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A Revision of Afrotropical *Thrinchostoma* de Saussure, 1890 (Hymenoptera: Apoidea: Halictidae)

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Abstract

The African species of *Thrinchostoma* de Saussure, 1890, are revised. Keys, photographic illustrations, detailed data and distribution maps are provided for all species. Two new species are described: *Thrinchostoma uluguruensis* and *T. upembae*. New synonymies are established: *T. guineense* Blüthgen 1930 (syn. of *T. lettowvorbecki* Blüthgen 1930); *T. wellmanni* Cockerell 1908a and *T. malelanum* Cockerell 1937a (both syn. of *T. torridum* (Smith 1879)); *T. telekii* Blüthgen 1930 and *T. undulatum* Cockerell 1936 (both syn. of *T. emini* Blüthgen 1930); *T. wissmanni* Blüthgen 1930 and *T. rubrocinctum* Benoits 1957 (both syn. of *T. petersi* Blüthgen 1930); *Halictus bibundicus* Strand 1910, *T. tessmanni* Strand 1912, *T. bequaerti* Blüthgen 1930, *T. bequaerti* var. *ochropus* Blüthgen 1930, *T. vachali* Blüthgen 1930 and *T. lualiensis* Cockerell 1939 (all syn. of *T. productum* (Smith 1853)); *Diagonozus sjoestedti* var. *rufescens* Friese 1909a, *T. millari* Cockerell 1916, *T. mwangai* Blüthgen 1930, *T. ugandae* Blüthgen 1930 and *T. umtaliense* Cockerell 1936 (all syn. of *T. sjoestedti* Friese 1909a). *Halictus patricius* Strand 1911 (female holotype) is not a *Thrinchostoma* as mentioned by Blüthgen 1930 but a species of *Zonalictus* Michener.

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Keywords: *Thrinchostoma*, Sub-Saharan Africa, revision, new species, bees.

Résumé

Les espèces africaines de *Thrinchostoma* de Saussure, 1890, sont révisées. Des clés, illustrations photographiques, données détaillées et cartes de distribution sont fournies pour chaque espèce. Deux nouvelles espèces sont décrites: *Thrinchostoma uluguruensis* et *T. upembae*. De nouvelles synonymies sont établies: *T. guineense* Blüthgen 1930 (syn. de *T. lettowvorbecki* Blüthgen 1930); *T. wellmanni* Cockerell 1908a et *T. malelanum* Cockerell 1937a (tous deux syn. de *T. torridum* (Smith 1879)); *T. telekii* Blüthgen 1930 et *T. undulatum* Cockerell 1936 (tous deux syn. de *T. emini* Blüthgen 1930); *T. wissmanni* Blüthgen 1930 et *T. rubrocinctum* Benoits 1957 (tous deux syn. de *T. petersi* Blüthgen 1930); *Halictus bibundicus* Strand 1910, *T. tessmanni* Strand 1912, *T. bequaerti* Blüthgen 1930, *T. bequaerti* var. *ochropus* Blüthgen 1930, *T. vachali* Blüthgen 1930 et *T. lualiensis* Cockerell 1939 (tous syn. de *T. productum* (Smith 1853)); *Diagonozus sjoestedti* var. *rufescens* Friese 1909a, *T. millari* Cockerell 1916, *T. mwangai* Blüthgen 1930, *T. ugandae* Blüthgen 1930 et *T. umtaliense* Cockerell 1936 (tous syn. de *T. sjoestedti* Friese 1909a). *Halictus patricius* Strand 1911 (holotype femelle) n'est pas un *Thrinchostoma* comme mentionné par Blüthgen 1930 mais une espèce de *Zonalictus* Michener.

Introduction

Thrinchostoma de Saussure, 1890, is a peculiar genus of relatively large bees (length 8-16 mm). The clypeus is strongly produced downward and the malar area is distinct but variable. It is three quarters as long as the eye in the subgenus *Diagonozus* Enderlein, 1903, in other subgenera it does not exceed one quarter of the eye length. The genus has also an extremely long proboscis, especially in *Diagonozus*. Males of the subgenus *Thrinchostoma* sensu stricto have a peculiar spot of setae along the second submarginal crossvein.

The genus is paleotropical and occurs in Africa (14 species), Madagascar (12 species) and South-East Asia (11 species). The species of Madagascar have been revised by BLÜTHGEN (1933) and by PAULY *et al.* (2001). Keys to the Asiatic species have been published by BLÜTHGEN (1926, 1928) and by MICHENER & ENGEL (2010). BLÜTHGEN (1930) revised the African species. After this revision, COCKERELL (1933, 1936, 1937a&b, 1939, 1941) and BENOIST (1957) published descriptions of some new species all of which are synonyms.

Thrinchostoma is a more common group in forests of Madagascar than in forests of Africa or Asia. On this great island, there is even an endemic cleptoparasitic genus, *Parathrinchostoma* Blüthgen, 1933.

We have examined the types of all the African species and we propose here a revision with many new synonyms. Two new species are described. Species from Madagascar have been excluded from this paper as they have been revised in PAULY *et al.* (2001). Each species is illustrated and a simplified key is provided for the identification of the males. Females of *Thrinchostoma* sensu stricto are often difficult or impossible to identify and we prefer to publish only diagnoses. New species should have never been described on the basis of the female only. Perhaps to propose a key for females will be possible when more material is available to study variation.

At the time of BLÜTHGEN (1930), the specimens of African *Thrinchostoma* were very rare in collections. We currently have more specimens, although they are still rare, which allowed us to study intraspecific variation in males. Thus we have seen that colour of the legs can be very variable in a series of specimens collected in the same locality, from light brown to dark brown. The colour of the metasoma is also very variable, some specimens have terga completely dark brown, others have terga largely red.

The number of notches on the antennal segments is important to distinguish some species such as *T. toridum* and *T. silvaticum*. In other cases, however, use of this character to differentiate two species known only by their types seems to have been biased by artifacts. The curvature of the last segment of the antennae of the males is significant in the keys to separate the species into two groups, but the variation of the curvature to distinguish two species has sometimes been overestimated. An extraordinary feature of one species is that the male antennae have 12 instead of 13 segments.

Other good characters to separate the species are the shape of the apical tibial lobe, as well as the curvature and pilosity of the fifth sternum of the male. Genitalia of the male have been poorly studied so as not to damage the few available specimens, but they seem to not be a useful character to separate the species, other features being already well characterized.

Because of their particularly elongated head, the biology of *Thrinchostoma* is certainly interesting to study, in particular their relationships with flowers. In fact, flowering plants visited by *Thrinchostoma* seem diverse. In Madagascar, however, we have met large concentrations of these bees foraging on *Impatiens*, a plant not visited by other bees. In Sumatra, *T. asianum* SAKAGAMI *et al.* 1991, has been observed on *Impatiens* together with

Anthophorine bees. This long tongued bees collects nectar in the long spurs of these flowers. In Africa, the subgenus *Diagonozus* has been collected on *Costus* but nothing more is known on floral relationships for this subgenus with remarkably elongate malar area and glossa. In Madagascar and Africa females of *Thrinchostoma* have often been observed on flowers of Melastomataceae. On these flowers, they collect pollen by buzzing and the characteristic sound is audible a few meters away. In Africa, specimens have also frequently been collected on *Asystasia gangetica* (Acanthaceae).

Material and methods

Most terminology for the description of species and keys is based on MICHENER (2007). Puncture density is expressed as the relationship between puncture diameter (d) and the space between them (i), such as $i = 1.5 d$ or $i < d$. Two abbreviations were used for morphological structures (T = metasomal tergum; S = metasomal sternum). Body length was measured from the vertex to the apex of the body. The malar area is the space between the eye and the mandible, measured relatively to the length of the eye (fig. 1). The calcar is equivalent to the inner hind tibial spur (MICHENER, 2007) in females (fig. 2c,d). The apical lobe of the hind tibiae is the broad yellowish enlargement carrying the tibial spurs of the males (fig. 9a,b). The antennal segments bearing notches are counted from the scape (= first segment) (fig. 4).

The pictures of *Thrinchostoma* in the field have been taken by Nicolas Vereecken (ULB), the pictures of the types of *T. sjoestedti* preserved in Stockholm by Hege Vardal (NHRS), the pictures of all types preserved in Berlin by the second author (C.E.) and the pictures of other species by the first author (A.P.). Specimens from South Africa have been identified by C.E. while those from other countries have been identified by A.P. Maps were produced using the software DFF (BARBIER *et al.* 2000) and the website “Atlas Hymenoptera”.

Acronyms for collections from which specimens were borrowed or deposited, are as follows:

AMNH: American Museum of Natural History, New York, USA.

BMNH: Natural History Museum, London, UK [formerly British Museum (Natural History)].

CAS: California Academy of Sciences, San Francisco, USA.

CUIC: Cornell University Insect Collection, Ithaca, USA.

DMSA: Durban Natural Science Museum, Durban, South Africa.

FSAG: Gembloux Agrobiotech, Entomologie Fonctionnelle et Evolutive, Gembloux, Belgium (formerly Faculté Universitaire des Sciences Agronomiques de Gembloux)

INECN: Institut National pour l'Environnement et la Conservation de la Nature, Gitega, Burundi.

IITA: Institut International d'Agronomie Tropicale, Cotonou, Benin.

LACM: Los Angeles County Museum of Natural History, Los Angeles, USA.

MCZ: Museum of Comparative Zoology, Harvard University, Cambridge, USA.

MNHNP: Museum National d'Histoire Naturelle, Paris, France.

MNHUB: Museum für Naturkunde an der Humboldt Universität zu Berlin, Germany.

MWNH: Museum Wiesbaden, Department of Natural Sciences, Wiesbaden, Germany.

NHRS: Naturhistoriska Riksmuseet, Stockholm, Sweden.

OOL: Oberosterreichs Landesmuseum, Linz, Austria.

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

RMCA: Royal Museum for Central Africa, Tervuren, Belgium.
 RMNH: Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands
 RU: Reading University, Reading, UK.
 SANC: Plant Protection Research Institute, Pretoria, South Africa.
 ULB: Université Libre de Bruxelles, Belgium.
 ZML: Zoological Museum, University of Lund, Sweden.

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We are much indebted to the following colleagues (in alphabetical order of collection acronyms) who made specimens under their curation available for this study: E. Wyman and J.G. Rozen (AMNH), D. Notton (BMNH), W.J. Pulawski (CAS), B. Danforth (CIUC), Kirstin Williams (DMSA), Longin Ndayikeza and Benoît Nzigidahera (INECN), G. Goergen (IITA), R.R. Snelling (LACM), S. Pratt (MCZ), C. Villemant (MNHNP), F. Koch (MNHUB), H. Vardal (NHRS), F. Gusenleitner and M. Schwarz (OOL), E. De Coninck and S. Hannot (RMCA), C. van Achterberg (RMNH), S. Potts and S. Roberts (RU), N. J. Vereecken (ULB), R. Danielsson (ZML).

Key to the subgenera

- (1) Very elongated head, especially very long malar area, equal to three quarters length of eye (fig. 1a) Subgenus *Diagonozus*
- Head and malar area shorter, not exceeding one quarter length of eye (fig. 1b)(2)



a - *Diagonozus*
 Fig. 1



b - other subgenera

- (2) Male: submarginal cells of fore wings without tuft of setae (fig. 2a). Female: calcaria on hind tibiae with many small teeth of similar size (fig. 2c) Subgenus *Eothrinchostoma*
- Male: wings with a tuft of characteristic setae on crossvein between second and third submarginal cells (fig. 2b). Female: calcaria on hind tibiae with first tooth well-developed and laminated (fig. 2d) Subgenus *Thrinchostoma*

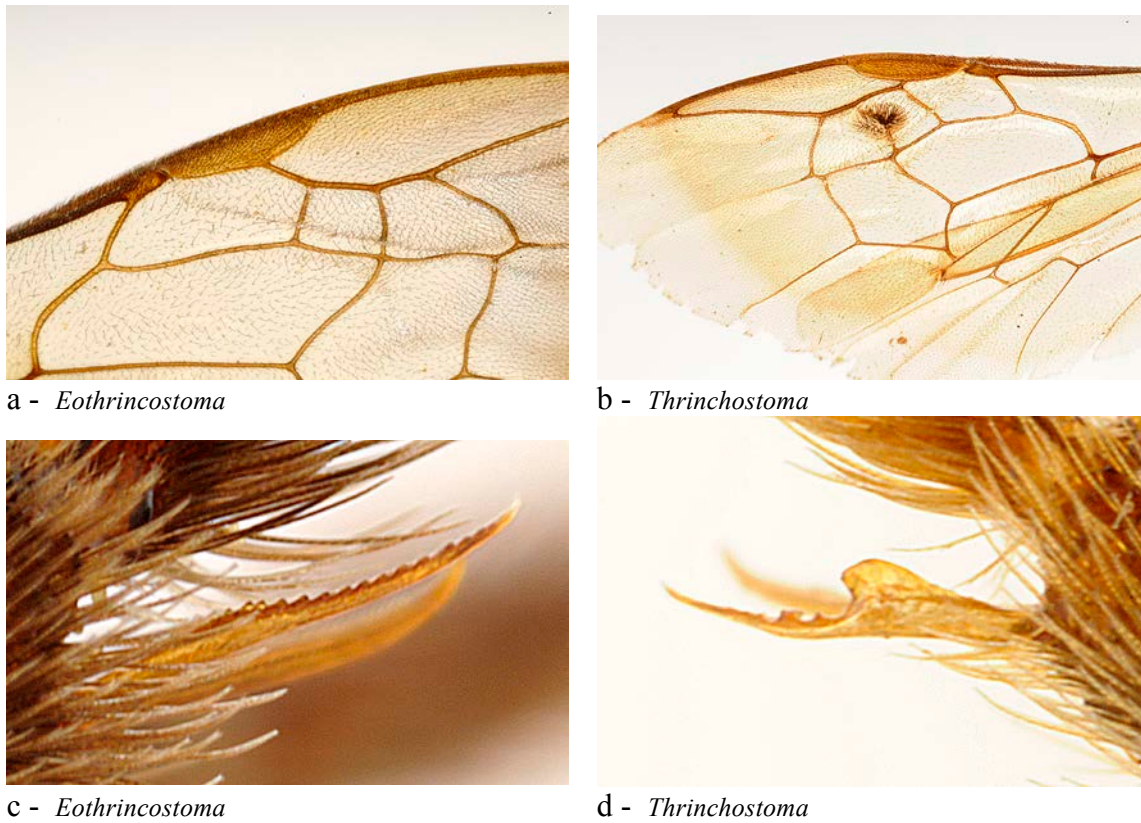


Fig. 2

Key to the species in *Diagonozus* Enderlein, 1903

Males only:

- 1) Segments 6 to 11 of antennae with notches and curved (fig. 3a) *T. bicometes* (Enderlein, 1903)
- Segments 8 to 11 of antennae with notches and almost straight (fig. 3b)..... *T. lettowvorbecki* Blüthgen, 1930

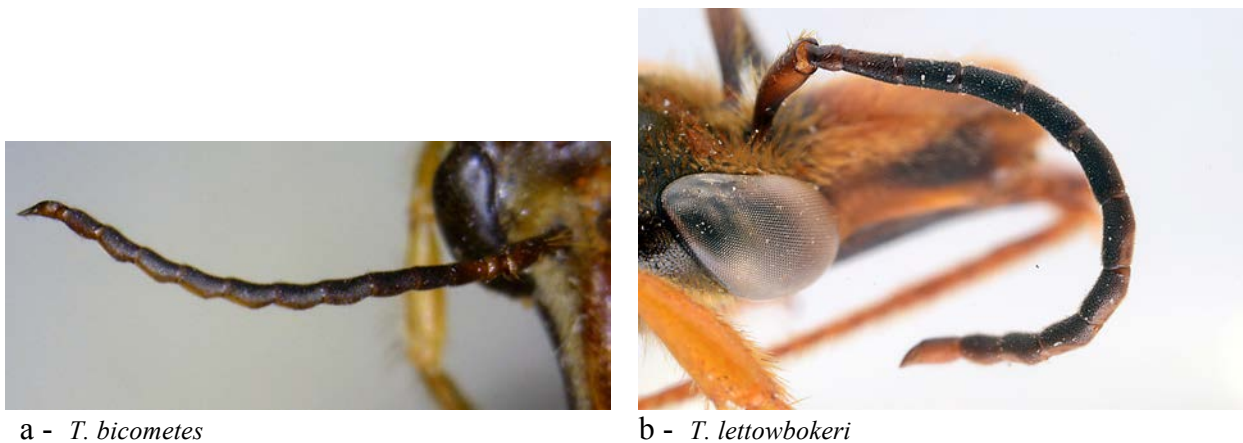


Fig. 3

Key to the species in *Eothrinchostoma* Blüthgen, 1930

- 1) Female: notches on segments 9 to 12 of antennae (fig. 4a). Male: notches on segments 9 to 13 of antennae (fig. 4b); apical lobe of hind tibia as in fig. 23 *T. torridum* (Smith, 1879)
 - Female: notches on segments 7 to 12 of antennae (fig. 4c). Male: notches on segments 6 to 13 of antennae (fig. 4d) ; apical lobe of hind tibia of male as in fig. 20
 *T. silvaticum* Blüthgen, 1930

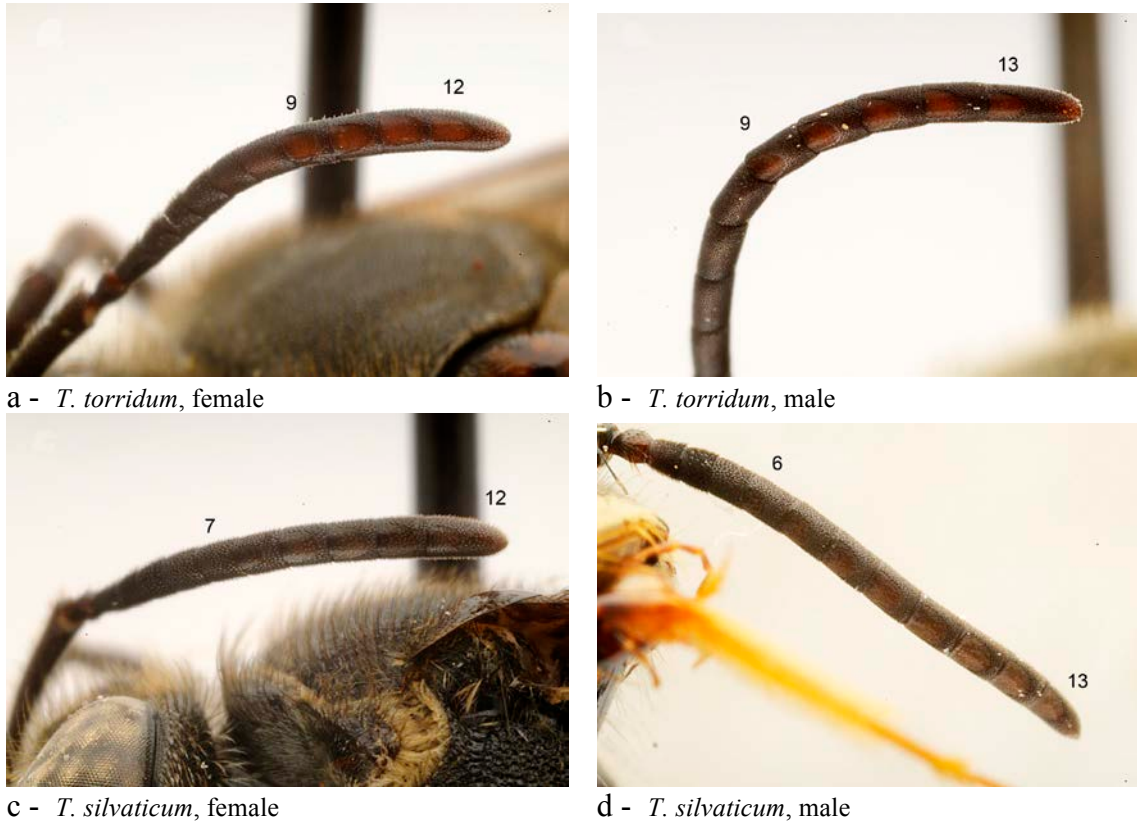


Fig. 4

Key to the species in *Thrinchostoma* de Saussure, 1890

Males only:

- (1) Antennae composed of only 12 segments (fig. 5a) *T. emini* Blüthgen, 1930
 - Antennae composed of 13 segments (fig. 5b) (2)

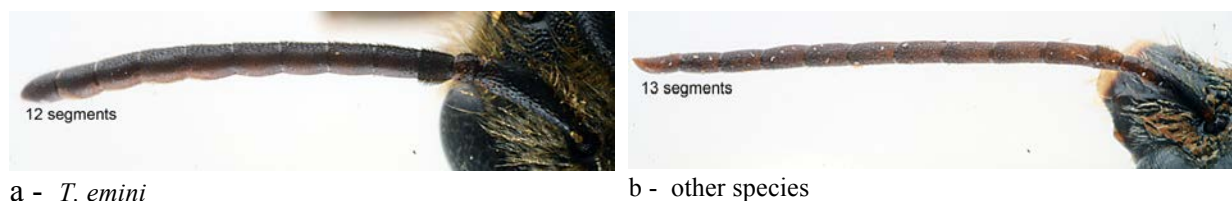


Fig. 5

- (2) Last segment of antennae bent at right angles or nearly so (fig. 6a) (3)
 - Last segment of antennae straight (fig. 6b) (6)



a - last segment bent



b - last segment straight

Fig. 6

- (3) Apical margin of S5 with setae (fig. 7a) (4)
 - Apical margin of S5 glabrous (fig. 7b) (5)



a - S5 with setae



b - S5 glabrous

Fig. 7

- (4) Hind femora strongly swollen (fig. 8a) *T. nactigali* Blüthgen, 1930
 - Hind femora weakly swollen (fig. 8b) *T. sjoestedti* (Friese, 1909)



a - *T. nactigali*



b - *T. sjoestedti*

Fig. 8

(5) Apical lobe of hind tibia short (fig. 9a); apical margin of S5 slightly curved (fig. 9c) ; terga always black *T. kandti* Blüthgen, 1930
 - Apical lobe of hind tibiae longer (fig. 9b); apical margin of S5 distinctly concave (fig. 9d) ; terga often partly red, rarely totally black *T. petersi* Blüthgen, 1930



a - *T. kandti*



b - *T. petersi*



c - *T. kandti*



d - *T. petersi*

Fig. 9

(6) Hind tibiae very broad and covered with a dense tomentum (fig. 10a) ; apical margin of S5 with long and very dense setae (fig. 10b) *T. orchidarum* Cockerell, 1908
 - Hind tibiae of different shape and without dense tomentum ; apical margin of S5 without setae or with less dense setae (7)



a - *T. orchidarum*, hind leg



b - *T. orchidarum*, last sternite

Fig. 10

- (7) Punctuation of scutum very sparse (fig. 11a) (8)
 - Punctuation of scutum dense (fig. 11b) (9)



a - spaced punctuation



b - dense punctuation

Fig. 11

- (8) Metasoma and legs orange ; hind femora swollen, apical lobe of hind tibiae acutely angled (fig. 12a) *T. amanicum* (Strand, 1910)
 - Metasoma and legs dark brown ; hind femora slender, apical lobe of hind tibiae truncated distally (fig. 12b) *T. uluguruensis* Pauly & Eardley sp. nov.



a - *T. amanicum*



b - *T. uluguruensis*

Fig. 12

(9) S5 without apical setae ; apical lobe of hind tibiae triangular ; posterior basitarsi narrow (fig. 13a) ; antennal segments long *T. productum* (Smith, 1853)
- S5 with apical setae; apical lobe of hind tibiae truncated distally ; hind basitarsi very wide (fig. 13b); antennal segments short *T. upembae* Pauly & Eardley sp. nov.



a - *T. productum*



b - *T. upembae*

Fig. 13

Genus *Thrinchostoma* de Saussure, 1890

Thrinchostoma de Saussure, 1890: 52. Type species: *Thrinchostoma renitantely* de Saussure, 1890 by monotypy; Blüthgen, 1930: 495–542; Michener, 1978: 507, 520, 521–525, 537–538; Michener, 1997: 58; Pauly, 1999: 142, 154–155; Pauly *In*: Pauly *et al.*, 2001: 82–101.

Trichostoma [!] de Saussure: Dalla Torre, 1896: 381, unjustified emendation of *Thrinchostoma* de Saussure, 1890; Friese 1909a: 150.

Thricostoma [!] de Saussure: Dalla Torre, 1896: 641, unjustified emendation of *Thrinchostoma* de Saussure, 1890; Blüthgen, 1928: 1930.

Trinchostoma [!] de Saussure: Ashmead, 1899: 91, lapsus for *Thrinchostoma* de Saussure, 1890.

Thrinchostoma (*Thrinchostoma*) de Saussure: Michener, 1978: 523–524; Pauly, 1984: 144–145; Michener, 2000: 374; Pauly *In*: Pauly *et al.*, 2001: 82–101.

Nesothrinchostoma Blüthgen, 1933: 364. Type species: *Thrinchostoma serricorne* Blüthgen, 1933, by monotypy; Michener, 1997: 41. syn.

Diagonozus Enderlein, 1903: 35. Type species: *Diagonozus bicometes* Enderlein, 1903, by monotypy; Michener, 1997: 20.

Thrinchostoma (*Diagonozus*) Enderlein: Michener, 1978: 525; Michener, 2000: 374.

Thrinchostoma (*Eothrinchostoma*) Blüthgen, 1930: 496, 501. Type species: *Halictus torridus* Smith, 1879, designated by Sandhouse, 1943; Michener, 1978: 523; Michener, 1997: 22; Michener, 2000: 374.

DIAGNOSIS. The genus *Thrinchostoma* differs from other African Halictine bees by the long malar area in both sexes. The male has the hind tibiae with an apical enlargement named « apical lobe ». Setae on apical margins of terga orientated laterally.

Subgenus *Diagonozus* Enderlein, 1903*Thrinchostoma* (*Diagonozus*) *bicometes* Enderlein, 1903

(Figs 14, 15, 19a)



a - male syntypes (lectotype at left)

b - lectotype labels

Fig. 14. *Diagonozus* (*Diagonozus*) *bicometes*, male syntypes.

Diagonozus bicometes Enderlein, 1903: 37, three male syntypes. Male lectotype: Cameroun, Johann-Albrechts-Höhe, 27.X.1895, leg. Conradt (MNHUB). Friese 1909b: 125.

Halictus (Thrinchostoma) [!] bicometes (Enderlein): Schulz, 1906: 239; Friese, 1909a: 128, 150-152.

Halictus (Diagonozus) bicometes (Enderlein): Strand, 1911: 141, 144.

Thrinchostoma (Diagonozus) bicometes (Enderlein): Cockerell, 1908c: 343; Michener, 1978: 525; Medler, 1980: 481; Pauly, 1999: 155, 172.

Thrinchostoma [!] (Diagonozus) bicometes (Enderlein): Blüthgen, 1930: 495–496, 499–501, 503, 521, 536.

Thrinchostoma bicometes (Enderlein): Cockerell, 1910: 506; Strand, 1912: 271; Cockerell, 1933: 24.



a - head and mesosoma

b - mesosoma



c - metasoma



d - propodeum

Fig. 15. *Thrinchostoma (Diagonozus) bicometes*, male lectotype.

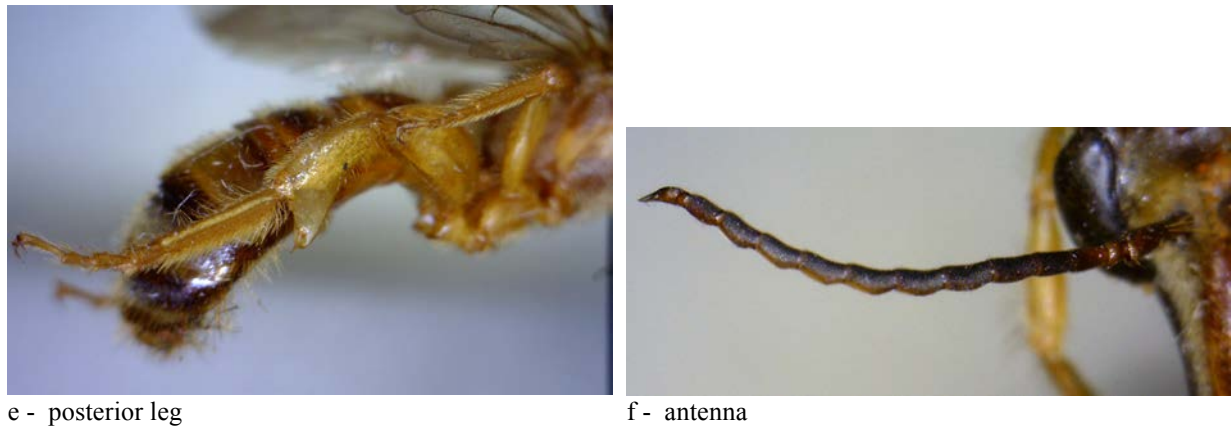


Fig. 15 (continued) *Thrinchostoma (Diagonozus) bicometes*, male lectotype.

NOTE: The species is only known from three specimens from the type locality: Johann-Albrechtshöhe. It is a former German station located in the volcanic region of NW Cameroon near Lake Barombi (4°40'N 9°24'E).

DIAGNOSIS. The male differs from *T. lettowvorbecki* by segments 6 to 11 of the antennae being notched, these segments are shorter and more curved (fig. 15f). Female unknown.

***Thrinchostoma (Diagonozus) lettowvorbecki* Blüthgen, 1930**
(Figs 16, 17, 18, 19b)

Thrinchostoma [!] (*Diagonozus*) *lettow-vorbecki* Blüthgen, 1930: 497, 499, 503, 522, 536, ♂, ♀. Male holotype: R.D. Congo, Barumbu, 12.XI.1913, sur fleurs de *Costus* n°1169, leg. Dr. Bequaert (RMCA).

Thrinchostoma (Diagonozus) lettow-vorbecki Blüthgen: Michener, 1978: 525.

Thrinchostoma lettow-vorbecki Blüthgen: Cockerell, 1933: 24.

Thrinchostoma (Diagonozus) lettowvorbecki (Blüthgen): Pauly, 1999: 156, 174.

Thrinchostoma [!] (*Diagonozus*) *guineense* Blüthgen, 1930: 536, ♂. Male holotype: Equatorial Guinea « Spanish Guinea », Uelleburg, Benitogebiet, 1-14.II.1907, leg. Tessmann (MNHUB).
Syn. nov.

Thrinchostoma (Diagonozus) guineensis Blüthgen: Michener, 1978: 525 ; Pauly, 1999: 156, 173.

Thrinchostoma (Diagonozus) ghesquieri Cockerell, 1933: 24, ♂. Male holotype: R.D. Congo, Yangambi, I.1925, leg. Lt. J. Ghesquière (RMCA). Michener, 1978: 525; Pauly 1999: 156, 173, syn.; Michener, 2000: 374.

NOTE: According to BLÜTHGEN (1930) *T. guineensis* may be simply a variety of *T. lettowvorbecki* and we preferred to consider it as a synonym because the differences are minimal.

DIAGNOSIS. The male differs from *T. bicometes* only by segments 8 to 11 of the antennae having notches and by the antennae being with fewer curved segments. The female differs from all other *Thrinchostoma* by its long malar area (fig. 18a).

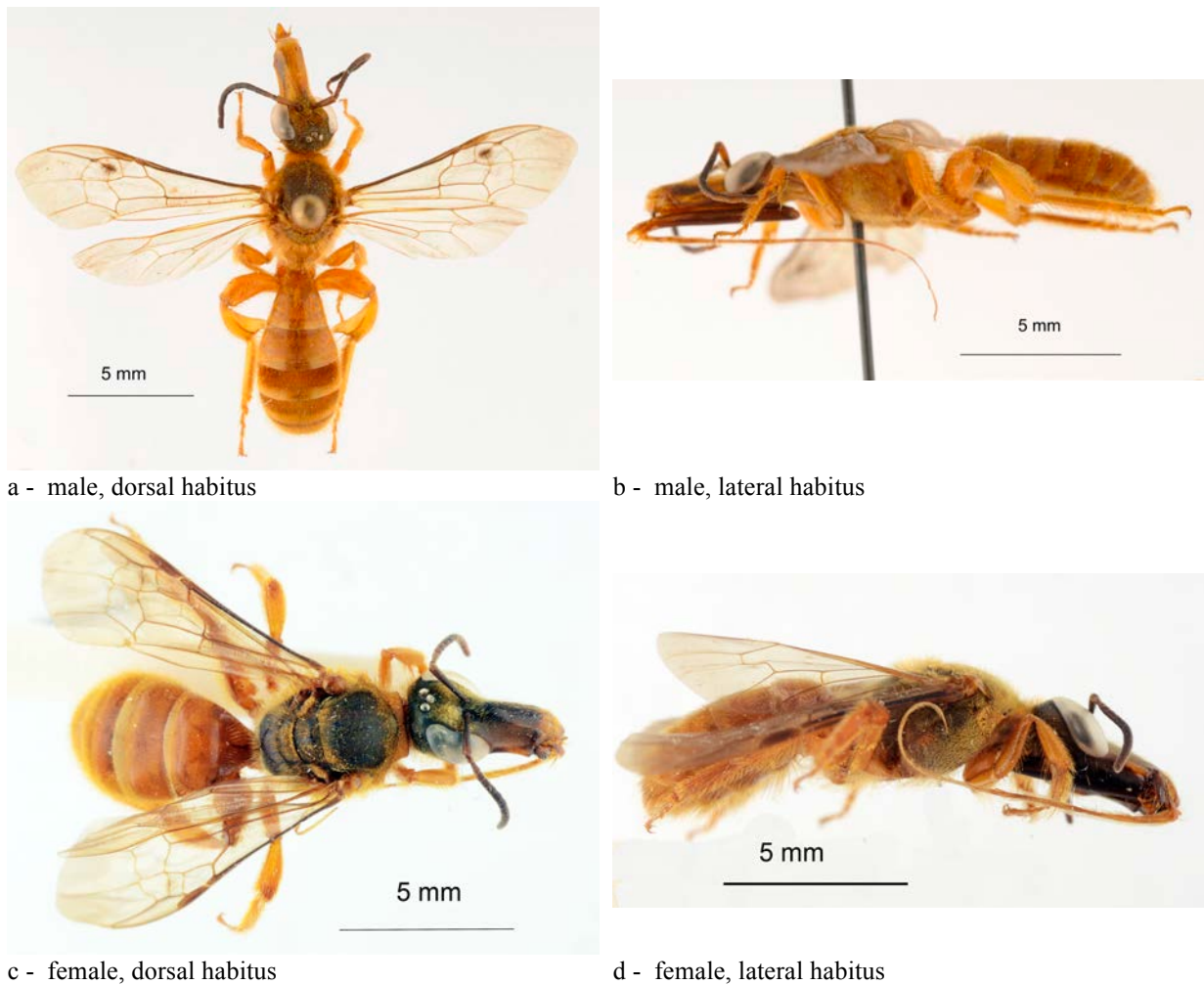


Fig. 16. *Thrinchostoma (Diagonozus) lettowvorbecki*, male (Congo-Brazzaville: Odzala) and female (Ivory Coast: Thai National Park).

MATERIAL.

IVORY COAST. Guiglo, Park National de Taï, 12 km E. of Pauleoula, 20.VIII.1983, 1♀, leg. R.T.A. Schouten & J.R.M. Buijsen (ITZA).

D.R. CONGO. Barumbu, 12.XI.1913, sur fleurs de *Costus* n°1169, 1♀ (paratype), leg. Dr. Bequert (RMCA). – Eala, 7.VIII.1935, 1♂, leg. J. Ghesquière (RMCA).

CONGO-BRAZZAVILLE. Odzala, Bordure de route près cases abandonnées, 8.II.1977, 1♂, leg. S. Kelner Pillault (MNHNP).

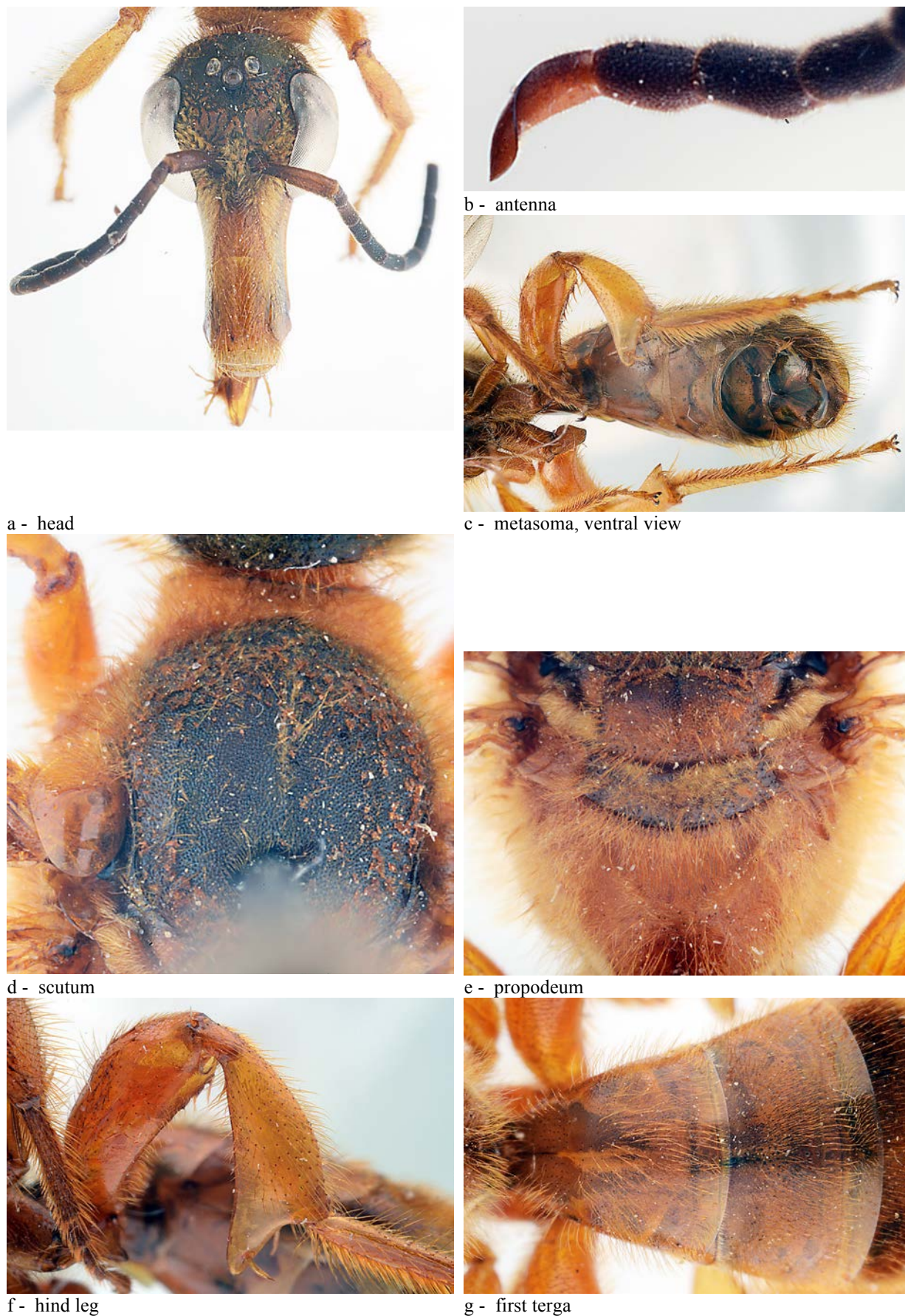


Fig. 17. *Thrinchostoma (Diagonozus) lettowvorbecki*, male (Congo-Brazzaville: Odzala).

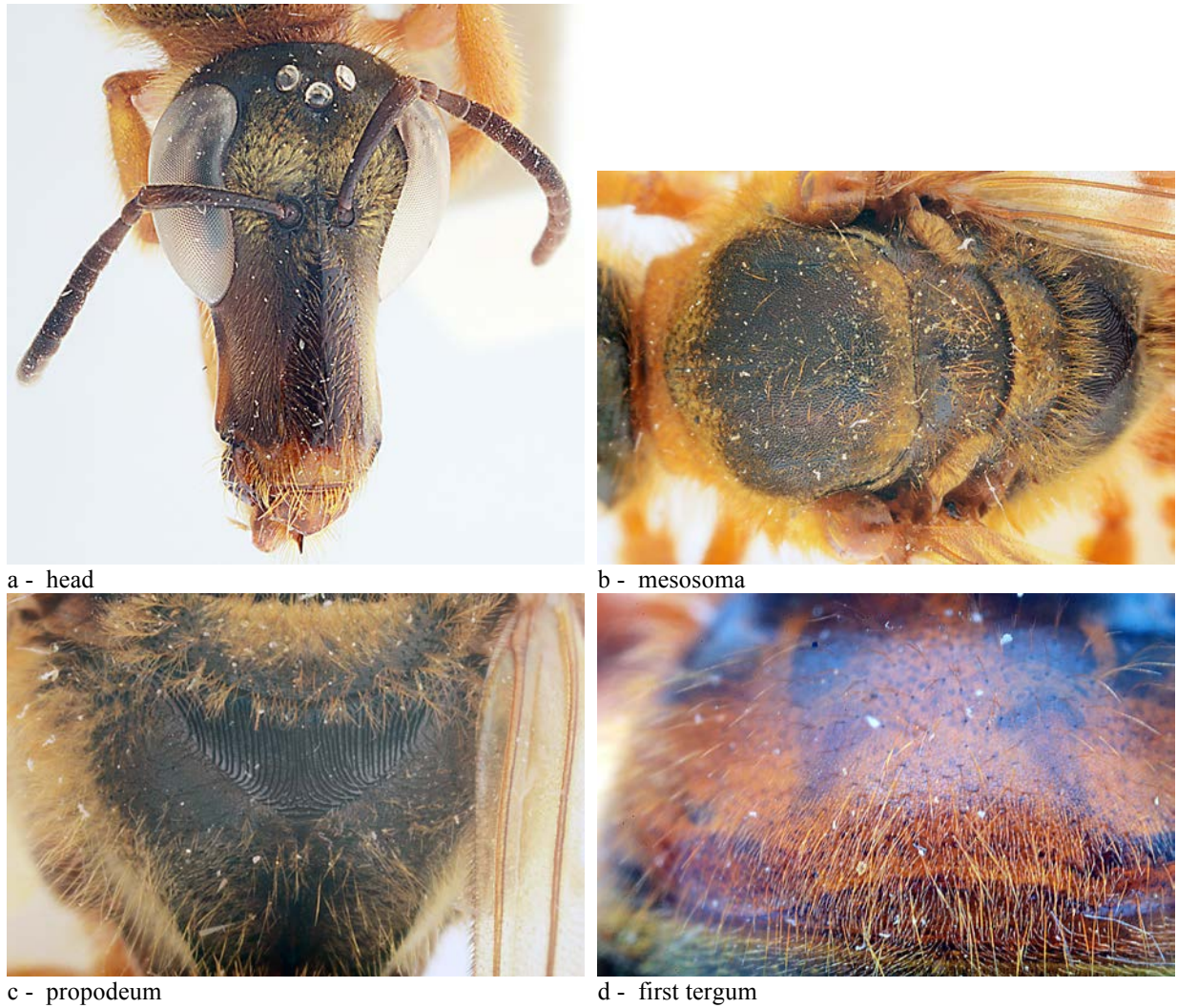


Fig. 18. *Thrinchostoma lettowvorbecki*, female (Ivory Coast: Taï).

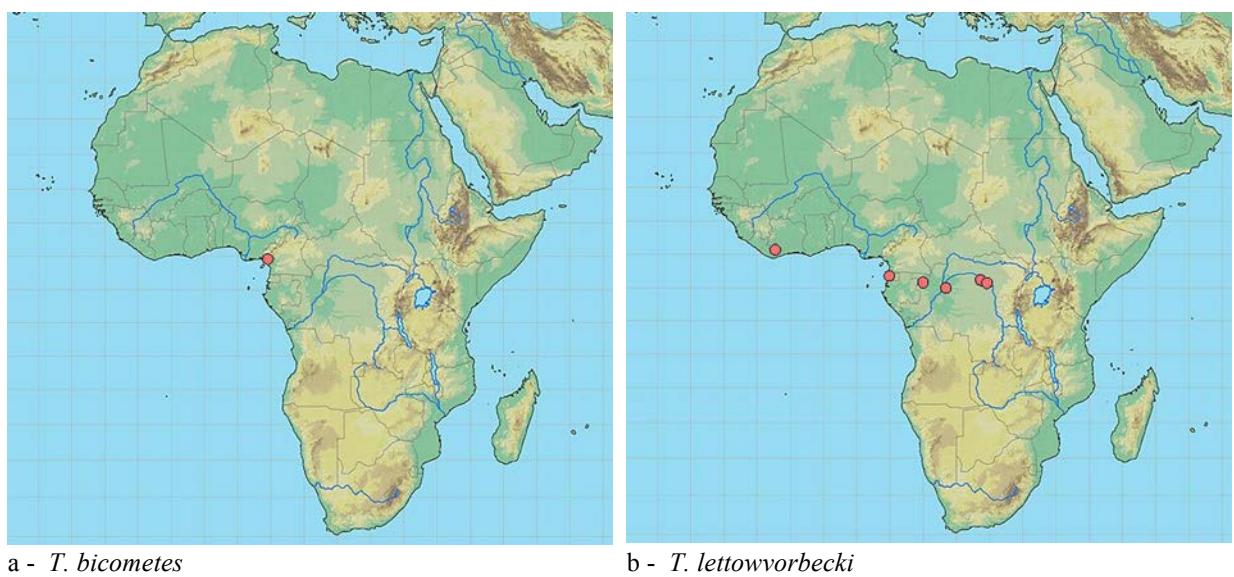


Fig. 19. Distribution maps of *Thrinchostoma* (*Diagonozus*).

Subgenus *Eothrinchostoma* Blüthgen, 1930*Thrinchostoma (Eothrinchostoma) silvaticum* Blüthgen, 1930

(Figs 20, 21, 25a)

Thrinchostoma [!] (*Eothrinchostoma*) *silvaticum* Blüthgen, 1930: 499, 520, 530, 533, 538, ♀.

Female holotype: Uganda, Tero-Walde, VII.1912, leg. C.C. Gowdey (BMNH).

Thrinchostoma silvaticum Blüthgen: Cockerell, 1936: 9.*Thrinchostoma (Eothrinchostoma) silvaticum* Blüthgen: Michener, 1978: 523; Pauly, 1999: 155, 176.

DIAGNOSIS. Both sexes differs from *T. torridum* by the number of notches on the distal segments of the antennae (8 in males, 6 in females). The male is new and resembles that of *T. torridum* except by the number of notches on the flagellum. The apical lobe of the hind tibiae is also a bit more curved (fig. 20c).

MATERIAL.

UGANDA. Bugoma Forest, Unyoro, 3700ft, 1-5.XII.1911, 1♀, leg. S.A. Neave (BMNH) (BLÜTHGEN 1930).

KENYA. Kakamega District, Kakamega forest, Isecheno, 0.02°N 34.97°E, 1800m, 18.X.1999, equatorial rainforest, 1♀, leg. R.R. Snelling (LACM). – Kakamega district, Isecheno, Isecheno Forest Reserve, 0.24°N 34.86°E, 1600m, 21-28.II.2002, Malaise trap in clearing Equatorial Rainforest, 1♀, 18.III.2002, on flowers of *Vernonia* sp. (Asteraceae), 1♂, leg. R.R. Snelling (LACM). – Kakamega district, Isecheno, Isecheno Forest Reserve, 0.24°N 34.86°E, 1600m, 1-10.VII.2001, 1♀, Malaise trap in equatorial rainforest, leg. W. Okeka (LACM). – Kakamega District, Yala R. Forest Reserve, 1450m, 0.20°N 34.88°E, 1-10.III.2002, 1♀, Malaise trap, leg. R.R. Snelling (LACM).

Thrinchostoma (Eothrinchostoma) torridum (Smith, 1879)

(Figs 22, 23, 24, 25b)

Halictus torridus Smith, 1879: 32, ♀. Female holotype: South Africa (BMNH). Friese, 1911: 651; Blüthgen, 1928: 164.*Thrinchostoma torridum* (Smith): Cockerell, 1916: 205–206; Cockerell, 1920: 304–305, syn. *nomiaeformis*; Cockerell, 1933: 23–24; Cockerell, 1936: 9; Cockerell, 1937a: 11; Cockerell, 1937b: 96; Cockerell, 1941: 510; Michener, 1969: 490; Pesenko, 1997: 479; Danforth *et al.*, 2008: 95.*Thrinchostoma* [!] *torridum* (Smith): Blüthgen, 1930: 496–497, 499–500, 516, 519–520, 531–532, 537–538, 542.*Thrinchostoma (Eothrinchostoma) torridum* (Smith): Michener, 1978: 523; Medler, 1980: 481; Pauly, 1999: 155–156, 177.*Nomia producta* Smith, 1875: 66, 70–71, ♂ [not *Nomia producta* Smith, 1953]. Male holotype: South Africa, Zeerust (BMNH). Cockerell, 1908b: 145; Friese, 1909a: 153, 160, 161; Blüthgen, 1928: 164; Blüthgen, 1930: 496.*Thrinchostoma (Eothrinchostoma) producta* (Smith): Blüthgen, 1930: 537, syn.; Michener, 1978: 521–522, 524; Pauly, 1999: 156, 175, syn.*Nomia (Thrinchostoma) producta* Smith: Friese, 1941: 99.*Thrinchostoma (Thrinchostoma) productum* (Smith): Michener, 1978: 524 [incorrectly placed].*Thrinchostoma (Eothrinchostoma) productum* (Strand): Michener, 2000: 370.*Thrinchostoma producta* (Strand): Roubik, 1989: 414.



Fig. 20. *Thrinchostoma (Eoathrinchostoma) silvaticum*, male (Kenya: Kakamega Forest).



a - habitus



b - head



c - mesosoma



d - antenna



e - propodeum



f - first terga

Fig. 21. *Thrinchostoma (Eoathrinchostoma) silvaticum*, female (Kenya: Kakamega Forest).

Thrinchostoma nomiaeformis Cockerell, 1908b: 145 [unnecessary replacement name for *Nomia producta* Smith, 1875]; Cockerell, 1920: 304–305; Blüthgen, 1930: 537, syn.; Pesenko, 1997: 479, 502.

Thrinchostoma (Eothrinchostoma) nomiaeformis Cockerell: Pauly, 1999: 156, 175.

Thrinchostoma wellmanni Cockerell, 1908a: 84–85, ♀. Female holotype: Angola, Benguella (BMNH); Cockerell, 1908c: 343; Cockerell, 1937a: 10. **Syn. nov.**

Halictus (Thrinchostoma) wellmanni (Cockerell): Friese, 1909a: 128, 152.

Thrinchostoma (Eothrinchostoma) wellmanni (Cockerell): Cockerell, 1933: 23; Michener, 1978: 523; Pauly, 1999: 155, 177.

Thrinchostoma [!] (*Eothrinchostoma*) *wellmanni* (Cockerell): Blüthgen, 1930: 496, 499, 541.

Thrinchostoma (Eothrinchostoma) manyemae Cockerell, 1933: 23, ♂. Male holotype: D.R. Congo, Manyema, leg. Mayné (RMCA). Michener, 1978: 523; Pauly, 1999: 156, 174, syn.

Thrinchostoma malelanum Cockerell, 1937a: 10–11, ♀. Female holotype: D.R. Congo, Pangula near Malela, Chief Kasende, 5°40'S 23°45'E, leg. J. Bequaert (AMNH). **Syn. nov.**

Thrinchostoma (Eothrinchostoma) malelanum Cockerell: Michener, 1978: 523; Pauly, 1999: 155, 174.

REMARK. *Halictus patricius* Strand, 1911: 141, ♀. Holotype ♀: without locality (MNHUB). The female holotype is actually a *Zonalictus* ! This species is therefore excluded from the genus *Thrinchostoma* where it was placed by Blüthgen (1930: 519, 520, 531, 538), on basis of it being the male « allo-holotype » (= *T. torridum*), and from the synonymy of *T. torridum* in Pauly, 1999.

DIAGNOSIS. *T. torridum* is a relatively large species (11–14 mm). The male can be distinguished from all other *Thrinchostoma*, except *T. silvaticum*, by the absence of a spot of setae on forewing. From *T. silvaticum* it differs in the number of notches on the antennal segments (fig. 4b). The female differs from all other *Thrinchostoma*, except *T. silvaticum*, by the sculpture of the calcaria (fig. 2c). From *T. silvaticum*, it also differs in the number of notches on the antennal segments (fig. 4a).

VARIATIONS. Some females from the Congo, Cameroon and Gabon have a black metasoma with black setae in the middle of the last terga. They may represent a variety or perhaps a distinct subspecies. The type of *T. malelanum* has the malar area and the clypeus a little longer than the other specimens of this species. It could be a distinct species, one that Blüthgen had wrongly identified as *T. patricium*.

MATERIAL.

LIBERIA. Brakatown, X.1926, 1♀, leg. Dr. Bequaert (RMCA).

GABON. WOLEU-NTEM: Médouneu, 22.XII.1985, 1♂ (FSAG) (Pauly 1998, dt sp.3) (black var.).

CONGO-BRAZZAVILLE. Kouilou, Kakamoeka, 4°07'S 12°04'E, IX.2007, 1♀, Darwin Project (RU).

D.R. CONGO. Walikale, 7.I.1915, 1♂, leg. Dr. Bequaert (RMCA) (dt *T. patricium* allotype by Blüthgen). – Maniema, Kindu, 1917, 1♀, leg. L. Burgeon (MNHNP). – Kibombo, 1.II.1910, 1♀, leg. Dr. Bequaert (RMCA). – Manyema, 1♀, leg. R. Mayné (RMCA). – Kapanga, XI.1932, 1♀, leg. G.F. Overlaet (RMCA). – Bambesa, 15.IX.1933, 1♀, leg. H.J. Brédo (RMCA). – Jadotville, 1951, 1♀, leg. Rév. Mère Sabine (RMCA). – Libengé, 9.XII.1931, 1♀, leg. H.J. Brédo (RMCA). – Bomboma, 21.VII.1935, 2♀, leg. A. Bal (RMCA). – Eala, XI.1931, 1♂, leg. H.J. Brédo, VI.1932, 1♀, VI.1935, 2♂, leg. J. Ghesquière, leg. A. Corbisier, VII.1935, 1♀, leg. J. Ghesquière (RMCA). – Stanleyville, 10–13.IX.1928, 2♀, leg. A. Collart (RMCA). – Rutshuru, IX–X.1936, 1♀, leg. Dr. Delville (RMCA). – Bomboma, 21.VII.1935, 6♂ (RMCA). – Lubumbashi, 21.VIII.1951, 1♂, leg. Ch. Seydel (RMCA). – Elisabethville, 2.V.1933, 1♂, 28.V.1933, 2♂, leg. Dr. M. Bequaert (RMCA). – P.N.G. (=

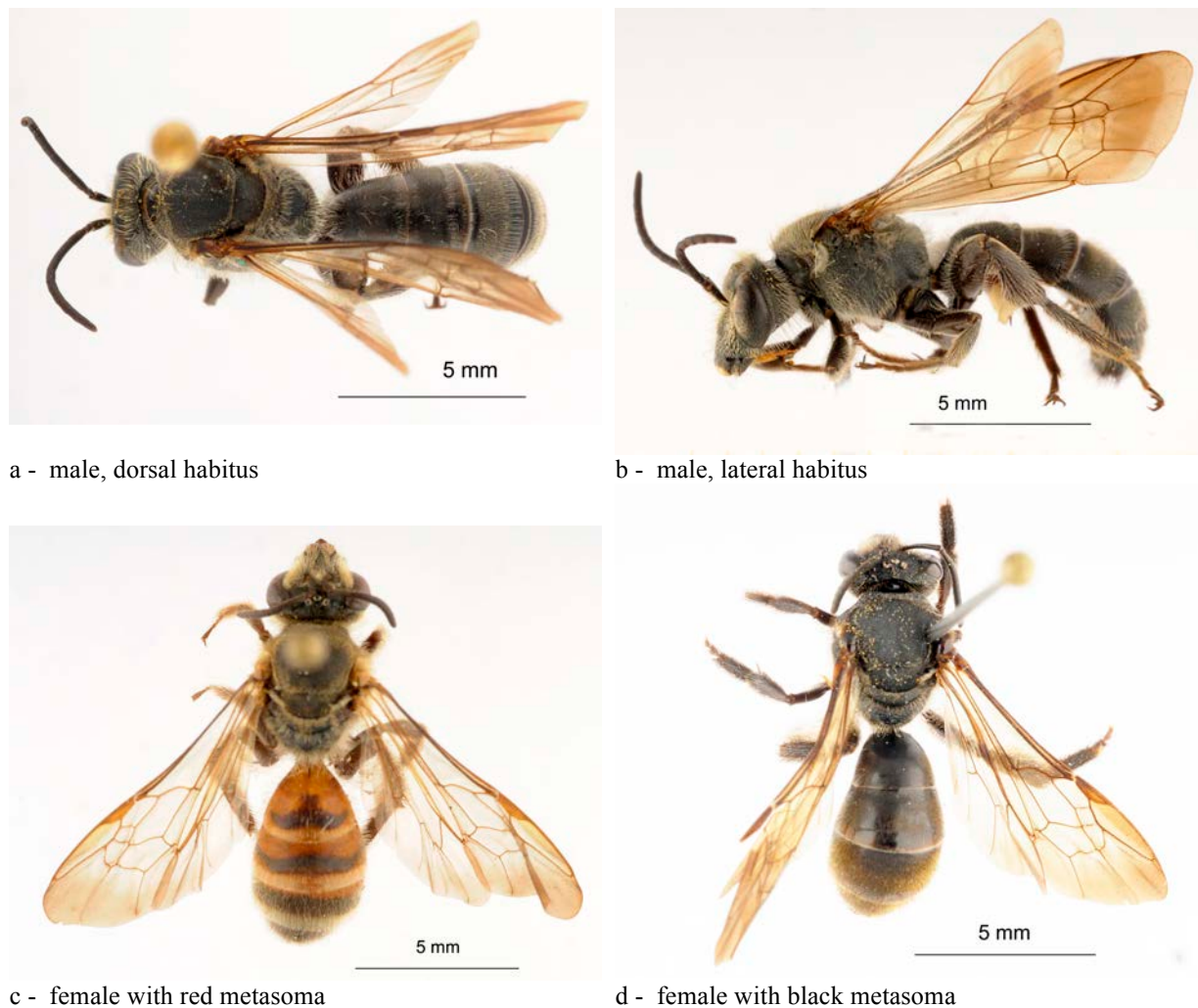


Fig. 22. *Thrinchostoma (Eoathrinchostoma) torridum*, specimens from Kenya (a, b), Zimbabwe (c) and Congo-Brazzaville (d).

Parc National de la Garamba, Inimvua, n°3488, 20.V.1952, 1♂, leg. H. De Saeger (RMCA). – P.N.U. (= Parc National de l'Upemba), Mbuye Bala, 1750m, 25-31.III.1948, 1♂, leg. G.F. de Witte n°1456a (RMCA). – P.N.U., Gorges de la Pelenge, 1150m, 10-14.VI.1947, 1♂, leg. G.F. de Witte n°471a (RMCA). – P.N.U., Ganza, près rivière Kamandula, affluent droit Lukoka, 860m, 27.VI-6.VII.1949, 1♂, leg. G.F. de Witte (RMCA). – Rutshuru, XII.1937, 1♂, leg. J. Ghesquière (RMCA). – P.N.A. (= Parc National des Virungas), Escarpement de Kabasha, 1500m, 12.XII.1934, 1♂, leg. G.F. de Witte n°901 (RMCA). – “Buvumo” VI.1929, leg. G.D.H. Carpenter (BMNH) (Cockerell 1941: 510; non examiné). – Kasaji 12 mi N, 31.I.1958, 1♀, leg. E.S. Ross & R.E. Leach (CAS).

ETHIOPIA. OROMIA. W. Haraghe, Mechara, 8°36'N 40°19'E, 30.X-13.XI.2010, *Justicia ladanoides*, 3♂, 5-19.XII.2010, *Trichodesma zeylanicum*, 2♂, 16.I.2011, *Trichodesma zeylanicum*, 1♂, leg. Degefa Weyessa, GTI Project (RBINS). – Abijata Shala National Park, 7°31'N 38°39'E, 1630m, 15.IX.2012, 1♀, leg. A. Pauly (RBINS). SOUTHERN. W. Konso, 5°24'N 37°11'E, 1387m, 22.IX.2012, *Lamiaceae*, 3♂, leg. A. Pauly (RBINS). – Arba-Minch, Lake Chamo, 5°55'N 37°32'E, 1138m, 19.IX.2012, 2♀, leg. A. Pauly (RBINS). – Road to Tebela, 6°38'N 37°49'E, 1386m, 18.IX.2012, *Plectranthus* sp., 1♂, leg. A. Pauly (RBINS). – Near Mago National Park, 5°45'N 36°22'E, 491m, 23.IX.2012, 3♀, leg. J.-L. Boevé et A. Pauly (RBINS).

BURUNDI. Réserve Naturelle de Rumonge, 04.59552°S 029.28214°E, 14.IV.2011, piège savon dans *Persea americana*, 1♀, leg. Ndayikeza L. (INECN).

KENYA. « Blue Pot Hot », Chema Riv., 4000ft, 1♂, leg. F.X. Williams (MCZ). – Kakamega District Kalunya Glade, Isecheno Nature Reserve, 0.24°N 34.87°E, 1800m, 6.V.2001, 2♀, leg. R.R. Snelling (LACM).

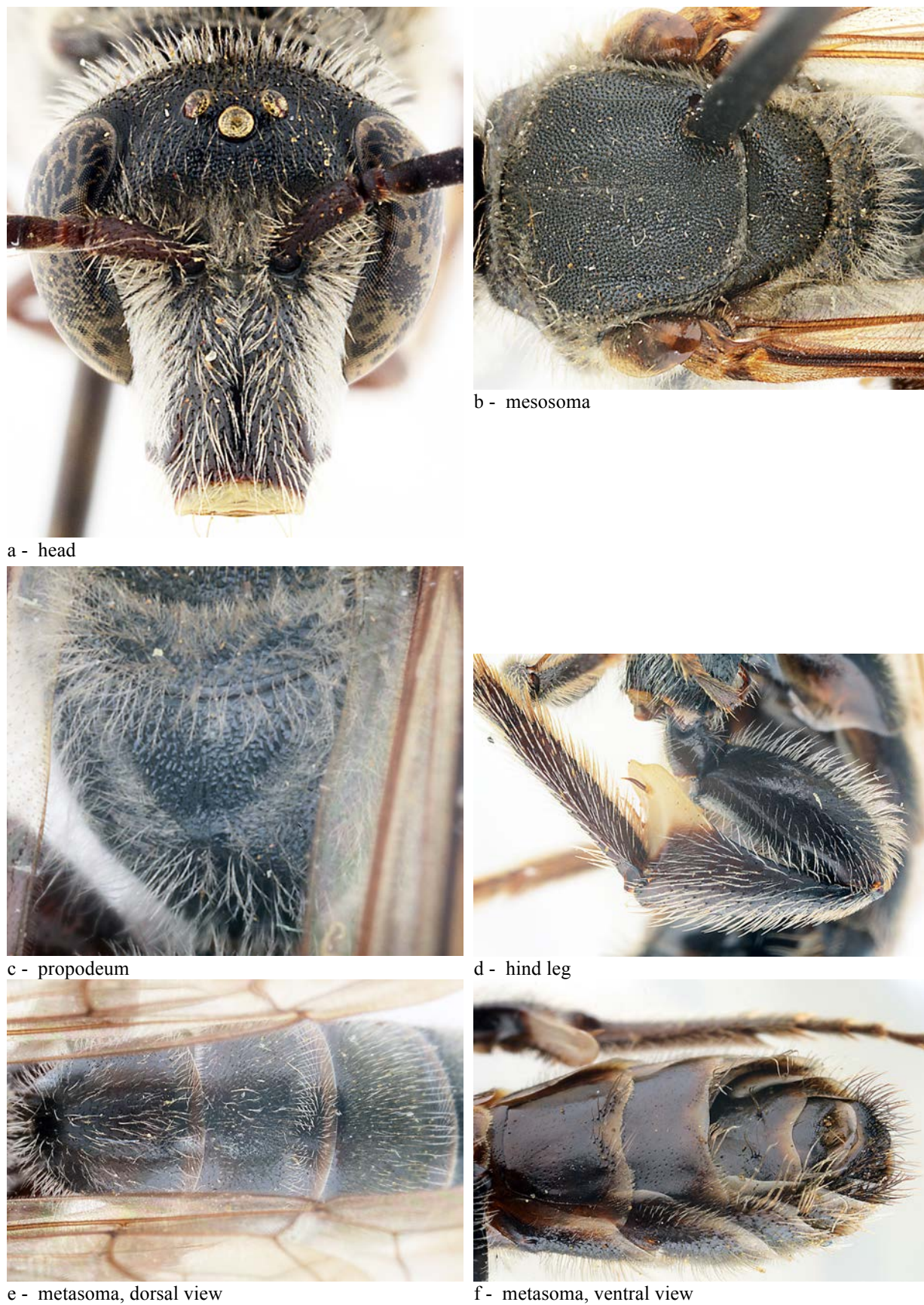
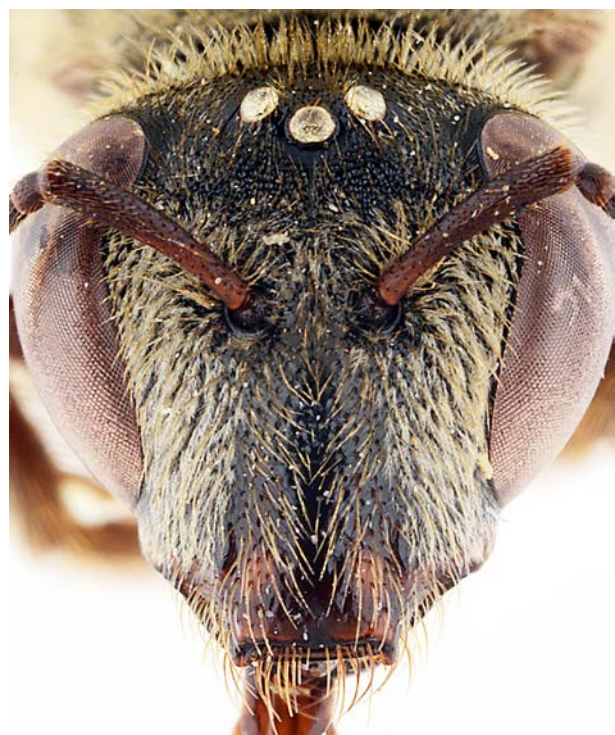


Fig. 23. *Thrinchostoma (Eothrincostoma) torridum*, male (Kenya).



a - head (*T. torridum*)



b - head (type *T. malelanum*)



c - mesosoma



d - propodeum



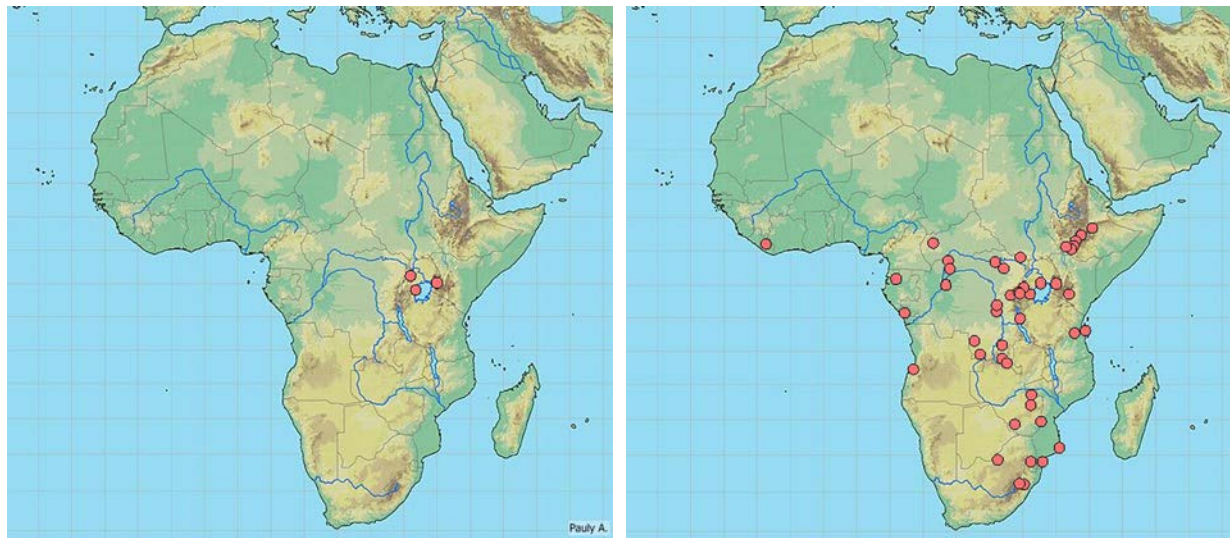
e - first tergum

Fig. 24. *Thrinchostoma* (*Eothrinchostoma*) *torridum*, female specimen from Zimbabwe (a, c, d, e) and type of *T. malelanum* (b).

– Kakamega District, Kalunya Glade, Kakamega Forest, 0.25°N 34.86°E, 1550m, 20.IV.2003, *Justicia* sp., 1♀, 20.IV.2003, *Asystasia gangetica*, 1♀, 29.IV.2003, *Asystasia gangetica*, 1♀, 30.IV.2003, *Orthosiphon rubicundus*, 2♀, 2.V.2003, on flowers of *Platystoma africanum* (Labiatae), 2♀, leg. R.R. Snelling (LACM). – Kakamega district, Isecheno, Isecheno Forest reserve, 0.24°N 34.86°E, 1600m, 5.V.2003, 1♂, leg. R.R. Snelling (LACM). – Kakamega District, Kalunya Glade, Kakamega Forest, 0.24°N 34.85°E, 1800ft, 13.V.2001, *Aspilia pluriseta*, 1♀, 6.V.2001, *Aspilia pluriseta*, 1♀, 26.IV.2001, *Aspilia pluriseta*, 2♂, 29.IV.2001, *Aspilia pluriseta*, 2♂, 6.V.2001, *Aspilia pluriseta*, 1♂, 13.V.2001, *Aspilia pluriseta*, 1♂, leg. R.R. Snelling (LACM). – Nairobi, Athi River city env., 20.XI.1999, 1♀, leg. M. Snizek (OOL).

ZIMBABWE. Matopo Hills, 17-30.IV.1932, 1♂, leg. A. Mackie (RMCA). – (N) Mavhuradonha Saf. A., 15km SE Muzarabani, 17.XII.1998, 2♀, leg. M. Halada (OOL). – (E), 40 km S. Chipinge, Mt Selinda, 13.XII.1998, 1♀, leg. J. Halada (OOL). – 30 km W. Harare, 22.XII.1998, 2♀, leg. J. Halada (OOL).

TANZANIE. Mts Uluguru, Kiroka, forêt heliophile, 725m, 27-31.V.1971, 3♂, leg. L. Berger, N. Leleup & J. Debecker (RMCA).

a - *T. silvaticum*b - *T. torridum*Fig. 25. Distribution maps of *Thrinchostoma* (*Eothrinchostoma*).

MOZAMBIQUE. Inhambane pr., 15km SE Seve, 27.XII.2003, 1♂, leg. J. Halada (OOL).

REPUBLIC OF SOUTH AFRICA. Chuniespoort, 24°13'S 29°30'E, 2.XII.1981, 1♂, leg. G.L. Prinsloo (SANC). – Crocodile Bridge, 28.V.1969, 1♀ 1♂, 2.VI.1969, 1♀, leg. L.C. Starke (SANC). – Duiwelskloof, 23°42'S 30°06'E, 15.XII.1985, 1♂, leg. J.S. Donaldson (SANC). – Entabeni Forest Reserve, 23°00'S 30°16'E, 7-11.I.1987, 1♂, leg. C.D. Eardley (SANC). – Happy Rest Nature Reserve, 22°59'S 29°46'E, 10.III.1990, 1♂, leg. C.D. Eardley (SANC). – Honingklip, 26°01'S 27.47°08'E, 18.IX.2005, 1♀, leg. M. Forsyth (SANC). – Ingwe Motel, N. Louis Trichardt, 22°58'S 29°56'E, 6.I.2004, 1♀, leg. C. Eardley (SANC). – Komatipoort, 23.V.1969, 2♀, 6♂, 27.V.1969, 1♂, leg. L.C. Starke (SANC). – Kruger National Park, Pafuri, 22°26'S 31°12'E, 9-24.IV.1986, 1♂, L.E.O. Braack (SANC). – Magoebaskloof, 23°54'S 30°00'E, 5.III.1986, 1♀, leg. C.D. Eardley (SANC). – Mogol Nature Reserve, Ellisras district, 23°58'S 27°45'E, 25-26.I.1982, 1♂, leg. C.D. Eardley (SANC). – Nylsvley, X.1978, 2♀, XI.1978, 1♀, leg. C.D. Eardley (SANC). – Nylsvley Nature Reserve, 24°39'S 28°42'E, 18.II.1982, 1♀, leg. R.G. Oberprieler (SANC). – Nylsvley Nature Reserve, 24°39'S 28°42'E, 10-11.XII.1979, 2♀, leg. C.D. Eardley (SANC). – Onder Sabie, 2.VI.1969, 2♂, 1♀, leg. L.C. Stark (SANC). – Presidentsrus, Witbank, 25°41'S 29°22'E, 20.III.1986, 1♂, leg. B. Grobbelaar & V.M. Uys (SANC). – Retiefskloof Nature Reserve, 13.IV.1960, 1♂, leg. H.N. Empey (SANC). – River Lodge near Strydom Tunnel, 24°22'S 30°41'E, 22-23.XII.1985, 1♂, 1♀, leg. C.D. Eardley (SANC). – Sabie Hoek, 8.V.1966, 1♂, 1♀, leg. H. Braack (SANC). – Thabazimbi 42 km E, 24°29'S 27°43'E, 10.I.2004, 1♀, leg. C.D. Eardley (SANC). – Vivo 20,5 km E, 962m, 23°05'S 29°26'E, 12.I.2004, 4♀, leg. C.D. Eardley (SANC). – Waterpoort 20 km E, 22°52'S 29°47'E, 6.I.2004, 1♀, leg. C.D. Eardley (SANC). – Weltevreden, 25°34'S 31°10'E, 24.I.1990, 1♀, leg. G.L. Prinsloo (SANC). – Barbeton 20km NE, 20-30.XI.2003, 1♀, leg. J. Halada (OOL). Blue Lagoon, Durban, 18.III.1963, 1♀, leg. H.N. Empey (SANC). – Burman Bush, Durban, 8.III.1963, 1♀, leg. H.N. Empey (SANC). – Cathedral Peak forestry area, 28°55'S 29°14'E, 10.XI.1981, 1♀, leg. S.J. v. Tonder & C. Kok (SANC). – False Bay, 27.95852S 32.35919E, sandforest, 15.I.2005, 1♀ (SANC). – Kloof, 20.XII.1959, 1♀, 26.XII.1960, 1♂,

leg. H.N. Empey (SANC). – Kosi Bay, 10-11.II.1990, 1♂, 2♀, leg. C.D. Eardley (SANC). – Kuleni Farm, Hulhulwe, 27°54'S 32°22'E, 14.II.1990, 1♀, leg. C.D. Eardley (SANC). – Pietermaritzburg, 10.II.1917, 1♂, leg. C. Akerman (SANC). – Scottburgh, 15.III.1963, 1♀, 16.VIII.1968, 1♀, leg. H.N. Empey (SANC). – Lake Sibaya, E. shore, 27°22'S 32°43'E, 19-20.I.1981, 1♀, leg. I.M. Millar (SANC). – Stanger, 14.III.1963, 2♂, leg. H.N. Empey (SANC). – Umtentwini, 20.IV.1973, 1♂, leg. H.N. Empey (SANC). – Vernon Crookes Nature Reserve, Umzinto, 30°17'S 30°37'E, 443m, 25-26.III.1985, 3♂, leg. C.D. Eardley (SANC). – Bergville 20 km S., 5.II.2001, 1♂, leg. M. Snizek (OOL).

Subgenus *Thrinchostoma* de Saussure, 1890

Thrinchostoma amanicum (Strand, 1910)

(Figs 26, 27)

Halictus (Thrinchostoma) amanicus Strand, 1910: 42–43, ♂. Male holotype: Tanzania, Amani, 22.III.2007, leg. S.G. Vosseler (MNHUB).

Thrinchostoma [!] (*Thrinchostoma* [!]) *amanicum* (Strand): Blüthgen, 1930: 496, 498–499, 504–506, 536.

Thrinchostoma (Thrinchostoma) amanicum (Strand): Michener, 1978: 524; Pauly, 1999: 155, 171, ? syn.



a - head and mesosoma



b - head



c - hind leg



d - hind leg

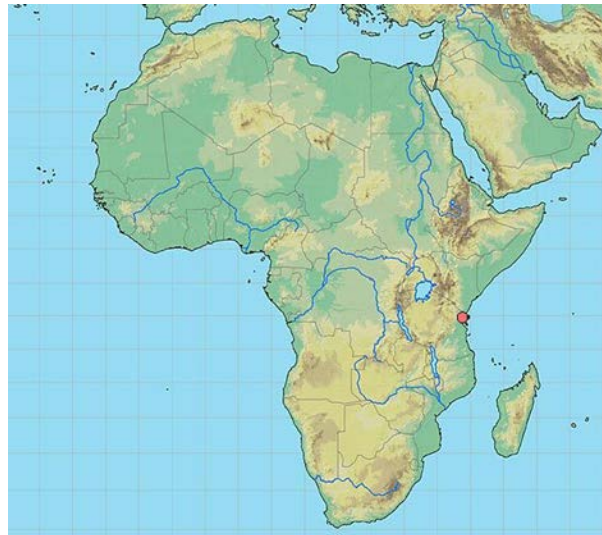
Fig. 26. *Thrinchostoma amanicum*, male holotype in MNHUB.



e - metasoma, dorsal view



f - metasoma, ventral view

Fig. 26 (continued). *Thrinchostoma amanicum*, male holotype in MNHUB.Fig. 27. Distribution map of *Thrinchostoma amanicum*.

NOTE: contrary to the opinion of PAULY, 1999 ("?" Synonymy) based on the original description, *T. amanicum* is very different from *T. productum* (Smith, 1853).

DIAGNOSIS. In the male the last antennal segment is straight. On the scutum the punctures are widely spaced. The metasoma and legs are orange, and the hind tibiae are broad (fig. 26 c, d). Female unknown.

***Thrinchostoma emini* Blüthgen, 1930**
(Figs 28, 29, 30, 31)

Thrinchostoma [!] (*Thrinchostoma* [!]) *emini* Blüthgen, 1930: 498–499, 510, 514–515, 524, 533, ♂ ♀. Male holotype: D.R. Congo, Albertville « am Westufer des Tanganijka », leg. R. Mayné, XII.1918 (RMCA).

Thrinchostoma [!] *emini* Blüthgen: Blüthgen, 1933: 375.

Thrinchostoma emini Blüthgen: Cockerell, 1933: 25.

Thrinchostoma (Thrinchostoma) emini (Blüthgen): Michener, 1978: 524; Pauly, 1999: 155, 173.

Thrinchostoma [!] *telekii* Blüthgen, 1930: 498, 499, 509–511, 534, ♂. Male holotype: Kenya, Westside des Aberdare Gebirge, Landschaft Leikipia, 8300ft, 1.III.1911, leg. T.J. Anderson (BMNH). **Syn. nov.**

Thrinchostoma telekii Blüthgen: Cockerell, 1933: 25; Cockerell, 1936: 7–9.

Thrinchostoma (Thrinchostoma) telekii Blüthgen: Michener, 1978: 525; Pauly, 1999: 155, 176.

Thrinchostoma michaelis Cockerell, 1933: 25, ♂. Male holotype: Elisabethville, 1.XII.1929, leg. Dr. M. Bequaert (RMCA). Pauly 1999: 155, 173, syn.

Thrinchostoma (Thrinchostoma) michaelis Cockerell: Michener, 1978: 524.

Thrinchostoma undulatum Cockerell, 1936: 7–8, ♂. Male holotype: D.R. Congo, Katanga, Tenke, 30.VII-9.VIII.1931, leg. Miss A. Mackie (AMNH). **Syn. nov.**

Thrinchostoma (Thrinchostoma) undulatum Cockerell: Pauly, 1999: 155, 177.

DIAGNOSIS. The male differs from all other *Thrinchostoma* in that the antennae have only 12 segments. The form of the last antennal segment in this species is more or less straight or flattened depending of the specimens. *T. telekii* falls within the variations of *T. emini*.

The female differs from other species by the scutum being completely covered with a dense beige tomentum.



a - male habitus

b - female habitus

Fig. 28. *Thrinchostoma emini* (Kenya: Kakamega Forest).

MATERIAL.

D.R. CONGO. Kalembelembe to Baraka, VII.1918, 1♀, leg. R. Mayné (RMCA) (allotype *T. emini*). – Katanga, Lubumbashi, 27.V.1920, leg. M. Bequaert (RMCA) (paratype *T. emini*). – P.N.G., II/fd/17, n°2468, 24.IX.1951, 1♂, leg. H. De Saeger (RMCA). – P.N.G. (= Parc National de la Garamba), Inimvua, 16.V.1952, 1♂, leg. H. De Saeger (RMCA). – P.N.U. (= Parc National de l'Upemba), Mbuye Bala, 1750m, 1-7.IV.1948, 1♂, leg. G.F. de Witte (RMCA). – P.N.U., Katongo, 1750m, I-IV.1948, 1♂, leg. G.F. de Witte (RMCA). – P.N.U., Kiamokoto – Kiwakishi, 1070m, 4-16.X.1948, 1♂, leg. G.F. de Witte (RMCA). – P.N.U., Lusinga, près Mukana, 1.VI.1945, 1♂, leg. G.F. de Witte (RMCA). – P.N.A., Tshamagussa, Bweza, 2250m, zone bambous, 10.VIII.1934, 2♂, leg. G.F. de Witte (RMCA). – P.N.A. (= Parc National des Virungas), Massif Ruwenzori, Kyandolire, Camp des gardes, 1700m, 7-15.X.1952, 1♂, leg. P. Vanschuytbroeck & J. Kekenbosch (RMCA). – P.N.A., Massif Ruwenzori, rivière Lume (moyenne), 1800m, 18.XII.1957, 1♂, leg. P. Vanschuytbroeck (RMCA). – Kivu, P.N.A., Kalondo, 6-9.VIII.1935, 1♂, leg. Dr. H. Damas (RMCA). – N. Kivu, Lacs Mokoto,



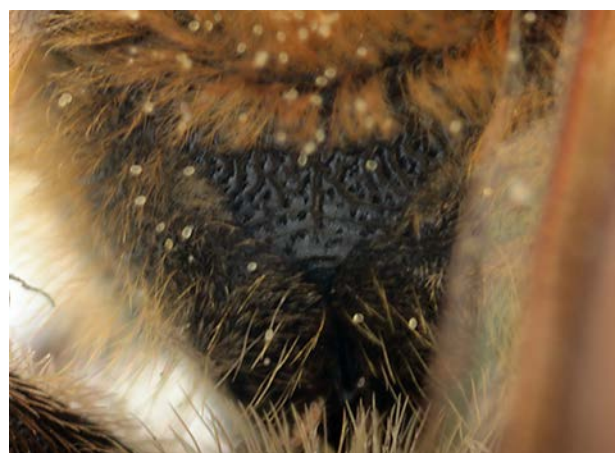
Fig. 29. *Thrinchostoma emini*, male (Kenya: Kakamega).



a - head



b - mesosoma



c - propodeum



d - first tergum



e - last terga

Fig. 30. *Thrinchostoma emini*, female (Kenya: Kakamega).

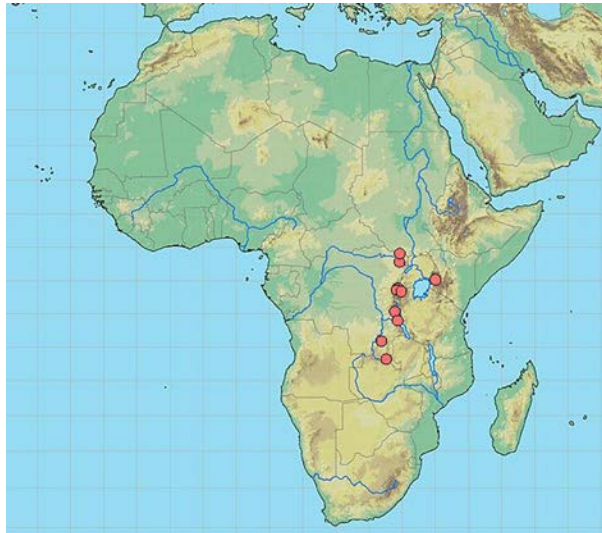


Fig. 31. Distribution map of *Thrinchostoma emini*.

30.VIII.1937, 1♂, leg. J. Ghesquière (RMCA). – Haut Uélé, Moto, X-XI.1923, 1♂, leg. L. Burgeon (RMCA).

RWANDA. Mt Bude, S. du Lac Luhondo, 2000m, 29.I.1958, 1♂, leg. P. Basilewsky (RMCA).

BURUNDI. Kibira, 4.XI.2010, flowers of “Umusogisogi”, 1♂, 1♀ (INECN). – Réserve Naturelle de Rumonge, 899m, 3.II.2011, Malaise trap dans champ haricots, 1♂, leg. Ndayikesa Longin (INECN).

KENYA. Kakamega District, Isecheno Forest Reserve, 0.24°N 34.86°E, 1600m, 1-10.VIII.2001, Malaise trap in Equatorial rainforest, leg. W. Okeka, 2♂; 1800m, 19.X.1999, 1♂, 1♀, 7.V.2001, 1♀, 10.V.2001, 1♂, 11.V.2001, 1♂, 12.V.2001, 1♀, leg. R.R. Snelling; 1-10.III.2002, Malaise trap, leg. R.R. Snelling, 1♂; 0.24°N 34.87°E, 1800m, 19-31.IV.2001, Malaise trap N°1 in clearing in degraded equatorial rainforest, 1♀, Malaise trap n°3 in degraded equatorial rainforest, closed canopy, 1♀, leg. R.R. Snelling, 1♀ (LACM). – Kakamega District, Kalunya Glade, Kakamega Forest, 0.25°N 34.86°E, 1550m, 18.IV.2003, leg. R.R. Snelling (LACM).

Thrinchostoma kandti Blüthgen, 1930 (Figs 32, 33, 34, 35, 36)

Thrinchostoma [!] (*Thrinchostoma* [!]) *kandti* Blüthgen, 1930: 499, 512–513, 525, 534, ♂ ♀. Male holotype: Uganda, Kampala, 29.VIII.1915, leg. C.C. Gowdey (BMNH).

Thrinchostoma [!] *kandti* Blüthgen: Blüthgen, 1933: 382–383, 385.

Thrinchostoma kandti Blüthgen: Cockerell, 1936: 8–9.

Thrinchostoma (*Thrinchostoma*) *kandti* Blüthgen: Michener, 1978: 524; Pauly, 1999: 155, 174.

Thrinchostoma (*Eothrinchostoma*) *kandti* Blüthgen: Danforth *et al.*, 2008: 95.

DIAGNOSIS. The male of this species is well characterized by the apical lobe of hind tibiae being distinctly shorter than that of the other species. The last antennal segment is bent. The apical margin of S5 is glabrous and slightly curved in the middle. The metasoma is black with grey setae. Some black specimens of *T. petersi* (var *wissmanni*) may be confused with *T. kandti* but they differs by the shape of the apical lobe of the tibiae and the S5 (fig. 9).

The female is always black with grey pubescence (fig. 34). It is difficult to separate it from *T. productum*.

VARIATION. The male metabasitarsi are black apically and pale yellow basally (type *T. kandti* and most specimens) or totally black (Kikombo).



a - lateral habitus



c - head



b - antenna



d - scutum



e - hind leg



f - propodeum



g - metasoma

Fig. 32. *Thrinchostoma kandti*, male holotype in BMNH.



a - head



b - antenna



c - last sternite



d - hind leg



e - mesosoma



f - metasoma

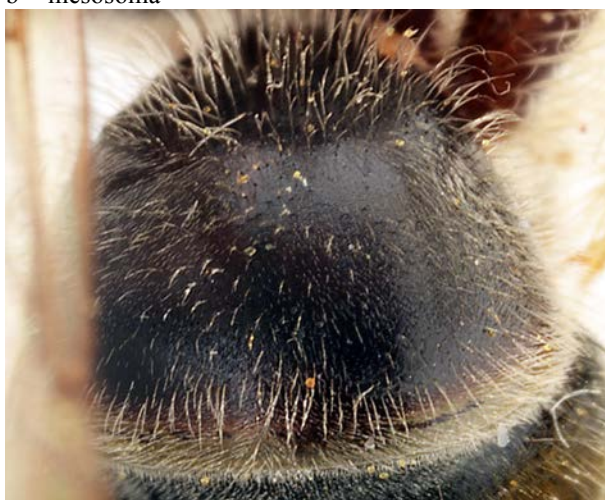
Fig. 33. *Thrinchostoma kandti*, males from Kenya, Kakamega) (a) and Cameroon, Fundong) (b, c, d, e, f).



a - head



b - mesosoma



d - first tergum



c - propodeum



e - last terga

Fig. 34. *Thrinchostoma kandti*, female (Kenya: Kakamega) found with male.

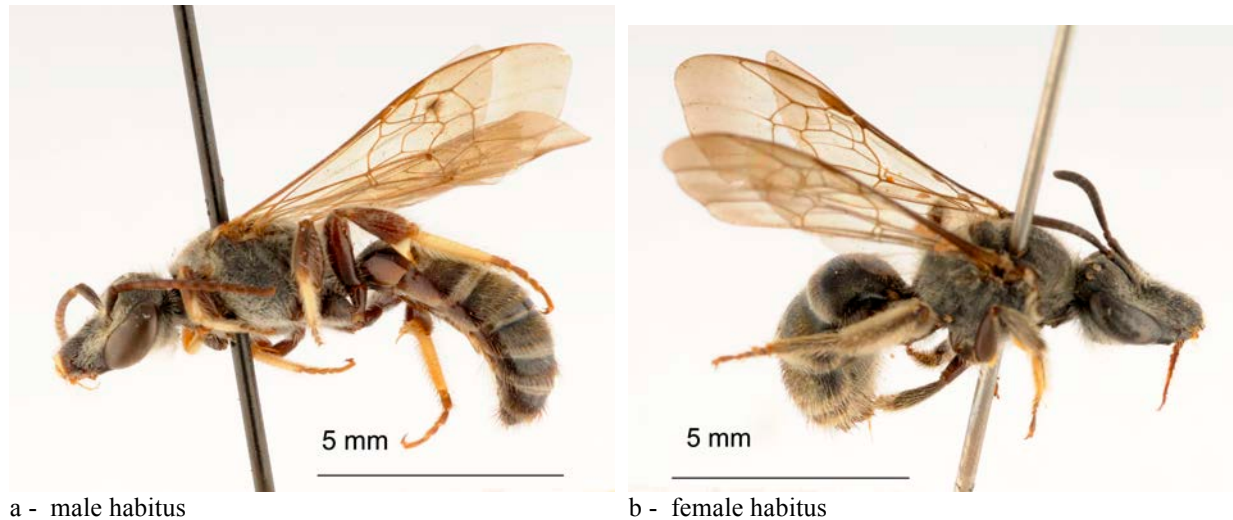


Fig. 35. *Thrinchostoma kandti*, male (Kabinda) and female (Kakamega).

MATERIAL.

CAMEROON. Fundong, 6°18'N 10°18'E, 21.VII.1987, *Stachytarpheta angustifolia*, 1♂, leg. A. Pauly (RBINS).

UGANDA. Kampala, 4.XII.1918-12.I.1919, 1♂ (BMNH). – Entebbe, 15.III.1913, 1♀ (allotype) (BMNH).

D.R. CONGO. Kalembelembe – Baraka, VII.1918, 1♀, leg. R. Mayné (RMCA) (paratype). – Kivu, N'Gwese, leg. Carlier (col. P. Blüthgen, MNHUB). – Equateur, Bokuma, II.1952, 1♂, leg. R.P. Lootens (RMCA). – Eala, I.1935, 1♂, leg. J. Ghesquière (RMCA). – Eala, IV.1933, 1♂, leg. A. Corbisier (RMCA). – Haut Uélé, Mauda, III.1925, 1♂, leg. H. Schouteden (RMCA). – Kalembelembe, Baraka, VII.1918, 1♂, leg. R. Mayné (RMCA). – Basoko, II.1948, 1♂, I.1949, 1♂, leg. P.L.G. Benoit (RMCA). – P.N.G. (Parc National de la Garamba), II/g/10, 25.I.1951, 2♂, Mission. H. De Saeger, leg. J. Verschuren n°1157 (RMCA). – P.N.G., PpK 8/d/8, 8.II.1952, 1♂, leg. H. De Saeger n°3101 (RMCA). – P.N.G., PpK/60/d/8, 18.XII.1951, 1♂, H. De Saeger n° 2924 (RMCA). – P.N.U. (Parc National de l'Upemba), Mabwe, Lac Upemba, 585m, 4.IX.1947, 1♂ (RMCA). – P.N.A. (Parc National des Virungas), Kikombo, 5.X.1935, 1♂, leg. Dr. H. Damas (RMCA). – P.N.A., Massif Ruwenzori, riv. Lume (moyenne), 1800m, 13.XII.1957, 1♂, leg. P. Vanschuytbroeck (RMCA). – « Belgian Congo », Kabinda, 6°08'S 24°21'E, 2♀, at flowers of *Vernonia* N°50, 1♂, leg. J. Bequaert (MCZ). – Kisantu, 17.III.2009, *Cuphea hyssopifolia*, 1♂, leg. N.J. Vereecken (ULB).

RWANDA. Mt Bude, S. du Lac Luhondo, 2000m, 29.I.1953, 2♂, leg. P. Basilewsky (RMCA).

KENYA. Kakamega district, Kalunya Glade, Isecheno Nature Reserve, 0°24'N 34°87'E, 1800m, 6.V.2001, 1♂, 23.IV.2001, *Aspilia pluriseta*, 1♀, 0.25°N 34.86°E, 29.III.2003, 1550m, 1♀, leg. R.R. Snelling (LACM).

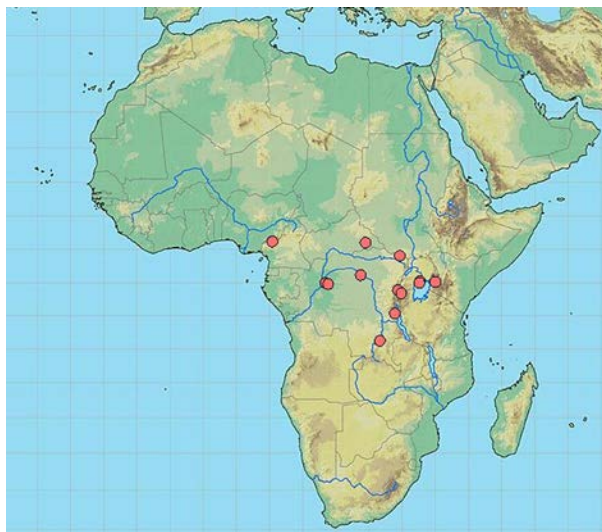


Fig. 36. Distribution map of *Thrinchostoma kandti*.

***Thrinchostoma nachtigali* Blüthgen, 1930**

(Figs 37, 38, 39, 40)

Thrinchostoma [!] (*Thrinchostoma* [!]) *nachtigali* Blüthgen, 1930: 528, 535, 538, ♀. Female holotype: Cameroon « Neu-Kamerun », leg. Tessmann (MNHUB).

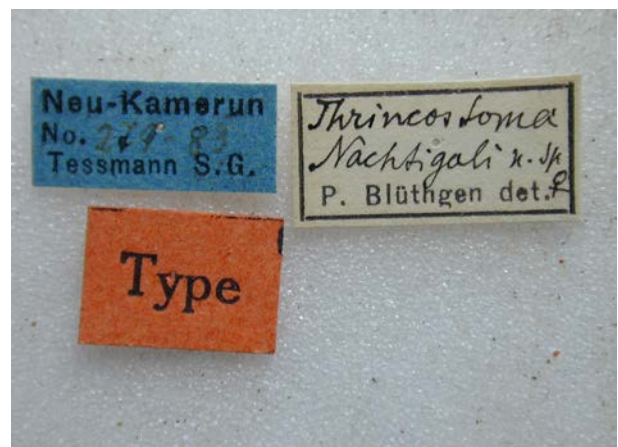
Thrinchostoma (*Thrinchostoma*) *nachtigali* Blüthgen: Michener, 1978: 524; Pauly, 1999: 155, 174.

DIAGNOSIS. In the male the last segments of the antennae are bent. The hind femora are thick, varying from orange to brown in the same locality. The hind tibiae are broad, the calcaria are well developed and in colour they are always testaceous to orange (fig. 38d,e).

In the female the metasoma is partly orange. The basal halves of the scape are orange and the edge of the scutum has beige tomentum.



a - female holotype



b - holotype labels



c - male dorsal habitus



d - male lateral habitus

Fig. 37. *Thrinchostoma nachtigali*, female holotype in MNHUB and male specimen (Cameroon, Nkolbisson).

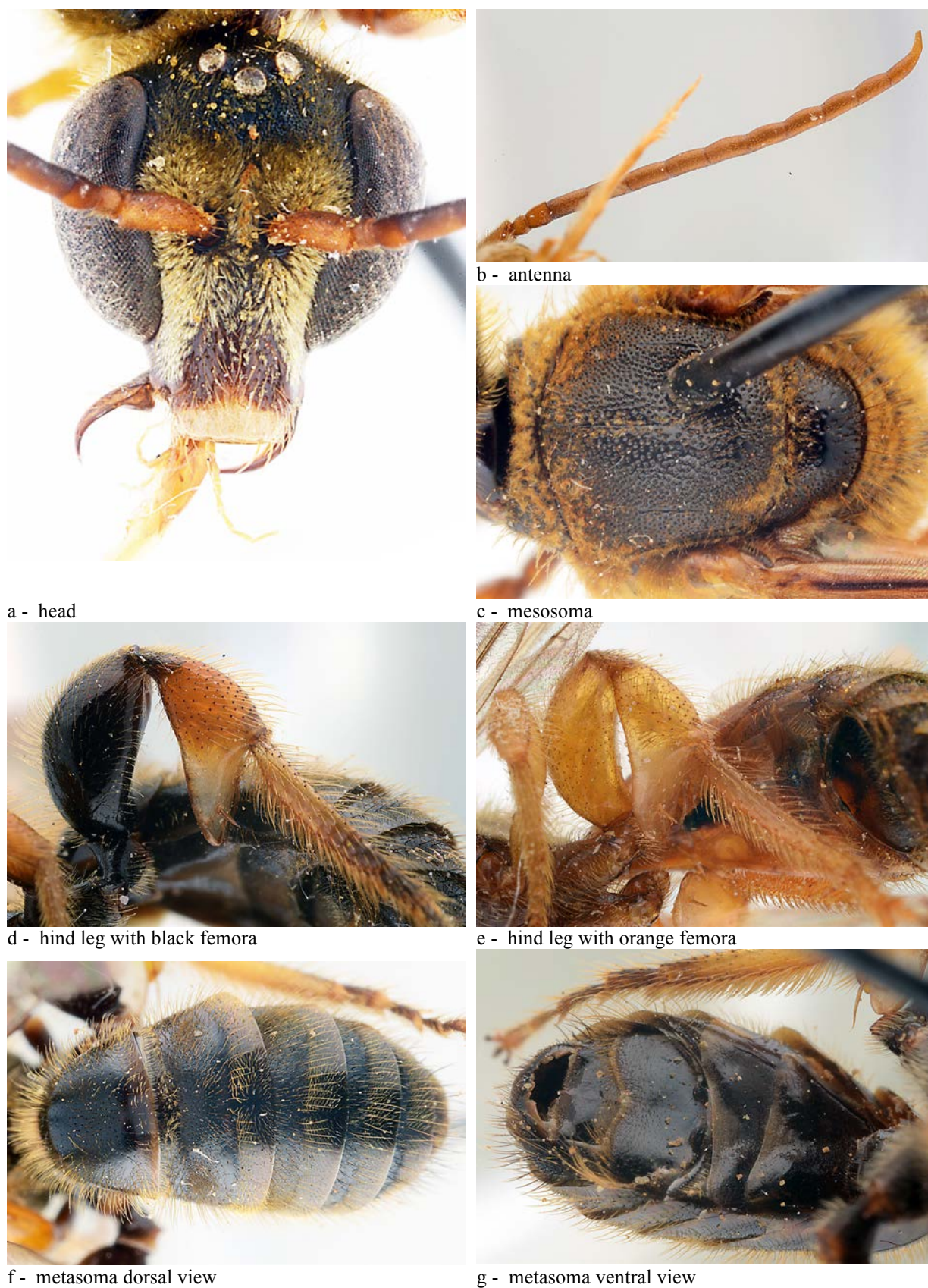


Fig. 38. *Thrinchostoma nachtigali*, males (D.R. Congo, Kinshasa).

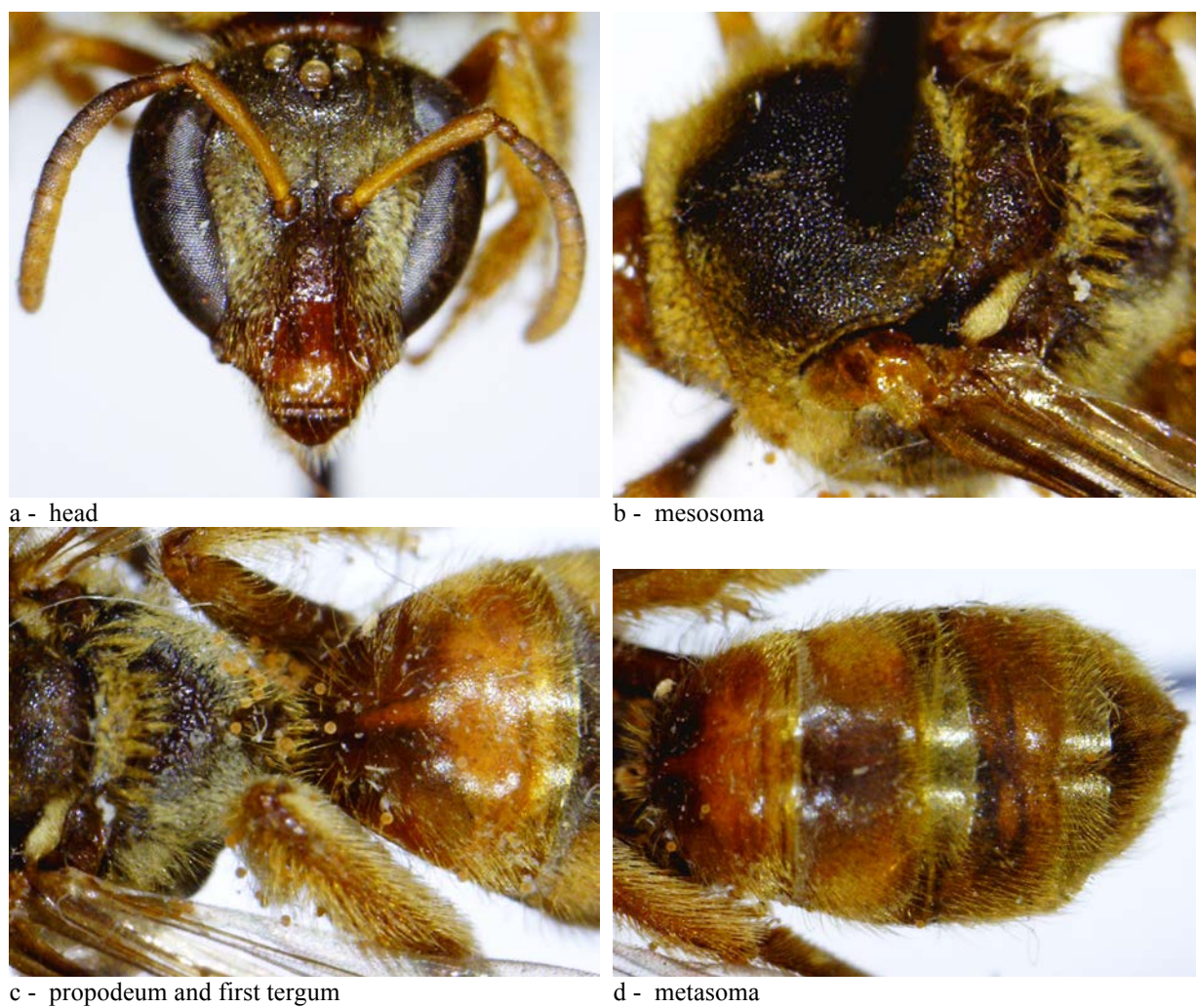


Fig. 39. *Thrinchostoma nachtigali*, female holotype in MNHUB.

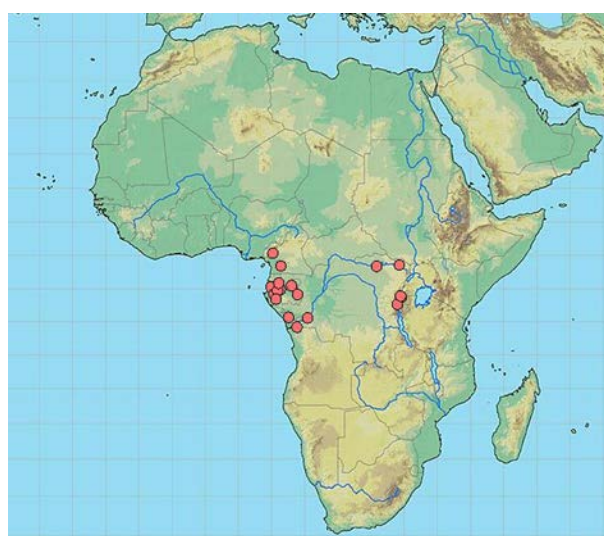


Fig. 40. Distribution map of *Thrinchostoma nachtigali*.

MATERIAL:

CAMEROON. Nkolbisson, 4.XI.1970, 1♀, 31.X.1970, 1♂, leg. L. Matile (MNHNP). – Région de Dchang, plateau volcanique, 1400m, VI-IX.1924, 1♂, leg. Dr. Gromier (MNHNP).

GABON. Makokou, XI.1973, 1♂, Mission Balachowsky – Menier (MNHNP). ESTUAIRE. Ntoun, 12.II.1984, 7h30, *Asystasia gangetica*, 1♀, 9.III.1984, 9h, *Cassia obtusifolia*, 1♀, X.1984, bord étang ombragé, PM, 1♀, XI.1984, lisière pâturage, PM, 1♀, 11.V.1985, *Calopogonium mucunoides*, 1♀. HAUT-OGOOUE. Atanga, 31.I.1987, *Harungana madagascariensis*, 1♀. – MOYEN-OGOOUE. Lambaréné 9 km S., 29.XII.1985, *Borreria* 188, 1♀. – Ndjolé, 17.XI.1985, *Mimosa pudica*, 1♀. – 38 km W. Ayem, 25.XII.1985, lisière forêt, *Sauvagesia erecta*, 1♀. – NGOUNIE. Bembodié, 30.XII.1985, forêt primaire, *Floscopa* 192, 1♀, *Borreria* 188, 1♂. WOLEU-NTEM. Abangayo, 19.III.1987, *Dissotis multiflora*, 1♀ (all leg and col. A. Pauly ; Pauly 1998).

CONGO-BRAZZAVILLE. Mayumbe, Dimonika, I.1964, 1♂, Mission A. Descarpentries & A. Villers (MNHNP).

D.R. CONGO. – Kinshasa, « UniKin », 15.III.2010, 2♂, 21.III.2010, 1♂, 30.III.2010, 1♂, leg. Lokoko (University of Kinshasa and RBINS). – Kisantu, 17.III.2009, *Turnera subulata*, 1♀, leg. N.J. Vereecken (ULB). – Congo da Lemba, III.1913, 1♂, leg. R. Mayné (RMCA). – Bambesa, 15.X.1933, 1♂, leg. H.J. Bredo (RMCA). – Uélé, Gangala, rivière Uéré, 1959, 2♂, leg. Dr. A.B. Stam (RMCA). – P.N.A. (= Parc National des Virungas), Rivière Ondo, affluent Rutshuru, 30.VII.1935, 1♂, leg. Dr. H. Damas (RMCA). – Kivu, Katana, 1933, 1♂, leg. Dr. De Wulf (RMCA). – Kivu, Rutshuru, rivière Fuku, 1250m, 5.VII.1935, 1♂, leg. G.F. de Witte (RMCA).

Thrinchostoma orchidarum Cockerell, 1908 (Figs 41, 42)

Thrinchostoma orchidarum Cockerell, 1908c: 343, ♂. Male holotype: Angola, Benguella, I.1908 (BMNH). Cockerell, 1910: 506; Cockerell, 1933: 25; Cockerell, 1936: 8.

Thrinchostoma [!] (*Thrinchostoma* [!]) *orchidarum* Cockerell: Blüthgen, 1930: 496–497, 499, 504, 536.

Thrinchostoma (*Thrinchostoma*) *orchidarum* Cockerell: Michener, 1978: 521, 254; Pauly, 1999: 155, 17.

DIAGNOSIS. The male of this species is very distinct. The antennae have 13 segments, and the last segment is not bent. The hind tibiae are very broad and covered with a dense grey tomentum (fig. 42e). Sternite 5 has a dense apical fringe of setae (fig. 42f).

Female: unknown.

MATERIAL. MALAWI. 100km S. Kasungu, 29.XI.2001, 1♂, leg. J. Halada (OOL).

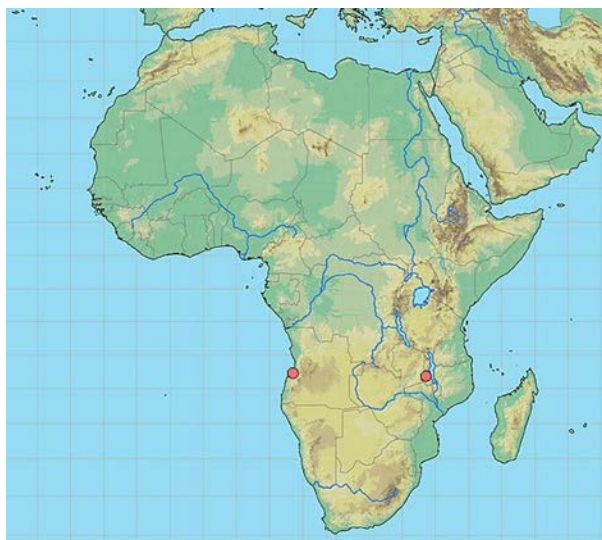


Fig. 41. Distribution map of *Thrinchostoma orchidarum*.

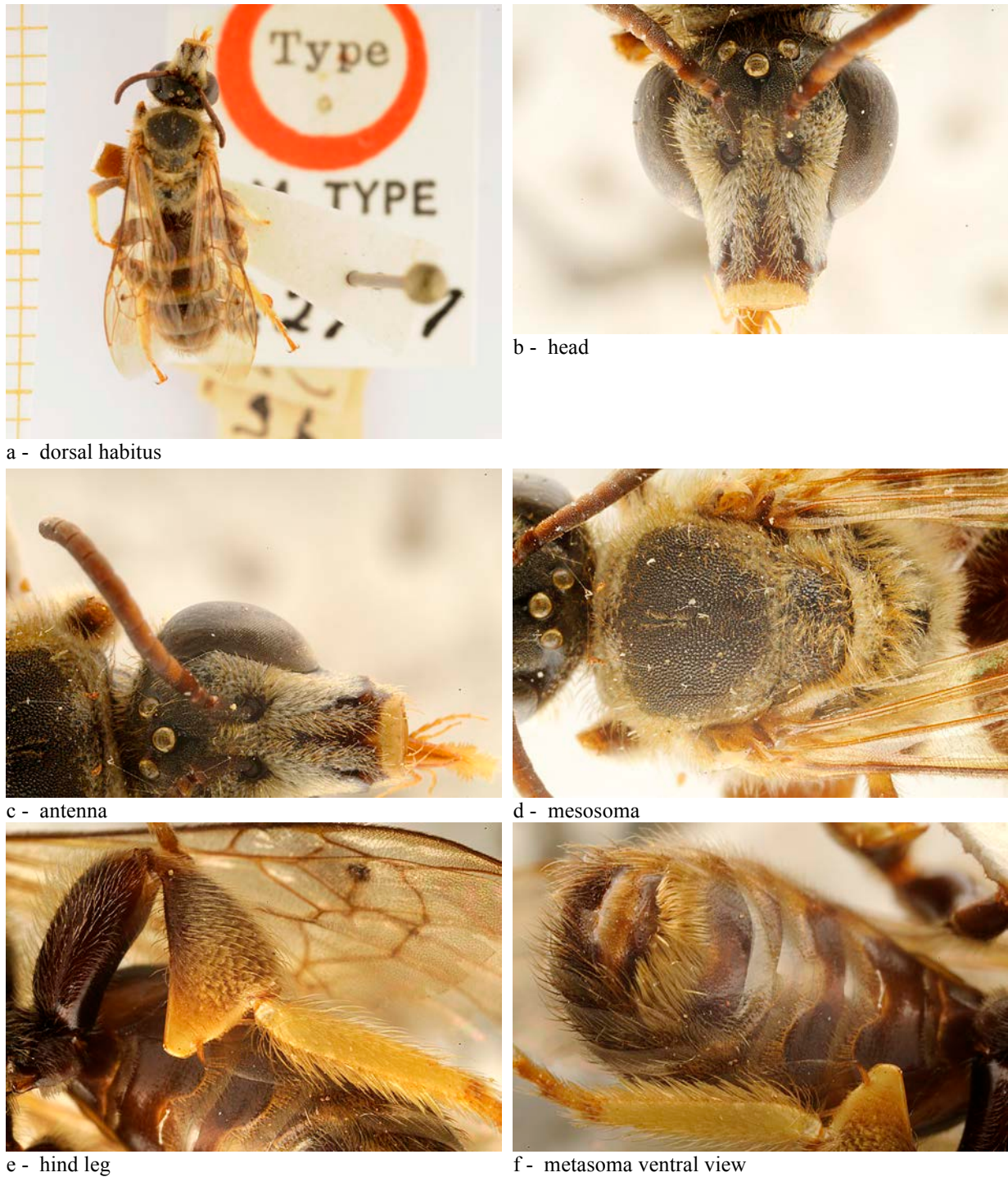


Fig. 42. *Thrinchostoma orchidarum*, male holotype in BMNH.

***Thrinchostoma othonnae* Cockerell, 1908**
(Figs 43, 44)

Thrinchostoma othonnae [!] Cockerell, 1908a: 343–344, ♀. Female holotype: Angola, Benguella hinterland, on *Othonna* sp., leg. Wellmann (BMNH).

Thrinchostoma othonnae Cockerell: Cockerell 1910: 506.

Thrinchostoma [!]/(*Thrinchostoma* [!]) *othonnae* Cockerell: Blüthgen 1930: 496, 499, 540–541.

Thrinchostoma (Thrinchostoma) othonnae Cockerell: Michener 1978: 524; Pauly 1999: 155, 175.



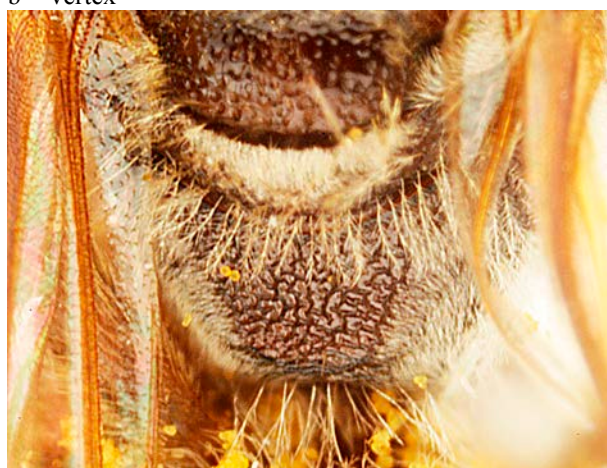
a - head



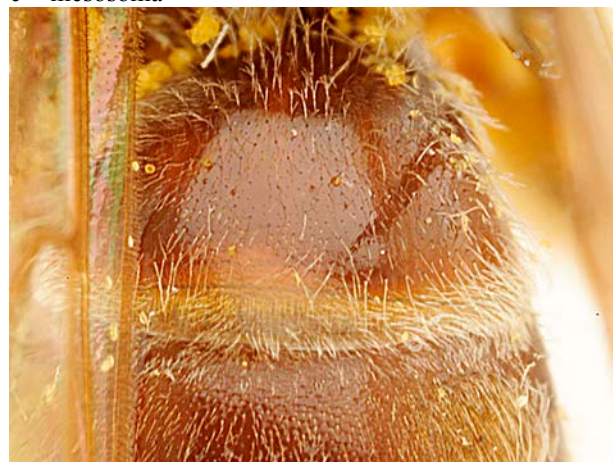
b - vertex



c - mesosoma



d - propodeum



e - first tergum



f - metasoma

Fig. 43. *Thrinchostoma othonnae*, female holotype in BMNH.

DIAGNOSIS. The type is a small female (body length 7.5 mm) similar to *T. productum* but with the vertex is more shiny and less punctuated, T1 less chagrined and with more widely spaced punctuation.

Male: unknown.

MATERIAL. SOUTH AFRICA. Kosi Bay, 26°58'S 32°48'E, 10-11.II.1990, 3♀, leg. C.D. Eardley (SANC).

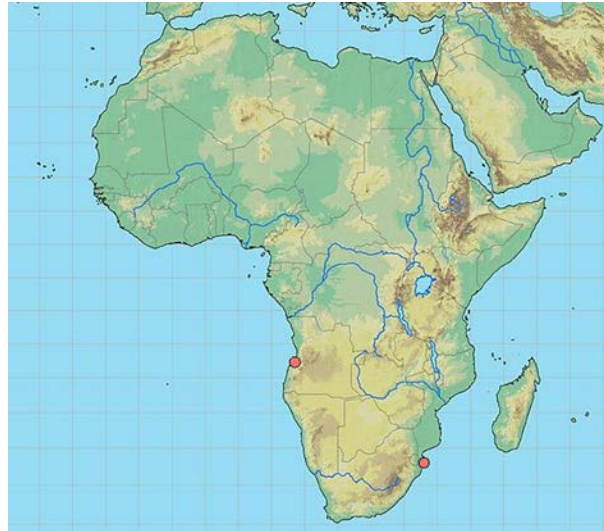


Fig. 44. Distribution map of *Thrinchostoma othonnae*.

***Thrinchostoma petersi* Blüthgen 1930**
(Figs 45, 46, 47, 48, 49)

Thrinchostoma [!] (*Thrinchostoma* [!]) *petersi* Blüthgen, 1930: 499, 515–516, 535, ♂. Male holotype: Uganda: Kampala, 20.VI.1926, leg. Hancock (BMNH).

Thrinchostoma petersi Blüthgen: Cockerell, 1936: 9.

Thrinchostoma (*Thrinchostoma*) *petersi* Blüthgen: Michener, 1978: 524; Pauly, 1999: 155, 175.

Thrinchostoma [!] (*Thrinchostoma* [!]) *wissmanni* Blüthgen, 1930: 499, 511–512, 534, ♂. Male lectotype: D.R. Congo, Congo da Lemba, III.1913, leg. R. Mayné (RMCA).

Thrinchostoma (*Thrinchostoma*) *wissmanni* Blüthgen: Michener, 1978: 525; Pauly, 1999: 155, 177. **Syn. nov.**

Thrinchostoma rubrocinctum Benoist, 1957: 879–880, ♂. Male holotype: Senegal, Bignona, V.1946 (MNHNP). **Syn. nov.**

Thrinchostoma (*Thrinchostoma*) *rubrocinctum* Benoist: Pauly, 1999: 155, 176.

REMARKS

T. petersi: in the original description Blüthgen reported that the antennae of the holotype are broken. He supposes that this species is close to *T. productum* (= *T. bequaerti*), but our examination of the type shows that this species actually corresponds to that which Benoist later described as *T. rubrocinctum*! Indeed, in the holotype of *T. petersi* the first two tergites are red and S5 is hairless and the same shape as in *T. rubrocinctum*.



a - dorsal habitus male (holotype *T. petersi*)



b - dorsal habitus male (holotype *T. rubrocinctum*)



c - lateral habitus male from Burkina-Faso



d - dorsal habitus female from Burkina-Faso



e - antenna



f - wings

Fig. 45. *Thrinchostoma petersi*, male holotype *T. petersi* in BMNH (a), male holotype of *T. rubrocinctum* in MNHNP (syn of *T. petersi*) (a, e, f), specimens male (c) and female (d) (Burkina-Faso).



Fig. 46. *Thrinchostoma petersi*, male holotype in BMNH.

T. wissmanni: it is superficially similar to *T. kandti* in colour but structurally is more similar to *T. petersi*. The apical lobe of the hind tibiae are longer and the S5 is more deeply curved. It seems that the type represents only a colour variety of *T. petersi*. As *T. petersi* and *T. wissmanni* are described in the same paper (Blüthgen, 1930), we have followed article 24 (a) of the International Code of Zoological Nomenclature (« If more than one name for a single taxon are published simultaneously, their relative priority is determined by the action of the first reviser ») and we consider *T. wissmanni* to be a synonym of *T. petersi*.



Fig. 47. *Thrinchostoma petersi*, female (Burkina-Faso).

Most *T. petersi* specimens have the metasoma red, while in the type of *T. wissmanni* it is black-brown.

DIAGNOSIS. In the male the last segments of the antennae are bent at right angles. The apical margin of S5 is glabrous. The apical lobes of the hind tibiae are longer than in *T. kandti*. The first two tergites are usually red, rarely black (var *wissmanni*). Males with black metasomae can only be separated from *T. kandti* by the longer apical lobe of the hind tibiae and the S5 that is more strongly curved.

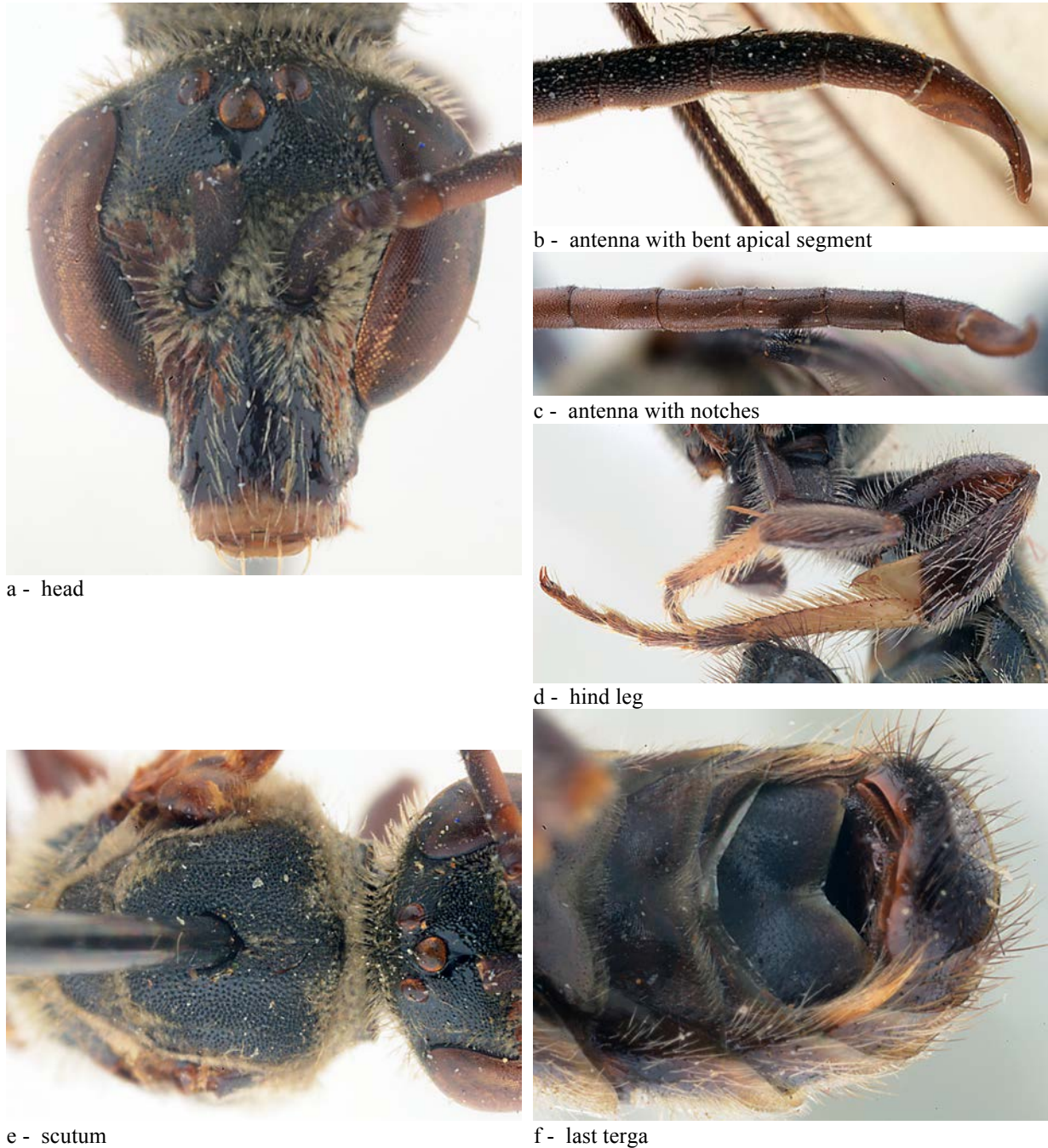


Fig. 48. *Thrinchostoma wissmanni*, male holotype in RMCA (syn of *T. petersi*).

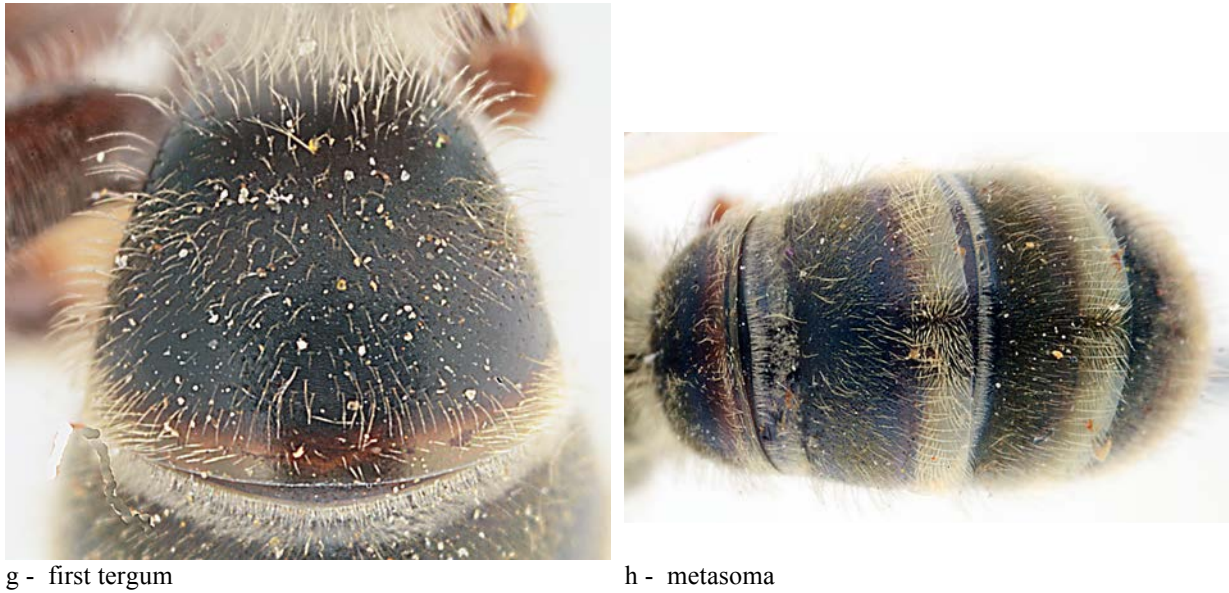


Fig. 48 (continued). *Thrinchostoma wissmanni*, male holotype in RMCA (syn of *T. petersi*).

The female is often confused with that of *T. torridum* but it can be easily distinguished by the subgeneric character in which the hind calcaria are characterized by strong laminated teeth in the center. In West and Central Africa the female can be separated from other species, like *T. productum*, by its partly red metasoma. From other species with orange metasomae, like *T. nachtigali*, it can be separated by the black scape and less punctured T1.

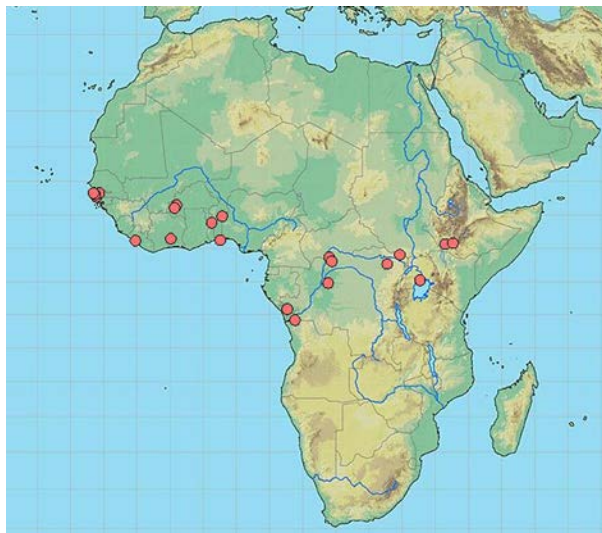


Fig. 49. Distribution map of *Thrinchostoma petersi*.

MATERIAL.

GAMBIA. 2 km S. Kitty, 7 km SW Brikama Road Junction, at fresh water stream, UTM 28PCK17-61, 27.II.1977, 1♂ (ZML). – At road junction to Situ Sinjang, about 2 km SE Kafuta, loc. N°11, UTM 28PCK41-57, 1.III.1977, 1♂ (ZML). – Outside Abuko Nat. rés., at water works, swept in vegetation at lamin stream, UTM 28PCK215812, loc. 6, 18.XI.1977, 1♂ (ZML).

LIBERIA. Harbel, leg. J. Bequaert, 1♀ (MCZ).

BURKINA FASO. Sources du Kou, 13.X.1979, fl.71 = *Asystasia gangetica*, 1♀, leg. A. Pauly (RBINS). –

Rivière Lahissa, S. Koundougou, 5.X.1979, *Aspilia helianthoides*, 1♂, leg. A. Pauly (RBINS).

IVORY COAST. Grand Béréby, 18.XII.1979, piège Malaise, 2♀, leg. A. Pauly (RBINS). – Lamto, Toumodi, 6°34'N 5°01'W, n°RR02 Fr, 1♀ (MNHNP).

TOGO. Sokodé, XII.1982, piège Malaise, 2♀, leg. A. Pauly (RBINS).

BENIN. Togbin, littoral, V.2005, 1♀, leg. G. Goergen (IITA). – Ina, 17.VIII.2001, 1♀, leg. L. Hautier (FSAG).

CONGO-BRAZZAVILLE. Niari, village Passi-Passi, 4.III.2007, n°39 = *Gossypium* sp., 2♂, leg. N. Boukaka, Darwin Project (RU) (black form *wissmanni*).

D.R. CONGO. Congo da Lemba, III.1913, 1♂ (paralectotype *T. wissmanni*), leg. R. Mayné (RMCA). – P.N.G. (= Parc National de la Garamba), II/cc/9, n°2446, 17.IX.1951, 1♂, leg. H. De Saeger (RMCA). – Lokandu, capt. Marée, I.1939, 1♂ (RMCA). – Equateur, Bokuma, 1953, 1♂, leg. R.P. Lootens (RMCA). – Haut-Zaire, Isiro, VIII.1978, piège Malaise, 1♂, leg. A. Pauly (RBINS). – Equateur: Boketa, piège Malaise, 3.IX.1983, 1♀, 6.IX.1983, 1♀, 13.IX.1983, 1♂, leg. Liongo (FSAG). – Bwamanda, 8.IX.1983, 1♀, leg. Liongo (FSAG).

ETHIOPIA. SOUTHERN. Lake Chamo, 5°55'N 37°32'E, 1138m, 21.IX.2012, 1♂, 1♀, leg. J.-L. Boevé & A. Pauly (RBINS). – Near Mago National Park, 5°45'N 36°22'E, 491m, 23.IX.2012, 1♀, leg. A. Pauly (RBINS).

Thrinchostoma productum (Smith 1853)

(Figs 50, 51, 52, 53, 54, 55)

Halictus productus Smith, 1853: 55, ♂ [!]. Female holotype: Sierra Leone (BMNH). Schulz, 1906: 239; Friese, 1909b: 128; Friese, 1909a: 125; Cockerell, 1937: 96.

Halictus (Thrinchostoma) [!] *productus* Smith: Vachal, 1903: 393; Friese, 1909a: 128, 151–152.

Thrinchostoma productum (Smith): Cockerell, 1908c: 343–344.

Thrinchostoma productus (Smith): Strand, 1912: 271.

Thrinchostoma [!] *productum* (Smith): Blüthgen, 1928: 164; Blüthgen, 1930: 496–497, 499, 537–539, 542.

Thrinchostoma (Thrinchostoma) productum (Smith): Medler, 1980: 481; Michener, 1978: 524; Pauly, 1999: 155, 175.

Halictus (Thrinchostoma) bibundicus Strand, 1910: 43–44, ♂. Male holotype: Cameroun, Bibundi, leg. J. Weiler (Mus. Wiesbaden). Strand, 1927: 62. **Syn. nov.**

Thrinchostoma (Thrinchostoma) [!] *bibundicus* (Strand): Blüthgen, 1930: 496–497, 499, 511–512, 514, 518, 534.

Thrinchostoma (Thrinchostoma) bibundicum (Strand): Michener, 1978: 524; Pauly, 1999: 155, 172.

Thrinchostoma tessmanni Strand, 1912: 271–272, ♂. Male lectotype: Equatorial Guinea « Spanish Guinea », Benitogebiet, Uelleburg, 1-14.II.1907, leg. Tessmann (MNHUB). Strand, 1927: 114. **Syn. nov.**

Thrinchostoma [!] (*Thrinchostoma* [!]) *tessmanni* Strand: Blüthgen, 1930: 496–497.

Thrinchostoma [!] *bibundicum* var. *tessmanni* (Strand): Blüthgen, 1930: 517–518, 535.

Thrinchostoma (Thrinchostoma) bibundicum tessmanni (Strand): Michener, 1978: 524; Pauly, 1999: 155, 176.

Thrinchostoma [!] (*Thrinchostoma* [!]) *grisescens* Blüthgen, 1930: 529, 536, ♀. Female holotype: Cameroun, Bosum, « Hinterland von Kamerun am Uamfluss », 5.V.1914, leg. Tessmann (MNHUB). Blüthgen, 1930: 542, syn.

Thrinchostoma grisescens Blüthgen: Pauly, 1999: 155, 173.



a - female holotype *T. productum*



b - female holotype *T. vachali*



c - female holotype *T. vachali*



d - male

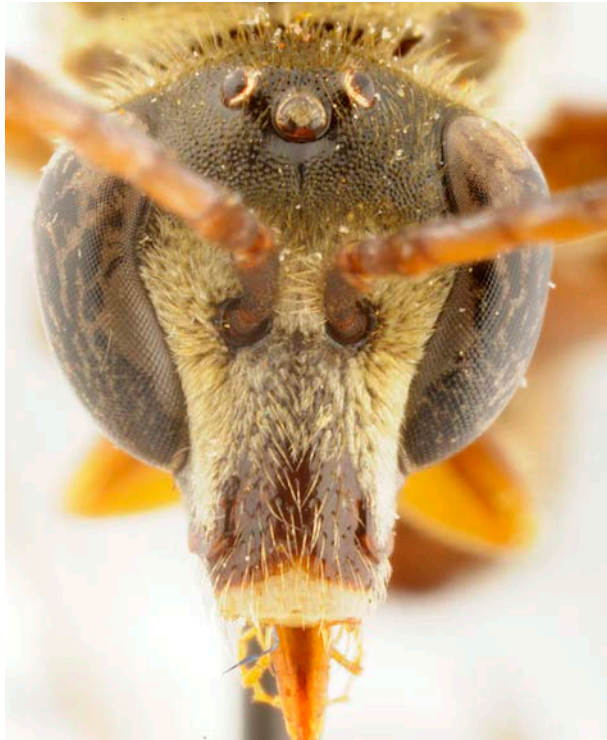


e - male antenna



f - last segments of antenna

Fig. 50. *Thrinchostoma productum*, female holotype in BMNH (Sierra Leone) (a), female lectotype of *T. vachali* in MNHNP (Gabon) (syn. of *T. productum*) (b, c) and male specimen collected in copula (Gabon, Ntoum) (d, e, f).



a - head



b - scutum



c - propodeum



d - last sterna

Fig. 51. *Thrinchostoma productum*, male (Gabon, Ntoum).



e - hind leg



f - metasoma

Fig. 51 (continued). *Thrinchostoma productum*, male (Gabon, Ntoum).

Thrinchostoma [!] (*Thrinchostoma* [!]) *bequaerti* Blüthgen, 1930: 499, 518, 535, ♂. Male holotype: Liberia, Du River, Camp n03, 27.VII.1926, leg. Bequaert (RMCA). **Syn. nov.**

Thrinchostoma (*Thrinchostoma*) *bequaerti* Blüthgen: Michener, 1978: 524; Pauly, 1999: 155, 172.

Thrinchostoma [!] (*Thrinchostoma* [!]) *bequaerti* var. *ochropus* Blüthgen, 1930: 518, 535, ♂. Male holotype: Liberia, Monrovia, 17.VII.1926, leg. M. Bequaert (RMCA). **Syn. nov.**

Thrinchostoma (*Thrinchostoma*) *bequaerti* var. *ochropus* Blüthgen: Michener, 1978: 524.

Thrinchostoma ochropus Blüthgen: Pauly, 1999: 155, 175 (syn. of *T. bequaerti*).

Thrinchostoma [!] (*Thrinchostoma* [!]) *vachali* Blüthgen, 1930: 497, 539, ♀. Female lectotype: Gabon, Entre Sam Quito et Ndjolé, 1900, leg. J. Bouyssou (MNHNP). **Syn. nov.**

Thrinchostoma (*Thrinchostoma*) *vachali* Blüthgen: Michener, 1978: 524–525.

Thrinchostoma vachali Blüthgen: Pauly, 1998: 45; Pauly, 1999: 155, 177 (syn. of *T. bequaerti*).

Thrinchostoma lualiensis Cockerell, 1939: 242, ♂. Male holotype D.R. Congo, Luali, 26.VIII.1913, leg. Dr. Bequaert (RMCA). **Syn. nov.**

Thrinchostoma (*Thrinchostoma*) *lualiensis* Cockerell: Michener, 1978: 524; Pauly, 1999: 155, 174 (syn. of *T. bequaerti*).

REMARKS.

The *T. bibundicum* type has not been examined, but the colour of the legs is quite variable among males of *Thrinchostoma*, therefore varieties with dark or orange legs are considered to be conspecific.

Blüthgen separates *T. tessmanni* according to notches on the antennae. According to a photograph of the holotype taken at MNHUB, there seems to be an artifact. The notches begin on segment 8 and not 6, as stated by Blüthgen (1930).



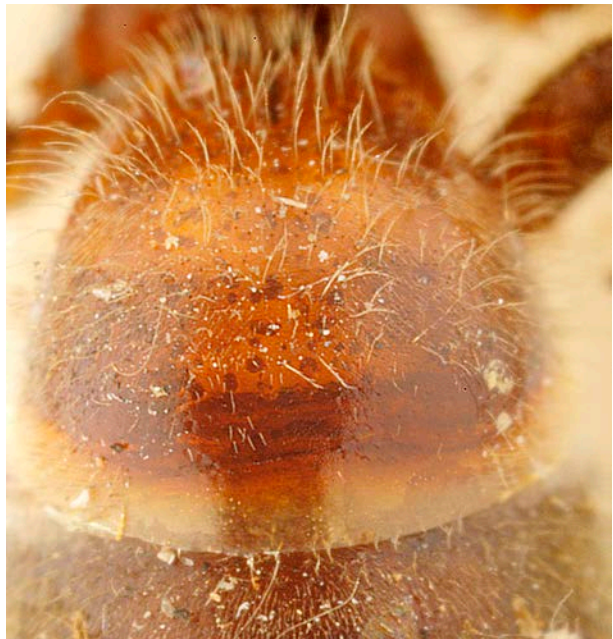
a - head



b - scutum



c - propodeum



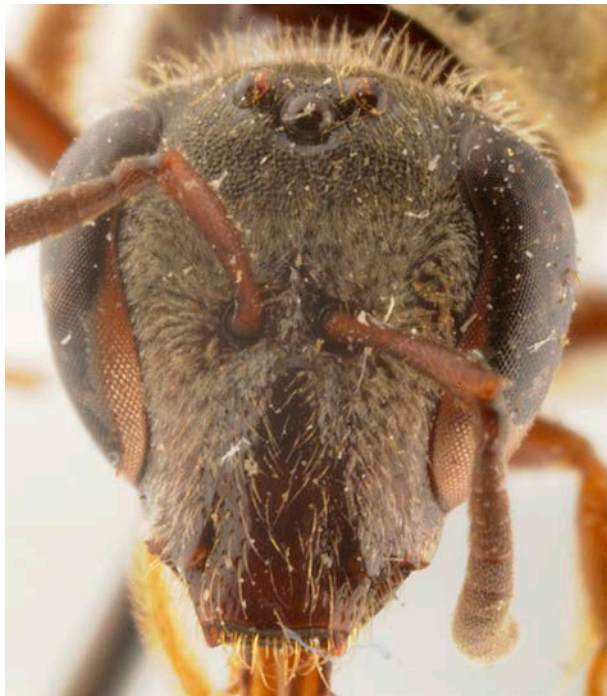
d - first tergum

Fig. 52. *Thrinchostoma productum*, female holotype in BMNH.



e - last terga with setae in lateral view

Fig. 52 (continued). *Thrinchostoma productum*, female holotype in BMNH.



a - head



b - scutum

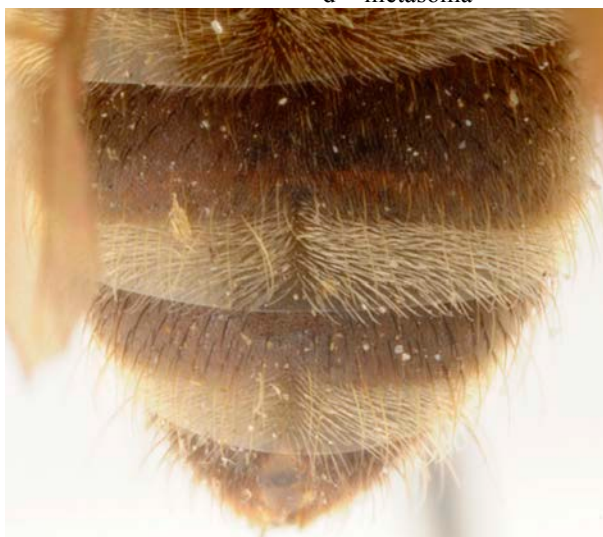
Fig. 53. *Thrinchostoma vachali*, female lectotype in MNHNP (= *T. productum*).



c - propodeum



d - metasoma



e - last terga

Fig. 53 (continued). *Thrinchostoma vachali*, female lectotype in MNHNP (= *T. productum*).

DIAGNOSIS. The male of *T. productum* is grey black, with the last segments of the antennae not bent, the apical margin of sternite 5 glabrous and the antennae with notches on segments 8 to 12.

The female is grey black. The abdomen is without red spots but sometimes suffused with brown. The scape of the antennae are entirely dark brown. The last terga has a mixture of clear and black setae. Tergite 1 is finely striated with scarce punctures ($i = 3d$). It differs from *T. petersi* and *T. nachtigali* by being completely grey. No good characters have been found to separate it from the grey *T. kandti*.

MATERIAL.

LIBERIA. Du River, Camp n03, 27.VII.1926, 1♂, leg. Bequaert (RMCA) (paratype *T. bequaerti*). – Memehtown, 29.VIII.1926, 1♂, leg. Bequaert (paratype *T. bequaerti*). – Harbel, Du River, leg. J. Bequaert (MCZ).

BENIN. Pénéssoulou, forest area, I.2004, 1♀, leg. G. Goergen (IITA). Forêt de Kpinkonzoun, Akpadanou, 6°46N 2°27'E, 28.II.2007, piège Malaise en lisière, 1♂, projet GTI (RBINS).



Fig. 54. Lateral habitus of *Thrinchostoma bequaerti* var. *ochropus*, male holotype in RMCA (= *T. productum*).

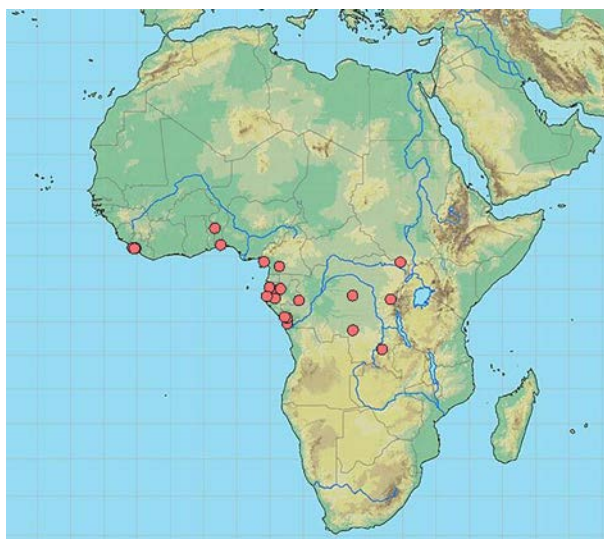


Fig. 55. Distribution map of *Thrinchostoma productum*.

CAMEROON. N'Kolbisson, 26.IV.1982, 1♀, leg. J. Carayon (MNHNP). – Nkolbisson, 20.V.2006, 1♂, sur *Cucumeropsis mannii*, 1♂, leg. Azdo Ela (RBINS).

EQUATORIAL GUINEA. Benitogebiet, Uelleburg, 16-31.VIII.1906, 1♂ (paralectotype *T. tessmanni*) leg. Tessmann (MNHUB). – Bata, 25.IX.1897, 1♀, leg. J. Bouysson (MNHNP) (Vachal 1903). – Nkogo, 1901, 1♀, leg. J. Bouysson (MNHNP) (Vachal 1903).

GABON. ESTUAIRE. Ntoun, VIII.1984, bord étang ombragé, PM, 2♀, IX.1984, verger, PM, 1♂, 14.X.1984, lisière forêt, *Manihot esculenta* (pollen), 1♀, 8.I.1985, *Heterotis decumbens*, 1♀, 9.III.1985, 9h, étang ombragé, 1♂ et 1♀ in copula, 1.VI.1985, *Ipomoea asarifolia*, 1♀, 2.IV.1985, *Dacryodes edulis*, 1♂. – route Ntoun-Donguila, 1.XII.1985, *Heterotis decumbens*, 1♀. – Bissobinam, 3.XI.1985, sablière, *Heterotis decumbens*, 1♀. – Kougouleu, 12.XI.1985, chemin forestier, *Dissotis multiflora*, 1♀. HAUT-OGOOUE. Léconi, 29.I.1987, *Dissotis brazzae*, 1♀.

MOYEN-OGOOUE. Ogooué, Lambaréné, 1911, 1♀, leg. R. Ellenberger (MNHNP). – Njolé, 1♀ (J. Bouyssou) (Vachal 1903). – Ngoum-Ngoum, 4.V.1986, 1♀. NGOUNIE. Mandilou II, 31.XII.1985, lisière forêt-savane, *Asystasia*, 1♀. OGOOUE-MARITIME. M'Paga, 12.IV.1986, *Otomeria guineensis*, 1♀. (all leg. and col. A. Pauly ; Pauly 1998).

CONGO-BRAZZAVILLE. M'Touki, col. des Bambas, route de Dimonika à Dolisi, 6.I.1969, 1♀, leg. J.P. Grillot (MNHNP). – Kakamoeka, 4°07'S 12°04'E, IX.2007, 1♂, Darwin Project (RU). – Lessaras-Girard, 27.I.1977, 1♂, leg. Grillot & Morin (MNHNP) (var *ochropus*).

D.R. CONGO. Limbala, 8.VIII.1913, 1♂, leg. Dr. Rodhain (RMCA). – Tshuapa, Bokota, I.1953, 1♂, leg. R.P. Hulstaert (RMCA). – P.N.U. (= Parc National de l'Upemba), Kaswabilenga, 700m, 14.X.1947, 1♂, leg. G.F. de Witte (RMCA). – P.N.U. Lukawe, affluent rive droite Lufira, 700m, 6-9.X.1947, 1♂, leg. G.F. de Witte (RMCA). – Walikale 39 km S, 700m, 25.XII.1957, leg. E.S. Ross & R.E. Leech (CAS). – P.N.G. (Parc National de la Garamba), PpK.56/d/8, 27.II.1952, 1♂, leg. H. De Saeger n°3149 (RMCA) (var *ochropus*).

***Thrinchostoma sjoestedti* (Friese 1909)** (Figs 56, 57, 58, 59, 60, 61, 62)

Diagonozus sjoestedti Friese, 1909b: 124–125, ♂ ♀. Male lectotype: Tanzania, Kibonoto am Kilimandjaro, 1300-1900m, 1905, leg. Y. Sjoestedt (NHRS, Stockholm, n°NHRS HEVA 000002023), designated here. Rasmussen & Ascher 2008: 100.

Halictus (Trichostoma) [!] *sjoestedti* (Friese): Friese, 1909a: 128, 152; Strand, 1912: 131.

Thrinchostoma sjoestedti (Friese): Cockerell, 1910: 506; Cockerell, 1937b: 106.

Thrinchostoma [!] (*Thrinchostoma [!]*) *sjoestedti* (Friese): Blüthgen, 1930: 496, 498–499, 510, 513–514, 524, 533–534.

Thrinchostoma (Thrinchostoma) sjoestedti (Friese): Michener, 1978: 521–524; Pauly, 1999: 155, 176.

Diagonozus sjoestedti var. *rufescens* Friese, 1909b: 125, ♂, ♀. Syntypes: Tanzania, Kibonoto am Kilimandjaro, 1300-1900m, 1905, leg. Y. Sjoestedt, and Meru (NHRS). Rasmussen and Ascher, 2008: 92. **Syn. nov.**

Thrinchostoma sjoestedti var. *rufescens* (Friese): Cockerell, 1916: 205, (? syn. *T. torridum*).

Thrinchostoma [!] (*Thrinchostoma [!]*) *sjoestedti* var. *rufescens* (Friese): Blüthgen, 1929: 29 ; Blüthgen 1930: 496, 513–514, 524, 533.

Thrinchostoma sjoestedti rufescens (Friese): Cockerell, 1936: 8.

Thrinchostoma (Thrinchostoma) sjoestedti var. *rufescens* (Friese): Michener, 1978: 524; Pauly, 1999: 155, 176.

Thrinchostoma millari Cockerell, 1916: 205–206, ♂. Male lectotype: South Africa, Durban, 24.XI.1915, leg. H.M. Millar (DMSA). Cockerell, 1917: 45; Cockerell, 1920: 304; Cockerell, 1933: 25. **Syn. nov.**

Thrinchostoma [!] (*Thrinchostoma [!]*) *millari* Cockerell: Blüthgen, 1930: 496, 499, 514, 524, 534.

Thrinchostoma (Thrinchostoma) millari Cockerell: Michener, 1978: 524; Pauly 1999: 155.

Thrinchostoma [!] (*Thrinchostoma [!]*) *mwangai* Blüthgen, 1930: 526–527, 535, ♀. Female holotype: Uganda, Entebbe, 22.VIII.1911, leg. G.C. Gowdey (BMNH). **Syn. nov.**

Thrinchostoma mwangai Blüthgen: Cockerell, 1936: 9.

Thrinchostoma (Thrinchostoma) mwangai Blüthgen: Michener, 1978: 524; Pauly, 1999: 155, 174.



a - male, dorsal habitus



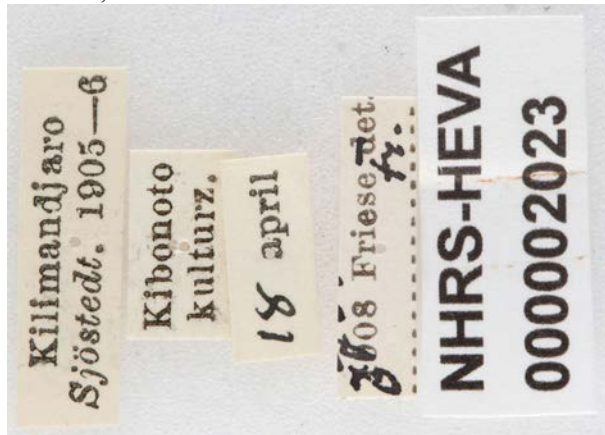
b - female, dorsal habitus



c - male, lateral habitus



d - female, lateral habitus



e - male lectotype labels



f - female paratype labels

Fig. 56. *Thrinchostoma sjoestedti*, male lectotype (a, c, e) and female paratype (b, d, f) in NHRS.

Thrinchostoma [!] (*Thrinchostoma* [!]) *ugandae* Blüthgen, 1930: 526–527, 536, ♀. Female holotype: Uganda, entre Seziwa River et Kampala, 3500-3750ft, 27-31.VIII.1911, leg. S.A. Neave (BMNH). **Syn. nov.**

Thrinchostoma ugandae Blüthgen: Cockerell, 1936: 9.

Thrinchostoma (*Thrinchostoma*) *ugandae* Blüthgen: Michener, 1978: 525; Pauly, 1999: 155, 177.

Thrinchostoma umtaliense Cockerell, 1936: 8, ♂. Male holotype: Zimbabwe, Xmas Pass, Umtali, 20-21.v.1932 (AMNH). **Syn. nov.**

Thrinchostoma (Thrinchostoma) umtaliense Cockerell: Michener, 1978: 525; Pauly, 1999: 155.



a - male paratype in MNHUB



b - paratype label in MNHUB



c - dorsal habitus male specimen from Ethiopia



d - dorsal habitus female specimen from Ethiopia



e - dorsal habitus male specimen from Cameroon

Fig. 57. *Thrinchostoma sjoestedti*; paratypes in MNHUB (a, b), male and female (Ethiopia) (c, d) and male var. *rufescens* (Cameroon: Fundong) (e).



a - head and mesosoma, dorsal view



b - head and mesosoma, lateral view



c - propodeum



d - antenna last segments



e - metasoma

Fig. 58. *Thrinchostoma sjoestedti*, male paratype in MNHUB.



f - first tergum



g - hind leg

Fig. 58 (continued). *Thrinchostoma sjoestedti*, male paratype in MNHUB.

REMARKS.

The lectotype of *T. sjoestedti* is designated here. On basis of the pictures sent by H. V. from the Museum of Stockholm and paratypes photographed by one of us (CE) in the Museum of Berlin all the types belong to the same species.

Syntypes of *T. sjoestedti* var *rufescens* could not be found in the Museum of Stockholm. As this species is well known to have black and red forms, the synonymy has been established.

In *T. mwangai* the type has the scapes orange. Blüthgen reported only a few differences in the key, such as the more polished supraclypeal area. The tergites are not really red, the punctuation of T1 is sparse and the legs are brown. We consider it here as a syn. nov. of *T. sjoestedti*.

In *T. ugandae* the type has the terga red and probably corresponds to the variety *rufescens*. The scutum bears little tomentum and the setae on the last terga are pale. We consider it here as a syn. nov. of *T. sjoestedti*, resembling *T. sjoestedti* var *rufescens*.

T. umtaliellum, a specific name cited in the index of PAULY (1999: 177), followed in the catalog of URBAN & EARDLEY (2010), is a lapsus for *T. umtaliense*.

DIAGNOSIS. The males of *T. sjoestedti* have the last segment of the antenna bent, the apical margin of S5 with setae and the hind femora not swollen, as in *T. nachtigali*.

The females can be identified by their widespread geographic range in East and South Africa while *T. petersi*, *T. productum* and *T. nachtigali* are widespread in West and Central Africa. The metasoma is often brown, sometimes suffused with red (var *rufescens*). The edge of scutum has beige tomentum. T1 is chagrined and with sparse punctures.



b - propodeum

a - head



c - mesosoma



d - metasoma



e - first tergum

Fig. 59. *Thrinchostoma sjoestedti*, female paratype (a, b, c, d) and specimen (Ethiopia) (e).



a - dorsal habitus (type)



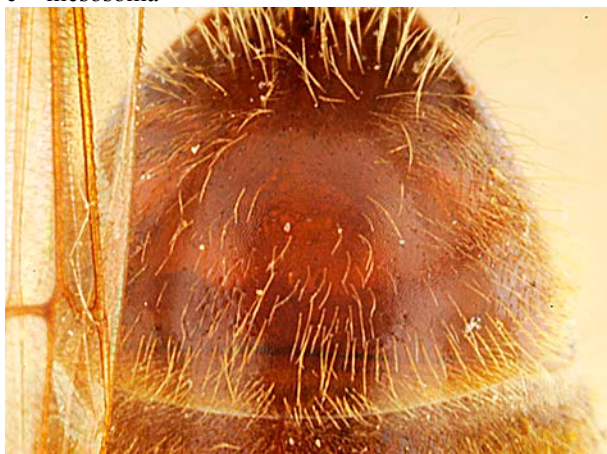
b - head



c - mesosoma



d - propodeum



e - first tergum



f - last terga

Fig. 60. Female holotype of *Thrinchostoma mwangi* in BMNH (syn. of *T. sjoestedti*).



a - dorsal habitus (type)



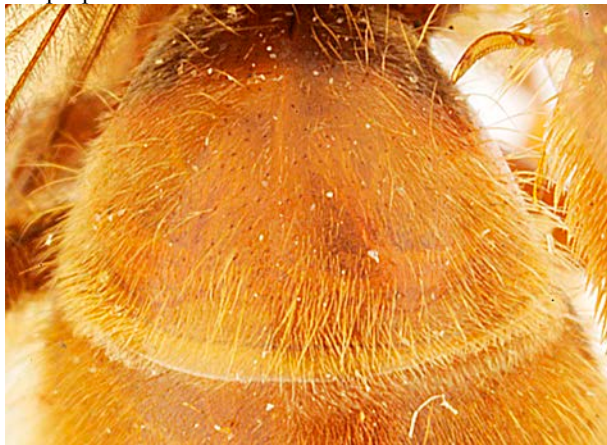
b - head



c - propodeum



d - mesosoma



e - first tergum



f - metasoma

Fig. 61. Female holotype of *Thrinchostoma ugandae* in BMNH (syn. of *T. sjoestedti*).

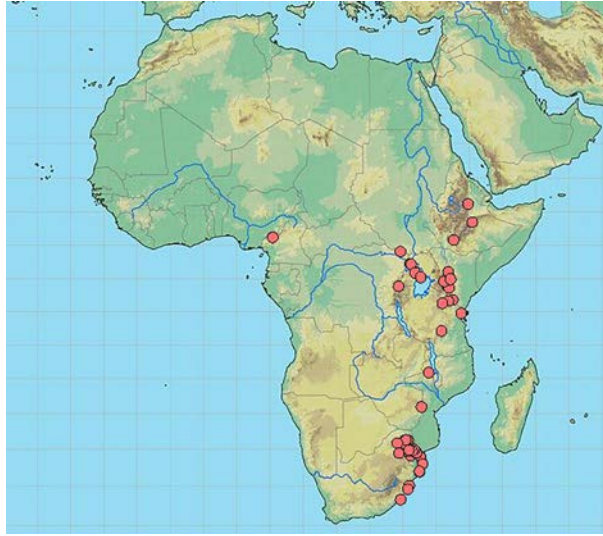


Fig. 62. Distribution map of *Thrinchostoma sjoestedti*.

MATERIAL.

CAMEROON. W. Cameroun, Fundong, 6°18'N 10°18'E, 21.VII.1987, 1♂, *Stachytarpheta* sp., leg. A. Pauly (RBINS).

ETHIOPIA. OROMIA. Mechara, 8°36'N 40°19'E, 6-25.XII.2010, *Stylosanthes guianensis*, 1♂, 5-19.XII.2010, *Trichodesma zeylanicum*, 1♂, 1♀, 16.I.2011, *Trichodesma zeylanicum*, 1♂, 1♀, leg. Degefa Weyessa, GTI project (RBINS). AMHARA. Hayk, 11°18'N 39°41'E, 17-18.XI.2010, *Hypoestes forskoolii*, 2♂, 4♀, leg. GTI project (RBINS). SOUTHERN. Arba-Minch, Lake Chamo, 5°55'N 37°32'E, 1138m, 19.IX.2012, 3♀, leg. A. Pauly & J.L. Boevé (RBINS).

UGANDA. « Westen des Nkole-Landes », 4500-5000 ft, leg. S.A. Neave, 10-14.X.1911, 1♂ (BMNH).

R.D. CONGO. Ituri, Mahagi, Niarembe, 18.II.1929, 1♂, leg. A. Collart (RMCA). – P.N.G. (Parc National de la Garamba), I/o/1, 5.X.1950, 1♂, leg. H. de Saeger (RMCA). – Kivu, Manevu, 8.X.1935, 1♂, leg. H. Damas (RMCA). – P.N.A. (Parc National Albert = PN Virungas), Kanyabayongo, Kabasha, 1760m, 11.XII.1934, 1♂, leg. G.F. de Witte (RMCA).

KENYA. Nanyuki, nr Sportsman's Arms Lodge, along stream, 1950m, 25.VIII.1975, 1♂, leg. R. Silberglied (MCZ). – Nairobi, Int. Center Ins. Physiol. Ecol., IV.1982, leg. M.C. Lubega, 1♂, 3♀ (CIUC). – Ol Punyata, ca 16 mi N. Nakuru, Nakuru District, 5500ft, 6-9.I.1973, 1♀, leg. J.P. Donahue (LACM). – Laragei Springs, 7 mi SW Maralal, Samburu District, 6200ft, 17-22.I.1973, 1♀, leg. J.P. Donahue (RBINS).

TANZANIA. Kibonoto am Kilimandjaro, 1300-1900m, 1905, 4♂, 4♀ (paralectotypes), leg. Y. Sjoestedt (MNHUB, NHRS). – Amani, Usambara, XII.1906, leg. Chr. Schroder (Blüthgen, 1930). – « Afrique Orientale Anglaise », Escarpment, VIII.1906, 1♂, leg. Maurice de Rothschild (MNHNP). – Meru, im Januar (Mus. Stockholm). – Lake Manyara, 28.VII.1958, 1♂, leg. M.&P. Machris (LACM). – Lake Manyara, 1000m, 21.X.1957, 1♂, leg. E.S. Ross & R.E. Leech (CAS). – Iringa, 11.VII.1985, 2♀, leg. G.J. James (RBINS).

MOZAMBIQUE. Maputo (= Lourenco Marques), 30.VIII.1963, 1♀, leg. H.N. Empey (SANC).

MALAWI. Lilongwe 85 km SE, Decza, 17-19.XII.2001, 1♂, leg. J. Halada (OOL).

REPUBLIC OF SOUTH AFRICA. Shilouvane, XII, leg. Junod (MNHUB) (Blüthgen 1930). – Barberton, XII.1978, 1♂, leg. C.D. Eardley (SANC). – Bergvliet Forest Station, Sabie, 25°05'S 30°54'E, 26-28.II.1986, 1♂, leg. C.D. Eardley (SANC). – Crocodile Bridge, 20.V.1969, 1♂, L.C. Starke (SANC). – De Hoek, XI.1978, 2♂, leg. G.L. Prinsloo (SANC). – De Kuilen, Lydenburg District, 25°10'S 30°32'E, 12.II.1981, 1♀, leg. C. Moolman, W. Harrop (SANC). – Duiwelskloof, 23°42'S 30°06'E, 15.XII.1985, 2♀, leg. J.S. Donaldson (SANC). – Duiwelskloof, 11.XII.1963, 1♀, leg. P. Paliatseas (SANC). – Fanie Botha Nature Reserve, near Tzaneen, 23°50'S 30°10'E, 2-6.III.1986, 2♂, leg. J.S. Donaldson (SANC). – Fanie Botha Nature Reserve, near Tzaneen, 23°50'S 30°10'E, 2-6.III.1986, 8♂, leg. C.D. Eardley (SANC). – Hans Merensky Nature Reserve, 23°40'S 30°39'E, 27-30.XI.1981, 1♂, leg. R.G. Oberprieler (SANC). – Happy Rest Nature Reserve, 22°59'S 29°46'E, 10.III.1990, 9♂, 4♀, leg. C.D. Eardley (SANC). – Komatipoort, 27.V.1969, 1♀, leg. L.C. Starke (SANC). – Kruger National Park, Skukuza,

24°59'S 31°35'E 292m, I.1985, 6♂, leg. G.L. Prinsloo (SANC). – Kruger National Park, Pretoriuskop, 25°09'S 31°16'E, 591m, 17.I.1985, 1♀, leg. G.L. Prinsloo (SANC). – Lekgalameetse Nature Reserve, 24°10'S 30°14'E, 13.II.1989, 1♂, 1♀, leg. V.M. Uys (SANC). – Lekgalameetse Nature Reserve, 24°10'S 30°14'E, 13.II.1989, 1♂, leg. N. Verheijen (SANC). – Loskop Dam Nature Reserve, 25°25'S 29°20'E, 12-13.XII.1985, 1♂, leg. C.D. Eardley (SANC). – Mac Mac Falls, 10km N Sabie, 25°02'S 30°48'E, 27.II.1986, 1♀, leg. C.D. Eardley (SANC). – Mojadji Nature Reserve, 23°38'S 30°20'E, 13-14.I.1987, 1♂, leg. C.D. Eardley (SANC). – Swadini, Blydepoort Nature Reserve, 24°32'S 30°54'E, 26-29.I.1987, 1♀, leg. B. Grobbelaar (SANC). – Thabaphaswa, near Potgietersrus, 24°03'S 29°02'E, 29-30.III.2006, 1♀, leg. J. du Plessis (SANC). Umbilo, 22.XI.1914, 1♂, leg. L. Bevis (paralectotype). – False Bay, 27.95852S 32.35919E, sandforest, 15.I.2005, 1♀ (SANC). – Kloof, 20.III.1963, 1♀, leg. H.N. Empey (SANC). – Kosi Bay, 10-11.II.1990, 15♂, 25♀, leg. C.D. Eardley (SANC). – Kuleni Farm, Hulhulwe, 27°54'S 32°22'E, 14.II.1990, 5♂, 16♀, leg. C.D. Eardley (SANC). – Vernon Crookes Nature Reserve, Umzinto, 30°17'S 30°37'E, 443m, 25-26.III.1985, 1♀, leg. C.D. Eardley (SANC). Port St. Johns, 19.III.1969, 1♂, leg. L.C. Starke (SANC).

***Thrinchostoma uluguruensis* Pauly & Eardley sp. nov.**
(Figs 63, 64, 65, 67a)

HOLOTYPE ♂: TANZANIA, « Tanganyka », territoire Bunduki, Uluguru Mts, moyen Mgeta, 1300m, 30.IV-11.V.1957, leg. P. Basilewsky & N. Leleup (RMCA).

DIAGNOSIS: Male. Very similar to that of *T. amanicum* in the sparse punctuation of the scutum, the last antennal segment not curved and S5 with long setae. It differs in the legs and terga being dark brown, the apical lobes of hind tibiae are truncated, the hind femora thinner and the punctuation of scutum finer and more sparse. Female unknown.

DESCRIPTION. Male. Black body, length 9 mm. Head: a little longer than wide ($L / W = 1.05$ mm); malar area 1/5 as long as eye; antennae 13 segmented, last segment straight; anterior margin of clypeus pale yellow. Mesosoma: scutum smooth with sparse punctuation ($i = 3d$). Hind legs: apical lobe of tibiae pale yellow, truncated apically, femora not very swollen, basitarsi thin and black. Forewings each with a spot of setae. Metasoma. Black above, brownish below; apical margin of S5 with long setae, bilobed; T1 chagrined with sparse punctuation. Genitalia illustrated (fig. 65).

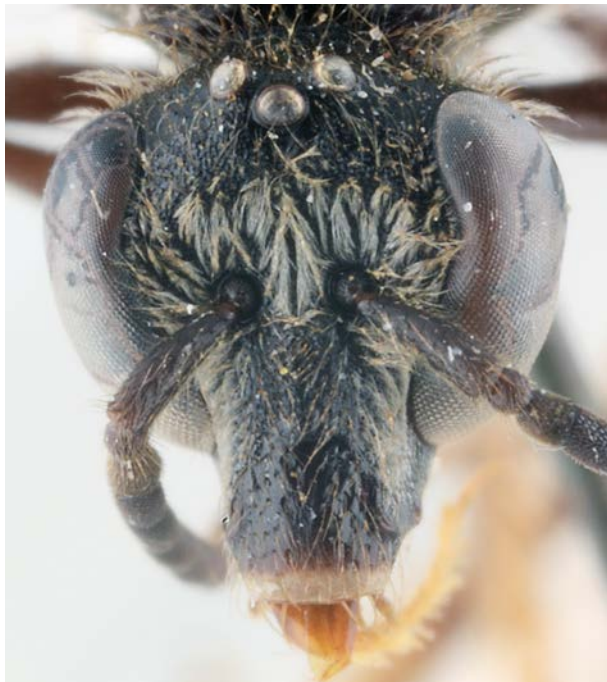


a - lateral habitus (end of metasoma lacking)



b - dorsal habitus

Fig. 63. *Thrinchostoma uluguruensis*, male holotype in RMCA.



a - head



b - mesosoma



c - hind leg



d - last sternite



e - first tergite

Fig. 64. *Thrinchostoma uluguruensis*, male holotype in RMCA.



a - dorsal view



b - ventral view

Fig. 65. Genitalia of *Thrinchostoma uluguruensis*, male holotype in RMCA.

***Thrinchostoma upembae* Pauly & Eardley sp. nov.**
(Figs 66, 67b)

HOLOTYPE ♂: D.R. CONGO, Parc National de l'Upemba (PNU), Gorges de la Palenge, 1150m, n°471a, 10-14.VI.1947, leg. G.F. de Witte (RMCA).

DIAGNOSIS. Male. Species well characterized by the apical lobe of the hind tibiae truncated and with large basitarsi (fig. 66c). Last segments of the antennae not bent, segments short. S5 with a fringe of setae. Female unknown.

DESCRIPTION. Male. Black body, length 8 mm. Head: longer than wide ($L / W = 1.15$) ; malar area $\frac{1}{4}$ as long as eye ; antennae 13 segmented, last segment straight ; anterior margin of clypeus pale yellow. Mesosoma: scutum with dense punctuation, punctures slightly larger and more widely spaced in centre ($i = d$). Hind legs: femora slightly swollen, apical lobes of tibia rather long, pale yellow, basitarsi broader than in other species, entirely pale yellow. Forewings with a spots of setae. Metasoma: black ; apical margin of S5 bilobed and with setae.



a - habitus lateral habitus



b - head



c - hind legs



d - antennae

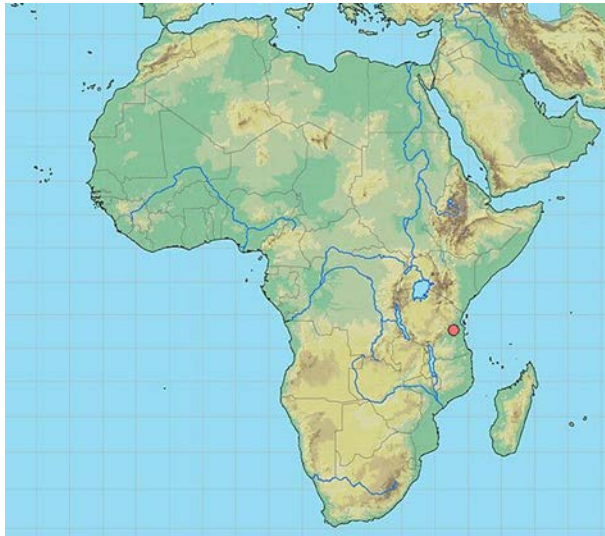
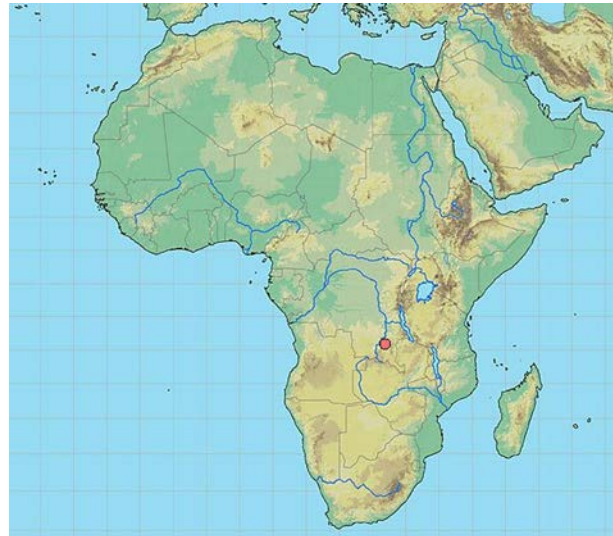


e - mesosoma



f - metasoma ventral view

Fig. 66. *Thrinchostoma upembae*, male holotype in RMCA.

a - *T. uluguruensis*b - *T. upembae*Fig. 67. Distribution maps of *Thrinchostoma*.

List of flowering plants visited by the *Thrinchostoma* species in Africa

Acanthaceae:

Asystasia gangetica (L.) T. Anderson: *T. torridum*, 2♀, *T. nachtigali*, 1♀, *T. petersi*, 1♀,
T. productum, 1♀.

Hypoestes forskalii (Vahl.) Roem & Schult.: *T. sjoestedti*, 2♂, 4♀.

Justicia sp.: *T. torridum*, 1♀.

Justicia ladanoides Lam.: *T. torridum*, 3♂.

Asteraceae:

Aspilia helianthoides (Schumach. & Thonn.) Oliv. & Hiern: *T. petersi*, 1♂

Aspilia plurisetata Schweinf.: *T. torridum*, 3♂, 2♀.

Vernonia sp.: *T. silvaticum*, 1♂.

Boraginaceae:

Trichodesma zeylanicum (Burm.f.) R. Br.: *T. torridum*, 4♂, *T. sjoestedti*, 2♂, 2♀.

Burseraceae:

Dacryodes edulis H.J. Lam.: *T. productum*, 1♂.

Caesalpiniaceae:

Cassia obtusifolia L.: *T. nachtigali*, 1♀.

Commelinaceae:

Floscopa sp.: *T. nachtigali*, 1♀.



a - *Thrinchostoma nachtigali*, female,
on *Turnera subulata* (Turneraceae)



b - *Thrinchostoma kandti*, male,
on *Cuphea hyssopifolia* (Lythraceae)

Fig. 68. *Thrinchostoma* on flowers (both © Nicolas Vereecken).

Convolvulaceae:

Ipomoea asarifolia (Desr.) Roem. & Schult.: *T. productum*, 1♀.

Costaceae:

Costus sp.: *T. lettowvorbecki*, 1♂, 1♀.

Cucurbitaceae:

Cucumeropsis manni Naudin: *T. productum*, 1♂.

Euphorbiaceae:

Manihot esculenta Crantz: *T. productum*, 1♀ (pollen).

Fabaceae:

Calopogonium mucunoides Desv.: *T. nachtigali*, 1♀.

Stylosanthes guianensis (Aubl.) Sw.: *T. sjoestedti*, 1♂.

Hypericaceae:

Harungana madagascariensis Lam. ex Poiret: *T. nachtigali*, 1♀.

Lamiaceae:

Orthosiphon rubicundus (D. Don) Benth. in Wall: *T. torridum*, 2♀.

Platystoma africanum P. Beauv.: *T. torridum*, 2♀.

Plectranthus sp.: *T. torridum*, 3♂.

Lauraceae:

Persea americana Mill.: *T. torridum*, 1♀.

Lythraceae:

Cuphea hyssopifolia Kunth.: *T. kandti*, 1♂ (fig. 68b).

Malvaceae:

Gossypium sp.: *T. petersi*, 2♂.

Melastomataceae:

Dissotis multiflora (Sm.) Triana: *T. nachtigali*, 1♀, *T. productum*, 1♀.

Dissotis brazzae (Graham) Cogn.: *T. productum*, 1♀.

Heterotis decumbens (P. Beauv.) Jacq.-Fel.: *T. productum*, 3♀.

Mimosaceae:

Mimosa pudica L.: *T. nachtigali*, 1♀.

Ochnaceae:

Sauvagesia erecta L.: *T. nachtigali*, 1♀.

Orchidaceae:

Genus sp.: *T. orchidarum*, 1♂.

Rubiaceae:

Borreria sp.: *T. nachtigali*, 1♂.

Otomeria guineensis Benth.: *T. productum*, 1♀.

Turneraceae:

Turnera subulata J.E. Smith: *T. nachtigali*, 1♀ (fig. 68a).

Verbenaceae:

Stachytarpheta angustifolia (Miller) Vahl: *T. kandti*, 1♂.

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