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Three new African species in the genus *Coccothera* Meyrick, 1914 (Lepidoptera: Tortricidae: Grapholitini)

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Abstract: Three new species from Africa are described in the genus *Coccothera* Meyrick, 1914 (Lepidoptera: Tortricidae: Grapholitini). *Coccothera yangambiana* **sp. nov.**, *Coccothera willydeprinsi* **sp. nov.** and *Coccothera juratedeprinsi* **sp. nov.** Diagnostic characters are illustrated and described, and the type locality is illustrated. The biology and distribution of the species are not known except for the collecting dates and locality.

Key words: Afrotropical Tortricidae, DNA barcoding, faunistics, morphology.
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INTRODUCTION

This is the third part of a revision of the genus *Coccothera* Meyrick, 1914. Material collected by the author during an expedition to the Democratic Republic of Congo in May 2012 has been examined morphologically and using DNA barcoding. The material consists of eight specimens which surprisingly represented three new species. The three species are very clearly different from all other known species of *Coccothera*. A preliminary examination and comparison with samples collected from neighboring Gabon and Uganda showed that none of the three new species were represented in this material, which will be treated in a subsequent paper.

METHODS AND MATERIALS

The material was collected using light traps with 125 W mercury vapour bulbs placed at the forest edge close to the house used by researchers in Yangambi, DRC.

The genitalia were mounted in euparal on slides in accordance with standard procedures (Robinson, 1976). This procedure was slightly modified when making the slides of the females. The females of *Coccothera* species have very weak structures, especially the sterigma and ostium, which are important for the definition of the species. The ductus bursae is also very weak and fragile, and sometimes nearly invisible. In consequence the production of the female slides follows a slightly different procedure. The genital structure is not removed from the abdomen, which makes it possible to image the sterigma and ostium together with the other parts of the abdomen. The disadvantage of this procedure is that it becomes more difficult to stain and therefore staining becomes less effective.

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The terminology of genitalia and morphological structures follows Horak (1991 & 2006), and the terminology of wing pattern elements follows Razowski (2003). Furthermore Gilligan, Wright & Gibson (2008) and Wright & Gilligan (2017) were consulted.

Images of genitalia were taken using a Toup Tek camera mounted on a Toup Tek binocular microscope. Photographs of whole specimens were taken using a Canon EOS50D camera and a 100 mm Canon macro lens. The photo of the cubital pecten in Fig. 13 was made by OM system OM-1 objective M Zuiko 90 mm f 3,5 macro and 2 x tele converter. Images are stacked of 20 photos 10 1/100 sek iso 200 and handled in light room and stacked in Photoshop.

The type material is currently deposited in the research collection of the author and will later be transferred to the Zoological Museum of Copenhagen (ZMUC).

Locality

Jurate De Prins (Leefdal, Belgium) arranged the 2012 expedition to the Yangambi Reserve in the Democratic Republic of Congo (DRC). Region: Oriental. Province: Tshopo, 100 km WNW of Kisangani, 0°45'49"N, 24°30'17"E. The main road from Kisangani to Yangambi follows the northern riverbank of the Congo River. The road was difficult to traverse (Fig. 1). The only possible collecting spot at Yangambi was the forest edge (Fig. 2) close to the house and approximately 270 m north of the riverbank of the Congo River. The vegetation was dense, impenetrable tropical forest. The species diversity of plants and insects was very high.

Abbreviations

Ht – holotype
Pt – paratype
sp. nov. – species nova
gen. prep. – genitalia preparation

KL – research collection of Knud Larsen, Dyssegaard, Denmark
ZMUC - Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark.

Figure 1 – DRC Congo. Main road to Yangambi along the Congo River.

Figure 2 – DRC. Congo. Yangambi forest.

RESULTS

Coccothera Meyrick, 1914 is a genus with mainly an Afrotropical distribution (Larsen, 2023). This genus, including the present changes, now contains fifteen species (AfroMoths: accessed 24.x.2024). An overview of the changes in the generic definitions can be found in Razowski (2004 & 2019) and on Afromoths (accessed 24.x.2024).

Coccothera yangambiana **sp. nov.** (Figs 3-7).
urn:lsid:zoobank.org:act:CA453E2F-D7B9-427E-9405-AA3CA3D80B4A

Material examined

Holotype: ♂, DRC. Democratic Republic of Congo. Province: Tshopo. Yangambi reserve, 100 km. WNW Kisangani, 0˚45'49"N, 24˚30'17"E, 450 m ASL. 14.-23.v.2012, leg. et coll. KL, later ZMUC. Gen. prep. 4952 ♂ KL.
Paratypes: 4♀ same data as the holotype. Gen. prep. 4946 ♀ KL, 4947 ♀ KL and 4951 ♀ KL.

Description

Imago: (Fig. 3-4). Wingspan ♂ 8 mm, ♀ 8-11 mm. Head and thorax very dark grey, scales yellow tipped. Segments of abdomen grey and black ringed last segment pure black; underside more light grey and shining. Antenna about half the length of the forewing, dark grey and yellow ringed. Labial palps short and grey with yellow tipped scales. Legs light grey and shining, black ringed with rather long white spurs.

Figure 3 – *Coccothera yangambiana* **sp. nov**. male. Holotype.

Figure 4 – *Coccothera yangambiana* **sp. nov**. female. Paratype.

Forewings: Triangular, with a slightly indented termen. Ground colour is dark brown to black. Basal blotch with numerous yellow dots more or less arranged in stripes. Antemedian fascia bend, bluish violet and shiny, ending at costa in two whitish strigula. Median fascia is broad with parallel sides before the angle towards the costa. Dark brown to black with an area with yellow dots placed in longitudinal stripes. At the costa and towards the postmedian fascia there are no stripes. Postmedian fascia half circular in shape two thirds of the wing from dorsum. Shiny bluish-violet and more strongly shining in the female. After two thirds bends sharply outwards and edged by orange line forming a costal strigula, which is more pronounced in the female. Three orange and white strigulae are present towards the apex. Termen with a fine black dividing line, cilia light brown to grey. Underside of forewings dark brown with strong bluish-violet sheen when held at right angle. Costa with 5 to 7 clear white strigula and more sharply marked in the female.

Hindwings: Male hindwings have a short anal extension, while the female hindwings are normally rounded. The hindwings of the male are dark brown at the dorsal half, while the rest is orange brown and lighter towards the anal margin. The extended anal area is dark brown. The female´s hindwing slightly darker brown, lighter towards basal part. Underside of hindwings grayish brown.

Male genitalia: (Fig. 5). Valva elongate with large cucullus, hairy in central part and with very small

sclerotized thorn close to the ventral side, costa strongly curved and slightly asymmetrical. Pedunculus and uncus weak and simple, phallus bottle shaped, slightly enlarged towards apex.

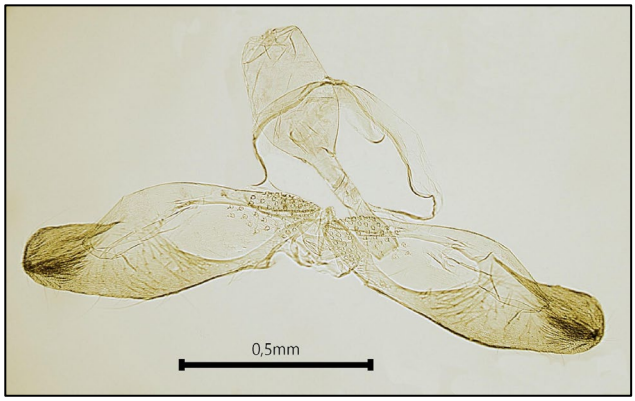

Figure 5 – *Coccothera yangambiana* **sp. nov**. Gen. prep. 4952 male. Holotype.

Female genitalia: (Figs 6-7). Papilla analis rather large. Apophyses posterior slender, apophyses anterior stronger and longer. Sterigma weak, cup shaped broad, lamella postvaginalis with scale sockets. Subgenital plate cone shaped, deeply indented dorsally and rather broad. Very strong sclerotized folds along lateral edges of tergum seven. Ostium very weak. Ductus bursae elongate, thin and fragile especially at colliculum, longitudinal folds in the medium part, widening before bursae. Colliculum very weak, slightly curved. Bursae large with two straight thorn-like signa. Eighth segment dorsally densely setose.

Results of DNA analysis: One specimen was analysed. Coccothera sample ID: TLMF Lep 26296. Barcode index number registry for BOLD: ADN1996 shows distance to nearest neighbor at 6.57%. Distance model: Pairwise distance; marker: COI-5P. Pairwise deletion. (BOLD: Guelph, Canada accessed 31.x.2024).

Diagnosis

Coccothera yangambiana **sp. nov.** is close to *C. cipollana* (Larsen, 2023 b) but differs by the direction of the stripes in the basal blotch and the median fascia. The postmedian fascia is sharper angled and the blackish blotch at the costa of the median fascia is larger along with the blackish areas in the termen. The shape of the hindwings of the male is characteristic. The valva is broad, curved at the costa and with a very tiny thorn in the cucullus; the female has a deep indented subgenital plate, lateral edges of tergum seven are very strongly sclerotized, eighth segment is densely setose dorsally.

Biology

The species is only known from the five type specimens all collected in May by light at Yangambi. Vegetation is dense impenetrable tropical forest on slopes leading down to the Congo River. Host plant is not known. The type locality at Yangambi is illustrated in Fig. 2.

Distribution

DRC. Democratic Republic of Congo: Province: Tshopo.

Etymology

The species is named after the type locality.

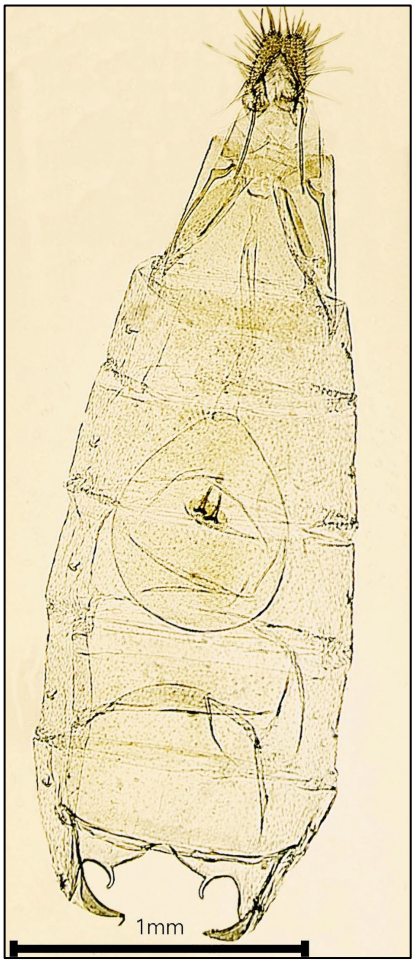

Figure 6 – *Coccothera yangambiana* **sp. nov**. Gen. prep. 4951 female. Paratype.

Figure 7 – *Coccothera yangambiana* **sp. nov**. Gen. prep. 4951 female, enlarged. Paratype.

Coccothera willydeprinsi **sp. nov.** (Figs 8-10).
urn:lsid:zoobank.org:act:864FCC2C-CA9F-4AE7-8B80-50B79FF6FD3C

Material examined

Holotype: ♂, DRC. Democratic Republic of Congo. Province: Tshopo. Yangambi reserve, 100 km. WNW Kisangani, 0˚45'49"N, 24˚30'17"E, 450 m ASL. 14.-23.v.2012, leg. et coll. KL, later ZMUC. Gen. prep. 4949 ♂ KL.

Description

Imago: (Figs. 8-9). Wingspan ♂ 7 mm. Head, thorax and abdomen dark grey with a few yellow tipped scales. Antennae less than half the length of the forewing, dark grey and yellow ringed underneath yellow in the first half. Labial palps short and light yellow, mixed with black scales mainly towards the apex. Legs light yellow, but the last segment of the legs ringed black. Spurs are white.

Figure 8 – *Coccothera willydeprinsi* **sp. nov**. male. Holotype.

Figure 9 – *Coccothera willydeprinsi* **sp. nov**. male, underside. Holotype.

Forewings: Regular shaped, costa slightly convex, ground colour dark brown to black. Basal blotch and median fascia with scattered yellow spots arranged in diffuse stripes. Antemedian and postmedian fascia narrow and angled towards the costa and shiny leaden in colour and with a minute leaden shiny dot in the middle of the angle. Five costal white strigula towards the apex and a diffuse dark subterminal blotch. Termen with a black dividing line, cilia light yellow. Underside very different with a large whitish area along dorsum and another more diffuse elongate whitish area at the centre of the wing. This area is bordered with scattered black scales in a larger blotch towards costa and a smaller one basally. The terminal part of the wing is more chocolate brown coloured.

Hindwings: Slightly irregular shaped with a rounded extension at termen. Dark orange-brown, darker at the costa, with patches of black scales at the basal part and which also form a prominent oval whitish spot laterally. Undersides the same but the scattered black scales at the basal part are more exposed and also form an elongate black-scaled area along the basal half of the costa.

Male genitalia: (Fig. 10). Valva elongate, with a large cucullus nearly half the size of the valva. Cucullus setose with a large slender thorn at the ventral side. Sacculus with long rather weak hairy scales. Pedunculus very weak, uncus short and simple, phallus bottle shaped with almost parallel sides towards apex.

Figure 10 – *Coccothera willydeprinsi* **sp. nov**. Gen. prep. 4949 male. Holotype.

Diagnosis

Coccothera willydeprinsi **sp. nov.** is defined by the diffuse standard "*Coccothera*" pattern with a minute leaden dot in the median fascia and by the oval whitish areas on the underside of the forewing and the oval whitish area in the corner of the underside of the hindwing, which is different from other species in the genus. In the male genitalia the species is characterized by the elongate and strongly setose cucullus, with the long and thin thorn at the ventral side. These presented structures are unique in the *Coccothera* genus.

Biology

The species is only known from the single type specimen collected in May by light at Yangambi. Vegetation of the type locality is dense impenetrable tropical forest on the slopes leading down to the Congo River. Host plant is not known. The type locality at Yangambi is illustrated in Fig. 2.

Distribution

DRC. Democratic Republic of Congo: Province: Tshopo.

Etymology

The species is named in honor of the well-known European entomologist Willy De Prins (Leefdal, Belgium), who participated in the expedition.

Coccothera juratedeprinsi **sp. nov.** (Figs 11-13).
urn:lsid:zoobank.org:act:B1337283-AAD6-4B67-AD64-B78B29861A32

Material examined
Holotype: ♂, DRC. Democratic Republic of Congo. Province: Tshopo. Yangambi reserve, 100 km. WNW Kisangani, 0˚45'49"N, 24˚30'17"E, 450 m ASL. 14.-23.v.2012, leg. et coll. KL, later ZMUC. Gen. prep. 4953 ♂ KL.
Paratype: 1 ♂ same data as the holotype. Gen. prep. 4954 ♂.

Description

Imago: (Fig. 11). Wingspan ♂ 9 mm. Head, thorax and abdomen browny-grey with numerous yellow tipped scales. Antenna less than half the length of the forewing, dark brown with narrow yellow rings. Labial palps short, light yellow. Legs dark brown with yellow tipped scales. Spurs light yellow.

Figure 11 – *Coccothera juratedeprinsi* **sp. nov**. male. Holotype.

Forewings: Regular shaped, costa straight, ground colour light brown. Basal blotch and median fascia with scattered yellow spots diffusely arranged in vertical stripes. Antemedian and postmedian fascia narrow and angled towards costa. The costal margin of the fasciae very weakly shiny leaden in colour. Continuous light yellow strigula at the costa and a diffuse dark brown subterminal blotch. Termen with black dividing line, cilia grey-brown. Underside dark brown with tiny basal silvery blotch. Along costa a triangular dark brown area with few white strigula. At the dorsum in the basal part a pencil of white very thin sex scales– a cubital pecten (Fig. 12). The structure is bent down from the underside of the forewing allowing a photo to be taken. This type of cubital pecten in the genus *Coccothera* is otherwise only known from *Coccothera spissana* (Zeller, 1852) (Larsen, 2023a). Underside brown.

Hindwings: Brown, lighter at the basal part.

Male genitalia: (Fig. 13). Valva elongate narrow, weakly sclerotized and with a smaller cucullus with a dusk of fine hair and a tiny thorn. Sacculus and pedunculus very weak, uncus short and simple, phallus bottle shaped with almost parallel sides towards apex.

Figure 12 – *Coccothera juratedeprinsi* **sp. nov**. Macro photo of the cubital pecten.

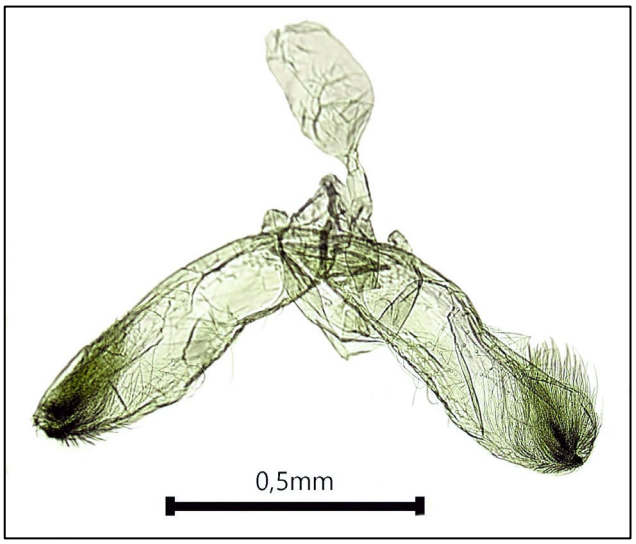

Figure 13 – *Coccothera juratedeprinsi* **sp. nov**. Gen. prep. 4954 male. Paratype.

Diagnosis

Coccothera juratedeprinsi **sp. nov.** is defined by the general unicolorous outlook which is unique for the genus. The males have a cubital pecten basally on the underside of the forewing. The male genitalia of the species are characterized by the elongate and narrow valva and the small hairy area and thorn.

Biology

The species is only known from the two type specimens both collected in May by light at Yangambi. Vegetation of the type locality is dense impenetrable tropical forest on the slopes leading down to the Congo River. Host plant is not known. The type locality at Yangambi is illustrated in Fig. 2.

Distribution

DRC. Democratic Republic of Congo: Province: Tshopo.

Etymology

The species is named in honor of the well-known European entomologist Jurate De Prins (Leefdal, Belgium) who

participated in the expedition. Jurate De Prins was the leading person to organize and make this difficult expedition possible.

DISCUSSION

The three species all have the same general structure of the male genitalia, characterized by the elongate valva and hairy cucullus with a thorn, and they all have a bottle shaped phallus as known from *C. spissana* (Zeller, 1852), *C. cipollana* Larsen, 2023*, C. bvumbana* Larsen, 2023 and *C. kingstoni* Larsen, 2023, but all Coccothera species seem to have a phallus without cornuti and with soft scerotization. The species also have many structures in common in their general appearance. Surprisingly, some of the remarkable differences were found on the underside of the wings, in the wing shape and also a cubital pecten was found in *Coccothera juratedeprinsi* **sp. nov.**

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