

ANNALEN VAN HET MUSEUM
VAN BELGISCH CONGO
TERVUREN (BELGIË)

Reeks in 8°

Zoologische Wetenschappen
Deel 8

ANNALES DU MUSÉE
DU CONGO BELGE
TERVUREN (BELGIQUE)

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THE DERMAPTERA OF THE BELGIAN CONGO

PART I. PYGIDICRANIDAE

BY

W. D. HINCKS

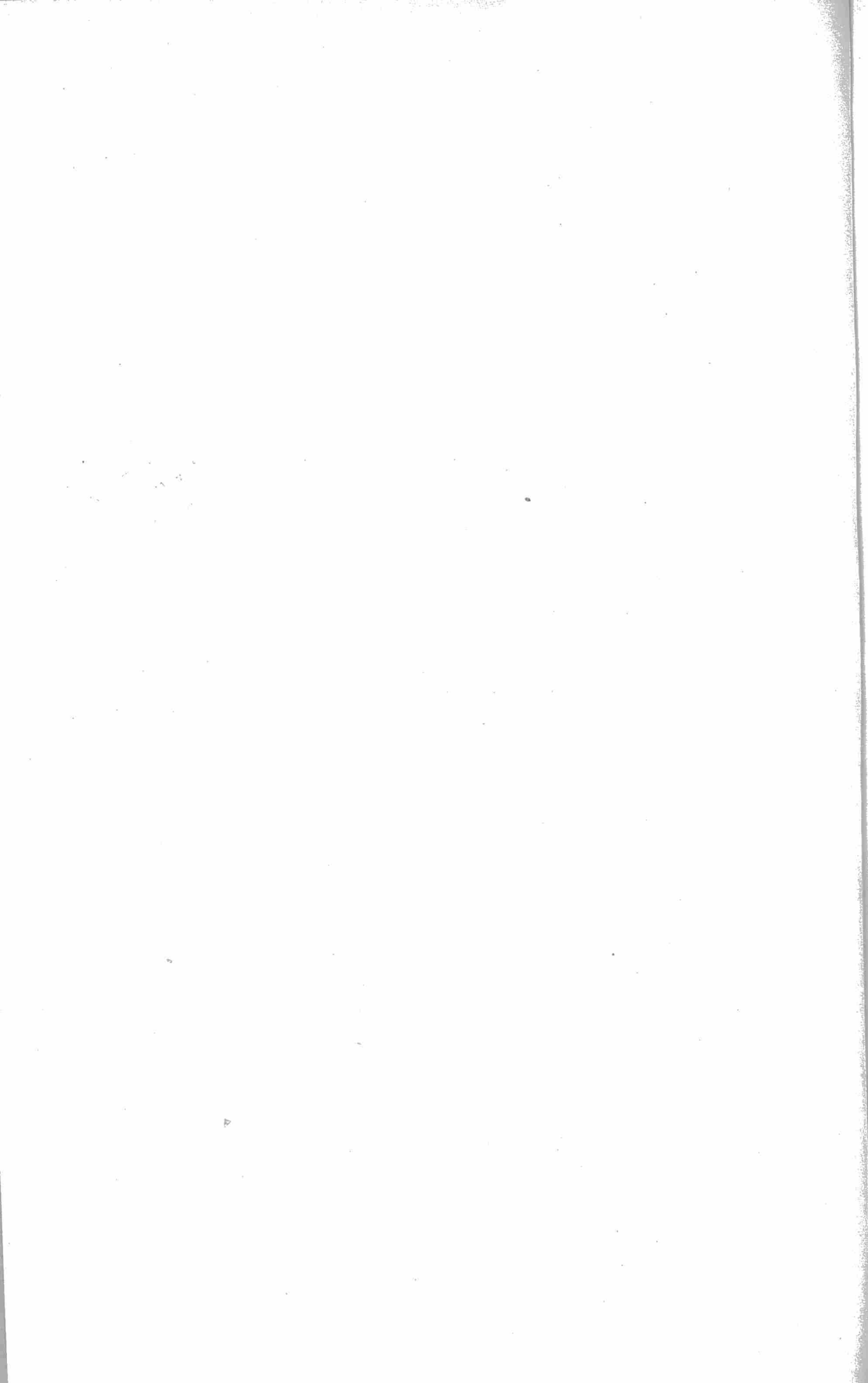
(Manchester Museum)



TERVUREN

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INTRODUCTION

The series of papers of which the present is the first instalment is intended to provide a preliminary survey of the earwig fauna of the rich and extensive territories of the Belgian Congo. It sets out to give a catalogue of the species known to occur within the area and a summary of the available distributional data. It is also intended to provide a more or less adequate means of identifying the species enumerated.

The classification adopted, with minor alterations, is essentially that of BURR (1911, 1915-6). Only the true earwigs or *Forficulina* are considered, the *Hemimerina* having been admirably treated by REHN & REHN (1935), and the *Arixenina* are extra-territorial in distribution.

Relatively little has been written on the Belgian Congo fauna except for some records included in general papers on the order. BURR (1909, 1911B) and BORELLI (1900, 1923) each wrote two papers dealing almost exclusively with Belgian Congo material and more recently REHN (1924, 1925, 1936), MENOZZI (1928, 1930, 1935) and the present writer (HINCKS 1936, 1937A, 1938, 1939) have made some contributions to our knowledge of the present subject.

As yet we know nothing of the biology of Belgian Congo earwigs. Several interesting species, which will be discussed in their places, are entirely montane in distribution and indicate a high-altitude earwig fauna paralleling that which is well known to occur on some European mountains at or above 10,000 ft. An interesting field of study awaits the naturalist in regard to the biology and ecology of the montane, as well as the lowland, earwigs of the Belgian Congo.

In identifying earwigs, at least in the Labiduroidea, the male genitalia provides characters of the greatest value to the taxonomist. It is true that such characters have the disadvantage of leaving the females undetermined, but since both sexes are usually collected together or can be related the one to the other, it is thought that its advantages as a diagnostic character far outweigh the disadvantages. The fullest use has been made therefore of the male genital armature in the present paper.

Technique. The armature may be found beneath the penultimate sternite and can easily be removed with needles from fresh or spirit material or by breaking off the tip of the abdomen in old specimens and dissecting it out carefully. If care is exercised the tip of the abdomen and dissected

segments may be replaced with gum leaving the specimen little the worse for its treatment. The genitalia should be soaked in 5 % KOH overnight or boiled for a minute or two if quick mounts are required. After neutralizing with Glacial Acetic Acid the organ is transferred to Euparal Essence and then to Euparal Mountant on a small strip of good quality celluloid and covered with a very small square of the same material. The free end of the celluloid strip is then placed on the same pin as the insect from which the genitalia were extracted thus preventing the confusion and error which has often resulted in the past from the habit of mounting on glass slides. These mounts appear to last in good condition for many years and all necessary detail usually can be readily observed. In many of the lower earwigs the genitalia are distinctive, often strikingly so, for each species; in the higher families (*Forficuloidea*) the differences are much less striking and often one can detect little difference between even distinct genera. Consequently it is in the Labiduroidea that the male genital armature provides characters of the greatest assistance to the systematist.

Materials and Acknowledgments. The materials on which the present paper has been based consist of many hundreds of specimens belonging to the Musée du Congo Belge, Tervuren, and sent for examination over a period of several years by Dr. H. SCHOUTEDEN and the late Monsieur L. BURGEON. The writer is most grateful for their courteous help and patience. Recently further material from this museum has been sent by Monsieur P. BASILEWSKY. From time to time the writer has been able to examine material in the BURR collection now at the British Museum (Natural History) and his thanks are due to Mr. N. D. RILEY, Keeper of the Department of Entomology, and his staff, for these invaluable facilities during visits to London as well as for the loan of specimens. The study of considerable African materials, besides those from the Belgian Congo, has been of the greatest advantage to the writer and his thanks are due to the following institutions and individuals: the Commonwealth Institute of Entomology (Dr. W. J. HALL), Centre de Faunistique de l'Office de la Recherche Scientifique Coloniale, Paris, Institut des Parcs Nationaux du Congo Belge (Prof. V. VAN STRAELEN). Institut Français d'Afrique Noire (M. A. VILLIERS), Coryndon Memorial Museum, Nairobi (Mr. A. F. J. GEDYE), Institut Scientifique de Madagascar (Professor MILLOT & Dr. R. PAULIAN).



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Superfamily **LABIDUROIDEA** TILLYARD, 1926.

Labiduroidea TILLYARD, 1926, *Ins. Austr. & New Zeal.* : 107.

Protodermaptera ZACHER, 1911, *Zool. Jahrb.* **30** : 306. — BURR, 1911, *Genera Insectorum*, **122** : 10; 1915, *Journ. R. Micr. Soc.* **1915** : 422. — BEY-BIENKO, 1936, *Faune de l'U.R.S.S., Ins. Dermaptères* : 216.

Diandria VERHOEFF, 1902, *Zool. Anz.* **25** : 201.

This superfamily is distinguished from the higher Earwigs (*Forficuloidea*) by the more generalized structure of the genital armature. Two penis lobes are present (one being atrophied in the *Karschiellinae*, *Isopyge* and *Pseudisolabis*). In rest the lobes are directed towards the base and in erection towards the apex of the genitalia. The proparameres are strong, chitinized and generally have a distinct hinge between them and the metaparameres. The metapygidium and telson are represented by distinct chitinous plates.

Two families belong here namely the Pygidicranidae and the Labiduridae, the typical groups of which are well defined but the presence in both families of several subfamilies of which the relationships are by no means clear renders verbal definition difficult.

Both families are well represented in the Belgian Congo.

Key to families. (After BURR).

- 1 (2) Femora compressed and carinulate (except *Echinosomatinae* and *Pyragrinae*). Gonapophyses present in ♀ (except *Pyragrinae*, Neotropical, and *Blandicinae*, S. Africa); opisthomeres usually with all three plates present and distinct; telson distinct and chitinous PYGIDICRANIDAE.
- 2 (1) Femora never compressed and carinulate. Gonapophyses absent in ♀; metapygidium and telson reduced, much smaller than the pygidium though usually distinct, or if lost in the pygidium the latter fused with the penultimate sternite to form a horizontal squamopygidium. LABIDURIDAE.

Family **PYGIDICRANIDAE**

Pygidicranidae VERHOEFF, 1902, *Zool. Anz.* **25** : 382. — BURR, 1909, *Dtsch. ent. Zeits.* **1909** : 321; 1910, *Fn. British India, Dermaptera* : 37; 1911, *Genera*

Insectorum, 122 : 10; 1915, *Journ. R. Micr. Soc.* 1915 : 423. — BEY-BIENKO, 1936, *Faune de l'U.R.S.S., Ins. Dermaptères* : 216.

Pygidicraniales ZACHER, 1910, *Ent. Rundsch.* 27 : 105; 1911, *Zool. Jahrb.* 30 : 307.

Pygidicranales ZACHER, 1915, *Zool. Anz.* 45 : 528.

This family may be distinguished from the *Labiduridae* and from all other Dermoptera, as far as the fauna of the Belgian Congo is concerned, by the presence of gonapophyses in the female. In addition, with the exception of the *Echinosomatinae*, all the species have carinulate and more or less compressed femora. The general facies of the family and its component subfamilies are very distinctive and they are soon recognized at sight.

Two subfamilies are exceptional in that they have segmented nymphal cerci (*Diplatyinae* and *Karschiellinae*).

The family is widely distributed throughout the Ethiopian and Malagasy, Oriental and Papuan regions to Australia, and throughout South America. One species is found in the Canaries and several almost reach the borders of the Palaearctic region in China.

The classification of the family is still very imperfect. Nine subfamilies are generally recognized but their relationships in several instances are still insufficiently studied.

Table of subfamilies of the Pygidicranidae.

Subfamily	N° of Genera	N° of Species	Distribution
1. <i>Cylindrogastrinae</i> (1)	1	3	Neotropical.
2. <i>Diplatyinae</i>	2	53	All tropical regions except Papuan.
3. <i>Karschiellinae</i>	2	9	Aethiopian.
4. <i>Isopyginae</i> subf. nov. (2)	1	1	Malagasy.
5. <i>Pygidicraninae</i>	8	54	All tropical regions.
6. <i>Anataelinae</i>	2	2	Palaearctic and Oriental.
7. <i>Pyragrinae</i>	3	11	Neotropical.
8. <i>Echinosomatinae</i>	1	21	Aethiopian and Oriental.
9. <i>Blandicinae</i>	1	1	South Africa.
10. <i>Allostethinae</i> (3)	3	10	Oriental.

1) Now believed by the writer to be better merged in the *Diplatyinae*.

2) Here proposed for the distinctive *Isopyge madagascariensis* BORELLI (1931, *Bull. Mus. Paris* (2) 3: 492-495).

3) Placed in this family by BURR but now regarded as belonging to the *Labiduridae* by the present writer.

Key to Belgian Congo Subfamilies of Pygidicranidae.

- 1 (2) Femora not carinulate; stout, chaetulose species with simple forceps; apex of metaparameres simple, without teeth or processes; virga long

- or very long, sometimes convoluted *Echinosomatinae*.
- 2 (1) Femora carinulate.
- 3 (4) Antennae usually with less than 25 segments (15-25), fifth segment nearly as long as third; medium sized, slender species; body cylindrical in male. Head broad, eyes large, metaparameres usually with terminal teeth or with an appendage. Nymphal cerci segmentate
..... *Diplatyinae*.
- 4 (3) Antennae usually with more than 25 segments, the fifth segment short.
- 5 (6) Antennal segments 4-6 transverse. Ultimate tergite of male often furnished with ridges or processes; forceps stout, often asymmetrical. Medium to large very robust and powerful species. Antennae robust, 25-33 segmented, individual segments short; tegmina entirely absent or rudimentary; wings entirely absent. One praepupal sac aborted; metaparameres short, broad and lobed. Nymphal cerci segmentate ...
..... *Karschiellinae*.
- 6 (5) Antennal segments 4-6 short but not transverse. Ultimate tergite without processes (1); forceps not asymmetrical (1). Build rather powerful; antennae setaceous with more than 25 segments; basal segment keeled above; head flat, truncate behind; tegmina and wings perfect, abbreviate or entirely absent. Both penis lobes fully developed; metaparameres usually with a single or bifid internal tooth. Nymphal cerci not segmentate *Pygidicraninae*.

Subfamily **DIPLATYINAE**

Diplatyidae (pars) VERHOEFF, 1902, *Zool. Anz.* 25 : 187. — ZACHER, 1911, *Zool. Jahrb.* 30 : 350.

Diplatyinae (pars) BURR, 1910, *Fn. Brit. India, Dermaptera* : 38; 1911 *Genera Insectorum*, 122 : 10, 12; 1915, *Journ. R. Micr. Soc.* 1915 : 424, 425 (genitalia); 1915, *Trans. ent. Soc. Lond.*, 1915 : 257 (opisthomeres), 267 (gonapophyses), 270 (manubrium).

This subfamily (2) comprises the genus *Diplatys* SERVILLE (3) which includes what are probably the most primitive living earwigs. The possession of segmentate nymphal cerci shared only among living species by the more highly specialized *Karschiellinae* is an adult character of the extinct suborder *Archidermaptera* BEY-BIENKO (4), erected for the jurassic *Protodiplatys fortis* MARTINOV (5). The *Karschiellinae* possess this primitive character in

1) In Belgian Congo species.

2) The remarkable apterous genus *Antenoria* may be also a member of this subfamily - cf. *Dermapteros do nordeste brasileiro*. Paulo de MIRANDA RIBEIRO in: *O. Campo*, MARCO 1937: 36, figs. - *Antenoria bicyclura* RIBEIRO from Villa de Poção, Serra do Acahy, Estado de Pernambuco.

3) The genus *Cylindrogaster* STAL, 1855 (type: *C. gracilis* STAL, 1855), at one time considered as a synonym of *Diplatys* has been reinstated by Maccagno (1929, *Bull. Mus. Zool. Anat. comp. Torino*, (3) 41, n° 12) and has been made the type genus of a separate subfamily, the *Cylindrogastrinae* — but see note 1 on page 12.

4) 1936, *Faune de l'U.R.S.S., Insectes Dermaptères*, Leningrad.: 77, 215.

5) Jurassic beds in Southern Kazakstan (Galkino, Kara-taü Mountains), 1925, *Izv., Ross. Ac. Nauk.*: 572,577.

the nymphal stages but the adult genitalia exhibit a specialization in the reduction of one of the penis lobes.

Genus **DIPLATYS** SERVILLE, 1831.

Genotype: *Forficula macrocephala* PALISOT DE BEAUVOIS, 1805.

- Diplatys* SERVILLE, 1831, *Ann. Sci. Nat.* **22** : 33. — BORMANS, 1900, *Das Tierreich*, **11** : 5, 8-10. — BURR, 1904, *Trans. ent. Soc. Lond.*, **1904** : 277-285 (*partim*) (revision); 1910, *Fn. British India, Dermaptera* : 38-53 (Indian spp.); 1911, *Trans. ent. Soc. Lond.*, **1911** : 21-47, pl. 7 et 8 (*partim*) (revision); 1911, *Genera Insectorum*, **122** : 12-14 (*partim*); 1915, *Journ. R. Micr. Soc.* **1915** : 426-429, pl. v. (genitalia). — REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* **49** : 353-354, map fig. 1., 402 (excl. syn. *Cylindrogaster*). — MACCAGNO, 1929, *Boll. Mus. Zool. Anat. Comp. Torino*, (3) **41**, N° 12 : 1-6 (*passim*), 13-14. — HINCKS, 1937, *Ent. mon. Mag.* **73** : 247-250 (polymorphism); 1947, *Arkiv f. Zool.* **39A**, N° 1 : 6-15 (Burmese spp.).
- Nannopygia* DOHRN, 1863, *Stett. ent. Zeits.* **24** : 60 (type *N. gerstaeckeri* DOHRN). — BORMANS, 1900, *Das Tierreich*, **11** : 5, 10-11. — ZACHER, 1910, *Ent. Rundsch.* **27** : 106 (subgenus); 1911, *Zool. Jahrb.* **30** : 354. — BURR, 1911, *Genera Insectorum*, **122** : 14 (subgenus); 1915, *Journ. R. Micr. Soc.* **1915** : 428.
- Dyscritina* WESTWOOD, 1881, *Trans. ent. Soc. Lond.*, **1881** : 601 (nymph) (type *D. longisetosa* WESTWOOD). — 1898, Green, *loc. cit.*, **1898** : 381. — BURR, 1898, *loc. cit.* **1898** : 387, pl. 18, 19; 1910, *Fn. British India, Dermaptera*: 40.
- Verhoeffiella* ZACHER, 1910, *Ent. Rundsch.* **27** : 106 (subgenus) (type, *D. aethiops* ZACHER *nec* BURR); 1911, *Zool. Jahrb.* **30** : 355 (subgenus). — BURR, 1911, *Genera Insectorum*, **122** : 14 (subgenus); 1915, *Journ. R. Micr. Soc.* **1915** : 426.
- Paradiplatys* ZACHER, 1910, *Ent. Rundsch.* **27** : 106 (subgenus) (type, *D. conradti* BURR); 1911, *Zool. Jahrb.* **30** : 355 (subgenus). — BURR, 1911, *Genera Insectorum*, **122** : 14 (subgenus); 1915, *Journ. R. Micr. Soc.* **1915** : 427.

Over fifty species of *Diplatys* are known at the present time and there can be no doubt that a considerable number of additional species will be discovered. Their distribution is essentially tropical, the majority of the species being centered in two areas, namely Tropical Africa with Madagascar (20 species) and that part of the Oriental region west of Wallace's line (30 species).

Table showing regional distribution of *Diplatys* spp.

Region	N° of spp.
Ethiopian	15
Malagasy	5
Indo-Malayan	30
Australian	—

Neotropical	3
Nearctic	—
Palaeartic	—

Little is known of the habits of these insects (REHN, 1924). The post-embryonic development has been studied by GREEN and BURR (1898).

The revision of BURR (1911C) is a valuable introduction to the study

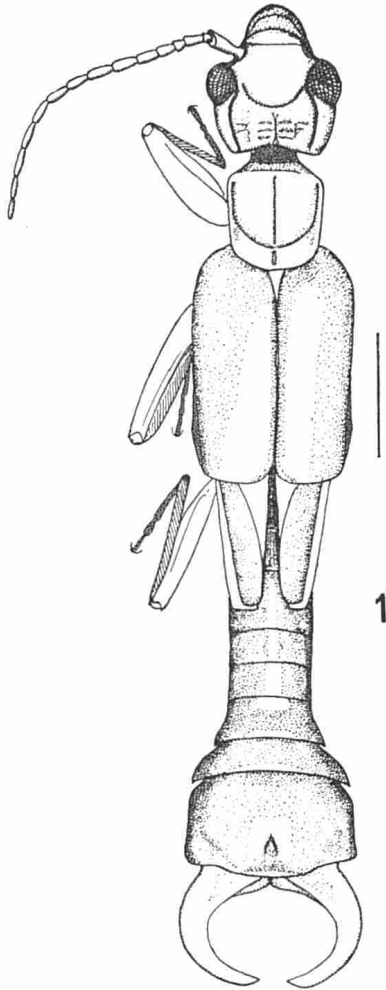


Fig. 1. — *Diplatys macrocephalus* (PALISOT DE BEAUVOIS), macrolabid male.

of this difficult genus. Recently (HINCKS, 1937B) it has been established that males of at least one species are polymorphic as regards the development of the distal abdominal segments and forceps so that characters derived from these structures are no longer tenable for specific segregation. The best diagnostic characters undoubtedly are those exhibited by the male genitalia which are abundantly distinct for all the species so far examined.

Unfortunately the females can only be named with certainty if taken with the males.

In so critical a genus it is not surprising that many errors of determination exist in the literature, especially when specimens are so rarely seen in collections, no doubt because collectors have yet to discover the habits of these retiring insects. At present I am able to admit the seven species recorded hereafter as members of the Belgian Congo fauna. In addition *D. raffrayi* (BORMANS, 1879) has been recorded by BORELLI (1923) and MENOZZI (1935) but for reasons mentioned under *D. macrocephalus* the records are regarded as erroneous.

Records of *Diplatys* which it has not been possible to identify specifically, owing to immaturity or damage, have a definite value in plotting the distribution of the genus in Belgian Congo and for this reason a number of such records are brought together below.

Records of Diplatys spp. indet. from Belgian Congo.

3 nymphs, Haut-Uelé: Tuku III. 1919 (P. VANDEN PLAS) [det. BORELLI. vide BORELLI, 1923] — ♂ (fragmentary) Lesse (Lt. BONNEVIE) [det. MENOZZI]. — 1 nymph Penghe, 31. I. 1914 (Dr. BEQUAERT). — 1 nymph, Haut-Uelé: Dika, 28. III. 1935 (Dr. H. SCHOUTEDEN). — 1 ♂ (fragmentary) Haut-Uelé, environ d'Aru, V. 1925 (L. BURGEON) [det. MENOZZI as *raffrayi*, recorded 1935].

Genital armature of males (Figs 2-8).

The genital armature of the species of *Diplatys* so far known from Belgian Congo fall into four groups:

- A. - Metaparameres without digit-like epimerite.
 - I. *macrocephalus* Group — Metaparameres with incision, virga short ... (*D. macrocephalus*, *D. feae*).
 - II. *kivuensis* Group — Metaparameres simple, virga short (*D. kivuensis*).
- B. - Metaparameres with a digit-like epimerite.
 - III. *coriaceus* Group — Virga short (*D. coriaceus*, *D. conradti*).
 - IV. *burri* Group — Virga long. (*D. burri*, *D. schoutedeni*).

Key to Belgian Congo Species of Diplatys.

- 1 (14) Males.
- 2 (5) Head with distinct lateral carinae extending from eye to caudal margin; penultimate sternite slightly concave mesad; fully winged species.
- 3 (4) Lateral carinae very distinct and sharp; occipital area abruptly and strongly depressed, coarsely rugose. General colour liver-brown. Larger species 11-16 mm. Inner margin of parameres with circular incision (fig. 2). *D. macrocephalus* BEAUVOIS, 1805.

- 4 (3) Lateral carinae weaker; occipital area less abruptly depressed and differentiated from frontal area, less coarsely rugose. General colour blackish with knees and caudal margin of pronotum whitish. Smaller species, about 11 mm. Inner margin of parameres with linear incision (fig. 3). *D. feae* BORELLI, 1907.
- 5 (2) Head without lateral carinae.

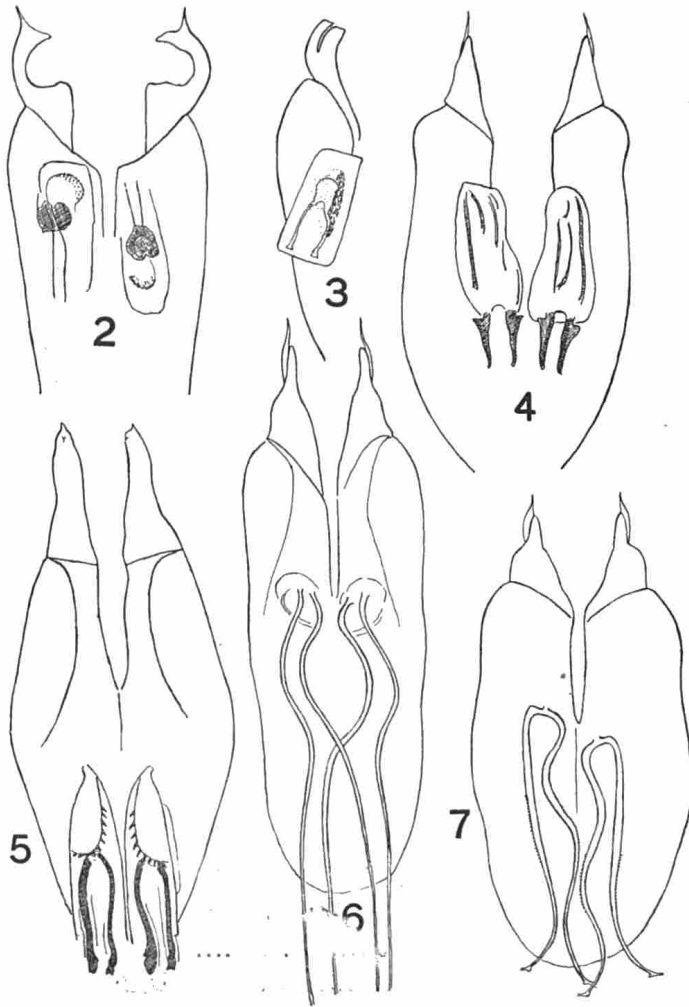


Fig. 2-7. — Male genitalia of *Diplatys* spp.
 2. *macrocephalus* (PALISOT DE BEAUVOIS). — 3. *feae* BORELLI (after MENOZZI).
 — 4. *coriaceus* (KIRBY). — 5. *kivuensis* n. sp.
 6. *schoutedeni* HINCKS. — 7. *burri* HINCKS.

- 6 (11) Penultimate sternite with large median emargination (figs. 9, 10, 12).
- 7 (8) Emargination of penultimate sternite bounded on each side by a pair of teeth (fig. 12). Parameres with digit-like epimerite; virga short and horny (fig. 4). Length 13-15 mm.
 *D. coriaceus* (KIRBY, 1891).

- 8 (7) Emargination of penultimate sternite simple, without lateral teeth (figs. 9, 10).
- 9 (10) Parameres with digit-like epimerite (fig. 8). Length 12 mm. *D. conradti* BURR, 1904.
- 10 (9) Parameres without digit-like epimerite (fig. 5). Length 14 mm. ... *D. kivuensis* sp. n.
- 11 (6) Penultimate sternite at most slightly concave mesad. (Parameres with digit-like epimerite).
- 12 (13) Tegmina and wings abbreviated; ultimate tergite strongly dilated; forceps dilated basad. Virga long with denticulate apex (fig. 7). Length 12.5 mm. *D. burri* HINCKS, 1936.
- 13 (12) Tegmina and wings complete; ultimate tergite and forceps moderately dilated. Virga long with apex simple (fig. 6). Length 11-11.5 mm. *D. schoutedeni* HINCKS, 1937.
- 14 (1) Females.
- 15 (16) General colour dark, almost black. Pronotum black with caudal margin whitish *D. feae* BORELLI, 1907.
- 16 (15) General colour lighter. Pronotum not contrastingly coloured black and white.
- 17 (18) Lateral carinae of head distinct. Pronotum narrow, sides more or less straight, converging caudad. *D. macrocephalus* (BEAUVOIS, 1805).
- 18 (17) Lateral carinae of head absent or indistinct. Pronotum broader, sides rounded.
- 19 (20) Penultimate sternite with narrow median lobe (fig. 11) *D. kivuensis* sp. n. or *D. conradti* BURR, 1904.
- 20 (19) Penultimate sternite broadly rounded.
- 21 (22) Head with indistinct lateral carinae; distinction between frontal and occipital areas more marked. *D. coriaceus* (KIRBY, 1891).
- 22 (21) Head without a trace of lateral carinae; distinction between frontal and occipital areas less marked *D. schoutedeni* HINCKS, 1937.

1. *Diplatys macrocephalus* (BEAUVOIS, 1805) (Figs. 1, 2).

Forficula macrocephala PALISOT DE BEAUVOIS, 1805, *Ins. Afr. Amer.* : 36, Orth. t. 1. f. 3 (♂, Benin).

Diplatys macrocephala SERVILLE, 1831, *Ann. Sc. Nat.* 22 : 33; 1839, *Hist. Nat. Ins. Orth.* : 51. — SCUDDER, 1876, *Proc. Boston Soc. nat. Hist.* 18 : 309. — BORMANS, 1900, *Das Tierreich*, 11 : 9 (pars) ♂ ♀, f. 5. — BURR, 1900, *Ann. Soc. ent. Belg.* 44 : 47; 1904, *Trans. ent. Soc. Lond.* 1904 : 279, 282. — (KIRBY, W. F., 1904, *Syn. Cat. Orth.* 1 : 1 (excl. syn. *raffrayi*)). — BORELLI, 1907, *Ann. Mus. Civ. Genova* (3) 3 : 346; (1909, *Il Ruwenzori*, 1 : 3 (sep.)).

Diplatys macrocephalus (1) BURR, 1911, *Trans. Ent. Soc. Lond.* 1911 : 24, 30, t. VII, f. 2, 2a, 2b; (1911, *Genera Insectorum*, 122 : 13); 1915, *Journ. R.*

1) *D. macrocephalus* ZACHER, 1911, *Zool. Jahrb.* 30 : 352 (Derema & Usambara) is not PALISOT DE BEAUVOIS' species. Cf. BURR, 1915, *Journ. R. Micr. Soc.*, 1915 : 426, pl. v. f. 14, and HINCKS, 1937, *Ent. monthly Mag.* 73 : 247.

Micr. Soc. 1915 : 426, t. V, f. 9. — (BORELLI, 1923, *Rev. Zool. Afr.* 11 : 412). — REHN, 1924, *Bull. Amer. Mus. nat. Hist.* 49 : 354, 402. — (MENOZZI, 1928, *Rev. Zool. Bot. Afr.* 16 : 29). — HINCKS, 1937, *Ent. monthly Mag.* 73 : 247-250, figs. (1).

Diplatys quaesitus REHN, 1924, *Bull. Amer. Mus. nat. Hist.* 49 : 355, f. 2-4, ♂ ♀, 402 (Belgian Congo : Faradje). — HINCKS, 1937, *Ent. monthly Mag.* 73 : 248-250.

Diplatys raffrayi BORELLI (*nec* BORMANS) (1923, *Rev. Zool. Afr.* 11 : 412). — (MENOZZI, 1935, *Rev. Zool. Bot. Afr.* 27 : 15).

Recorded distribution : Southern Nigeria, French Congo, Fernando Po, Belgian Congo and Uganda.

Recorded distribution in Belgian Congo : Boma; Stanley Pool; Katanga, Nyonga; Ituri, La Moto, Madyu; Ituri, Faradje; Cembisa (Thysville); Kisantu; Haut-Uele, Moto, Abimva; Kasai.

Material examined : 1 ♂ Katanga : Nyonga, V. 1925 (G. F. DE WITTE) (det. MENOZZI and recorded 1928); 1 ♂ (broken) Ituri : La Moto, Madyu (L. BURGEON) (det. BORELLI and recorded 1923); 1 ♂ Ituri : Faradje, 12. IV. 1930 (A. COLLART) (macrolabic form, recorded HINCKS, 1937); Cembisa (Thysville) 1934 (A. LEGROS) (brachylabic form recorded HINCKS, 1937); 1 ♂ Mutombo-Mukulu, 1936 (Dr. RICHARD); 1 ♀ (fragmentary) Kisantu (P. GILLET) (det. BORELLI as *raffrayi*, recorded 1923); 1 ♀ Haut-Uele : Moto, Abimva IV. 1925 (L. BURGEON) (det. MENOZZI as *raffrayi*, recorded 1935); 1 ♀ (fragmentary) Kasai (L. ACHTEN) (det. MENOZZI, recorded 1935); 2 ♀ ♀ Ituri : Faradje 24, III. 1930, 12, IV. 1930 (A. COLLART); 1 ♀ Albertville, end I. 1933 (L. BURGEON); 1 ♀ Katanga-Lubudi, VIII. 1945 (R. CLOSE).

The male of this species is polymorphic (HINCKS, 1937) and occurs in three forms :

Macrolabic : Ultimate tergite strongly inflated, lateral margins straight, subparallel; forceps dilated only at extreme base, there contiguous mesad for a short distance; the branches taper strongly and are falcate, enclosing a transverse oval space. Length 15-16 mm. This form was described by REHN (1924) as a distinct species under the name of *quaesitus*.

Normal : Ultimate tergite less inflated, its lateral margins gently arcuate; forceps dilated and contiguous in proximal third, feebly arcuate and tapering distad enclosing an elliptical space. Length 14 mm.

Brachylabic : Apex of abdomen of female type. Ultimate tergite only slightly inflated; forceps simple, straight and contiguous. Length 11 mm.

The male genitalia of this species (fig. 2) are distinctive and render its identification easy. The characters of the ultimate tergite and forceps, on

1) I should like to take this opportunity of correcting some errors in this paper. On page 249 the length of the *macrocephalus* variants should read: 15, 16, 14 and 11 mms, instead of 25, 26, 24 and 21 despectively. The figure of this species given by PALISOT is misquoted; it is pl. 1, f. 3 (not f. 5).

the other hand, are unreliable because of their variability. Females are difficult to identify but the head in both sexes appears to offer useful characters as indicated in the key. Females have been compared with specimens in the BURR collection at the British Museum and appear to agree.

D. raffrayi (BORMANS, 1879 = DUBRONY) owes its inclusion in the Belgian Congo list to a fragmentary specimen from Kisantu recorded by BORELLI (1923) and three females (two of which are damaged) recorded by MENOZZI (1935). These identifications cannot be relied on in the absence of males, and as no females of *D. macrocephalus* have been recorded hitherto from Belgian Congo, the specimens (all of which have been re-examined) together with several other females, are regarded as belonging to the present species and are recorded above. Writing in 1911 BURR expressed a doubt concerning the West African records of *D. raffrayi* which he stated « is only known decidedly from Zanzibar. It probably replaces *D. macrocephalus* in East Africa ». That *D. raffrayi* is distinct may be seen from BURR's (1915) figure of the male genitalia but it seems quite inadmissible to have included it in the Belgian Congo list on females only when females of the closely allied *D. macrocephalus* had not been recorded.

2. *Diplatys feae* BORELLI, 1907. (Fig. 3).

Diplatys feae BORELLI, 1907, *Ann. Mus. Civ. Genova* (3) 3 : 347 (♀, Fernando Po). — BURR, 1911, *Trans. ent. Soc. Lond.*, 1911 : 44; (1911, *Genera Insecurum*, 122 : 14). — MENOZZI, 1935, *Rev. Zool. Bot. Afr.* 27 : 15, f. 1, ♂ (Genitalia and penultimate sternite). — REHN, 1936, *Proc. Acad. Nat. Sci. Philad.*, 38 : 507.

Recorded distribution : Fernando Po, Belgian Congo.

Recorded distribution in Belgian Congo : Kai Bumba; Luebo, Kamaiembi; Haut-Uele, Dika and Tuku; Penge; Kibali-Ituri, Saidi's Village.

Material examined : 1 ♂ Kai Bumba, 10. X. 1920 (H. SCHOUTEDEN) [det. MENOZZI, recorded 1935]; 1 ♂ (damaged) Ubangi : Motenge-Boma, 22. XII. 1921 (H. J. BRÉDO).

MENOZZI (1935) has studied this species and figured the genitalia and penultimate sternite of the previously unknown male. The figure of the genitalia is copied here (fig. 3) and indicates a close relationship with *D. macrocephalus* which appears to be confirmed by the external characters. The metaparameres in *D. feae* are broad distad with a linear incision near the apex. The latter is broader and larger in *D. macrocephalus* which also differs in the shape of the metaparameres and in the structure of the praeputial sac.

Colouration is not a character to which any great importance can be attached in this genus but it is rather striking in the present species. The general colour is very dark brown to black, rather dull, with the basal segments of the antennae yellowish, gradually passing into brown. The coxae and knees are yellowish and the pronotum is bordered caudad and laterad with whitish. The eyes are prominent and coarsely faceted.

The lateral cephalic carinae are short and ill defined, extending caudad from the eyes. A short distance mesad a strong oblique ridge is directed from the eye and two weak, shorter linear elevations from the tumid frons occupy the centre of the occiput. REHN (1936) has recorded 3 ♂♂ from the Kibali-Ituri district and regarded the species in the male as distinctive because of the caudal narrowing of the pronotum, the emargination of the penultimate sternite and the distribution of dull black and yellowish white in the colour pattern. In discussing the records of MENOZZI and that of his own REHN says « apparently the species is one of the West African Forest Province, but not limited to the circumscribed true Forest Subprovince ».

3. *Diplatys coriaceus* (KIRBY, W. F. 1891). (Figs. 4, 12).

Forficula coriacea KIRBY, 1891, *Journ. Linn. Soc., Lond.* 23 : 525 (♀, Sierra Leone). — BORMANS, 1900, *Das Tierreich*, 11 : 127 (♀, copia).

Diplatys coriacea (KIRBY) BORELLI, 1907, *Ann. Mus. Civ. Stor. Nat. Genova* (3) 3 : 346 (♂) (? this species); 1923, *Rev. Zool. Afr.* 11 : 413. — BURR, 1911, *Trans. Ent. Soc. Lond.* 1911 : 44 (♀); 1911, *Genera Insectorum* 122 : 14.

Diplatys coriaceus (KIRBY) MENOZZI, 1935, *Rev. Zool. Bot. Afr.* 27 : 17, f. 2 (♂). — HINCKS, 1936, *Proc. R. Ent. Soc. Lond.* (B) 5 : 126, 128; 1937, *Entom. Mon. Mag.* 73 : 38.

Diplatys sp. n. BURR, 1915, *Journ. R. Micr. Soc.* 1915 : 426, pl. V, f. 12.

Recorded Distribution : Sierra Leone, Portuguese Guinea, Cameroons, Belgian Congo.

Recorded distribution in Belgian Congo : Ituri : Mahagi; Haut-Uele : Yebo-Moto; Haut-Uele : Moto; Haut-Uele : Tuku.

Material examined : 1 ♂ Faradje : Maruka, 25. II. 1930 (A. COLLART); 1 ♂, 1 ♀, Ituri : Faradje, 9. III, 23. III. 1930 (A. COLLART); 1 ♂ Duriabe (Faradje) (A. COLLART); 1 ♂ Sesenge (Faradje) 17. II. 1930 (A. COLLART). I have also examined the specimen recorded by BORELLI (1923) and the three examples listed by MENOZZI (1935); they are as follows : Haut-Uele : Moto, 1920 (L. BURGEON) (det. BORELLI); Haut-Uele : Yebo-Moto, IV. 1926 (L. BURGEON); Ituri (Mahagi) Ambaki, 28. II. 1929 (A. COLLART); Haut-Uele : Tuku, III. 1919 (P. VANDEN PLAS) (det. MENOZZI).

The characteristic genital armature and penultimate sternite are described and figured by MENOZZI (1935) whose association of these male characters with the hitherto problematic female *Forficula coriacea* of KIRBY was independantly confirmed by the writer (HINCKS, 1936).

4. *Diplatys burri* HINCKS, 1936 (Fig. 7).

Diplatys burri HINCKS, 1936, *Proc. R. Ent. Soc. Lond.* (B) 5 : 127, f. 1 et 2 (♂, Belgian Congo : Ituri, Genge); 1937, *Ent. Mon. Mag.* 73 : 38.

Material examined : 2 ♂♂, Ituri : Genge, 15.III.1929 (A. COLLART). (Holotype and Paratype).

This species is at present known only from the above specimens. The genital armature (Fig. 7) suggests a close relationship to *D. schoutedeni* and *D. coriaceus*. The presence of distinct teeth along the mid external margins of the virga and the series of similar teeth at the apex are a striking feature of the genitalia in this species.

5. *Diplatys schoutedeni* HINCKS, 1937. (Fig. 6).

Diplatys schoutedeni HINCKS, 1937, *Ent. Mon. Mag.* 73 : 38, 39, f. 1, (♂ ♀, Belgian Congo : Sandoa).

Material examined : 1 ♂, 1 ♀, Sandoa, VI. 1932 (F. G. OVERLAET). (Holotype and Allotype).

The presence of a long slender epimerite attached to the metaparameres is shared by *D. burri* HINCKS and *D. coriaceus* (KIRBY). *D. schoutedeni* is very closely allied to *D. burri* but differs in the very long unarmed virga, complete tegmina and wings, and in the but slightly dilated ultimate tergite and forceps.

6. *Diplatys conradti* BURR, 1904. (Figs. 8, 9).

Diplatys conradti BURR, 1904, *Trans. ent. Soc. Lond.*, 1904 : 278, 281, (♂, North Cameroons, Joh.-Albrechtshöhe). — 1911, ZACHER, *Zool. Jahrb.* 30 : 353, f. F1, G1 (North Cameroons, Joh. Albrechts-Höhe). — BURR, 1911, *Trans. Ent. Soc. Lond.*, 1911 : 26, 32, pl. VII, f. 11, 11 a. — BORELLI, 1923, *Rev. Zool. Afr.* 11 : 413 (Belgian Congo : Dungu).

Recorded Distribution : Cameroons, Belgian Congo.

Recorded Distribution in Belgian Congo : Dungu.

Material examined : Belgian Congo : Dungu, IX. 1919. (P. VAN DEN PLAS), 1 damaged male, det. A. BORELLI as *D. conradti* BURR ?

The unique type of *D. conradti* in the BURR collection at the British Museum (Nat. Hist.) is in very bad condition. The genital armature however is very distinctive and proves to be identical with that figured by ZACHER as BURR's species. BURR (1915, *Journ. R. Micr. Soc.* 1915 : 426) has stated that ZACHER was wrong in this identification but it is now evident that the latter was quite correct and that BURR himself had failed to identify correctly his own species. I have not been able to trace the specimen referred to in 1915 from the Cameroons so that its identity cannot be established except in so far as BURR states that the genitalia are the same as those figured by ZACHER as *D. aethiops* (not of BURR), a species still unidentified.

In 1912 BURR (*Ann. K. K. Naturh. Hofmus. Wien*, 26 : 66) recorded a female from Cameroons : Mundame and two females from the Gold Coast as *D. conradti* BURR ?. These records are extremely doubtful indeed and the same remark must also apply to the record of a female from Fernando Po by BORELLI in 1907 (*Ann. Mus. Civ. Stor. Nat. Genova* (3) 3 : 346).

In 1923 the same author recorded a headless male as *D. conradti* BURR ?

from Belgian Congo : Dungen. This specimen has been examined. The genitalia have been removed and unfortunately are not preserved with the specimen. BORELLI however states that they agree with that figured by ZACHER as *conradti*. It seems clear therefore that *D. conradti* is a member of the present fauna.

The material of this species so far examined is so fragmentary that it has not been possible to discover any satisfactory external character separating it from the following species, which, however, differs very markedly in the male genital armature. If, however, the Dungen example is correctly identified there is a difference in the form of the emargination of the penul-

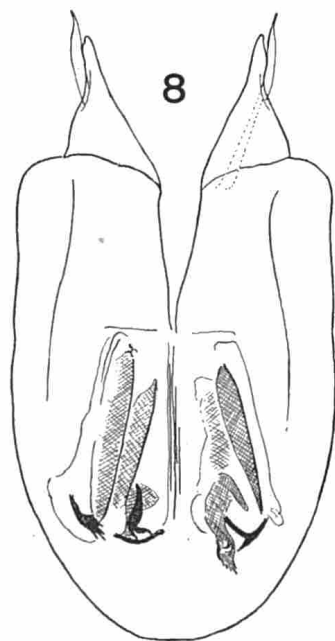


Fig. 8. — Male genitalia of *Diplatys conradti* BURR. Type.

time sternite which is bounded, in *conradti*, by a right angle but is rounded laterad in *D. kivuensis* n. sp. (figs. 9, 10). This has not been checked by an examination of the fragmentary type of *conradti* as that specimen has been gummed to a card to secure its survival.

7. *Diplatys kivuensis* sp. n. (Figs 5, 10, 11).

♂, Head black, rest of body brown; antennae, legs, lateral pronotal margins, part of underside and forceps lighter brown.

Head: Occiput depressed; sutures and carinae obsolete.

Antennae 14-segmented (broken).

Pronotum a little longer than broad, contracted behind; lateral margins strongly convex; caudal margin truncate.

Tegmina long, more than twice as long as pronotum; caudal margins slightly convex. *Wing scales* long, almost as long as pronotum.

Abdomen slender; ultimate tergite only slightly broader than preceding segments, caudal margin slightly concave mesad, the concavity bounded on either side by slight tumidities above roots of forceps, thence margin is markedly oblique. *Forceps* simple and gynecoid, straight, contiguous, tapering, apices crossed; inner margins crenulate; pygidium hidden. *Penultimate sternite* strongly and deeply emarginate mesad, outer edges of emargination rounded-off into outer margin of sternite without any trace of angle; median area of sternite behind emargination somewhat depressed. *Genitalia* (fig. 5)

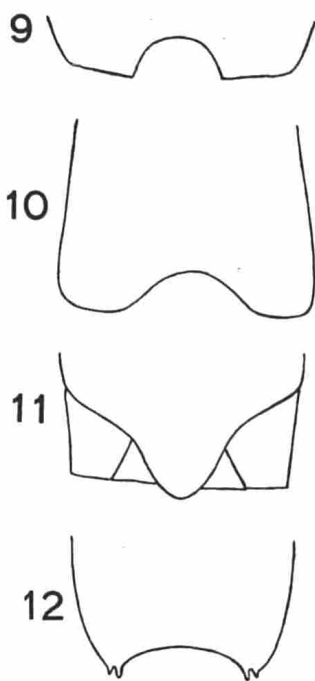


Fig. 9-12. — Penultimate sternite of *Diplatys* spp.
9. *conradti* BURR, male. — 10. *kivuensis* n. sp., male. — 11. ditto female. —
12. *coriaceus* (KIRBY), male.

characteristic; metaparameres neither emarginate nor bearing digit-like epimerite, having two small denticles at apex; virga short and stout; base of penis heavily armed with strong teeth. *Length* 12 mm. (excl. forceps), forceps 2 mm.

HOLOTYPE: Male, Kivu: Rwankwi, IV. 1946 (J. V. LEROY) (Coll. Mus. Congo).

♀. Agrees with above male in all characters including structure of ultimate tergite and forceps. The latter however are somewhat more slender in the female. Tegmina and wing-scales a little darker in colour, a median longitudinal dark mark present on ultimate tergite. Caudal margin of penul-

time sternite (fig. 11) triangular, rounded distad. Length 12 mm. (excl. forceps), forceps 2 mm.

ALLOTYPE: Female, Mongbwalu (Kilo), 1938 (M^{me} SCHEITZ) (Coll. Mus. Congo).

The male of *D. kivuensis* is almost identical in all external characters with *D. conradti* BURR. There appears to be some difference in the form of the emargination of the penultimate sternite (figs. 9, 10) and there is a very marked dissimilarity in the genitalia of the two species (figs. 5, 8).

The female recorded above is associated with the present species with some doubt. It might have been placed equally well as the female of *D. conradti*.

Subfamily **KARSCHIELLINAE**

Karschiellinae BURR, 1909, *Deutsch. Ent. Zeitschr.* 1909 : 322; 1911, *Genera Insectorum*, 122 : 11, 14, 15; 1915, *Journ. R. Micr. Soc.* 1915 : 424, 429.

Karschiellidae VERHOEFF, 1902, *Zool. Anz.* 25 : 183. — ZACHER, 1911, *Zool. Jahrb.* 30 : 346.

This interesting and well marked group was erected by VERHOEFF in 1902 and by him given full family rank. Its composition has remained the same since its erection but it was reduced to subfamily status by BURR in 1909. The two genera falling here, *Karschiella* and *Bormansia*, are particularly closely allied and it is doubtful whether the distinction between them will be maintained with increased knowledge.

The subfamily is confined to the Ethiopian region and according to REHN (1924) « *Karschiella* is a Forest Province equivalent of the Savannah Province *Bormansia* ». The map given by REHN (1924; p. 358, fig. 5) shows *Karschiella* as having a western and central distribution whilst *Bormansia* occurs over a large eastern area. The distributional limits of these genera have been extended, however, since REHN's paper, by the discovery of *Karschiella pygmaea* REHN, 1933, and *Bormansia monardi* MENOZZI, 1937, both from Angola.

The *Karschiellinae* share with the *Diplatyinae* a character almost unique in living true Earwigs, the possession of segmentate nymphal cerci. In the present subfamily the basal segment of the nymphal cerci is very long and the adult forceps develop within it. In *Bormansia africana* at least, this segment has a series of basally directed spinules along the inner margin. Beyond the basal segment REHN records 15-16 segments, of which the proximal four or five have a single basally directed spinule.

The facies of the *Karschiellinae* are very distinctive and render their recognition easy. The robust form, stout antennae, apterousness, characteristic sternal plates and asymmetrical male forceps are amongst the characters which strike the eye at once.

The following attempt has been made to provide a key to the males of all the known members of the sub family except *K. bidentata* ZACHER.

Key to Species of Karschiellinae (males).

- 1 (8) Rudimentary tegmina present, fused to mesonotum **Karschiella** VERHOEFF, 1902 (1).
- 2 (3) Ultimate tergite of ♂ without caudad projecting processes but with well-marked longitudinal dorso-lateral carinae; parameres with a short tooth (fig. 14) *K. neavei* BURR, 1909.
- 3 (2) Ultimate tergite of ♂ with caudad projecting processes.

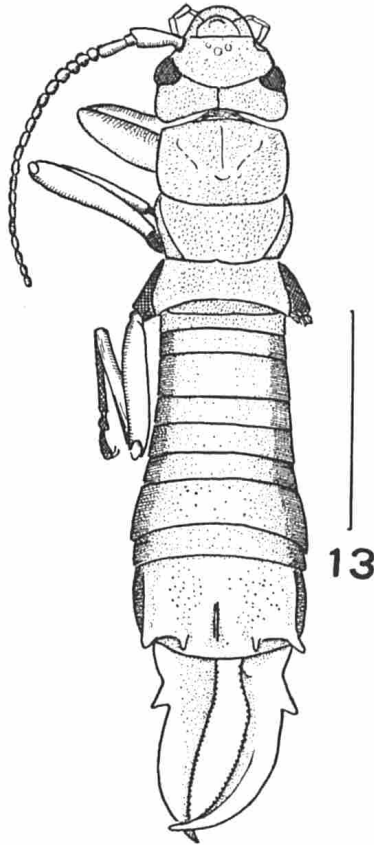


Fig. 13. — *Bormansia africana* VERHOEFF. Mâle.

- 4 (5) Pronotum decidedly transverse; anal processes diverging (?); inner tooth of parameres inserted at a right angle, short (fig. 15) *K. camerunensis* VERHOEFF, 1902.
- 5 (4) Pronotum not transverse.
- 6 (7) Size smaller (about 15 mm.); medio-longitudinal sulcation of pronotum very weak *K. pygmaea* REHN, 1933 (2).

1) *bidentata* ZACHER 1911, *Zool. Jahrb.*, **30**: 350, fig. Z, 349, ♂ Cameroons, is not included as it is insufficiently described. It is closely allied to *camerunensis* and *büttneri* and, according to REHN (1933), is not identical with *neavei* as presumed by BURR (1915).

2) REHN, 1933, *Trans. Amer. Ent. Soc.* **59**: 3-6, fig. 1, 2; ♂ ♀ Angola.

- 7 (6) Size larger (about 21 mm.); medio-longitudinal sulcation of pronotum strong and deep; anal processes parallel; parameres with inner tooth long, inserted at an acute angle (fig. 16) . *K. büttneri* (KARSCH, 1886).
- 8 (1) Tegmina entirely absent **Bormansia** VERHOEFF, 1902.
- 9 (16) Forceps of ♂ with strong basal projection directed outwards.
- 10 (11) Dextral branch only of forceps of ♂ armed; metaparameres trilobed (fig. 17) *B. monardi* MENOZZI, 1937 (1).
- 11 (10) Both branches of forceps armed at base.
- 12 (13) Size smaller (about 18 mm.); metaparameres (fig. 18) *B. orientalis* BORELLI, 1912 (2).
- 13 (12) Size larger (about 20-26 mm.).
- 14 (15) Metaparameres (fig. 20) *B. africana* VERHOEFF, 1902.
- 15 (14) Metaparameres (fig. 19) *B. impressicollis* VERHOEFF, 1902 (3).
- 16 (9) Forceps of both sexes unarmed at base *B. meridionalis* BURR, 1904 (4).

Karschiella VERHOEFF, 1902.

Karschiella VERHOEFF, 1902, *Zool. Anz.* **25** : 183. — (KIRBY, 1904, *Syn. Cat. Orth.* **1** : 13, genotype *Pygidicrana büttneri* KARSCH). — ZACHER, 1911, *Zool. Jahrb.* **30** : 348, 349. — BURR, 1911, *Genera Insectorum*, **122** : 15; 1915, *Journ. R. Micr. Soc.* **1915** : 429. — REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* **49** : 403, f. 5, p. 358.

Readily recognized by the presence of rudimentary tegmina attached to the mesonotum, differing in this respect from *Bormansia* which is totally apterous. The species are difficult to distinguish by external characters owing to the inadequacy of existing descriptions. The male genitalia, however, appear to offer trustworthy criteria for specific separation.

I have seen so far Belgian Congo examples of *K. neavei* only, but another species may be represented in the material belonging to the Congo Museum by a single female from Mayidi, 1942 (Rév. P. VAN EYEN).

8. *Karschiella büttneri* (KARSCH, 1886). (Fig. 16).

Pygidicrana büttneri KARSCH, 1886, *Berl. Ent. Zeitschr.* **30** : 86, pl. III, f. 4, ♂ [Kuako to Kimpoko (Belgian Congo)]. — BORMANS, 1900, *Das Tierreich.* **11** : 22.

Karschiella büttneri (KARSCH) VERHOEFF, 1902, *Zool. Anz.* **25** : 184. — (KIRBY, 1904, *Syn. Cat. Orth.* **1** : 13). — ZACHER, 1911, *Zool. Anz.* **30** : 348, 349,

1) MENOZZI, 1937, *Rev. Suisse Zool.* **44** : 444, fig. I, 2, ♂ ♀ Angola.

2) BORELLI, 1912, *Bull. Mus. Hist. Nat. Paris*, **1912**, N° 4 : 1, ♂ Mozambique, Province of Gorongosa. See also MENOZZI, 1936, *Mem. Mus. Zool. Coimbra* (1) N° 95 : 3, 4, fig. A,

3) VERHOEFF, 1902, *Zool. Anz.* **25** : 184, ♀ Tanganyika: Taita Dist. This species is listed by MENOZZI (1935) as occurring in the Belgian Congo but as far as we know it is not yet definitely recorded. See note on p. 30.

4) BURR, in DISTANT, 1904, *Ins. Transv.* : **97**, pl. 5, f. B, ♂ Transvaal: Zoutpansberg.

f. A'III. — (BURR, 1911, *Genera Insectorum*, 122 : 15); 1915, *Journ. R. Micr. Soc.* 1915 : 429, pl. V. f. 19. — (REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* 49 : 403).

Recorded distribution : Belgian Congo : Kuako to Kimpoko.

This species does not appear to have been recognized since its original description.

9. ***Karschiella camerunensis*** VERHOEFF, 1902. (Fig. 15).

Karschiella camerunensis VERHOEFF, 1902, *Zool. Anz.* 25 : 184 ♂ (Cameroons). (KIRBY, 1904, *Syn. Cat. Orth.* 1 : 13). — BURR, 1908, *Ann. Soc. Ent. Belg.* 52 : 34; 1910, *Proc. U. S. Nat. Mus.* 38 : 444; 1911, *Genera Insectorum*, 122 : 15, pl. 1, f. 1, 8a, 8b, 8c, 8d; 1915, *Journ. R. Micr. Soc.* 1915, 429, pl. V, f. 18. — (BORELLI, 1914, *Boll. Lab. Zool. Portici* 8 : 264). — (REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* 49 : 403).

Karschiella kamerunensis (VERHOEFF) ZACHER, 1911, *Zool. Jahrb.* 30 : 348, 349, f. y, A' II.

Bormansia meridionalis REHN (*nec* BURR, 1904), 1905, *Proc. U. S. Nat. Mus.* 29 : 504 (Belgian Congo : Luebo).

Bormansia lictor BURR, 1907, *Dtsch. ent. Zeit.* 1907 : 487, ♂ (Cameroons).

Recorded distribution : Cameroons, Belgian Congo.

10. ***Karschiella neavei*** BURR, 1909. (Fig. 14).

Karschiella neavei BURR, 1909, *Ann. Soc. Ent. Belg.* 53 : 96 ♂ ♀ (Belgian Congo : Katanga, Kambove 4.000-5.000 ft.); (1911, *Genera Insectorum* 122 : 15); 1915, *Journ. R. Micr. Soc.* 1915 : 429, pl. V, f. 20, 21. — REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* 49 : 403; 1933, *Trans. Amer. ent. Soc.* 59 : 2. — (MENOZZI, 1928, *Rev. Zool. Bot. Afr.* 16 : 30; 1935, *loc. cit.* 27 : 18).

Recorded distribution : Belgian Congo - Katanga : Kambove, Katanga : Kabelwe, Katanga : Lubumbashi. Northern Nigeria.

Material examined : 1 ♂, Lomami : Kipanga V. 1931 (FR. QUINTIN) (length, incl. fcps. 33 mm.). 1 ♂, 1 ♀, Lulua : Sandoa, XI, XII. 1931 (F. G. OVERLAET) (length, ♂ incl. fcps. ± 38 mm.; ♀ 34 mm.). 1 ♂, 1 ♀, Sakania XI, XII. 1932 (Dr. POYER) (length ♂ incl. fcps. 36 mm., ♀, 32 mm.). 1 ♀ Ituri : Lama-Lama 6. IX. 1929 (A. COLLART). 1 ♂ Katanga : Luashi XII. 1933 (FREYNE) (length 33 mm.).

The Ituri female may belong to another species as it is much below average size, the tip of the abdomen is missing, however. The Lulua and Sakania specimens have been inexpertly repaired so that it is only possible to give their approximate measurements.

K. neavei is structurally quite distinct from the other species of the genus. REHN (1933) says « it differs from other known species of similar proportions (*büttneri* and *camerunensis*) in a number of structural details, such as the exact shape of the pronotum, of the coalesced tegmina and the form

and sculpture of the anal segment of the male it may be noted that no caudad projecting processes are indicated, although longitudinal dorso-lateral carinae are well marked ».

BURR (1915) suggested the synonymy of this species with *K. bidentata* ZACHER, 1911. It seems certain, however, that REHN (1933) was correct in rejecting this synonymy as ZACHER's figure shows distinct caudad projecting processes. Of the identity of *K. bidentata* nothing more can be said until the type is re-examined. ZACHER's remarks merely consist of two lines of « description ».

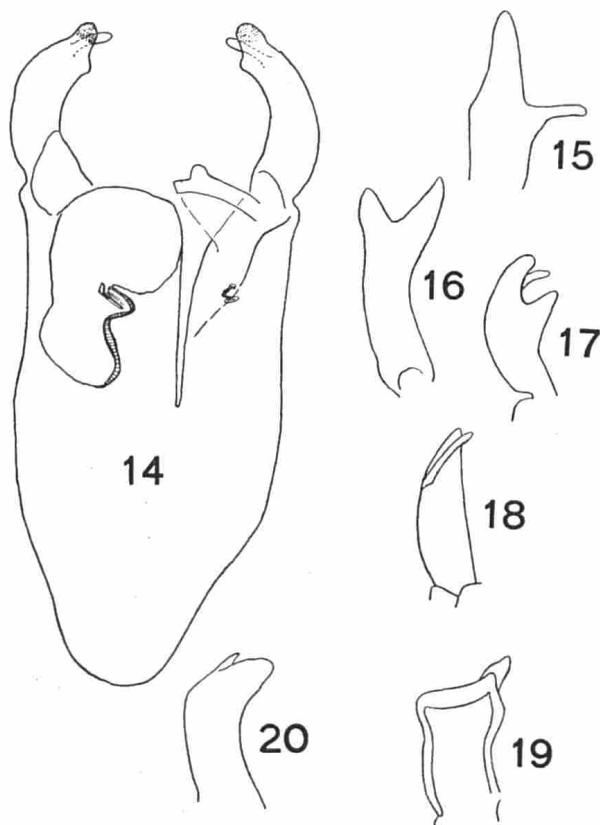


Fig. 14-20. — 14. Male genitalia of *Karschiella newei* BURR. — 15. Paramere of *K. camerunensis* VERHOEFF. — 16. Paramere of *K. büttneri* (KARSCH). — 17. Paramere of *Bormansia monardi* MENOZZI. — 18. Paramere of *B. orientalis* BORELLI. — 19. Paramere of *B. impressicollis* VERHOEFF. — 20. Paramere of *B. africana* VERHOEFF, (fig. 15, 16, 19, 20 after ZACHER; fig. 17 & 18 after MENOZZI).

Descriptive notes : Large, heavily built species. Anterior parts varying from reddish brown with abdomen and femora, except base and apex, dark brown, to almost entirely piceus. *Head* subcordiform; sutures deeply impressed and strong throughout; surface strongly granulate; occiput laterad with three moderately clear longitudinal carinae. *Eyes* small, shorter than first antennae segment. *Antennae* short and stout (broken in all specimens examined); first segment stout; second very short; third long, as long as three

following segments combined; fourth to sixth transverse; from seventh onwards progressively more elongate. *Pronotum* slightly narrower than head, about as long as broad or slightly transverse, rounded in front with rounded cephalic angles; caudal angles more broadly rounded; caudal margin nearly truncate or very slightly convex; sides subparallel; surface granulate with a few scattered larger granules on disc and on caudal margin; prozona tumid, well marked and separated from metazona mesad by strong, curved, transverse impression; median sulcus strong in front, evanescent behind; lateral margin reflexed. *Tegmina* reduced to short oblique flaps, shorter than pronotum, strongly and completely keeled laterad, rounded distad. *Wings* absent. *Abdomen* of male progressively expanded to ultimate tergite which is broadest segment, being considerably broader than head, granulate-punctate; surface with fine reddish brown pubescence giving the abdomen, in good specimens, a sericeous appearance. In female abdomen more gradually and less strongly expanded to ultimate tergite. *Ultimate tergite* very large in male, subquadrate, somewhat deplanate above with indistinct longitudinal median impression; sculpture and pubescence evident; declivity with small median tubercle or pair of tubercles situated above medially prominent caudal margin; laterad with well marked keel, especially distad, where it takes the form of a triangular tooth projecting beyond the recurved caudal margin. In female this tergite is narrower, the tubercles and carinae being absent. *Forceps* of male asymmetrical, flattened, recurved distad; base with externomarginal tooth; inner margin crenulate; simple, symmetrical, in female, without basal tooth. *Legs* stout; femora strongly longitudinally carinate; tibiae compressed; tarsi stout and broad, strongly pubescent. Sternal plates broad. Underside of abdomen strongly pubescent. *Genitalia* (fig. 14). *Length* of male, excl. forceps, 23-25 mm., forceps 6-8 mm.; of female 28 mm.; forceps 6 mm.

Bormansia VERHOEFF, 1902.

Bormansia VERHOEFF, 1902, *Zool. Anz.* **25** : 184. — (KIRBY, 1904, *Syn. Cat. Orth.* **1** : 13, genotype *Bormansia africana* VERHOEFF). — BURR, 1904, *Trans. ent. Soc. Lond.* : 286; 1911, *Genera Insectorum* **122** : 15; 1915, *Journ. R. Micr. Soc.* **1915** : 430. — ZACHER, 1911, *Zool. Jahrb.* **30** : 348. — REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* **49** : 358, fig. 5, 403.

This genus differs almost solely from *Karschiella* in the absence of rudimentary termina. The mesonotum bears a strong costal keel and is truncate caudad. The metanotum is emarginate caudad and not fused with the first abdominal segment.

Only a single species, *B. africana* VERHOEFF, 1902, has been recorded so far from the Belgian Congo. MENOZZI (1935) also included in the list of species at the end of his paper, *B. impressicollis* VERHOEFF, 1902, but I have failed to trace any definite Belgian Congo record. This species, if it is really distinct from *B. africana*, is recorded from Uganda, Kenya & Tanganyika, and there is no reason why it should not occur in the present territory as

B. africana has a similar distribution. However, *B. impressicollis* is rather doubtfully distinct from *B. africana* and the supposed differences in the parameres were illustrated by ZACHER (1911) whose figures are copied here (figs. 19, 20).

11. ***Bormansia africana*** VERHOEFF, 1902. (Figs. 13, 20).

Bormansia africana VERHOEFF, 1902, *Zool. Anz.* 25 : 184, ♂ ♀ (Tanganyika). — (KIRBY, 1904, *Syn. Cat. Orth.* 1 : 13). — ZACHER, 1911, *Zool. Jahrb.* 30 : 348, 349, f. A'I. — (BURR, 1911, *Genera Insectorum*, 122 : 15 (excl. syn.)); 1915, *Journ. R. Micr. Soc.* 1915 : 430, pl. V, f. 22. — BORELLI, 1915, *Voy. ALLUAUD & JEANNEL, Afr. Orient. Dermaptera* : 5, pl. I, figs. 2 & 3; (1923, *Rev. Zool. Afr.* 11 : 413). — REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* 49 : 359 f. 6, 7, 403. — (MENOZZI, 1935, *Rev. Zool. Bot. Afr.* 27 : 18); (1938, *Mission Scient. de l'Omo* (Mus. Hist. Nat. Paris) 4 : 135).

Recorded distribution : Belgian Congo; Uganda; Kenya; Tanganyika.

Distribution in Belgian Congo : Medje; Garamba; Kibombo; Ituri : Ukasere & Matongo.

Material examined : 2 ♀ Mahagi-Niareembe 1935 (CH. SCOPs). 1 ♂, 1 ♀ Ruanda : Kibungu X-XII. 1937 (R. VERHULST). 1 ♂ Ruanda : Nyansa V. 1946 (A. LESTRADE). 1 ♂ Ruanda : Astrida (forêt) 1947 (A. LESTRADE). 1 ♀ Kisantu (R. P. VAN WING). 1 ♀ Kibali-Ituri : Geti 1934 (CH. SCOPs). 2 ♀ ♀ I nymph, Mayidi 1942, 1945 (Rév. P. VAN EYEN).

The genitalia of the males agree with the figures of ZACHER and BURR and there can be little doubt that the identification is correct. The specimens recorded agree well with the published descriptions and the males with the figure given by BORELLI (1915).

Subfamily **PYGIDICRANINAE**

Pygidicraninae BURR, 1908, *Ann. Mag. Nat. Hist.* (8) 2, 383; 1909, *Dtsch. ent. Z.* 1909, 322; 1910, *Fn. British India, Dermaptera*, 38-53; 1911, *Genera Insectorum*, 122 : 16; 1915, *Journ. R. Micr. Soc.* 1915 : 424, 430.

In his last revisional work on Dermaptera, BURR (1915-16) considerably modified his earlier (1908) generic arrangement of this subfamily by introducing the genitalia as a primary character. The redefined genera are definitely superior to the older ones and one of them, *Dicrana* (BURR 1908) emend. BURR 1915, occurs in the Belgian Congo. Two other genera of uncertain status occur in Africa, both of which will probably prove to be inseparable from *Dicrana*. *Dacnodes* BURR, 1907, (erroneously renamed *Acnodes* by BURR in 1911) has for its type *D. wellmani* BURR, 1907, from Portuguese West Africa, and differs solely from *Dicrana*, according to BURR, in being entirely apterous. A further species, *D. americana* (BURR, 1911) from Bolivia, has been incorrectly associated with *Dacnodes*. The other African genus is *Pi-*

crania BURR, 1908, the only definite species of which is the genotype, *Forficisila liturata* STAL, 1855, from South Africa.

Surprisingly little is known of the habits and life histories of these striking and distinctive insects. BURR (1910) gives a few fragmentary details regarding an Indian and a Cingalese species.

Most of the species are medium to large sized insects which have a distinctive facies rendering their recognition easy.

The subfamily is widely distributed throughout the Ethiopian, Oriental and Neotropical regions.

Genus **DICRANA** (BURR, 1908) emend. BURR, 1915.

(Genotype: *Pygidicrana frontalis* KIRBY, 1903, selected by BURR, 1908). *Dicrana* BURR, 1908, *Ann. Mag. Nat. Hist.* (8) 2 : 387 (pars); 1911, *Genera Insectorum*, 122 : 19 (pars); 1915, *Journ. R. Micr. Soc.* 1915 : 431, 433. — HINCKS, 1939, *Ent. Mon. Mag.* 75 : 236.

The head is broader than the pronotum. The penultimate ventral segment in the male is broad. The male parameres are lanceolate with a long narrow internal tooth which may be entire, or more usually, bifid distad. The genus occurs only in Africa.

The species are closely allied and have frequently been misidentified. Doubtless if it were possible to study all the original types determination could be much simplified, but such a revision has not been possible up to the present.

Hitherto seven species have been recorded as occurring in Belgian Congo but two of them, *D. caffra* (DOHRN, 1867) and *D. livida* (BORELLI, 1907), were introduced in error by MENOZZI (1935) presumably because they appeared in REHN's catalogue (1924), although they were not there recorded from Belgian Congo, as REHN expressly states « in addition to those forms which have been definitely recorded from the Belgian Congo, we are including a number of species which have been reported from localities in Uganda and East Africa, within extremely short distances of the Belgian Congo, and which will in all probability be found in the area under consideration ». Belgian Congo records of four of the five remaining species, namely *D. wigginsi* BURR, 1914, *D. separata* BURR, 1908, *D. bettoni* (KIRBY, 1903), and *D. frontalis* (KIRBY, 1903), appear to be in some confusion. Fortunately they are few in actual numbers as these insects are rare in collections and consequently it has been possible to correct several of the inaccuracies by a re-examination of the recorded specimens. The results of this revision appear below under the respective species, but as an indication of the difficulties of accurate specific identification in this genus it may be mentioned that the *D. bettoni* of BORELLI is *D. wigginsi*, *D. frontalis* of MENOZZI is *D. bettoni*, and *D. wigginsi* of MENOZZI is *D. separata*!

D. frontalis (KIRBY), the genotype, does not actually occur in the Belgian Congo. It has not been correctly recognized since its original description in

1903. On external characters it appears to be barely distinct from *D. separata* BURR but the examination of a paratype in the British Museum (Nat. Hist.) revealed that the genitalia of the two species are abundantly distinct. In view of the importance of recognizing the genotype of *Dicrana* a brief re-description is included below.

The most satisfactory method of determining the species of *Dicrana* is by an examination of the male genitalia, and the following key includes

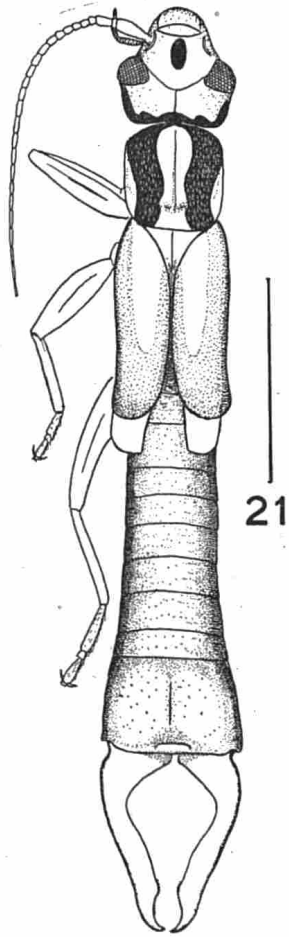


Fig. 21. — *Dicrana separata* BURR, male.

such characters. The key and the description of a new species from the Belgian Congo were published by the writer in 1939. *D. burri* HINCKS brings the total number of recorded species from the territory under consideration to five.

Unspecified records: The following records of nymphs etc., which cannot be identified specifically are included as indicating distributional data relating to the genus.

Elisabethville, III. 1926 (Dr. H. SCHOUTEDEN) 1 nymph (det. C. MENOZZI);

Ruanda : Gabiro, 1934 (R. VERHULST) 1 nymph; Mombassa, 36 km. S. Lubero, VIII. 1932 (L. BURGEON), 1 nymph; Ruwenzori : Kalonge (2.050 m.), 6-11. VIII. 1932 (L. BURGEON), 1 nymph; Ruanda : Astrida III. 1940 (A. LESTRADE), 1 nymph; Kivu : Sake, V. 1937 (J. GHESQUIÈRE), 1 nymph; Kivu : Lacs Mokoto VIII. 1937 (J. GHESQUIÈRE) 1 nymph.

Key to Belgian Congo Species of Dicrana.

(after HINCKS 1939).

- 1 (2) Head black, tegmina and wings chestnut, abdomen black; ninth tergite of male emarginate mesad, entire in female; forceps stout, trigonal, depressed and tapering in both sexes; metaparameres slightly longer than bifid transverse lobe, a little swollen before apex (fig. 23). Length 30-35 mm. *D. biaffra* (BORMANS).
- 2 (1) Coloration not as above; head, pronotum, tegmina or abdomen more or less maculated.
- 3 (4) Transverse inner lobe of metaparameres not bifid distad (fig. 27); forceps with numerous long hairs. Length 23 mm. *D. frontalis* (KIRBY) (1).
- 4 (3) Transverse inner lobe of metaparameres bifid distad.
- 5 (6) Metaparameres strongly acuminate distad; bifid transverse lobe narrow, parallel-sided and straight (fig. 26); pronotum broader, yellowish, with four black spots; wings absent; tegmina much reduced; legs banded with black; male ultimate tergite without lateral keels; male ninth sternite emarginate, of female entire; forceps stout, trigonal, contiguous and nearly straight in both sexes. Length 26-30 mm. *D. wigginsii* BURR.
- 6 (5) Metaparameres not strongly acuminate distad; pronotum narrower; legs not banded with black.
- 7 (8) Metaparameres gradually tapering from base to apex, longer than bifid lobe (fig. 25); wings and tegmina either fully developed or reduced; ninth sternite in male with small median emargination, in female entire; ultimate tergite of male with lateral keels; forceps of male with branches depressed, dilated and approximate at extreme base, gently arcuate, armed with obtuse crenulate tooth near apex of inner margin; female forceps simple, trigonal. (Fig. 21). Length 22-25 mm. *D. separata* BURR.
- 8 (7) Metaparameres either shorter than inner lobe or swollen just before apex; tegmina and wings fully developed.
- 9 (10) Metaparameres pointed, shorter than inner lobe (fig. 22); tegmina brownish with large, diffuse yellow spot; penultimate sternite entire in both sexes; male forceps short, strongly arcuate, dilated before apex. Length 33-35 mm. *D. bettoni* (KIRBY).

1) Not yet recorded from Belgian Congo.

- 10 (9) Metaparameres swollen before apex (fig. 24); tegmina brownish with oblique testaceous stripe; ultimate tergite without lateral keels; penultimate sternite emarginate mesad in male (female unknown); male forceps long and slender, basal two-thirds arcuate, enclosing an oval area, beyond which inner margin has crenulate obtuse tooth. Length 26.5 mm. *D. burri* HINCKS.

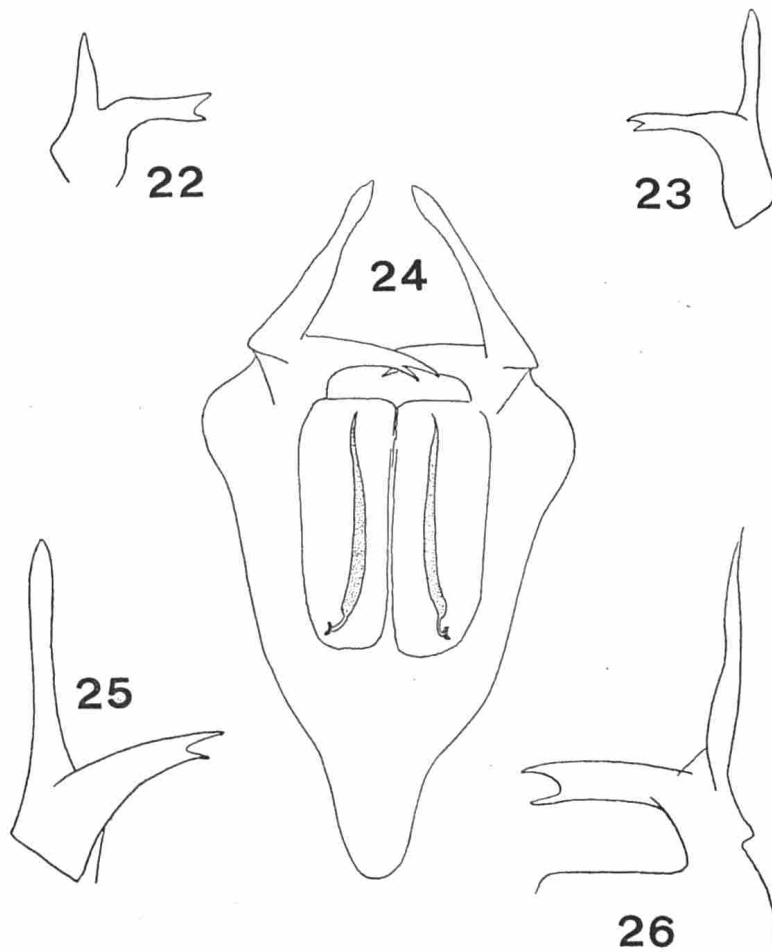


Fig. 22-26. — 22. Paramere of *D. bettoni* (KIRBY), after BURR.
 23. Paramere of *D. biaffra* (BORMANS), after BURR. ..
 24. Genitalia of *D. burri* HINCKS, holotype. — 25. Paramere of *D. separata* BURR.
 26. Paramere of *D. wigginsii* BURR, paratype.

12. *Dicrana frontalis* (KIRBY, 1903). (Fig. 27).

Pygidicrana frontalis KIRBY, 1903, *Ann. Mag. Nat. Hist.* (7) 11 : 61 (Came-
 roons); (1904, *Syn. Cat. Orthop.* 1 : 4).

Dicrana frontalis (KIRBY) BURR, 1908, *Ann. Mag. Nat. Hist.* (8) 2 : 378; (1911,
Genera Insectorum 122 : 19); (1912, *Ann. K. K. Nat. Hofmus. Wien.*

1912 : 68 (Cameroons)); 1915, *Journ. R. Micr. Soc.* 1915 : 434; HINCKS, 1939, *Ent. mon. Mag.* 75 : 236, 237.

This species is known only from the Cameroons, MENOZZI's 1928 record of a female from Belgian Congo is a misidentification (*vide bettoni* KIRBY). The following redescription is based on a male paratype in the BURR Collection at the British Museum (Natural History) from Cameroons (CONRADT).

Male. Antennae and mouthparts testaceous. Head light brown, bordered behind eyes with deeper brown. Frontal spot large, ill-defined, black. Pronotum testaceous with two suboblique broad black longitudinal stripes. Tegmina deep brown, inner basal area and ill-defined lateral stripe, testa-

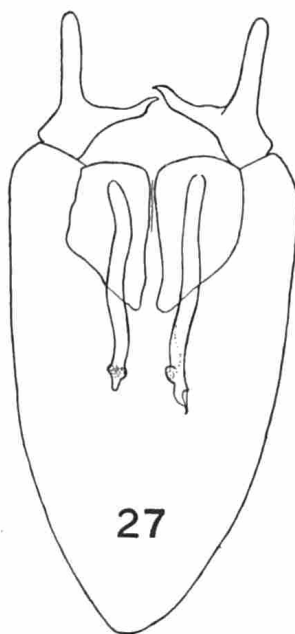


Fig. 27. -- Male genitalia of *Dicrana frontalis* (KIRBY), paratype, Cameroons (CONRADT),

ceous. Exposed tips of wings testaceous. Abdomen deep brown, appearing cinereous due to copious short testaceous pubescence which is longer on ultimate tergite and forceps. Legs testaceous. Underside testaceous cephalad, gradually passing to brown caudad.

Head rather shining, sutures distinct; sides arcuately narrowed behind eyes. *Antennae* 27-segmented (? some distal segments lost). *Pronotum* longer than broad, subrectangular in general outline; slightly narrowed caudad with caudal angles rounded, margin subtruncate. *Tegmina* about one and a half times as long as pronotum, chaetulose. *Wings* slightly exposed beyond tegmina. *Abdomen* duller than ultimate tergite and forceps. *Ultimate tergite* transverse; sides subparallel; distal margin slightly sinuate; distal angles moderately prominent; surface granulose. *Forceps* subcontiguous basad, enclosing a pear shaped area terminating in an inner tooth at the beginning

of the distal quarter; inner margin, between tooth and abruptly arcuate distal extremity of forceps, slightly curved and moderately strongly crenulate. *Penultimate sternite* transverse, sides rounded; upper surface slightly convex, shining and rather finely rugose; distal margin truncate when viewed from above, sinuate seen horizontally. *Genitalia* (fig. 27) with inner tooth of metaparameres not bifid. Length (total) 23 mm.

D. frontalis is very closely allied to *D. separata* BURR, the most obvious external differences between the two species being the presence of numerous long hairs on the forceps in *frontalis* which are absent in *separata*, and the emarginate ninth sternite in the latter species. The apparent colour differences may be of little value as they are variable in *separata* and only a single *frontalis* has been available for study. The genitalia however are abundantly distinct and provide a ready means of separating the two species; indeed the simple parameral tooth in *D. frontalis* will distinguish it from all other members of the genus of which the genitalia have been examined.

13. **Dicrana biaffra** (BORMANS, 1903). (Fig. 23).

Pygidicrana biaffra BORMANS in BURR, 1903, *Ann. Mag. Nat. Hist.* (7) 11 : 232 (♂, Cameroons).

Pygidicrana biafra BORMANS, BURR, 1908, *loc. cit.* (8) 2 : 384; (1911, *Stettin ent. Z.* 1911 : 330, Cameroons).

Kalocrania biafra (BORMANS) (BURR, 1911, *Genera Insectorum* 122 : 19); (1912, *Ann. K. K. Nat. Hofmus., Wien* 1912 : 338, Ukaika-Mawambi).

Kalocrania biaffra (BORMANS) (BURR, 1912, *loc. cit.* : 67, Cameroons & West Africa).

Dicrana biafra (BORMANS) BURR, 1915, *Journ. R. Micr. Soc.* 1915 : 434, pl. V, fig. 3 (genitalia).

Dicrana biaffra (BORMANS) (REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* 49 : 404); (REHN, 1945, *Ent. News* 56 : 145, Southern Cameroons : Edea). — HINCKS, 1939, *Ent. mon. Mag.* 75 : 236, 237.

The inclusion of this species in the Belgian Congo list rests on a single male collected by GRAUER at Ukaika-Mawambi, now in the Vienna Museum and reported by BURR (1912).

14. **Dicrana wigginsi** BURR, 1914. (Fig. 26).

Dicrana wigginsi BURR, 1914, *Ann. Mag. Nat. Hist.* (8) 14 : 422 (♂ ♀, Uganda: Entebbe); 1915, *Journ. R. Micr. Soc.* 1915 : 434, pl. VI, fig. 1. (genitalia). — (REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* 49 : 404 (Uganda)).

(*Dicrana bettoni* BORELLI, 1923 (*nec* KIRBY), *Rev. Zool. Afr.* 11 : 414 (Haut-Uele : Moto)).

The two males recorded by MENOZZI (1935) from Ituri : Blukwa are incorrectly determined (= *separata* BURR, q. v.). No doubt the same applies to the female recorded by that author in 1928 from Kivu : Kibati but this specimen has not been re-examined. The specimen which BORELLI (1923)

recorded as a nymph of *D. bettoni* from Haut-Uele : Moto proves to be an adult female of the present species. A further female has been examined from Mongbwalu, 10. III. 1939 (M^{me} A. LEPERSONNE).

Distribution : Uganda, Belgian Congo (Haut-Uele : Moto; Mongbwalu).

The following description is prepared from a paratype male in the BURR Collection (British Museum, Nat. Hist.) from Uganda : Entebbe Forest VI-VIII. 1912 (WIGGINS).

Antennae yellow brown, 26-segmented (distal segments broken?); first as long as second to fourth segments combined; second a little shorter than fourth and fifth combined but as long as sixth; third a little longer than fourth and fifth together. *Head* yellowish, mouthparts darker; frons with median round black spot and narrowly margined with same colour; a black spot also present on inner side of eye; caudal and lateral margins bordered with black, former interrupted mesad; head broadest at eyes; sutures not very distinct; surface with scattered, longer and shorter bristles, a distinct row of bristles from near inner angle of eye to caudal margin.

Pronotum testaceous with four large black spots, two at cephalic angles and two in the region of caudal margin; surface chaetulose; cephalic margin rounded; caudal margin subtruncate with rounded angles; sides subparallel; general outline rather short and broad. *Scutellum* yellowish, ample. *Tegmina* abbreviate, a little shorter than pronotum, dirty yellowish brown, darker at margins; strongly chaetulose. *Wings* absent. *Abdomen* dark brown, very finely rugose, abundantly covered with yellow adpressed pubescence leaving a round or oblong denuded area laterad on each tergite; proximal two or three tergites yellowish mesad. *Ultimate tergite* dark brown, subquadrate, sides parallel, almost smooth mesad or very indistinctly sculptured, subrugose and somewhat pubescent laterad; caudal margin prominent and subtruncate mesad, depressed and sinuate laterad with the angles distinct; lateral keels or depressions absent. *Forceps* simple, more or less trigonal in section (less distinctly so than in the usual female type of forceps), about one and a half times as long as ultimate tergite, more or less straight and broad proximad, gently curved and gradually tapering distad, slightly asymmetrical, right arm being more curved than left; inner margin with four or five denticulations on proximal one third passing into small crenulations which disappear in distal one third. *Legs* yellowish with median brown band on femora and on proximal half or two thirds of tibiae; tibiae about as long as femora and distinctly longer than tarsi. *Underside* dark brown; head testaceous with darker markings; pro- and mesosternum light brown; forceps more or less smooth, punctate and pubescent. *Penultimate sternite* very broad, sides and distal angles rounded; caudal margin with round median emargination; sculpture and pubescence obsolete mesad. *Genitalia* (fig. 26). *Length*, excl. forceps, 23.5 mm., forceps 6 mm.

15. *Dicrana separata* BURR, 1908. (Figs. 21, 25).

Dicrana separata BURR, 1908, *Ann. Mag. Nat. Hist.* (8) 2 : 387, 388 (♂, N'guru); 1911, *Wissensch. Ergebn. Deutsch. Zentr.-Afr. Exped.*, 1907-1908,

3 (4) : 455 (Belgian Congo : Ruzizi Valley, Rutshuru Valley & N. W. Tanganyika); 1911, *Genera Insectorum* 122 : 19, pl. I, figs. 4a, 4b; (1912, *Ann. K. K. Nat. Hofmus. Wien* 26 : 68, 338 (Tanganyika)); (1912, *Sitz. Ges. Nat. Fr.*, Berlin 1912 : 314 (Tanganyika)); 1915, *Journ. R. Micr. Soc.* 1915 : 434. — (REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* 49 : 404 (Belgian Congo, Tanganyika, S. W. Africa)). — MENOZZI, 1936, *Mem. Mus. Zool. Univ. Coimbra* 1, 95 : 4, fig. B (genitalia), 5 (Mozambique).

Pygidicrana bettoni BURR, 1907 (*nec* KIRBY), in SJÖSTEDT, *Kilimandjaro* 17 (I) : 3, pl. I, fig. 1. (Tanganyika).

Dicrana wigginsi MENOZZI, 1928 (*nec* BURR) (*Rev. Zool. Bot. Afr.* 16 : 30 (Kivu: Kibati)); 1935, *loc. cit.* 27 : 18 (Ituri : Blukwa).

Recorded distribution : Belgian Congo, Tanganyika, S. W. Africa, Mozambique.

Recorded distribution in Belgian Congo : Ruzizi Valley, Rutshuru Valley, Kivu-Kibati, Ituri : Blukwa.

Material examined: 1 ♂ Ituri: Blukwa 27. XI. 1928 (A. COLLART); 1 (? broken) ditto 13. XI. 1928 (A. COLLART); 1 (? broken) Kivu : Tshibinda XI. 1932 (L. BURGEON); 1 ♀ Kivu : Kibati 17-18. XII. 1925 (Dr. H. SCHOUTÉDEN) (det. MENOZZI as *D. wigginsi*); 2 ♀ ♀ Stanleyville 24-31. VIII. 1928, VI. 1928 (A. COLLART); 1 ♂ Eala V. 1932 (H. J. BRÉDO); 1 ♀ Ruanda : Gabiro 1934 (R. VERHULST); 2 ♀ ♀ Kibali-Ituri : Kilo IX. 1930 (G. DU SOLEIL); 2 ♀ ♀, 1 nymph Rwankwi I. 1944, récolté sur vieille souche *Erythrina* (J. V. LEROY).

This species, the commonest in the Belgian Congo, is easily distinguished from *D. frontalis* by the genitalia of the male. It also differs in having the ninth sternite emarginate and by the forceps being less hairy. It probably differs also in having lateral keels on the ultimate tergite, a character unfortunately not referred to in the writer's original notes on the type of *D. frontalis*.

From *D. wigginsi* it differs in having the head narrower, eyes a little less prominent, caudal margin and sides of head with broad black band, pronotum a little narrower in proportion to length, tegmina a little longer, ultimate tergite with lateral keels, penultimate sternite shallowly but broadly depressed on either side with small median emargination and in the smaller size (length, excl. forceps, 18 mm., forceps 4.25 mm.). The genital armature is also distinct (fig. 25).

16. *Dicrana bettoni* (KIRBY, 1903). (Fig. 22).

Pygidicrana bettoni KIRBY, 1903, *Ann. Mag. Nat. Hist.* (7) 11 : 61 (British East Africa); (1904, *Syn. Cat. Orth.* 1 : 4).

Dicrana bettoni (KIRBY) BURR, 1908, *Ann. Mag. Nat. Hist.* (8) 2 : 387; (1911, *Genera Insectorum* 122 : 19); 1915, *Journ. R. Micr. Soc.* 1915 : 434, pl. VI, fig. 2 (genitalia).

(*Dicrana frontalis* MENOZZI, 1928 (*nec* KIRBY), *Rev. Zool. Bot. Afr.* 16 : 30 (Elisabethville)).

Distribution: British East Africa, Belgian Congo (Elisabethville).

Material examined: A female paratype from the BURR Collection (British Museum, Nat. Hist.). 1 ♀ Elisabethville X. 1923 (CH. SEYDEL) (det. MENOZZI as *D. frontalis*); 1 ♀ ditto X. 1934 (CH. SEYDEL); 1 ♀ ditto XII. 1932 (M^{lle} KERKVOORDE).

Descriptive notes: This is a large species of which the writer has so far only seen female specimens. Length, overall 33-35 mm. Yellow brown. Eyes, base of head and frontal spot black. Pronotum with yellow ante-median oval spot, lateral margins and small spot at cephalic angles yellow. Tegmina and wings fully developed, the former brown with indistinct yellowish sub-median spot; the latter bordered with yellow. Distal abdominal segments dark, median segments maculated with black. Legs and antennae unicolorous yellowish brown. Surface of body with scattered long hairs. Ultimate tergite parallel-sided, caudal angles slightly prominent, surface granulate, especially caudad. Penultimate sternite rounded triangular in outline. Forceps contiguous, trigonal in section, straight except at apex, distinctly crenulate internally at base.

The male (not examined) is said to have complete tegmina and wings; entire penultimate sternite; forceps short, strongly arcuate and dilated before apex. The genitalia is distinctive and is here copied (fig. 22) from BURR (1915).

D. bettoni was added to the Belgian Congo list by BORELLI (1923) on a supposed nymph from Haut-Uele: Moto, collected in 1920 by the late M. L. BURGEON. On re-examination this has proved to be an adult female of *D. wigginsi* BURR (q. v.). One of the females listed above was incorrectly recorded by MENOZZI (1928) as *D. frontalis* (KIRBY).

17. ***Dicrana burri*** HINCKS, 1939, (Fig. 24).

Dicrana burri HINCKS, 1939, *Ent. Mon. Mag.* 75 : 236, 238 (♂, Belgian Congo, Urundi: Rumonge).

This species is known only from the type male taken in 1934 at Urundi: Rumonge by A. LESTRADE.

It is perhaps most closely allied to *D. separata* from which it is easily distinguished by the male genitalia and the absence of lateral keels on the ultimate tergite. The characters separating *D. burri* from other species of the genus are noted in the original description (HINCKS 1939).

Subfamily ECHINOSOMATINAE

Echinosomatinae BURR, 1910, *Fn. British India*, Dermaptera : 69 (sub fam. Labiduridae); 1910, *Trans. Ent. Soc. London*, 1910 : 161, 163 (sub fam. Labiduridae); 1911, *Genera Insectorum*, 122 : 11, 22; 1915, *Journ. R. Micr. Soc.* 1915 : 425, 436.

Pyragrinae (pars) VERHOEFF, 1902, *Zool. Anz.* 25 : 189 (sub fam. Pygidicrani-
dae). — BURR, 1909, *Dtsch. ent. Zeits.* 1909 : 325 (sub fam. Labiduridae).
Echinosomidae ZACHER, 1910, Beitr. zur Revision der Dermapt. I. (Inaug.
dissat., Namslau) : 36; 1910, *Ent. Rundsch.* 1910 : 24; 1911, *Zool. Jahrb.*
30 : 342; 1915, *Zool. Anz.* 45 : 528.

Only a single genus, *Echinosoma* SERVILLE, is included in the present
subfamily.

Genus **ECHINOSOMA** SERVILLE, 1839.

(Genotype: *Forficula afra* PALISOT DE BEAUVOIS, 1805).

Echinosoma SERVILLE, 1839, *Hist. Nat. Ins. Orth.* : 34. — DOHRN, 1863, *Stett.*
ent. Z. 24 : 63. — BORMANS, 1900, *Das Tierreich*, Forficulidae : 6, 26. —

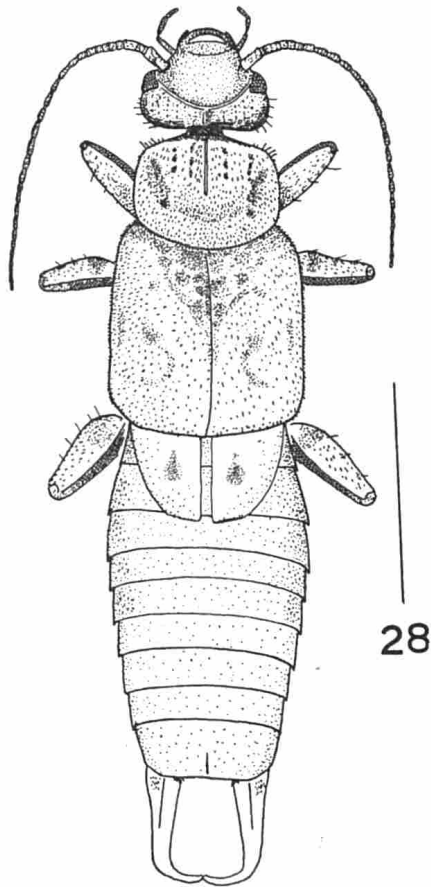


Fig. 28. — *Echinosoma occidentale* BORMANS, male.

BURR, 1910, *Trans. Ent. Soc. London*, 1910 : 163; 1910, *Fn. British India*,
Dermaptera : 70; 1911, *Genera Insectorum*, 122 : 23; 1915, *Journ. R. Micr.*
Soc. 1915 : 437. — ZACHER, 1911, *Zool. Jahrb.* 30 : 342. — REHN, 1924, *Bull.*

Amer. Mus. Nat. Hist. 39 : 360, 361 (map of distribution), 404 (catalogue of African spp.).

Twenty-one species of this essentially tropical genus are known at present. Eleven species are recorded from the Indo-Australian region, ranging from Ceylon and India to the northern part of Australia. From the African mainland seven species are known of which no fewer than six have been recorded from the Belgian Congo, and three others occur in Madagascar.

The stout form, chaetulose integument, sickle-like male forceps, prominent female pygidium, and the extraordinary gonapophyses, figured by ZACHER (1911), render the genus easily recognizable. The species, on the other hand, are difficult to distinguish and, unfortunately, the male genital armature does not provide such distinctive characters as is the case in the *Diplatyinae*.

The typical coloration of each, at least of the larger species is rather constant and distinctive but there occur also a small number of individuals exhibiting a darker pattern. This tends in all species towards the same general pattern having a dark, almost black, pronotum with single lateral yellow spots, dark tegmina and abdomen, wing-scales with larger or smaller dark spots, and the legs extensively darkened. These forms can only be separated on structural characters and their occurrence no doubt has contributed to the confusion which probably exists in the records of several species.

Unspecified records.

Kamatembe (HINCKS, 1938 : 9); Eala, 1 nymph, IV. 1932 (H. J. BRÉDO); Kafakumba, 5 nymphs X, XII. 1932 (F. G. OVERLAET); Lulua : Kapanga XII. 1932 (F. G. OVERLAET); Bas-Congo : Kalina VIII. 1945 (M^{me} DELSAUT).

Key to Belgian Congo species of Echinostoma SERVILLE (1).

- 1 (2) Small species, not more than 10 mm. long; more or less concolorous light brown. Pronotum parallel-sided; caudal margin with small but distinct emargination; prozona tumid, distinctly separated from metazona and lateral areas (fig. 36) *concolor* BORELLI.
- 2 (1) Large species, more than 10 mm. long; colour patterns various but not unicolorous light brown.
- 3 (10) Males.
- 4 (5) Abdominal tergites 5 and 6 distinctly keeled laterad. Virga very long and convoluted. Length 13-15 mm. *wahlbergi* DOHRN.
- 5 (4) Abdominal tergites 5 and 6 not distinctly keeled laterad. Virga not convoluted.
- 6 (7) Inner basal lobe of paramere proportionally longer, its upper inner angle somewhat produced (fig. 30). Virga clearly longer than paramere. Penultimate sternite with sides oblique; caudal margin a little produced, truncate or very slightly concave mesad. Dark

1) *E. congolense* BORELLI is omitted as it is only known to me from description.

- brown, rather dull species with orange lateral pronotal spot and wing-scales. Of medium size, length 16-18 mm. ... *fuscum* BORELLI.
- 7 (6) Inner lobe of paramere proportionally shorter, its inner margin rectangular or slightly rounded, the upper inner angle not produced (figs. 29, 31).
- 8 (9) Virga about as long as paramere (fig. 29). Penultimate sternite oblique laterad, its caudal margin a little produced, broadly but shallowly concave mesad. Large species; coloration of pronotum, tegmina and wing-scales subtestaceous mottled with darker markings. Length 20-27 mm. *occidentale* BORMANS.

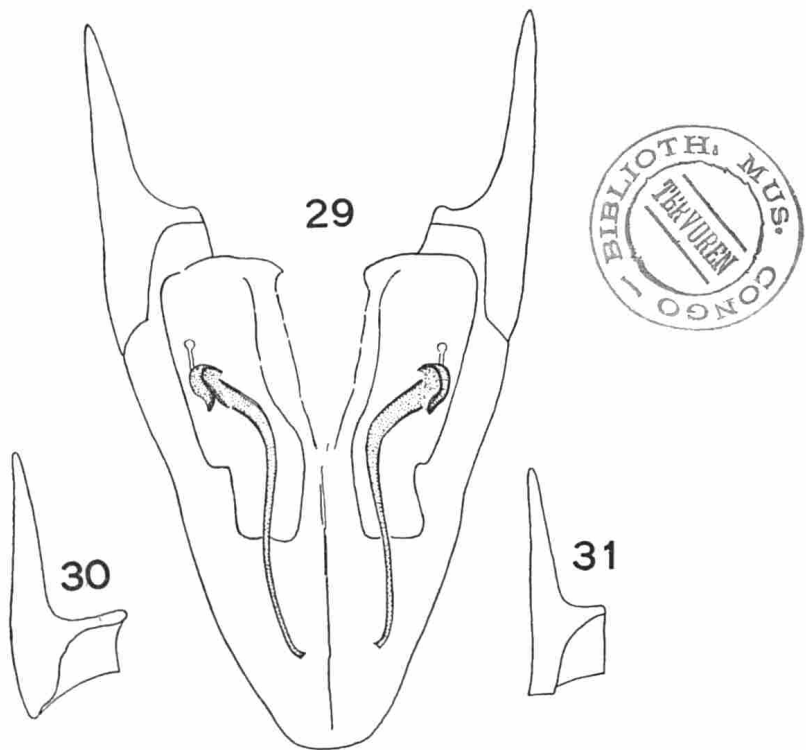


Fig. 29-31. — 29. Male genitalia of *Echinosome occidentale* BORMANS.
 30. Paramere of *E. fuscum* BORELLI. — 31. Paramere of *E. afrum* (PALISOT DE BEAUVOIS).

- 9 (8) Virga clearly longer than paramere. Penultimate sternite with sides and caudal margin broadly and regularly arcuate, slightly concave mesad. Smaller species, length 15-20 mm.
 *afrum* (PALISOT DE BEAUVOIS).
- 10 (3) Females.
- 11 (12) Pygidium transverse, truncate distad (fig. 32)
 *afrum* (PALISOT DE BEAUVOIS).
- 12 (11) Pygidium not truncate, rounded or pointed distad.
- 13 (14) Pygidium narrow, acute distad (fig. 33) *fuscum* BORELLI.
- 14 (13) Pygidium broader, rounded distad.

- 15 (16) Pygidium convex, rounded distad (fig. 34) *occidentale* BORMANS.
 16 (15) Pygidium with shallow depression proximad, angularly rounded
 distad (fig. 35)

18. *Echinosoma afrum* (PALISOT DE BEAUVOIS). (Figs. 31, 32).

Forficula afra PALISOT DE BEAUVOIS, 1805, *Ins. Afr. Amér.* : 35, Orth. pl. I, fig. 1 (♀, Kingdom of Oware and Benin, Nigeria).

Echinosoma afrum (PALISOT DE BEAUVOIS) SERVILLE, 1839, *Hist. Nat. Ins. Orth.* : 34. — DOHRN, 1863, *Stett. ent. Z.* 24 : 63 (♂, Guinea (Benin, Bissao, Old Calabar)). — SCUDDER, 1876, *Proc. Boston Soc. Nat. Hist.* 18 : 33. — BORMANS, 1900, *Das Tierreich, Forficulidae* : 26, f. 14 (Guinea (Wari, Benin), Old Calabar, Senegambia (Ins. Bissao)). — (KIRBY, 1904, *Syn. Cat. Orth.* 1 : 8 (W. Africa)). — (? BURR, 1907, *Bull. Mus. Hist. Nat.*, Paris, 1907, n° 7 : 3); (1908, *Bull. Soc. Ent. Ital.* 60 : 175 (Congo, Uganda)); (1910, *Trans. ent. Soc. Lond.* 1910 : 164); (1911, *Genera Insectorum*, 122 : 23); (1912, *Ann. k. k. naturhist. Hofmus., Wien* 26 : 338 (Belgian Congo : Ukaika-Mawambi)); 1915, *Trans. ent. Soc. Lond.* 1915 : 260, f. 4 (Opisthomeres); 1915, *loc. cit.* : 267, f. 20 (Gonapophysys); 1915, *Journ. R. Micr. Soc.* 1915 : 437, 438 (Uganda, Spanish Guinea). — REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* 39 : 361, 362, 363, f. 9, 364, f. 10, 11, 12, 404 (pars) (Belgian Congo : Medje); 1936, *Proc. Acad. Nat. Sc., Philad.* 88 : 508 (Belgian Congo : Kibali-Ituri dist.); (1945, *Ent. News* 56 : 145 (Southern Cameroons)). — MENOZZI, 1928, *Rev. Zool. Bot. Afr.* 16 : 30 (Belgian Congo : Haut-Uele, Moto & Yebo, 300 km. de Kindu)); (1935, *loc. cit.* 27 : 18 (Belgian Congo : Mayumbe, Kai Baku; Bangala, Busu-Mundi & Kuvawa; Likimi, Mundjungami; Equateur, Flandria; Haut-Uele, Moto; Leverville)).

Echinosoma afri RODZIANKO, 1897, *Wien. ent. Z.* 16 : 154.

Echinosoma distanti BORELLI (*nec* BURR), 1923, *Rev. Zool. Afr.* 11 : 414 (Belgian Congo : Haut-Uele, Watsa, Moto, La Moto-Madyu, Kunungu).

Recorded distribution : (Uncertain owing to confusion with *E. fuscum*). Portuguese Guinea, Nigeria, Belgian Congo, Cameroons, Ivory Coast? Gold Coast? Spanish Guinea.

Recorded distribution in Belgian Congo : Stanley Pool, Kuako, Medje, Ukaika-Mawambi Barobiti, Kibali-Ituri dist., Haut-Uele : Moto & Yebo, 300 km. de Kindu; Mayumbe : Kai-Baku; Bangala : Busu-Mundi & Kuvawa; Likimi : Mundjungami; Equateur : Flandria; Leverville; Haut-Uele : Watsa, La Moto-Madyu, Kingungu.

Material examined : Ituri : Kituri (Lubutu) 1 ♂, I. X. 1929 (A. COLLART). Lulua : Kapanga 13 ♂♂, 9 ♀♀, II, VII-XII. 1932; I, III. 1933 (F. G. OVERLAET). Eala 1 ♂, 30. VIII. 1933 (A. CORBISIER). Haut-Uele : Moto 1 ♂, 1 ♀, II. 1927 (L. BURGEON). Bangala : Bondia 1 ♀, 31. X. 1927 (A. COLLART). Maruka à Faradje 3 ♀♀, 27. II. 1930 (A. COLLART). Sandoa 1 ♀, X. 1930 (F. G. OVERLAET). Equateur : Flandria 1 ♂, 1 ♀, X. 1928; IV. 1932 (R. P. HULSTAERT). Kafakumba 4 ♂♂, XII. 1932 (F. G. OVER-

LAET). Bambesa 2 ♂♂, 15. VI., 28. VIII. 1937 (J. VRIJDAGH). Stanleyville 1 ♂ (G. MULLER). Haut-Uelè: Watsa 1 ♀, 1922 (L. BURGEON). Mayidi 3 ♀♀, 2 nymphs (RÉV. P. VAN EYEN).

Descriptive notes: (In part after REHN, 1924). Head blackish brown; pronotum more or less yellow with two black spots separated cephalad by a more or less distinct yellow line; tegmina sepia brown to dark brown-black; wing-scales yellowish with small median brown spot; abdomen shining and rather smooth in both sexes, puncturation coarse, surface less chaetulose than in allied species; decurved lateral portions of tergites 5 and 6 not distinctly longitudinally carinate, margin of same portions of tergites less angulate caudad; penultimate sternite of male with margin broadly and regularly arcuate with a median concavity; pygi-

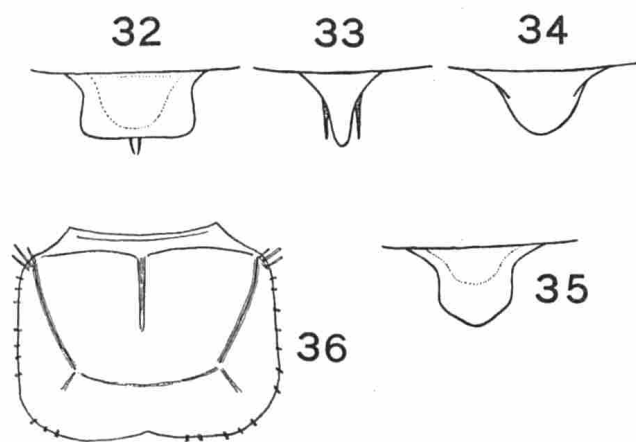


Fig. 32-36. — 32. Female pygidium of *E. afrum* (PALISOT DE BEAUVOIS), — 33. ditto, *E. fuscum* BORELLI. — 34. ditto, *E. occidentale* BORMANS, 35. ditto, *E. wahlbergi* DOHRN. — 36. Pronotum of *E. concolor* BORELLI.

dium of female transverse, transversely constricted mesad, distal margin thickened, dorsal surface appreciably excavate. Virga of male moderately long, not convoluted; inner basal angle of paramere rectangular. Total length of males 15-20 mm., of females 13-20 mm.

REHN (1924) has given a good account of this species together with figures. He included *E. fuscum* BORELLI as a synonym, a procedure with which the present writer is unable to agree (see under *E. fuscum*). *E. afrum* is distinguished from *E. occidentale* by the colour in typical specimens, by the outline of the male penultimate sternite, the female pygidium, the smoother and more polished abdominal tergites, and the male parameres. *E. wahlbergi* is similar in coloration to *E. afrum* but averages smaller, has a different genital armature, male penultimate sternite and female pygidium. *E. fuscum* BORELLI differs in colour in typical specimens, in the pygidium of the female and the paramere of the male.

BORELLI's (1923) *E. distanti*, from his short notes, appears to be *E. afrum*; BURR's species actually is a synonym of *E. wahlbergi*.

Two of the four males recorded above from Kafakumba are unusually small and slender but I can find nothing to separate them from the other specimens. Variation in size and proportions is quite considerable in the material examined.

19. ***Echinosome fuscum* BORELLI.** (Figs. 30, 33).

Echinosome fuscum BORELLI, 1907, *Ann. Mus. Civ. Stor. Nat. Genova* (3) 3 (43) : 6 (♂, French Congo, Fernando Poo). — BURR, 1911, *Genera Insectorum* 122 : 23, pl. 2, fig. 3; (1912, *Sitz. Ges. nat. Fr. Berlin* 1912 : 315 (Cameroons, Togo)); (1912, *Ann. k. k. naturhist. Hofmus. Wien* 26 : 70 (Gaboon, Cameroons)); 1915, *Journ. R. Micr. Soc.* 1915 : 437, 438, pl. VII, figs. 10, 11 (Kuako, Entebbe). — (BORELLI, 1923, *Rev. Zool. Afr.* 11 : 415 (Belgian Congo : Kasai, Ngombe; Kasai, Bashishombe; Luebo)).

Echinosome afrum (PALISOT DE BEAUVOIS) REHN, 1924 (*pars*) *Bull. Amer. Mus. Nat. Hist.* 39 : 404.

Recorded distribution : French Congo, Fernando Poo, Togo, Cameroons, Gaboon, Belgian Congo (Kasai : Ngombe and Bashishombe; Luebo; Kuako), Uganda.

Material examined : Eala 3 ♂♂, 25. III, 22. IV. 1932 (H. J. BRÉDO). Ituri : Uluku 1 ♂, 24. IX. 1929 (A. COLLART). Lulua : Kapanga, 1 ♂, 2 ♀♀, VII, IX, X. 1932 (F. G. OVERLAET).

Descriptive notes : Dull brownish black. Antennae with two proximal segments brown, distal segments yellowish; mouthparts brown; palpi yellow. Pronotum a little lighter at base and sides, with yellow medio-lateral spot. Tegmina dull blackish brown. Wing-scales bright orange yellow, usually unspotted but sometimes with a median brownish spot of variable extent. Abdomen black-brown, dull proximad, more shining distad in male; forceps brown to nearly black. Underside testaceous-brown to deep brown on abdomen. Legs with coxae testaceous-brown; femora and tibiae dark brown, lighter below and at both extremities; tarsi brown.

Pygidium of male almost hidden. Penultimate sternite of male a little produced mesad, with free margin broadly subtruncate; sides oblique; upper surface with a broad, more or less triangular distal depression. Lateral keels on abdominal segments indistinct, faintly indicated on segments 4-6. Genitalia of male with parameres as fig. 30.

Abdomen of female more distinctly chaetulose and duller than male. Pubescence of underside longer. Pygidium of female narrow and pointed (fig. 33). Penultimate sternite of female triangular, rounded distad.

Total length, including forceps : ♂, 15-17.5; ♀, 15 mm.

The male of this species differs markedly from typical *E. afrum*, *wahlbergi* and *occidentale* in coloration and in the form of the parameres. From *E. afrum* both sexes differ in the form of the penultimate sternite and the

female of *E. fuscum* is also easily distinguished by the narrow, pointed pygidium. The latter also distinguishes the female from females of *E. wahlbergi* and *occidentale*.

In 1915 BURR suggested the synonymy of *E. fuscum* with *E. afrum*. In this conclusion he was followed by REHN (1924 : 362). An examination of the Belgian Congo material recorded above does not confirm this synonymy. Specimens of *E. fuscum* agreeing with BORELLI's description have been compared with the series in the BURR collection and have been found to agree. The differences between the two species are quite striking as may be seen from the foregoing notes.

How far the distribution recorded above is correct is difficult to check without a reexamination of the specimens on which the original records were based.

E. fuscum was included as a distinct species in MENOZZI's (1935) list of Belgian Congo Dermaptera.

20. *Echinosoma occidentale* BORMANS, 1897. (Figs. 28, 29, 34).

Echinosoma occidentale BORMANS in BOLIVAR, 1893, *Ann. Soc. Ent. France* **62** : 170 (♂, Ivory Coast : Assinie); 1900, *Das Tierreich*, Forficulidae : 26, 27 (Assini). — (KIRBY, 1904, *Syn. Cat. Orth.* **1** : 8). — (BORG, 1904, *Ark. Zool.* **1** : 564 (Cameroons)). — BORELLI, 1907, *Ann. Mus. Civ. Stor. Nat. Genova* (3) **3** (43) : 6 (French Congo); (1923, *Rev. Zool. Afr.* **11** : 414 (Belgian Congo : Haut-Uele, Watsa & Moto; Kasai, Makumbi & N'Gombe; Mayumbe, Makaia N'tete)). — (BURR, 1911, *Stettin ent. Z.* **72** : 331 (Congo)); (1911, *Genera Insectorum* **122** : 23); (1912, *Ann. k. k. naturhist. Hofmus. Wien* **26** : 71 (Cameroons), 338 (Belgian Congo; Ukaika-Mawambi)); 1915, *Journ. R. Micr. Soc.* **1915** : 438, pl. VII, figs. 8, 9 (genitalia) (Cameroons, Uganda : Entebbe). — ZACHER, 1911, *Zool. Jahrb.* **30** : 344, f. Q, 345, f. S, V, W, 346 (Togo, Cameroons). — REHN, 1924, *Bull. Amer. Mus. Nat. Hist.* **39** : 361, 363, f. 9 (distribution), 364, 366, f. 14-16, 404 (Belgian Congo : Medje); 1936, *Proc. Acad. Nat. Sc. Philad.*, **38** : 509 (Belgian Congo : Kibali-Ituri). — (MENOZZI, 1935, *Rev. Zool. Bot. Afr.* **27** : 18 (Belgian Congo : Haut-Uele, Moku Moto & Yebo Moto; Mayumbe, Lundu)); (1937, *Rev. Suisse Zool.* **44** : 448 (*occidentalis*) (Angola)). — (REHN, 1945, *Ent. News* **56** : 145 (Southern Cameroons)).

Recorded distribution : Ivory Coast, Togo, Cameroons, French Congo, Belgian Congo, Uganda, Angola.

Recorded distribution in Belgian Congo : Haut-Uele : Watsa, Moto, Moku Moto, Yebo Moto. Kasai : Makumbi, N'Gombe. Mayumbe : Makaia N'tete, Lundu. Kibali-Ituri : Saidi's village (1). Ukaika-Mawambi. Medje.

Material examined : Lulua : Kapanga 1 ♂, 5 ♀♀, VIII-XII. 1932, I, X. 1933, III. 1934 (F. G. OVERLAET). Sandoa 1 ♀, VII. 1932 (F. G. OVERLAET).

1) This locality is given by REHN (1936) as « ten miles west of Epula River ferry, Irumu-Avakubi road ».

Haut-Uelè: Moto 1 ♀, II. 1927 (L. BURGEON). Ituri: Masua (Lubutu) 1 ♂, 27. IX. 1929 (A. COLLART). Ituri: Okondo (Buhunde) 1 ♀, 18. IX. 1929 (A. COLLART). Kivu: Mts. Nyamukubi 2.600 m., 1 ♂, XI. 1932 (L. BURGEON). Rég. Lisala 1 ♀, X. 1938 (J. J. DEHEYN).

Descriptive notes: Head and antennae, except proximal segments, blackish brown. Pronotum obscure yellow with darker markings. Tegmina brownish yellow with darker mottlings. Wing-scales yellowish with median dark spot. Legs with femora broadly dark proximad and dark marked distad; tibiae with dark proximal ring. Abdomen of male moderately shining. Male penultimate sternite obliquely emarginato-truncate laterad, very shallowly obtuse-emarginate mesad. Genitalia (fig. 29). Abdomen of female dull and strongly chaetulose. Female pygidium moderately narrow, slightly tapering, linguiform, rounded distad. Total length of male 20-27, of female 21-25 mm.

Dark form, male. Kivu: Mts. Nyamukubi 2.600 m., XI. 1932 L. BURGEON.

Head and pronotum black, latter with lateral and caudal yellow spot; tegmina black; wing-scales brown; abdomen dark brown; legs heavily infuscated. Length 24 mm.

REHN (1924) has given a good account of this species, including its separation from *E. afrum*, variation and distribution. The colour variation in the material I have examined is not very considerable except as regards the melanic male from the Nyamukubi Mts. The larger size, distinctive coloration in typical examples, male penultimate sternite, female pygidium and surface sculpture of both sexes enable this species to be separated from its allies.

21. *Echinosoma wahlbergi* DOHRN, 1863.

Echinosoma wahlbergi DOHRN, 1863, *Stettin ent. Z.* 24 : 64 (♂, Caffraria). — (SCUDDER, 1876, *Proc. Boston Soc. Nat. Hist.* 18 : 50). — BORMANS, 1900, *Das Tierreich, Forficulidae* : 26, 27 (Cape, Zanzibar). — (KIRBY, 1904, *Syn. Cat. Orth.* 1 : 8 (S. Africa)). — (BURR, 1900, *Ann. Soc. Ent. Belg.* 44 : 48 (Popocabacca)); in SJÖSTEDT, Kilimandjaro, 1907 : 3, pl. 1, fig. 2 (Kilimandjaro, Meru); (1907, *Bull. Mus. Hist. Nat.*, Paris, n° 7 : 510 (Fernando Po, Gaboon)); (1908, *Ann. Soc. Ent. Belg.* 52 : 35 (Linguanda)); (1908, *Bull. Soc. Ent. Ital.* 60 : 175 (Belgian Congo : Buta)); (1909, *Ann. Mag. Nat. Hist.* (8) 3 : 254 (Nguelo, E. Africa)); (1910, *Proc. U. S. Nat. Mus.* 1910 : 446 (Liberia)); (1911, *Genera Insectorum*, 122 : 23); (1912, *Sitz. Ges. naturf. Fr. Berlin* 1912 : 315 (Lake Nyassa, Usambara, Cameroons, Togo)); (1912, *Ann. k. k. naturhist. Hofmus.*, Wien 26 : 71 (Cameroons, Tanganyika, Mozambique)); (1913, *Medd. Götesborgs Mus. Zool.* 2 : 3 (Natal, Zululand)); 1915, *Journ. R. Micr. Soc.* 1915 : 437, 438, pl. VIII, fig. 2 (genitalia). — BORELLI, 1907, *Ann. Mus. Civ. Stor. Nat. Genova* (3) 3 (43) : 349 (5) (French Congo, Portuguese Guinea); 1915, *Voy. Alluaud & Jeannel Afr. Orient.*, Dermapt. : 6 (Kenya); 1923, *Rev. Zool. Afr.* 11 : 414 (Belgian Congo). — ZACHER, 1911, *Zool. Jahrb.* 30 : 344, f. P, 346 (Tanganyika). — REHN, 1922, *Ann. Transvaal Mus.* 9 : 3 (Natal);

1924, *Bull. Amer. Mus. Nat. Hist.* 39 : 362, 363, 364, f. 13, 404 (Belgian Congo). — MENOZZI, 1936, *Mem. Mus. Zool. Coimbra* 1936 : 5 (Mozambique); (1937, *Rev. Suisse Zool.* 44 : 447 (*wahlbergi* sic!) (Angola)); (1938, *Mission Scient. de l'Omo*, 4 (34) : 135 (Ethiopia)).

Echinosoma distanti BURR, 1910, in Distant, *Ins. Transvaal.* : 252, f. 48 (♂, Transvaal); (1911, *Genera Insectorum*, 122 : 23); 1915, *Journ. R. Micr. Soc.* 1915 : 437, pl. 8, f. 5 (genitalia).

Recorded distribution : Portuguese Guinea, Liberia, Togo, Cameroons, Fernando Po, French Congo, Belgian Congo, Angola, Gallaland, Uganda, Kenya, Tanganyika, Mozambique, Ethiopia, Zululand, Zanzibar, Natal, Transvaal, Cape Province.

Recorded distribution in Belgian Congo : Popokabaka, Buta, Lingunda, Maniyema : Niemba-Tengo, Lukuga-Niemba.

Material examined : Lulua, Kapanga 8 ♂♂, 12 ♀♀, IX, XI, XII. 1932, II. 1933, III. 1934 (F. G. OVERLAET). Lulua, R. Kawa 2 ♂♂, 16. XII. 1925 (F. G. OVERLAET). Lomami, Kaniama 1 ♂, 1931 (R. MASSART). Albertville 1 ♂ fin. I. 1933 (L. BURGEON). Lomami, Kishinde 1 ♀, 2 damaged spns. X. 1931 (P. QUARRÉ). Kivu, Katana 1 ♀, X. 1932 (L. BURGEON). Katanga, Luashi 1 ♂, XII. 1933 (FREYNE). Ituri : Masua (Lubutu) 1 ♀, 26. IX. 1929 (A. COLLART). Elisabethville 1 ♀, XII. 1923 (CH. SEYDEL).

Descriptive notes : Head black; pronotum with prozona black, metazona and lateral areas broadly yellow; tegmina brown-black; wing-scales yellow with large subapical dark spot; abdomen rather dull with close puncturation in male, very dull and chaetulose in female; penultimate sternite of male similar to that of *E. occidentale*; decurved lateral portions of fifth and sixth abdominal tergites distinctly longitudinally carinate, margin of same portions of these segments more angulate caudad; pygidium of female truncate but narrower than *E. afrum*; virga of male very long and convoluted. Total length 13-15 mm.

In 1915 BURR suggested the identity of his *E. distanti* with DOHRN's species and this was accepted by REHN in 1922. This step appears to be quite correct although BORELLI (1923) professed to distinguish between the two species and MENOZZI (1935) has listed both from the Belgian Congo. An examination of BORELLI's remarks on *distanti* however, suggest that he probably had *afrum* before him and I have therefore transferred his records to that species. It is interesting to note that REHN (1922, 1924) doubted the occurrence of the true *wahlbergi* in West Africa, suggesting that such records probably refer to *afrum*. I feel convinced however that the series before me from the Belgian Congo should be referred to *wahlbergi* and are distinct from *afrum*.

22. *Echinosoma congolense* BORELLI, 1907.

Echinosoma congolense BORELLI, 1907, *Ann. Mus. Civ. Stor. Nat. Genova* (3) 3 : 351 (♂, French Congo); 1914, *Boll. Lab. Zool. Portici* 8 : 256 (? Gold

Coast). — (BURR, 1911, *Genera Insectorum* 122 : 23); (1912, *Sitz. Ges. naturf. Fr. Berlin* 1912 : 315 (Cameroons)); (1915, *Journ. R. Micr. Soc.* 1915 : 437); — (MENOZZI, 1935, *Rev. Zool. Bot. Afr.* 27 : 18 (*congolensis*) (Belgian Congo : Lukolela)).

Distribution : Gold Coast ?; French Congo; Cameroons; Belgian Congo (Lukolela).

This small species is unknown to me. The only record of its occurrence in the Belgian Congo appears to be that of MENOZZI noted above.

23. ***Echinosoma concolor*** BORELLI, 1907, (Fig. 36).

Echinosoma concolor BORELLI, 1907, *Ann. Mus. Civ. Stor. Nat. Genova* (3) 3 (43) : 352 (♂ ♀, Prince and St. Thomas Islands); var. *longipennis* : 353 (Prince Isl., Portuguese Guinea); var. *brevipennis* : 354 (Prince and St. Thomas Is.); (1914, *Boll. Lab. Zool. Portici* 8 : 264 (Gold Coast)); (1923, *Rev. Zool. Afr.* 11 : 415 (Belgian Congo : Mongende, Kunungu)). — (BURR, 1911, *Genera Insectorum* 122 : 23). — MENOZZI, 1928, *Rev. Zool. Bot. Afr.* 16 : 29, f. 2, 30 (Belgian Congo : Nouvelle Anvers)); (1935, *loc. cit.* 27 : 18 (Belgian Congo : Bas-Uele, Djamba; Nouvelle Anvers)).

Distribution : Gold Coast; St. Thomas and Prince Islands; Portuguese Guinea; Belgian Congo (Nouvelle Anvers, Bas-Uele : Djamba, Mongende, Kunungu).

Material examined : Ubangi : Burubu 1 ♀, 6. XII. 1929 (H. J. BRÉDO).

The single female recorded above appears to belong to this species. It is in rather poor condition and measures 9 mm. in length. The colour is more or less concolorous brown. The wing-scales are almost as long as the tegmina. MENOZZI (1928) has given valuable data regarding the male genital armature, including a figure, based on material from the Belgian Congo.



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