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A new burrower bug species of the African genus *Shillukia* Linnavuori, 1977 (Hemiptera: Heteroptera: Cydnidae)

D. PLUOT-SIGWALT^{1, 2}, PH. MAGNIEN^{1, 3}

¹Muséum National d'Histoire Naturelle (Entomologie); UMR 7205 MNHN – CNRS; 45 rue Buffon; F-75005 Paris

²E-mail: dps@mnhn.fr

³E-mail: philippe@heteroptera.fr

Abstract

Described from Ivory Coast, the new species *S. ribesi* n. sp. is the second known species of the African genus *Shillukia* Linnavuori, 1977. The main characters are illustrated: cephalic and thoracic chetotaxy, evaporatorium of the metathoracic glands, male genitalia, external and internal female genitalia. The particularities of the spermathecal duct, devoid of the dilated or invaginated part usually present within the Geotomini, are confirmed for the genus; on the other hand, the other female genitalic structures prove to be typical of most geotomine representatives. The new species is compared to *S. polita* Linnavuori, 1977 and the diagnostic characters of the genus are reviewed.

Key words: Cydnidae, Geotomini, *Shillukia ribesi* n. sp., spermatheca.

Resumen

Una nueva especie de cínido del género africano *Shillukia* Linnavuori, 1977 (Hemiptera: Heteroptera: Cydnidae)

Descrita de Costa de Marfil, la nueva especie *S. ribesi* n. sp. es la segunda especie conocida del género africano *Shillukia* Linnavuori, 1977. Se ilustran los caracteres principales: quetotaxia cefálica y torácica, área evaporatoria de las glándulas metatorácicas, genitalia masculina y genitalia femenina externa e interna. Se confirman para el género las particularidades del conducto espermático, carente de la dilatación (con o sin invaginación) generalmente presente en los Geotomini; por otro lado, las restantes estructuras genitálicas femeninas resultan ser las típicas de la mayoría de representantes de la tribu. Se compara la nueva especie con *S. polita* Linnavuori, 1977 y se revisan los caracteres diagnósticos del género.

Palabras clave: Cydnidae, Geotomini, *Shillukia ribesi* n. sp., espermateca.

Laburpena

Zidnidoen espezie berri bat *Shillukia* Linnavuori, 1977 genero afrikarrekoa (Hemiptera: Heteroptera: Cydnidae)

S. ribesi n. sp., Boli Kostako espezie berria, *Shillukia* Linnavuori, 1977 genero afrikarreko bigarren espezie ezaguna da. Ezaugarri nagusiak irudiztatzen dira: buruaren eta toraxaren ketotaxia, guruin metatorazikoen ebaporazio-eremua, arren genitalia eta emeen kanpo- nahiz barne-genitalia. Genero honetan bereizgarria den hodi espermáticoaren izaera berresten da, hau da, Geotomini-ek izan ohi duten dilatazioirik (bai eta inbaginazioirik) gabekoa; emeen gainean egitura genitalikoak, baina, tribuaren ordezkari gehienek dira. Espezie berria *S. polita*ekin Linnavuori, 1977 konparatzen da eta generoaren ezaugarri diagnostikoak berraztertzen dira.

Gako-hitzak: Cydnidae, Geotomini, *Shillukia ribesi* n. sp., espermateka.

Introduction

The genus *Shillukia* was described by Linnavuori (1977) to accommodate a single species from Sudan (Upper Nile) and Chad, *S. polita* Linnavuori, 1977 (Cydnidae: Cydninae: Geotomini). The species differed at once from the other geotomine species by «the coarse and dense puncturing and the structure of the osteolar peritreme [vestibule of the metathoracic gland]». Later, having examined other specimens from Senegal, Ivory Coast and Ghana, Linnavuori (1993) redescribed both the genus and the species and he added the description of the spermatheca which also proved to be very distinctive: «bursa [dilation of the duct] absent, tube very long, strongly coiled». The genus has remained monospecific until now (Lis, 1999, 2002).

A second species was recently discovered among unidentified African cydnid material housed in the Museum National d'Histoire Naturelle (Paris). The particular features of the spermatheca described by Linnavuori (1993), unusual within the Geotomini, are confirmed. In the present paper we describe *Shillukia ribesi* n. sp., focusing on female genitalia in search of other possible peculiarities. We compare the new species with *S. polita*, and we reexamine also the diagnostic characters of the genus *Shillukia* provided by Linnavuori (1993).

Material and methods

The species description is only based on specimens found in the Museum National d'Histoire Naturelle, Paris (MNHN).

Examination of male and female genitalia: Pygophore and female abdomen were removed and macerated in cold potassium hydroxide (10%) for several hours. After dissection, the structures were examined, drawn and photographed in glycerol using a semi-covered cavity slide as described by Doesburg (2004). If necessary, membranous structures were stained by chlorazol black. The dissected structures were then placed in a plastic microvial containing glycerol and attached to the pin bearing the specimen. Series of pictures have been assembled using CombineZP.

The terminology follows Lis (1994), Lis and Pluot-Sigwalt (2002), Pluot-Sigwalt and Lis (2008) and Kment and Vilimová (2010).

Taxonomy

Shillukia ribesi n. sp.

(Figs. 1-3)

Type material:

HOLOTYPE: ♂ : Côte d'Ivoire, 19.06.65, Galerie Bandama, 150 m², Gillon, Museum Paris. (MNHN).

PARATYPES: 7 ♂♂, 8 ♀♀, same data as holotype (MNHN); 1 ♀, same data (coll. Magnien); 1 ♂, 1 ♀, Côte d'Ivoire, Lamto (Toumoudi), 12.02.1975, R. Vuattoux (MNHN).

Description:

Body elongate oval, coloration dark fuscous, shiny, antenna lighter.

Measurements (in mm): total length = 9.1–11.1 (♂), 9.3–10.6 (♀); width = 4.7–5.9 (♂), 4.9–5.5 (♀); ocular index = 2.4–2.7; interocellar index = 3.7–4.2.

Head (Fig. 1a). Genae coarsely punctate, anteclypeus and middle part of frons less punctate. Clypeus wrinkled, as long as the paraclypei and devoid of subapical pair of setae; paraclypei almost converging in front, bearing three submarginal pairs of hair-like setae. Eye devoid of apical seta; ocelli located posterior to the eye, at about one ocellar diameter behind a line connecting hind margin of the eyes. Antenna five-segmented slightly shorter than head and pronotum together, first segment shorter, second and third subequal, fourth longer by more than 50% than second, fifth two times as long as second. Rostrum just reaching the mesocoxae, the first segment not longer than the head and completely concealed between the bucculae in lateral view.

Thorax. Pronotum coarsely punctate, except in some areas, particularly on the calli and the hind margin finely punctate or impunctate; lateral margins almost straight in posterior two thirds, bearing six pairs of submarginal hair-like setae (five on the anterior half, one on the posterior half); scutellum triangular about as long as wide, the punctation stronger on the anterior part. Hemelytron slightly longer than the abdomen, almost completely covering the dorsum; its lateral margin elevated in the anterior half, bearing a single pair of marginal hair-like setae; corium overall punctate; membrane light fuscous. Legs reddish brown. Evaporatorium widely expanded on meso- and metaepurion (Fig. 1b); vestibule elevated, relatively short,

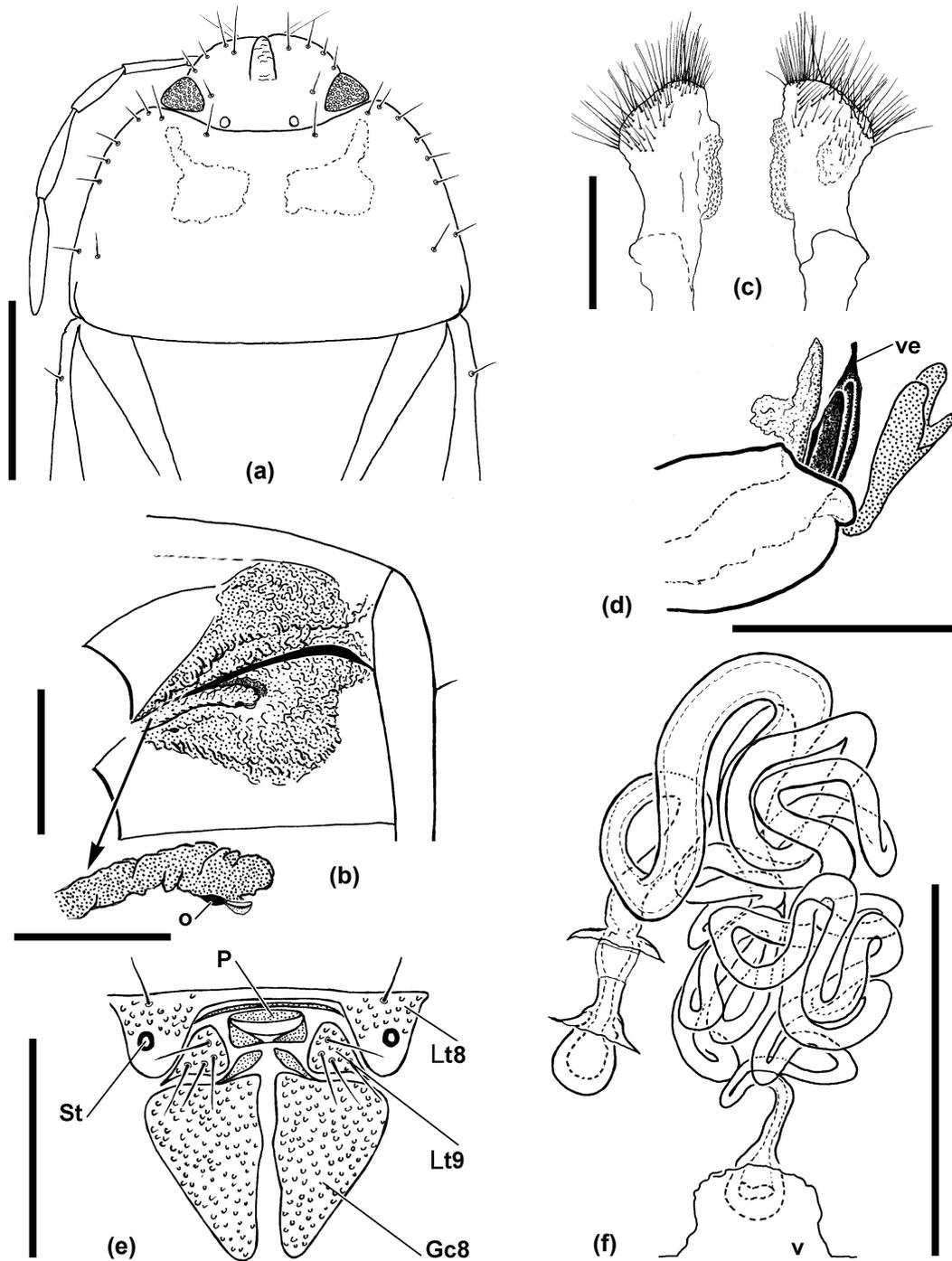


FIGURE 1. *Shillukia ribesi* n. sp.: (a) Head and thorax showing chetotaxy; (b) Evaporatorium on meso- and metapleuron and detail of vestibule, terminal lobe and ostiole; (c) Left paramere, dorsal and ventral views; (d) Apex of phallus and protruding conjunctival appendages; (e) Female external genitalia; (f) Spermatheca (Gc8: Gonocoxite 8; Lt8, Lt9: Laterotergites 8, 9; o: Ostiole; P: Proctiger; v: Vagina; ve: Vesica) (Scale bars: (a) = 1 cm; (b) = 2 mm and (detail) 0.5 mm; (c)-(d) = 0.5 mm; (e)-(f) = 1 mm).

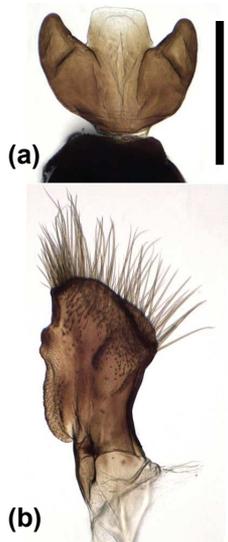


FIGURE 2. *Shillukia ribesi* n. sp.: (a) Apical part of the lower conjunctival process, ventral view; (b) Left paramere, dorsal view (Scale bars: (a) = 0.5 mm; (b) = 1 mm).

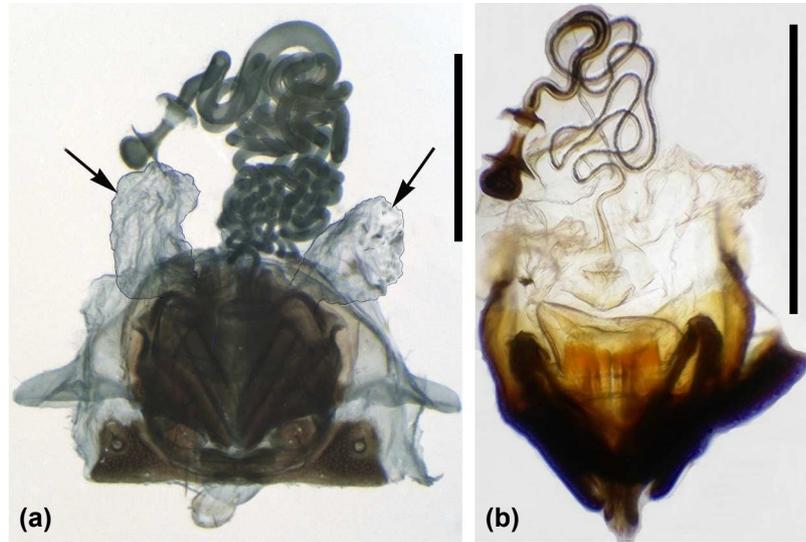


FIGURE 3. Internal and external female genitalia, dorsal view: (a) *Shillukia ribesi* n. sp. (after KOH treatment and chlorazol black coloration) (arrows indicate lateral vaginal pouches); (b) *Shillukia polita* (after KOH treatment only) (Scale bars = 1 mm).

reaching about the middle of the evaporatorium, its surface wrinkled (gyrification); terminal lobe developed; ostiole opening caudad, just in front of a minute light brown process (peritreme?) (Fig. 1b).

Abdomen. Sternites shiny, finely punctate laterally, smooth and impunctate in the middle; one pair of submarginal setae on sternites 6 and 7 each.

Male genitalia. Parameres as in Figs. 1c, 2b. Phallosome strongly sclerotized and pigmented, nearly straight showing three distinct protruding conjunctival processes (Fig. 1d): the lower one trilobed and semi-membranous (Fig. 2a); the upper one membranous with a basal lobe; a triangular sclerotized, strongly pigmented structure consisting of the fine vesica closely flanked by a pair of finger-like processes situated between the upper and lower processes.

Female genitalia. External genitalia: see Fig. 1e; laterotergites 8 joined medially by a narrow dorsal bridge; laterotergites 9 bearing four long setae. Internal genitalia (Fig. 3a): spermatheca lightly yellowish-pigmented, not strongly sclerotized; apical receptacle pear-shaped; intermediate part long, delimited by two well developed flanges; flexible zone lightly swollen in basal position; spermathecal duct wide, very long, coiled in

a dense huge mass (Fig. 1f), devoid of definite dilation or invagination, but clearly wider in apical part than in basal part. Spermathecal opening situated under a small pouch of the vaginal wall. Ring sclerites present, thin, associated with a pair of lateral vaginal pouches well differentiated (Fig. 3a, arrows).

NOTE: The apical receptacle is usually positioned on the left of the large mass of the spermathecal duct. In one specimen it was located on the right. The twists and turns of the very long duct do not seem tidy and apparently do not follow a precise direction.

Etymology:

It is our pleasure to dedicate this new species to our friend and colleague Jordi Ribes, in recognition of his very important contribution to the knowledge of Heteroptera.

Distribution:

Ivory Coast.

Type locality and habitat:

The concise labels of the holotype and most paratypes do not allow a clear localisation of the type loca-

Characters	<i>ribesi</i> n. sp.	<i>polita</i>
Body form	elongate slightly oval, < 2 longer than wide	elongate parallel-sided 2.1 longer than wide
Body length	> 9 mm	< 9.5 mm
Calli punctation	lightly punctate	impunctate
Submarginal pairs of setae: - head	3	2
- pronotum	6	2-3
- hemelytra	1	0
Position of ocelli	posteriad to the eye	at the level of eye
Female laterotergite 9	4 long setae	2 long setae
Spermathecal duct	longer	shorter

TABLE 1. Main morphological differences between the two species of the genus *Shillukia*.

lity, so we want to add here the following precisions. The specimens have been collected by Dominique Gillon in the «Station d'Ecologie de Lamto» (6°13'N, 5°02'W). The Lamto region is a forest-savannah mosaic area; the surface indicated, «150 m²», represents very likely the area of the quantitative quadrat prospected by D. Gillon when she collected the specimens during 1965 (see Gillon, 1972). The words «Galerie Bandama» means that the specimens were collected in the gallery-forest of the river Bandama. We can thus deduce that *S. ribesi* n. sp. is probably a forest species rather than a savannah one.

Discussion:

S. ribesi n. sp. can be readily distinguished from *S. polita* by several characters: body size and shape, chetotaxy, punctation, position of the ocelli, shape of spermathecal duct (Figs. 3a-b) (see Table 1).

The unusual structure of the spermathecal duct devoid of definite dilation or invaginated part, already described by Linnavuori (1977) in *S. polita*, is confirmed for the genus. All other features show no notable particularity and are clearly generally geotomine-like, including the female genital tract that possesses the paired ring sclerites of the parieto-vaginal glands associated with paired lateral vaginal pouches (Fig. 3a).

The genus *Shillukia* can be recognized by the combination of the following set of characters:

- body form elongated;
- coarse punctation of the dorsal part of the body;
- reduced chetotaxy (submarginal hair-like setae on head, thorax, abdomen);
- absence of apical seta on eyes, or if present (rarely) only as a minute seta;

- genus-specific shape of the vestibule of the meta-thoracic glands;
- evaporatorium occupying large area on meso- and metapleura;
- laterotergites 8 connected mediodorsally;
- spermathecal duct wide and long, strongly coiled, devoid of definite dilation or invagination.

As pointed by Linnavuori (1993), the genus *Shillukia* superficially resembles certain *Geotomus* species (now transferred to the genus *Fromundus*; see Lis, 1994, 1999) in general appearance. All the above characters (excepting the spermatheca) are indeed shared by several other geotomine genera.

The genus is best characterized by its spermatheca. In Cydnidae, the spermathecal characters are of great value at species, genus and suprageneric levels.

According to Linnavuori (1993), *Shillukia*, an endemic African geotomine genus, could be a taxon representing an evolutionary lineage of its own. We essentially agree with this opinion. This kind of spermatheca, although clearly of geotomine facies, is indeed unique within Geotomini. With its very long and wide spermathecal duct, it does not fit any of the three geotomine species groups recently defined (Pluot-Sigwalt and Lis, 2008) on the basis of the structure of the spermathecal duct:

- group I: spermathecal duct with spherical dilation more or less developed (most genera such as *Aethus*, *Geotomus*, *Fromundus*, *Macrosicytus*);
- group II: spermathecal duct with a large pumpkin-like dilation (such as *Teabooma*, *Cydnolomus*);
- group III: duct with a sausage-like dilation (such as *Hiverus*, *Katakadia*, *Scoparipes*).

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