 (RBINS); 1♂, 8♀♀: Central Malawi, Ntchisi District, Ntchisi Forest Reserve, 13°22'S 34°00'E, 5000 ft, 10–15.XII.2001, R.J. Murphy, I.G.: 31.908 (RBINS); 2♂♂: 10km SSW Nkhata Bay, 10°41'S 34°17'E, 10–12.XII.1986, E. Holm & E. Marais (NMNW).

TANZANIA: 1♀: Kilimanjaro, Kibonoto kulturzone, 1905, Y. Sjöstedt (NHRS); 1♀: idem, 18.III.1906 (NHRS); 3♂♂, 6♀♀: Kilimanjaro, 15.III.1906, Y. Sjöstedt (NHRS); 5♂♂, 21♀♀: idem, 16.III.1906 (NHRS); 1♂, 4♀♀: idem, 20.III.1906 (NHRS); Mamahisara (Mbulu D.), 6.III.1981, 2000 m, J. Kielland, Bjornstad coll., n°41538, I.G.: 31.230 (RBINS) coordinates: 3°55'01.2"S 35°31'58.8"E.

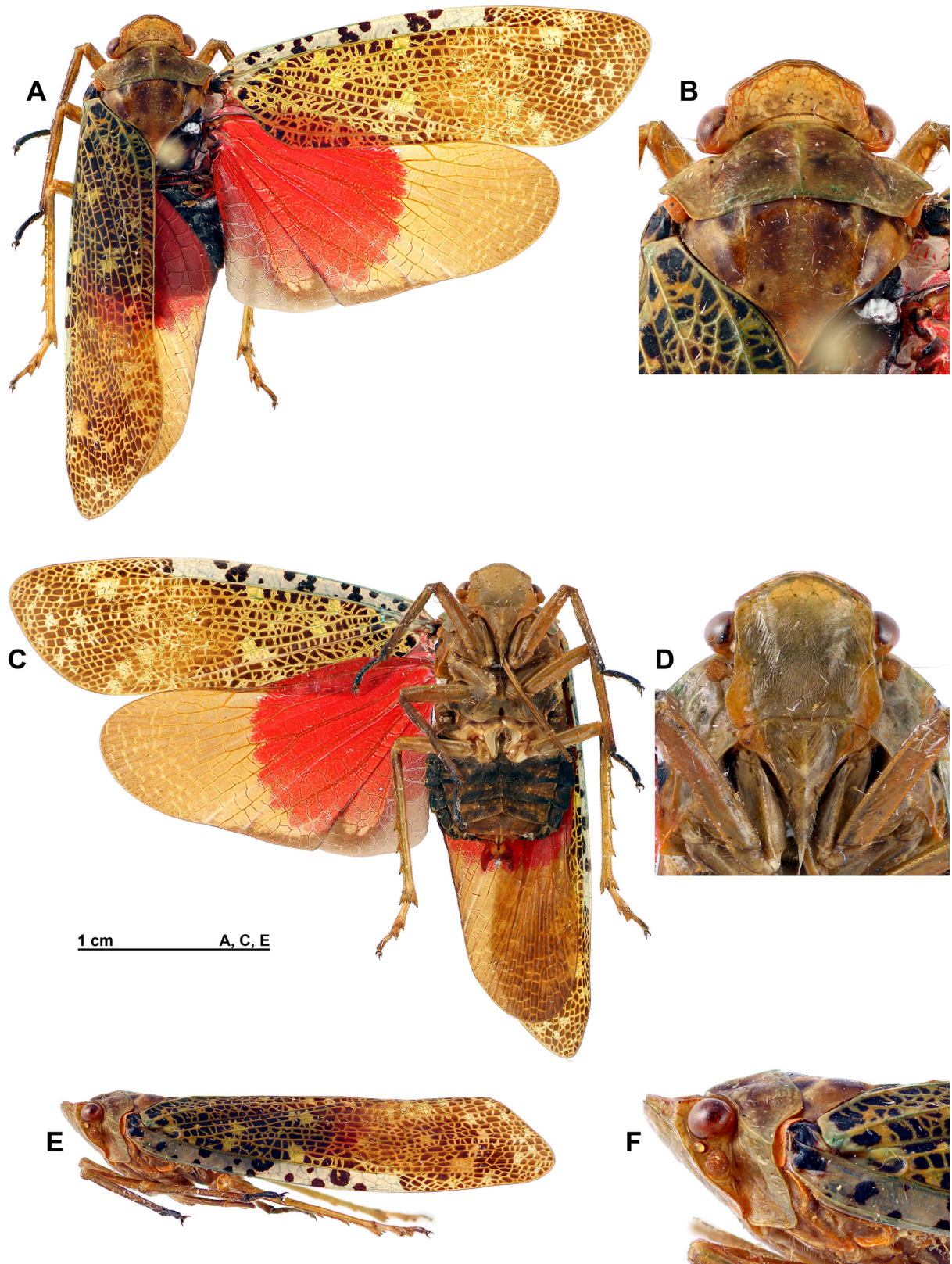


Fig. 2. *Coelodictya sjoestedti* Jacobi, 1910, female from Malawi (RBINS). A, habitus, dorsal view. B, head, pro- and mesonotum, dorsal view. C, habitus, ventral view. D, frons, normal view. E, habitus, lateral view. F, head and thorax, lateral view.

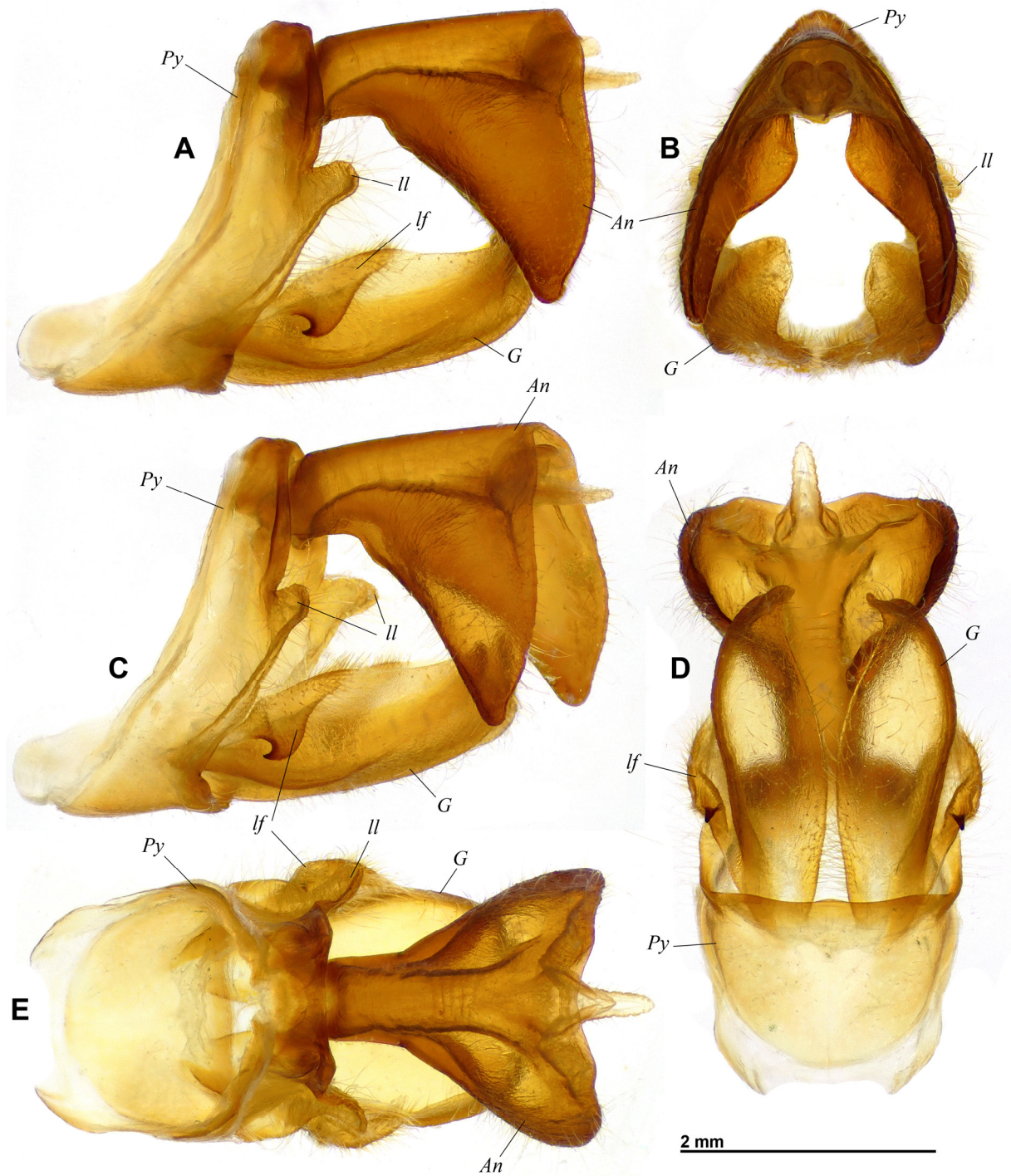


Fig. 3. *Coelodictya sjoestedti* Jacobi, 1910, male genitalia (specimen from Malawi, Ntchisi – RBINS): pygofer, anal tube and gonostyli. A, left lateral view. B, posterior view. C, left posterolateral view. D, ventral view. E, dorsal view. – An, anal tube. – G, gonostylus. – lf, lateral fold of gonostylus. – ll, lateroposterior lobe of pygofer. – Py, pygofer.

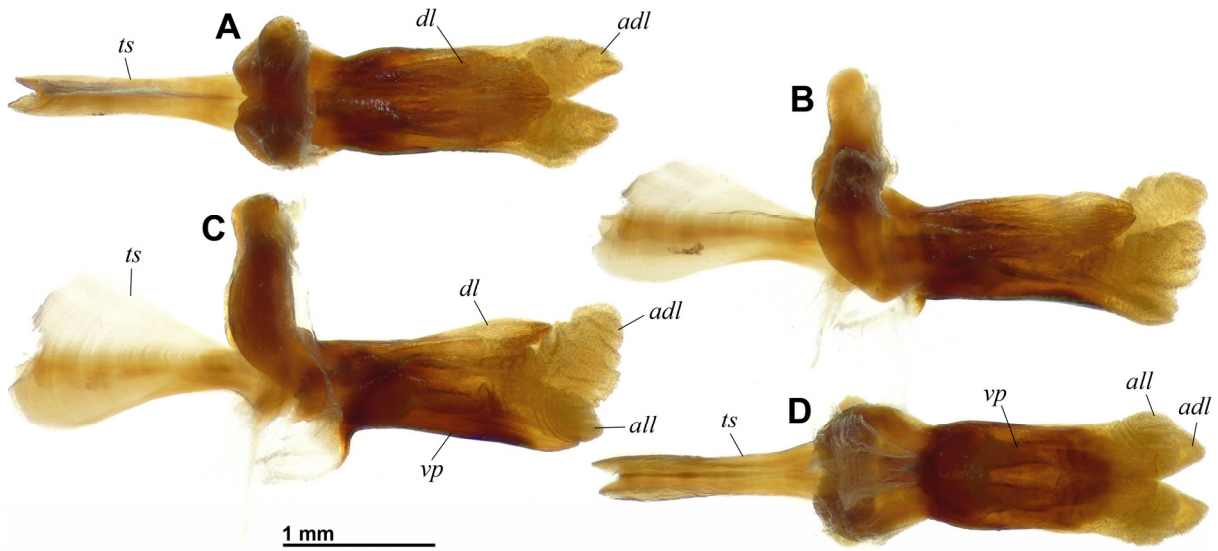


Fig. 4. *Coelodictya sjoestedti* Jacobi, 1910 (specimen from Malawi, Ntchisi – RBINS), male genitalia: aedeagus. A, dorsal view. B, left laterodorsal view. C, left lateral view. D, ventral view. – *adl*, apicodorsal lobe. – *all*, apicolateral lobe. – *dl*, dorsal lobe. – *ts*, tectiform structure. – *vp*, ventral process.

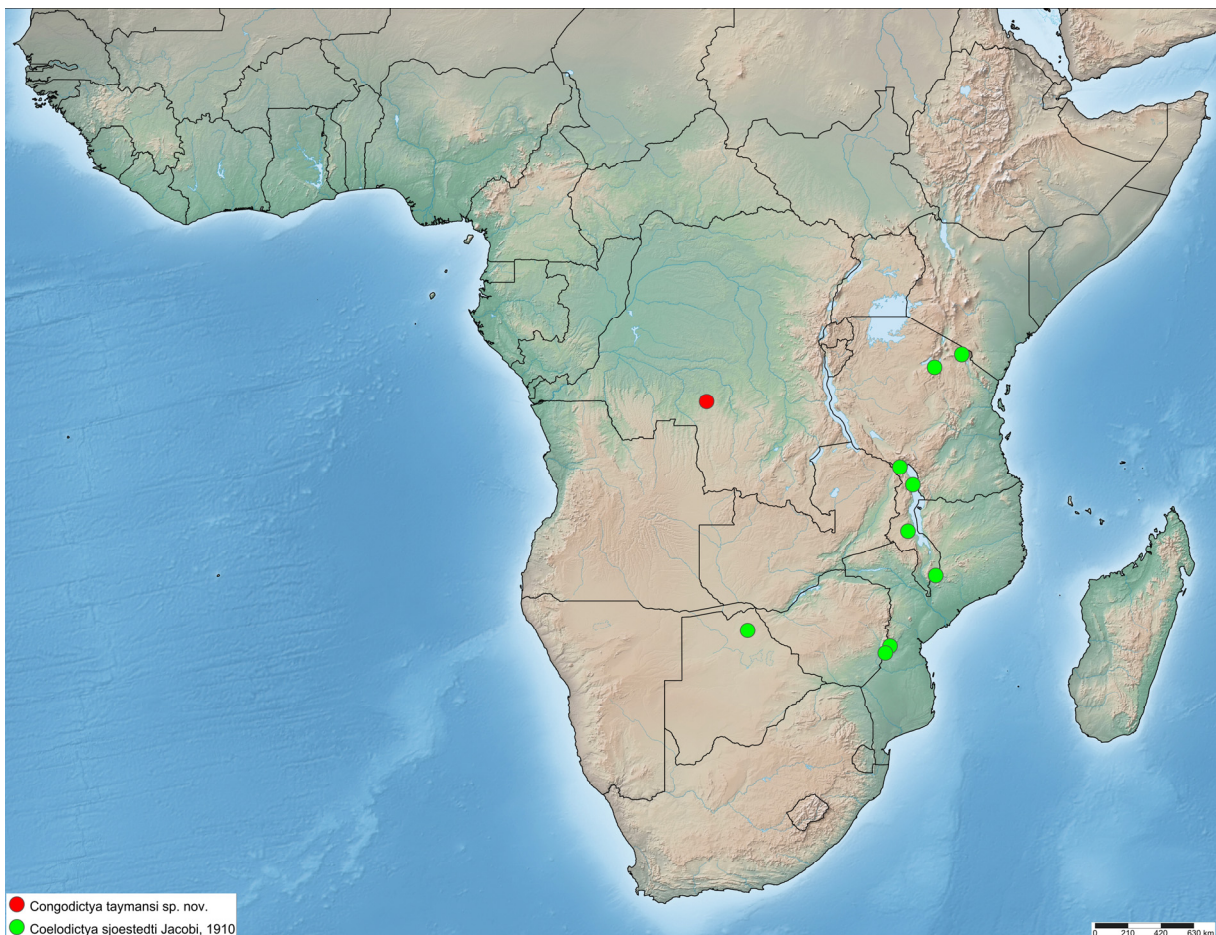


Fig. 5. *Coelodictya sjoestedti* Jacobi, 1910 and *Congodictya taymansi* sp. nov., distribution map.

ZIMBABWE: 1♀: Bunga Forest near Mutare, 19°06'S 24°46'E, 1900m, 16–18.I.1992, R. Oberprieler (SANC).

ADDITIONAL DATA

MALAWI: 2♂♂, 4♀♀: Mlanje (= Mulanje), 8.I.1913, S.A. Neave (BMNH – M. Webb pers. com. 16.IV.2018); 4♀♀: same data, 20.XII.1912 (BMNH – M. Webb pers. com. 16.IV.2018). TANZANIA: 1♂: Manou, Deutsch Ost Afrika (MFNB – J. Deckert pers. com. 30.III.2018). ZIMBABWE: 1♀: near Chimanimani N.P., 20°01'S 32°58'E, 920m, 18–26.X.1994 B. Hayfield (BMNH – M. Webb pers. com. 16.IV.2018); 1♂: S.E. Rhodesia, Melsetter, Gazaland, about 4500ft, Mt. Chirinda, XII.1901, G. Marshall (BMNH – M. Webb pers. com. 16.IV.2018).

ADDITIONAL DESCRIPTION.

Male genitalia: (Figs 3–4) pygofer about 2.2 times higher than long basally in lateral view, narrower dorsally and with lateral lobe rounded apically on posterior margin, projecting posterolaterally. Gonostyli separated basally, about 2.5 times longer than high in lateral view; inner wall strongly concave; lateral slightly bulging ridge in middle, developed to 2/3 of length of gonostylus; ventral margin sinuate leaving a median opening in ventral view between apices of gonostyli largely separated; dorsal margin with a lateral fold on proximal 1/3 projecting ventrally to level of half the height of gonostylus and ended with a strong hook pointing anteriorly. Tectiform structure elongate and strongly flattened laterally. Phallobase with elongate, deeply notched dorsal membranous lobe not reaching apex of aedeagus; ventral sclerified process; paired apical membranous lobes bearing minute spinulation with secondary dorsal and lateroventral lobes apically. Anal tube very large, surpassing gonostyli and with huge, subtriangular, convex, lateral lobes; apex cut more or less vertically; lobes diverging in posterior view; base of lobes at basal 1/5 of length of anal tube.

DISTRIBUTION. Tanzania, Malawi* and Zimbabwe* (Fig. 5).

* = new country record

Genus *Congodictya* gen. nov.

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Type species: *Congodictya taymansii* sp. nov. by present designation.

ETYMOLOGY. The genus name is formed from “Congo”, the country from which the taxon originates and “-dictya” which means “reticulate” and refers to the wing venation as well as to the genera names *Coelodictya* and *Holodictya* Gerstaecker, 1895, that same ending underlining the resemblance with these taxa. The gender is feminine.

DIAGNOSIS

The genus can be separated from all other Aphaenini by the following combination of characters

- 1) Head without cephalic process (Fig. 6 B, E–F).
- 2) Frons and vertex separated by a narrow but continuous groove (Fig. 6 B).
- 3) Frons nearly flat with an obsolete median carina visible on dorsal third (Fig. 6 E–F).
- 4) Pro- and mesonotum without strong median carina (Fig. 6 B).
- 5) Pronotum with anterior margin carinate laterally and a longitudinal carina on lateral lobes behind antennae (Fig. 6 B, E–F).

- 6) Tegmina elongate and narrow with apical margin slightly oblique and reticulation visibly more dense distally to nodal line (Fig. 6 A).
- 7) Posterior wings broad, only about 1.5 times as long as broad and about 1.7 times broader than the tegmina (Fig. 6 A).
- 8) Legs elongate and slender (Fig. 6 A, D).

NOTE:

The most similar genera are *Coelodictya* and *Holodictya* from which *Congodictya* gen. nov. can easily be separated by characters 5: *Coelodictya* does not show a carina on the lateral lobes of pronotum (Fig. 2 B, D, F) and *Holodictya* does not show carinae on anterior margin and on lateral lobes of pronotum; and 6: the reticulation of the tegmina is uniform in *Coelodictya* (Fig. 2 A) and *Holodictya*.

DESCRIPTION

Medium sized (around 20 mm in length) Fulgoridae without cephalic process and with posterior wings brightly coloured.

Head: narrower than thorax. Vertex concave, broader than long and with all margins elevated, separated from frons by a continuous narrow groove. Frons nearly flat, subquadrate, with short obsolete longitudinal groove laterally at level of eye and short obsolete median carina on dorsal half. Clypeus triangular, longer than frons. Labium elongate and narrow, surpassing metatrochanters. Eyes strongly protruding laterally; ocelli present under eye. Antennae short; scapus very short and cylindrical; pedicel bulbous.

Thorax: nearly flat dorsally. Pronotum about four times broader than long in midline, with anterior margin slightly laminate anteriorly; disc slightly excavate and with a slight median carina; posterior margin incurved; lateral lobes with a longitudinal carina behind antenna and a shallow longitudinal groove at level of clypeofrontal joint. Mesonotum with disc slightly excavate and flat; smooth with flat area wrinkled and very obsolete median carina on anterior portion.

Tegmina: elongate and narrow, more than 2.6 times longer than broad; costal and postclaval margins subparallel; apical margin slightly oblique with angles broadly rounded. Basal cell elongate and narrow. Clavus reaching 2/3 of length. Vein ScP+R visible to nodal line; subcostal cell elongate and broad; MP forked at basal half of corium length; CuA forked beyond 2/3 of corium; clavus open; Pcu and A1 merged near apex of clavus; numerous cross-veinlets between main veins on corium; half of the apical area of the corium is covered with cells about 1/3–1/4 the size of those in the anterior half of corium.

Posterior wings: large, broader than tegmina, with anal area well developed. Veins MP and CuA forked at level of wing coupling lobe; other main veins not forked but linked by some cross-veins.

Legs: elongate and slender. Metatibiae with 5 lateral and 7 apical spines. Metatibiotarsal formula: (5) 7/9/6.

Abdomen: broad, dorsoventrally flattened.

Male genitalia: pygofer higher than long in lateral view, narrower dorsally and with small lateral lobe on posterior margin. Gonostyli separated basally, elongate and with inner wall strongly concave; ventral margin sinuate; dorsal margin with a hook near posterior margin of pygofer. Tectiform structure large and hemitubular. Phallobase with a sclerified ventral

elongate process and two dorsal sclerified processes; rest of the aedeagus well developed and membranous with digitiform processes. Anal tube very large, surpassing the gonostyli and with two lobes beyond anal opening projecting ventrally.

DISTRIBUTION. Afrotropical Region: Congo.

***Cogodictya taymansi* sp. nov.**

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Figs 5–9

ETYMOLOGY. The species name is a patronym dedicated to E. Taymans, the collector of the types series.

TYPE MATERIAL. DEMOCRATIC REPUBLIC OF THE CONGO: holotype ♂ (Fig. 6): [Congo belge Centr., Kassaï, Edm. Taymans, 1904] [Museum Paris, R. Oberthur, 1906] (MNHN).

Paratypes: 6♂♂, 5♀♀: same data as holotype (4♂♂, 3♀♀: MNHN; 2♂♂, 2♀♀: RBINS–I.G.: 33.704).

DIAGNOSIS. In addition to the characters of the genus, the species can be separated from all superficially resembling species in the genera *Coelodictya*, *Holodictya* or *Hypselometopum* Stål, 1853 by its largely bright red posterior wings (Figs 6 A, 7 A) and the black spots on the vertex and mesonotum (Figs 6 B, 7 B). Species of the latter genus furthermore have slightly foliaceous pro- and mesotibiae (slender in *C. taymansi* sp. nov.).

DESCRIPTION

Measurements and ratios TL: ♂ (n = 7): 17.6 mm (17.2–18.0); ♀ (n = 5): 21.7 mm (21.1–22.3) ; LTg/BTg = 2.85; BV/LV = 3.1; LF/BF = 0.79.

Head: (Figs 6 B, E–F, 7 B, E, G) yellow-brown. Vertex curved, slightly wrinkled, with two small black spots at each side sometimes merged together. Frons with anterior margin slightly projecting in perpendicular view; surface slightly wrinkled longitudinally; maximum breadth under antennae; rather strongly laminate laterally at level of antennae. Clypeus with two small black spots basally and an irregular black-brown transverse band in middle; apex brown. Labium yellow-brown. Eyes surpassing margins of frons and antennae laterally; ocelli orange-brown. Antennae orange-brown.

Thorax: (Figs 6 B, E–F, 7 B, E, G) yellow-brown. Pronotum slightly wrinkled with two small impressed spots on disc on each side of median carina and a larger black spot on lateral fields of dorsum; lateral lobes with a black spot behind eye, between the carinae. Mesonotum with a small black spot near tegulae, two larger black spots in a row on each side and a small black spot posteriorly and more centrally. Tegulae entirely yellow-brown.

Tegmina: (Figs 6 A, 7 A) pale yellow-brown with veins slightly darker; cells of membrane largely brown; corium with brown to black cells forming irregular dark markings distributed over most surface but forming 2–3 ocellate markings in postcostal cell along CA and 2–3 more indistinct ones along claval joint.

Posterior wings: (Figs 6 A, 7 A) bright red with distal 1/3 and a narrow area along posterior margin yellow-brown. Veins red in red area and proximal parts of yellow-brown area; yellow-brown near apex; numerous cross-veinlets on all surface, more densely reticulate on apical 1/3.

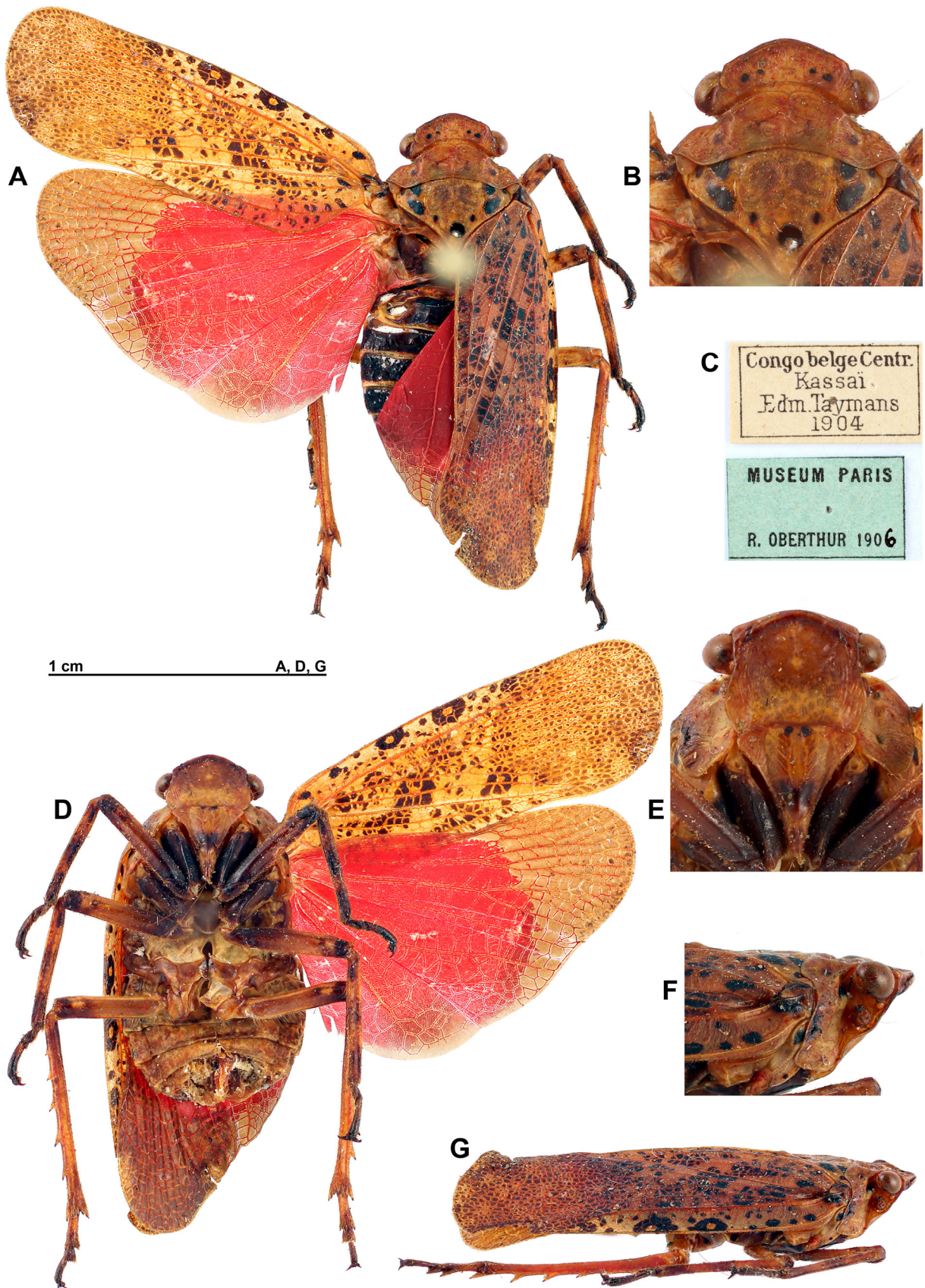


Fig. 6. *Congodictya taymans* sp. nov., male holotype (MNHN). A, habitus, dorsal view. B, head, pro- and mesonotum, dorsal view. C, labels. D, habitus, ventral view. E, frons, normal view. F, head and thorax, lateral view. G, habitus, lateral view.

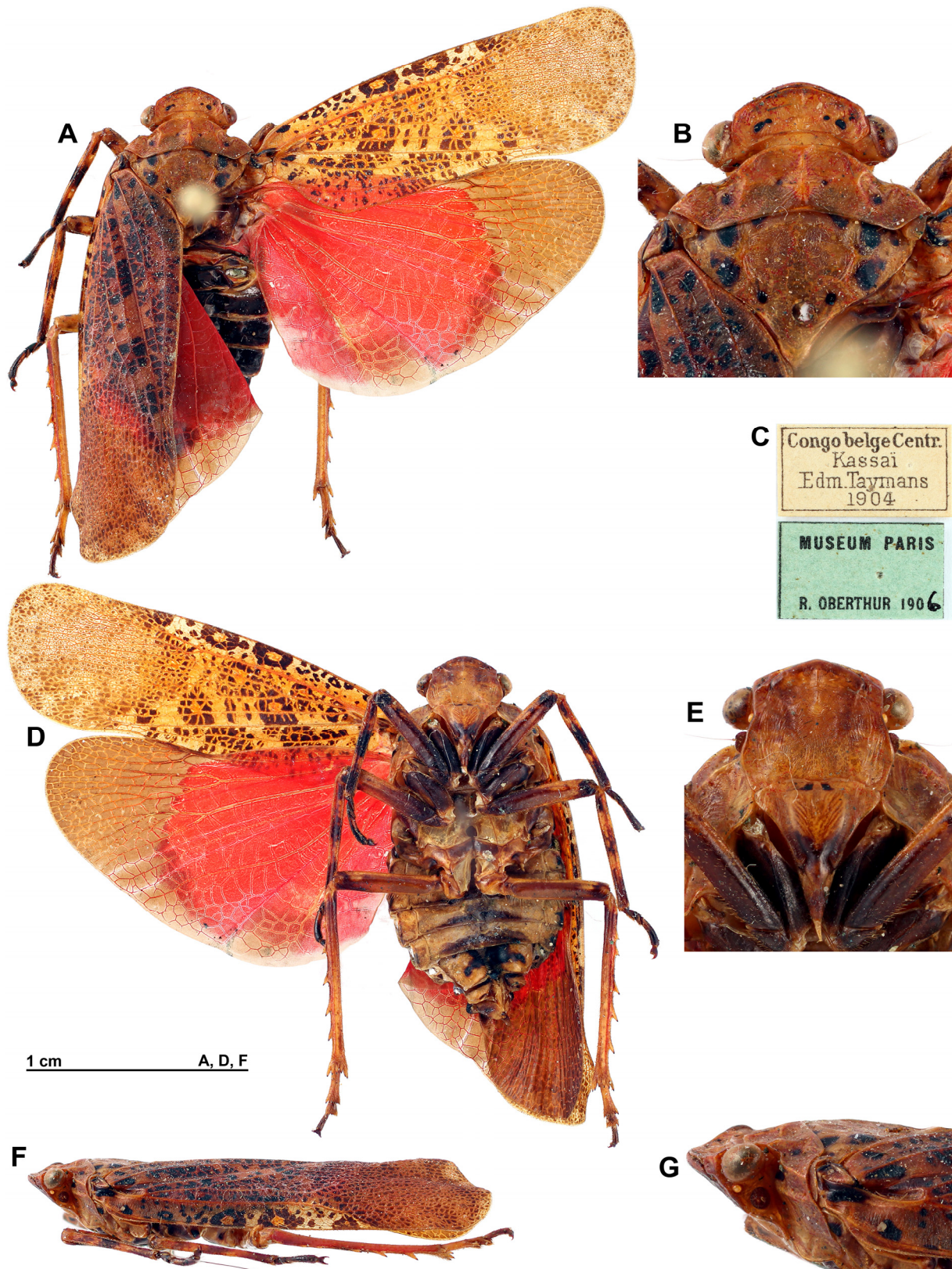


Fig. 7. *Congodictya taymansis* sp. nov., female paratype (MNHN). A, habitus, dorsal view. B, head, pro- and mesonotum, dorsal view. C, labels. D, habitus, ventral view. E, frons, normal view. F, habitus, lateral view. G, head and thorax, lateral view.

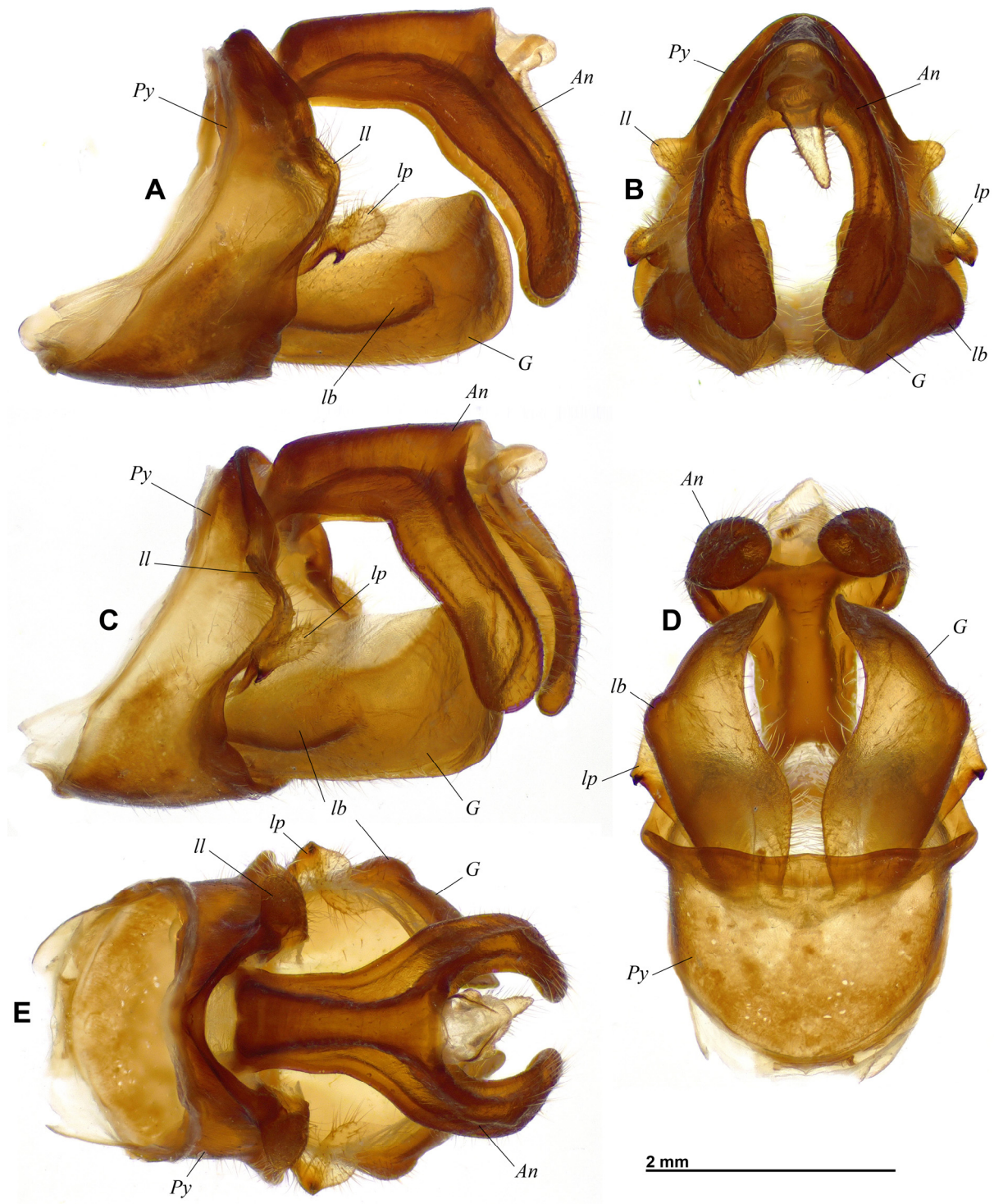


Fig. 8. *Congodictya taymansii* sp. nov., holotype (MNHN), male genitalia: pygofer, anal tube and gonostyli. A, left lateral view. B, posterior view. C, left posterolateral view. D, ventral view. E, dorsal view. – An, anal tube. – G, gonostylus. – lb, lateral bulge of gonostylus. – ll, lateroposterior lobe of pygofer. – lp, lateral process of gonostylus. – Py, pygofer.

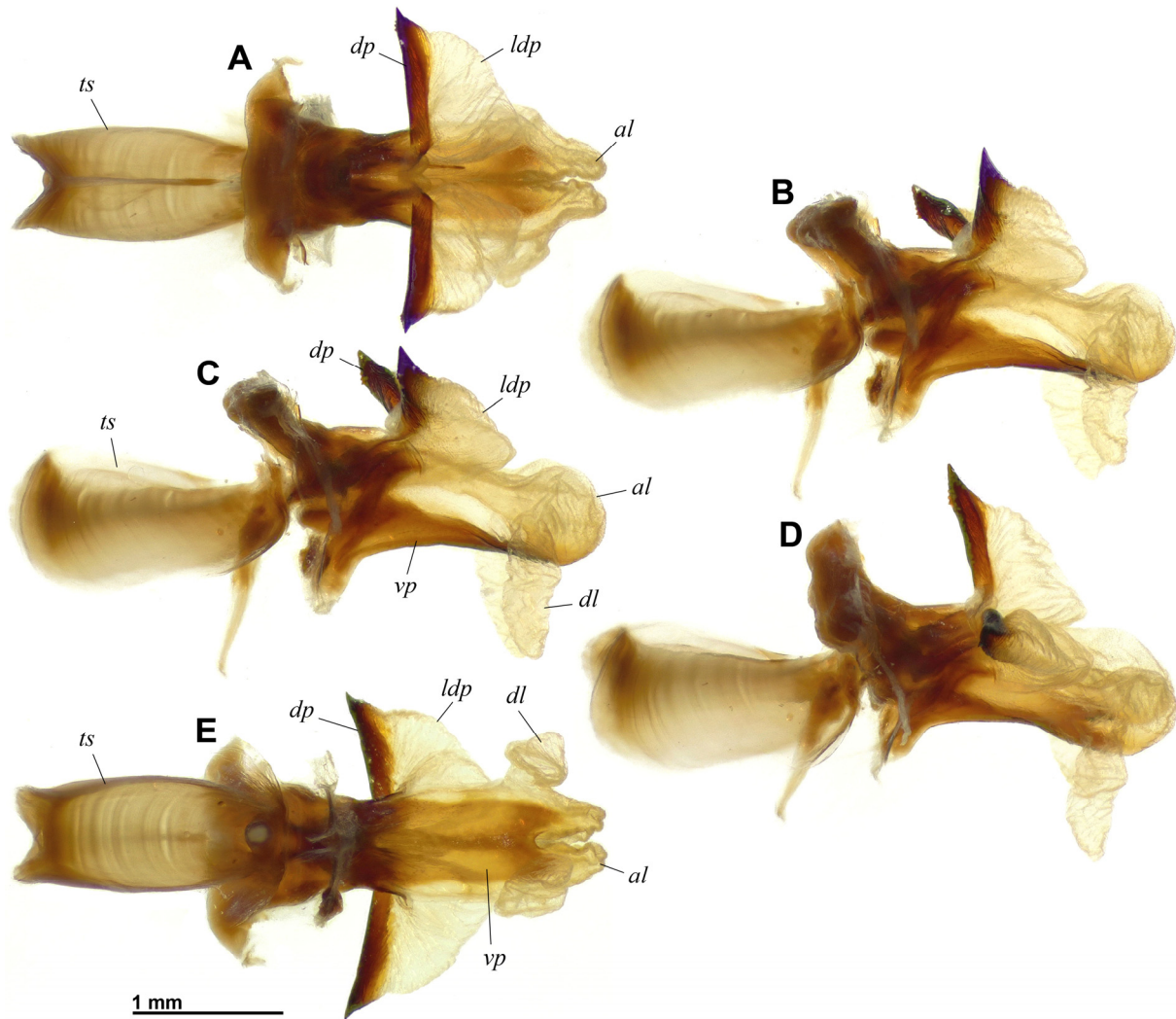


Fig. 9. *Congodictya taymansii* sp. nov., holotype (MNHN), male genitalia: aedeagus. A, dorsal view. B, left lateroventral view. C, left lateral view. D, left laterodorsal view. E, ventral view. – *al*, apical lobe. – *dl*, digitiform lobe. – *dp*, dorsal process. – *ldp*, lobe of dorsal process. – *ts*, tectiform structure. – *vp*, ventral process.

Legs: (Figs 6 A, D, G, 7 A, D, F) elongate and slender. Pro- and mesocoxae and trochanters black-brown. Pro- and mesofemora dorsally yellow-brown with two narrow transverse brown bands distally; ventrally black brown basally progressively fading to yellowish brown distally, apex black and subapical unclear transverse band brown. Pro- and mesotibiae yellow-brown with three more or less distinct black-brown rings. Pro- and mesotarsi black-brown with base of last segment paler. Metacoxae and trochanters yellow-brown with darker brown markings. Metafemora yellow-brown dorsally and brown ventrally. Metatibiae yellow-brown, darker basally and with lateral face reddish. Metatibiae with 5 lateral and 7 apical spines. Metatibiotarsal formula: (5) 7/9/6. Metatarsi yellow-brown usually with last segment darker.

Abdomen: (Figs 6 A, D, 7 A, D) broad, dorsoventrally flattened; black dorsally; in males, yellowish ventrally; in females, yellowish ventrally with median dark brown transverse markings along posterior margin of abdominal segments and black markings on terminalia.

Male genitalia: (Figs 8–9) pygofer about 1.7 times higher than long basally in lateral view, narrower dorsally and with small lateral rounded lobe on posterior margin projecting laterally. Gonostyli separated basally, about 1.5 times longer than high in lateral view; inner wall

strongly concave; lateral bulge in middle, developed to midlength of gonostylus; ventral margin sinuate leaving a median opening in ventral view; dorsal margin with a lateral elongate bulging process with a hook near posterior margin of pygofer; hook pointing anteroventrally. Tectiform structure large and hemitubular. Phallobase with a sclerified ventral elongate process not reaching apex of aedeagus and roundly, deeply notched apically; two dorsal sclerified processes projecting laterodorsally at right angle, pointed apically and with small teeth distally; rest of the aedeagus well developed and membranous with large lobes attached to lateral processes, rounded, inflated apical lobes and subapical digitiform lobes projecting ventrally. Anal tube very large, surpassing gonostyli and with two lobes beyond anal opening projecting ventrally; lobes longer than basal portion, laminate and incurving distally, horseshoe-shaped in posterior view.

DISTRIBUTION. Democratic Republic of the Congo: Kasai (Fig. 5).

Discussion

More than half a century after the works of FENNAH (1958) and LALLEMAND (1959), a new genus of Afrotropical Fulgoridae is described. However, the taxonomy of the group is far from being resolved with many genera needing a revision, e.g. *Anecphora* Karsch, 1890, *Druentia* Stål, 1866, *Eddara* Walker, 1858, *Metaphaena* Schmidt, 1905, *Xosophara* Kirkaldy, 1904, *Zanna* Kirkaldy, 1902, to name a few, because of their inconsistent treatment in the above mentioned works. This need of revisions is further illustrated by the recent revision of the Malagasy genus *Belbina* Stål, 1863 (CONSTANT, 2014) which provided a number of major necessary taxonomic changes.

Acknowledgements

I thank Prof. Thierry Bourgoïn and Dr Adeline Soulier-Perkins (MNHN) for their help during my visit in the collections of MNHN which allowed the discovery of the new genus described in this paper; Mrs Gunvi Lindberg (NHRS), Dr Jürgen Deckert (MFNB), Dr Eugene Marais (NMNW) and Mr Mick Webb (BMNH) for providing data or specimens of the collections under their care; Miss Mado Berthet (RBINS) for her help in improving the aedeagus figures.

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