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***Cyana smithi*, a new species from Liberia (Lepidoptera: Erebidæ: Arctiinae: Lithosiini)**

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Abstract

The new species *Cyana smithi* Volynkin & László, **sp. nov.** is described from Liberia. The new species belongs to the subgenus *Lousia* Karisch, 2013 comprising two species, *C. (L.) quentini* Karisch, 2003 and *C. (L.) yaseminae* Baron & Karisch, 2016. Adults, male and female genitalia of all three species are illustrated.

Key words: Sub-Saharan Africa, Afrotropical Region, *Lousia*, taxonomy.

Introduction

The genus *Cyana* Walker, 1854 is widely distributed in the Afrotropical, eastern and south-eastern Palaearctic, Oriental and Australian Regions. In the Afrotropics, 64 valid species are known to date. The African taxa of the genus were recently revised by Karisch (2013). In his revision, Karisch has subdivided the genus into 24 subgenera, 17 of which are present in Africa. The subgenus *Lousia* Karisch, 2013 was erected for a single species *C. (L.) quentini* Karisch, 2003 distributed in Equatorial Guinea, Congo, Democratic Republic of Congo and Uganda (Karisch 2003; 2013). Later, Baron & Karisch (2016) described *Cyana yaseminae* Baron & Karisch, 2016 from Uganda. Although the authors did not associate this species with any existing subgenus, due to the configuration of its male genitalia, *C. yaseminae* is a sister species of *C. quentini* belonging also to the subgenus *Lousia*.

In the Lithosiini collection held at the African Natural History Research Trust, a series of unidentified species of *Cyana* recently collected in Liberia was found. Due to its male and female genitalia structure (the shape of juxta in males and the presence of the strongly setose tuber-like process at the base of the appendix bursae in females), this species undoubtedly belongs to the subgenus *Lousia*. However, its male and female genitalia structures show significant differences compared to those of *C. quentini* and *C. yaseminae* proving that it belongs to another, yet undescribed species, the description of which is given in the present paper.

Materials and methods

Abbreviations of the depositories used: ANHRT = African Natural History Research Trust, Leominster, UK; MWM/ZSM = Museum Witt München / The Bavarian State Collection of Zoology (Zoologische Staatssammlung München), Munich, Germany; NHMUK (formerly BMNH) = Natural History Museum, London, United Kingdom.

The genitalia were dissected and mounted in euparal on glass slides. The photos of adults were taken using a Nikon D3100/AF-S camera equipped with a Nikkor, 18–55 mm lens. The photos of genitalia were taken by the same camera attached to a microscope with an LM-scope adapter. All pictures were processed using the Adobe Photoshop CC 2018® software.

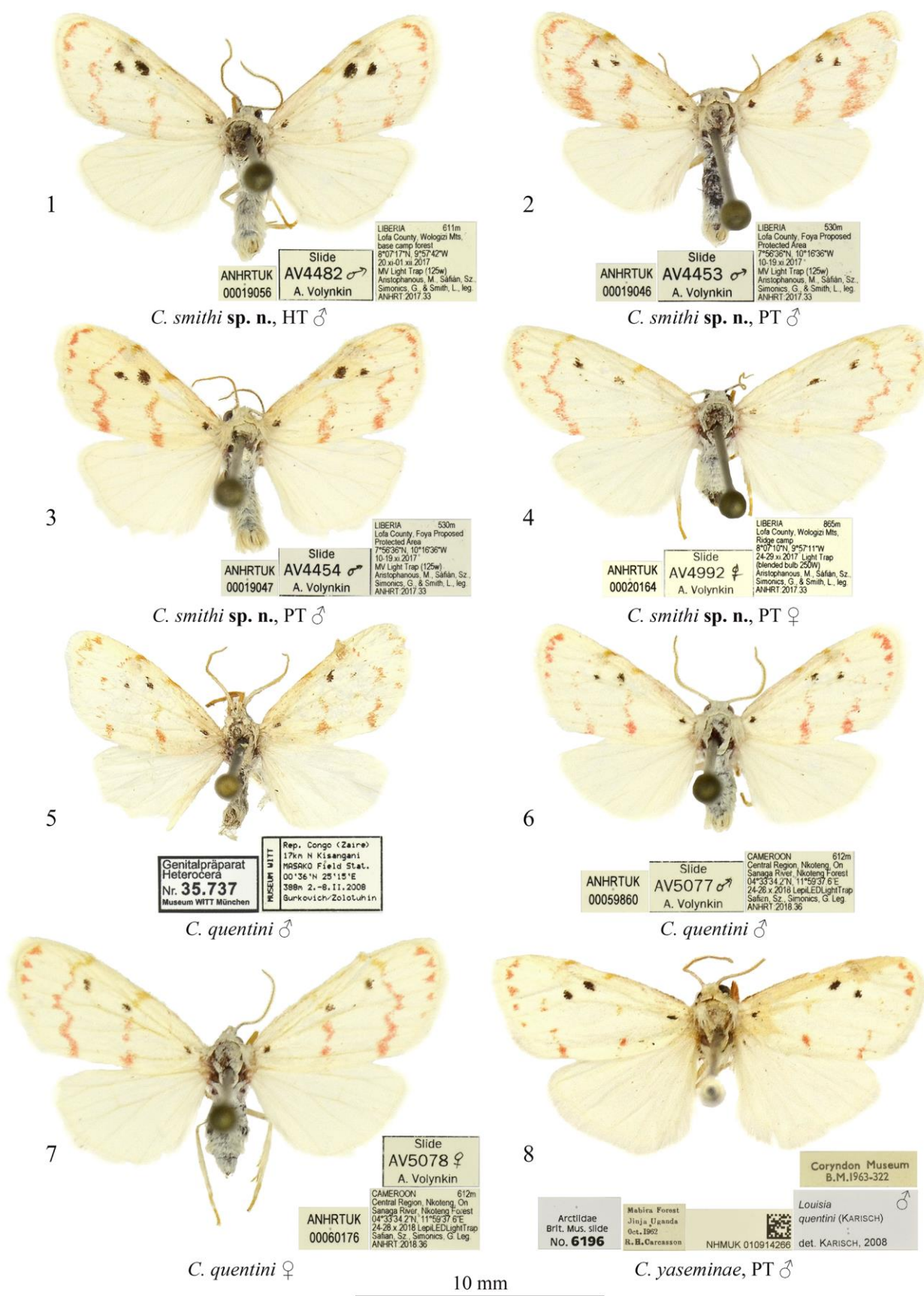
Cyana (Louisia) smithi Volynkin & László, **sp. nov.**

(Figs 1–4, 9, 10, 15, 17, 19)

Type material. Holotype (Figs 1, 9): male, Liberia, 611m, Lofa County, Wologizi Mts., base camp forest, 8°07'17"N, 9°57'42"W, 20.XI–01.XII.2017, MV Light Trap (125w), Aristophanous, M., Sáfián, Sz., Simonics, G., Smith, L. leg., ANHRT:2017.33 / ANHRTUK 00019056, slide No.: AV4482♂ Volynkin (coll. ANHRT).

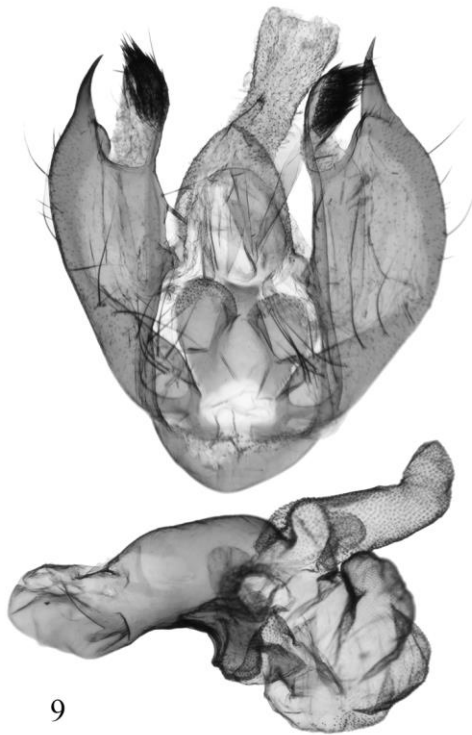
Paratypes: 7 males, with same data as the holotype (ANHRT unique id numbers: ANHRTUK 00020212, 00026543, 00020215, 00020305, 00020472, 00020207, 00020214), slide No.: AV4990♂ Volynkin; 16 males, Liberia, 530m, Lofa County, Foya Proposed Protected Area, 7°56'36"N, 10°16'36"W, 10–19.XI.2017, MV Light Trap (125w), Aristophanous, M., Sáfián, Sz., Simonics, G., Smith, L. leg., ANHRT:2017.33 (ANHRT unique id numbers: ANHRTUK00019046, 00019047, 00020088, 00026301, 00026465, 00026294, 00026282, 00026320, 00026408, 00026407, 00026406, 00026479, 00026480, 00020084, 00025905, 00009091), slide Nos: AV4453♂, AV4454♂ Volynkin; 1 female, Liberia, 865m, Lofa County, Wologizi Mts., Ridge Camp, 8°07'10"N, 9°57'11"W, 24–29.XI.2017, Light Trap (blended bulb 250W), Aristophanous, M., Sáfián, Sz., Simonics, G., Smith, L. leg., ANHRT:2017.33 / ANHRTUK 00020164, slide No.: AV4992♀ Volynkin; 2 males, 1 female, Liberia, 585m, Lofa County, Wologizi Mts., Rosewood Camp, 8°06'14.9"N, 9°58'27.3"W, 18.XI–1.XII.2018, Cold Cathode UV Light Trap (8w), Sáfián, Sz., Simonics, G. leg., ANHRT:2018.43 (ANHRT unique id numbers: ANHRTUK 00060192, 00060193, 00061769) (coll. ANHRT).

Diagnosis. *Cyana smithi* (Figs 1–4) is the third member of the subgenus *Lousia*. It does not show significant external differences from *C. quentini* (Figs 5–7) and can be distinguished by genitalia structure only. Compared to *C. yaseminae* (Fig. 8), *C. smithi* is somewhat smaller in size (male's wingspan of *C. smithi* is 15–16 mm, while that of *C. yaseminae* is 18–19 mm). In addition, the forewing costa of *C. smithi* is pale orange in the underside (similar to that of *C. quentini*), whereas that area is dark brown in *C. yaseminae* (see Baron & Karisch 2016: fig. 4). In the male clasping apparatus, *C. smithi* (Figs 9, 10) differs clearly from *C. quentini* (Figs 11, 12) and *C. yaseminae* (Figs 13, 14) by its heavily setose valva apex (that is weakly setose in *C. quentini* and *C. yaseminae*). In addition, in *C. smithi* the postero-lateral lobes of juxta have significantly finer dentation (Figs 15, 16) than in the related species, and the distal sacculus process is basally broader and less curved than in *C. quentini*. In comparison with *C. yaseminae*, the male genitalia of *C. smithi* has less sclerotized medial part of juxta, narrower valva with less curved costa, and shorter, slenderer and less curved distal sacculus process. The aedeagus of *C. smithi* is much longer and narrower (that is short and very broad in *C. quentini* and *C. yaseminae*), with a large dorsal process of carina (in *C. quentini* and *C. yaseminae* the carina is represented by a sclerotised dentate crest). The vesica of the new species has only one small subbasal diverticulum situated laterally, whereas in *C. quentini* there are two subbasal diverticula: a small, short and narrow dorsal one, and a large ventral diverticulum, which is broadly conical with rounded apex and heavily granulated. The female genitalia of *C. smithi* (Figs 17, 19) is very similar to that of *C. quentini* (Fig. 18) and differs by its larger signum only. The vesica structure and female genitalia of *C. yaseminae* are unknown.



10 mm

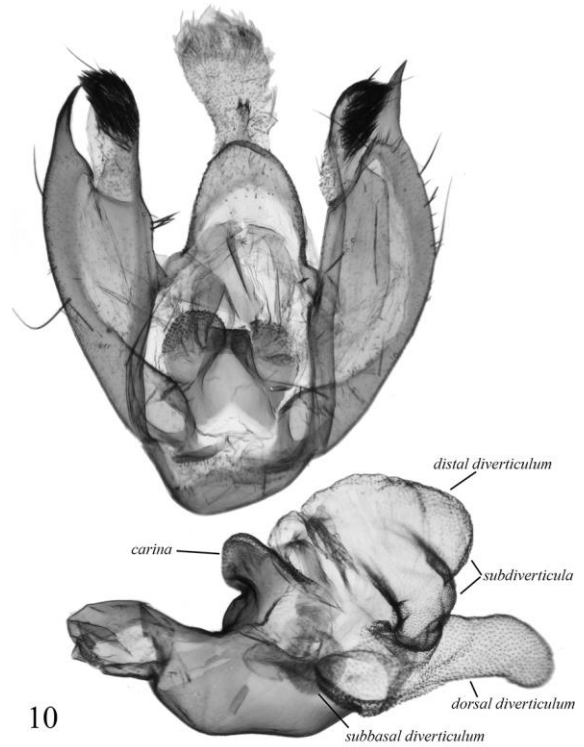
Figures 1–8. *Cyana* spp.: adults. 1, *C. smithi*, holotype male, Liberia (ANHRT); 2, *C. smithi*, paratype male, Liberia (ANHRT); 3, *C. smithi*, paratype male, Liberia (ANHRT); 4, *C. smithi*, paratype female, Liberia (ANHRT); 5, *C. quentini*, male, DR Congo (MWM/ZSM); 6, *C. quentini*, male, Cameroon (ANHRT); 7, *C. quentini*, female, Cameroon (ANHRT); 8, *C. yaseminae*, paratype male, Uganda (©NHMUK).



9

***C. smithi* sp. n., HT**

Liberia, Wologizi Mts., slide AV4482



10

***C. smithi* sp. n., PT**

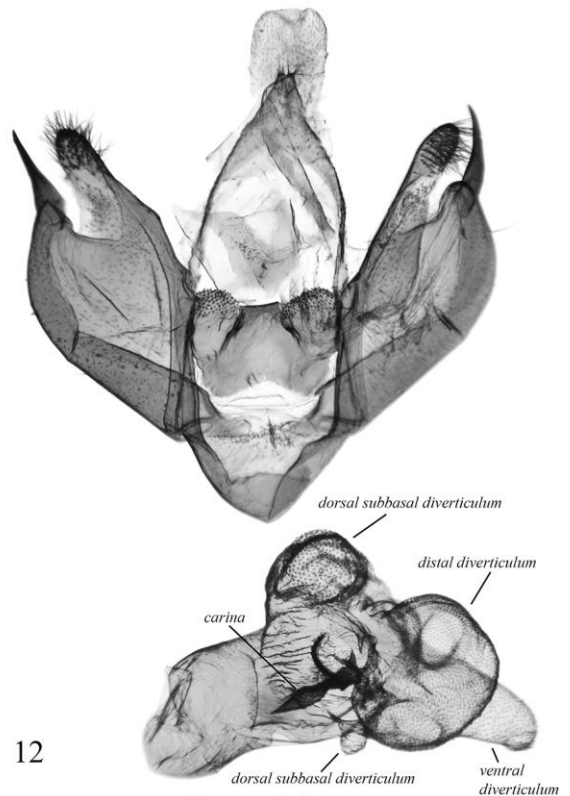
Liberia, Wologizi Mts., slide AV4453



11

C. quentini

Democratic Republic of the Congo, Tshopo Province,
slide MWM 35737



12

C. quentini

Cameroon, Central Region, Nkoteng Forest,
slide AV5077

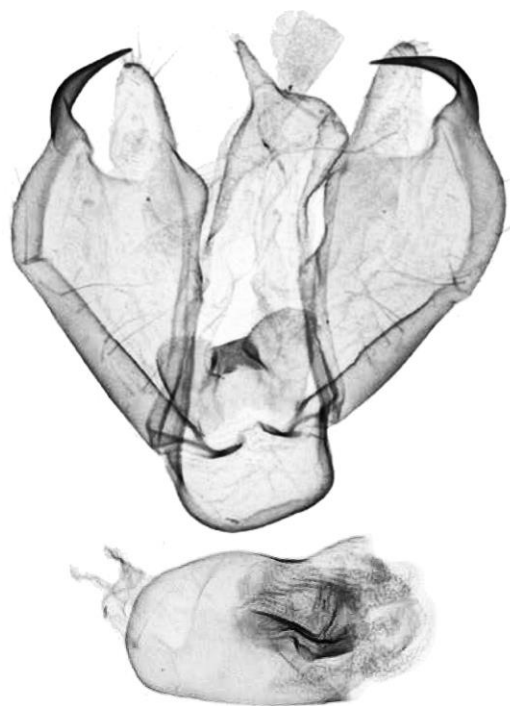
Figures 9–12. *Cyana* spp.: male genitalia. 9, *C. smithi*, holotype, Liberia, slide AV4482 Volynkin; 10, *C. smithi*, paratype, Liberia, slide AV4453 Volynkin; 11, *C. quentini*, DR Congo, slide MWM 35737 Volynkin; 12, *C. quentini*, Cameroon, slide AV5077 Voynkin.



13

C. yaseminae, PT

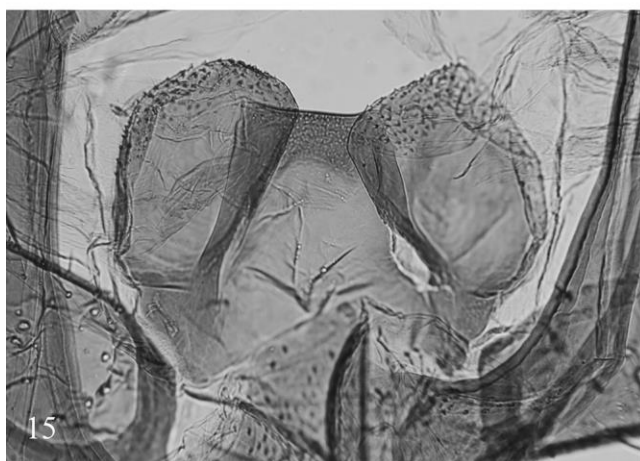
Uganda, Mabira Forest, slide BMNH(E) Arct-6196



14

C. yaseminae, PT

Uganda, Mpanga Forest, slide 3300 Karisch



15

C. smithi sp. n., PT

Liberia, Wologizi Mts., slide AV4990



16

C. quentini

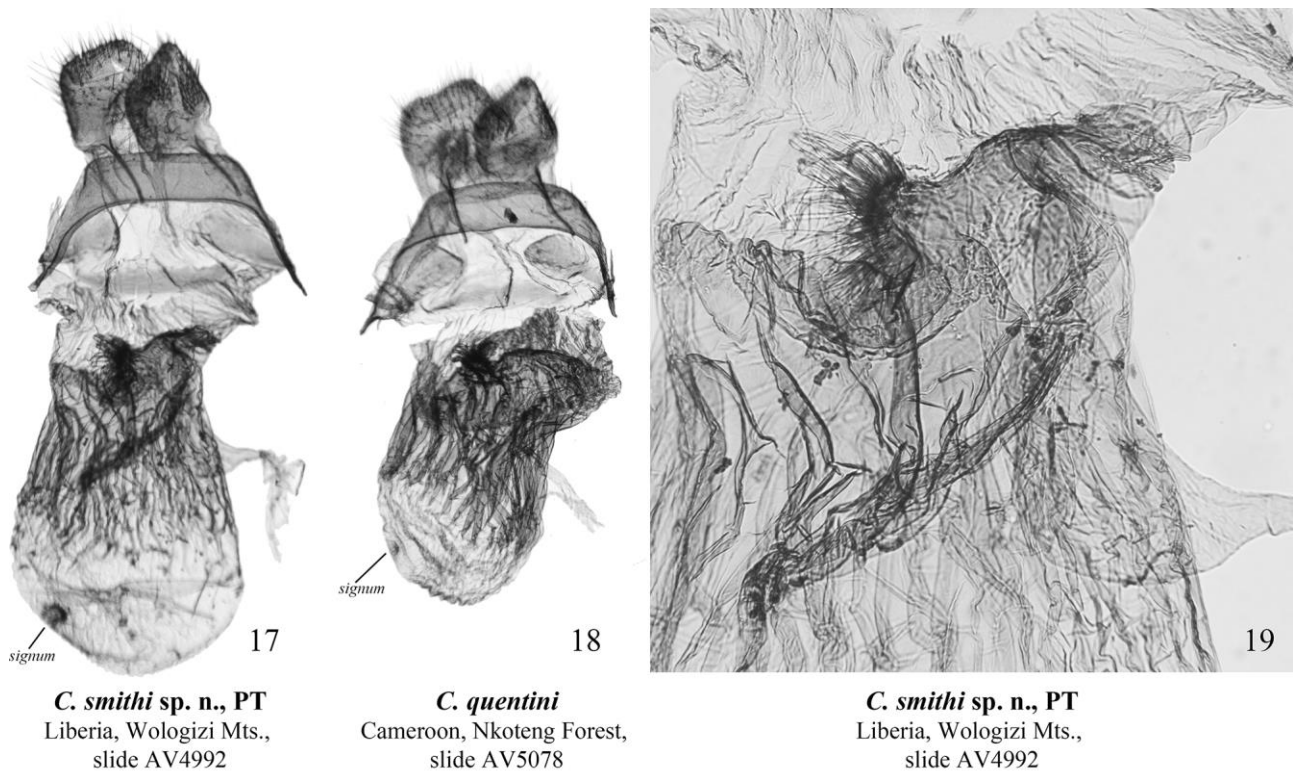
Cameroon, Nkoteng Forest, slide AV5077

Figures 13–16. *Cyana* spp.: male genitalia. 13, *C. yaseminae*, paratype, Uganda, slide BMNH(E) Arct-6196 Karisch (©NHMUK); 14, *C. yaseminae*, paratype, Uganda, slide 3300 Karisch (photo by T. Karisch); 15, *C. smithi*: magnified juxta, paratype, Liberia, slide AV4990 Volynkin; 16, *C. quentini*: magnified juxta, Cameroon, slide AV5077 Volynkin.

Description. Adult (Figs 1–4). Forewing length 7.5–8.0 mm in males (8.0 mm in holotype) and 8.0–8.5 mm in females. Wingspan 15–16 mm in males and 17.5–18 mm in females. Male antennae ciliate, female antennae filiform. The sexual dimorphism well expressed: besides presence of forewing androconial lobes on the underside of forewing, male characterized by its slightly less elongated forewing and black spots of forewing situated obliquely to the costal margin (female has black spots parallel to the costal margin). In males, size of black spots and width of transverse lines vary. Body of both sexes white. Forewing base with a black dot. Ante- and postmedial lines shortly and irregularly dentate, pale pinkish red from cell to inner forewing margin and yellowish at wing costa. Subterminal line pale pinkish red, short, absent from tornus to CuA2 vein, interrupted at veins M3 and CuA1. Cilia white. Hindwing and cilia white, wing pattern absent.

Male genitalia (Figs 9, 10, 15). Uncus short, narrow, dorso-ventrally flattened, connected to tuba analis. Tuba analis distally broadened, setose. Tegumen short, broadened apically and narrow laterally. Juxta large, shield-like, with two lateral, rounded and inflated lobes densely covered with fine dentation apically. Vinculum short, broad, U-shaped. Valva elongated, slightly dilated medially; costa narrow; distal lobe of valva short, narrow, apically rounded, its distal half densely covered with long and strong setae. Saccus broad, its distal process elongated trigonal, rather thorn-like, broad at basal with arcuate margins, its distal half slightly curved inwards, apically pointed. Aedeagus short, curved, strongly dilated distally; carina large, heavily sclerotised, more or less trapezoid, directed ventrally. Vesica thick, with a small, globular, granulated subbasal diverticulum situated laterally; a large, broad and globular distal diverticulum with two short but broad granulated subdiverticula apically; and a long and narrow, granulated dorsal diverticulum directed distally.

Female genitalia (Figs 17, 19). Ovipositor broad and short, papillae anales large, rectangular, with rounded corners, setose. Apophyses thin, apophyses posteriores ca. twice longer than apophyses anteriores. Ostium bursae broad. Ductus bursae as broad as ostium bursae, very short, rugose. Corpus bursae sack-like, its anterior third membranous, weakly rugose, with a well-developed rounded signum; medial and posterior thirds of corpus bursae strongly rugose, with weakly sclerotised longitudinal wrinkles. Posterior third of corpus bursae with a broad oblique fold and a short, tuber-like process covered with hair-like setae at the base of appendix bursae. Appendix bursae short, narrowly conical, membranous, situated postero-laterally, directed laterally.



Figures 17–19. *Cyana* spp.: female genitalia. 17, *C. smithi*, paratype, Liberia, slide AV4992 Volynkin; 18, *C. quentini*, Cameroon, slide AV5078 Volynkin; 19, *C. smithi*: magnified posterior part of corpus bursae, paratype, Liberia, slide AV4992 Volynkin.

Distribution. *Cyana smithi* is currently only known from northeastern Liberia (Lofa County).

Etymology. The species is dedicated to Mr Richard Smith, founder of the African Natural History Research Trust, organiser of extensive entomological exploratory program in Sub-Saharan Africa.

Cyana (Louisia) quentini Karisch, 2003
(Figs 5–7, 11, 12, 16, 18)

Cyana quentini Karisch, 2003, *Lambillionea* **103**: 120, figs. 1, 4a, 4b (Type locality: Dem. Rep. Congo (Zaire): Equateur: Kalamba).

Material examined: 1 male, Rep. Congo (Zaire), 17 km N Kisangani, Masako Field Stat., 00°36'N 25°15'E, 388m, 2–8.II.2008, Gurkovich/Zolotuhin, slide MWM 35737 Volynkin (Coll. MWM/ZSM); 1 male, 1 female, Cameroon, 612m, Central Region, Nkoteng, On Sanaga River, Nkoteng Forest, 04°33'34.2''N, 11°59'37.6''E, 24–28.X.2018, LepiLED Light Trap, Safian, Sz., Simonics, G. Leg., ANHRT:2018.36 (ANHRT unique id numbers: ANHRTUK 00059860, 00060176), slides AV5077♂, AV5078♀ Volynkin (Coll. ANHRT).

Remark. The specimens from DR Congo and Cameroon show slight differences in male genitalia (in width of uncus, length of juxta, width of distal saccular process, and size of subdiverticula of the distal diverticulum of vesica) (Figs 11, 12). To clarify the status of the different populations of *C. quentini* examination of more extensive material from different countries is necessary.

Distribution. The species was found in Equatorial Guinea, Cameroon, Congo and Democratic Republic of Congo (Karisch 2003; 2013). The record from Cameroon is new data for the species distribution.

Acknowledgements

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