



## Review of the *Cyana rejecta* (Walker, 1854) species-group, with descriptions of three new species from mainland Africa and a new subspecies from Madagascar (Lepidoptera, Erebidae, Arctiinae, Lithosiini)

ANTON V. VOLYNKIN<sup>1, 2, 3\*</sup> & GYULA M. LÁSZLÓ<sup>1, 4</sup>

<sup>1</sup> The African Natural History Research Trust (ANHRT), Street Court Leominster-Kingsland, HR6 9QA, United Kingdom

<sup>2</sup> Altai State University, Lenina Avenue, 61, RF-656049, Barnaul, Russia.

<sup>3</sup> [✉ monstruncusarctia@gmail.com](mailto:monstruncusarctia@gmail.com); [ORCID: https://orcid.org/0000-0001-9447-4925](https://orcid.org/0000-0001-9447-4925)

<sup>4</sup> [✉ gyulalaszlo@anhrt.org.uk](mailto:gyulalaszlo@anhrt.org.uk); [ORCID: https://orcid.org/0000-0001-9862-8290](https://orcid.org/0000-0001-9862-8290)

\* Corresponding author

### Abstract

The present paper provides an overview of the *Cyana rejecta* (Walker, 1854) species-group. Three new species (*C. yao* sp. n., *C. occidentalis* sp. n. and *C. cornutissima* sp. n.) and a new subspecies (*C. rejecta viettei* ssp. n.) are described. Adults, male and female genitalia of all taxa of the species-group are illustrated.

**Key words:** *Cyana*, new species, new subspecies, Sub-Saharan Africa, Madagascar, Afrotropics

### Introduction

*Cyana* Walker, 1854 is a very diverse lithosiine genus widely distributed from the Afrotropics through the Indo-malayan and eastern Palaearctic Regions to New Guinea and Australia. The African taxa of the genus were revised by Karisch (2013), who referred to 62 species and 9 subspecies from Africa, Madagascar and the adjacent islands. Subsequently, one additional species was transferred to the genus *Cyana* from *Asura* Walker, 1854, one subspecies was raised to species level and five species were described recently (Baron & Karisch 2016; Volynkin 2019; 2020; Volynkin & László 2019a; 2019b).

In his revision, Karisch (2013) subdivided the genus into 24 subgenera based on the wing venation, configuration of androconial lobes of the forewing, wing pattern and genitalia structures. The subgenus *Cornutivulpecula* Karisch, 2013 was erected for ten species and two subspecies with *Cyana klohsi* Karisch, 2003 designated as the type species (Karisch 2013). One species of *Cornutivulpecula*, *C. rejecta* has an unmistakable appearance characterized by the uniformly yellowish body and wing coloration with the pattern reduced to two black dots in the cell. Specimens with such an appearance are known from many parts of the Afrotropics including Madagascar and were all treated by Karisch (2013) as conspecific. However, thorough examination of the male and female genitalia, especially through everting the vesica of the specimens from various regions of Africa led to the discovery that *C. rejecta* is a complex of cryptic taxa comprising four species in mainland Africa and one distinct subspecies in Madagascar. The four new Afrotropical taxa are described in this paper as new to science.

### Material and methods

Abbreviations of the depositories used: ANHRT = African Natural History Research Trust (Leominster, United Kingdom); NHMUK (formerly BMNH) = Natural History Museum (London, United Kingdom); NHRS = Swedish Museum of Natural History (Naturhistoriska Riksmuseet, Stockholm, Sweden); TMSA = Ditsong Museum of Natural History (formerly Transvaal Museum, Pretoria, South Africa); ZSM = The Bavarian State Collection of

Zoology (Zoologische Staatssammlung München, Munich, Germany). Other abbreviations used: AV = genitalia slide prepared by Anton Volynkin; HT = holotype; PT = paratype.

The genitalia were dissected and mounted in euparal on microscope 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.

## Taxonomic part

### Genus *Cyana* Walker, 1854

*Cyana* Walker, 1854, *List of the specimens of lepidopterous insects in the collection of the British Museum* 2: 528.  
Type species: *Cyana detrita* Walker, 1854 (by monotypy).

### Subgenus *Cornutivulpecula* Karisch, 2013

*Cornutivulpecula* Karisch, 2013, *Esperiana* 18: 74. Type species: *Cyana klohsi* Karisch, 2003 (by original designation).

**Diagnosis.** The subgenus is characterized by the presence of an undivided androconial lobe on the male forewing underside, the presence of the M1 vein and the partially obsolescent terminal vein of the cell. In the male genitalia, the medial process of the valva is absent and the aedeagus is larger than that of other subgenera. The female genitalia are characterized by the absence of a sclerite in the corpus and ductus bursae, and the narrow ductus bursae partially lacking sclerotization (Karisch 2013).

### The *Cyana rejecta* species-group

**Diagnosis.** Members of the species-group are characterized by the amber or canary yellow coloration of the body and the wings and the reduced forewing pattern represented by two black dots in the cell. In the male genitalia, the species-group differs from other members of the subgenus *Cornutivulpecula* by the thick, three dimensional vesica bearing numerous spine-like cornuti. The female genitalia of the species-group differ conspicuously from those of other species-groups of the genus by the weakly sclerotized, rugose ductus bursae and the adjacent posterior section of the corpus bursae, as well as the absence of clusters of spinules in the corpus bursae. The male genital capsule of the species of the complex display no noticeable differences and the distinctive features are expressed exclusively by the configuration of the vesica.

**Description. External morphology of adults.** Forewing length 10–16 mm in males and 11–14 mm in females. Antennae of both sexes weakly ciliate. Sexual dimorphism limited, expressed by the lack of androconial lobe on female forewing. Body and wing coloration varies from amber yellow to canary yellow; hindwing slightly paler than forewing. Forewing pattern represented by two black dots in the cell medially and distally. **Male genitalia.** Uncus short, triangular with rounded tip, dorso-ventrally flattened, setose, almost fully fused with tuba analis, only its tip separated. Tuba analis narrow, membranous; scaphium reduced; subscaphium reduced or represented by a narrow, weakly setose area. Tegumen narrow, shorter than valva, its posterior fused section broad and elongate. Juxta weakly sclerotized, X-shaped, with longer posterior branches. Anellus weakly serrulate. Vinculum short but robust, U-shaped. Valva elongate, dilated medially, costal margin with a large triangular protrusion as part of the medial sclerotized plate of costa; distal section of valva tapered, apically rounded. Sacculus narrow, moderately sclerotized, its distal process robust, elongate, slightly curved dorsally with thorn-like tip. Aedeagus conspicuously broad, straight. Vesica thick, membranous, with granulated subbasal diverticulum bearing a cluster of spinules; medial section of vesica with two or three short granulated diverticula; distal diverticulum of vesica broad, granulated, with two elongate clusters of various-sized robust spine-like cornuti (joined into one line in *C. yao* sp. n. and *C. cornutissima* sp. n.). Vesica with a broadly triangular, weakly sclerotized distal plate with rounded outer margin. **Female genitalia.** Papillae anales large, rectangular with rounded corners, weakly setose. Apophyses relatively long and thin, apophyses anteriores shorter than apophyses posteriores. Ostium bursae moderately broad, with membranous margins. Ductus bursae short, tubular, its posterior section membranous, anterior section sclerotized, rugose

with numerous longitudinal weakly sclerotized folds protruding into the posterior section of corpus bursae. Corpus bursae sack-like, thick-walled, without spinules, in some species with weak scobination of signum bursae medially. Appendix bursae broad, situated laterally, with sclerotized rugose broad main section (fused with a similarly sclerotized rugose posterior area of corpus bursae in *C. occidentalis* sp. n. and *C. cornutissima* sp. n.) and small membranous section at base of ductus seminalis.

**Distribution.** Members of the species-group are widely distributed in Sub-Saharan Africa and in Madagascar. As members of this species-group display no reliable distinctive external characters, the former literature records of *C. rejecta* (partially as *bipunctigera*) (Druce 1887; Butler 1898; Hampson 1909; Pagenstecher 1903; Strand 1912, 1922; Kiriakoff 1963; Pinhey 1975) need verification.

### Checklist of the *Cyana rejecta* species-group

- *rejecta rejecta* (Walker, 1854) (South Africa: KwaZulu-Natal Province)
- *rejecta viettei* ssp. n. (central and eastern Madagascar)
- *yao* sp. n. (northern Mozambique, Malawi and Kenya)
- *occidentalis* sp. n. (Sierra Leone, Guinea, Liberia, Togo, Cameroon, northern Angola and north-western Zambia)
- *cornutissima* sp. n. (northern South Africa, Mozambique, Zimbabwe, Malawi, Zambia, Uganda, Tanzania and Kenya)

### *Cyana (Cornutivulpecula) rejecta rejecta* (Walker, 1854)

(Figs 1–4, 27, 39)

*Setina rejecta* Walker, 1854, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum* 2: 521 (Type locality: not provided in the original description [Natal]).

= *Lithosia bipunctigera* Wallengren, 1860, *Wiener entomologische Monatsschrift* 4 (2): 45 (Type locality: [South Africa, Eastern Cape Province] “Caffraria”).

**Type material examined. Holotype** (by monotypy) of *Setina rejecta* (Fig. 1): male without abdomen, [South Africa, KwaZulu-Natal Province] “Natal” / green ring label “Type” / “18. *Setina rejecta*.” / “1952/188” / label with QR-code and unique number “NHMUK010814204” (NHMUK); photographs of the **holotype** of *Lithosia bipunctigera* (after de Prins & de Prins (2020)): female, “Caffraria.” / *Lithosia bipunctigera* Wallengr.” / “466” (NHRS).

**Additional material examined. SOUTH AFRICA:** 1 male, 1 female, Karkloof, Natal, G.A.K. Marshall, 97-50, unique number: NHMUK 10918064 (male), gen. slide No.: NHMUK10315726 (male) (prepared by Volynkin); 1 male, Durban, Natal, G.F. Leigh / Rothschild Bequest B.M.1939-1, unique number: NHMUK 10918065, gen. slide No.: NHMUK10315727 (prepared by Volynkin); 1 female, Durban, Natal, 34.IX.1913 / L. Hargreaves, B.M. 1927-53, unique number: NHMUK 10918066, gen. slide No.: NHMUK10315728 (prepared by Volynkin); 1 female, Natal, A.J. Spiller; 1 female, Lower Umkomaas, Natal (G.F. Leigh); 1 male, Transvaal, Johannesburg, April 1906, A.T. Cooke, 1908-112, unique number: NHMUK 10918067, gen. slide No.: NHMUK10315729 (prepared by Volynkin); 1 female, Transvaal, Pretoria, W.L. Distant; 1 female, Transkei, Cape Colony (Miss Barrett); 1 male, Bashee R., Kaffraria, J.H. Bowker (NHMUK).

**Remark.** In the original description of *Setina rejecta*, Walker (1854) referred to a type specimen, without indication of its locality. An *S. rejecta* specimen labelled as “type” was located in the NHMUK collection bearing a “Natal” label. The same specimen was treated by Karisch (2013) as a syntype. Although the original description does not specify the number of types, it clearly refers to a single specimen by listing it under a single letter “a”. In many of his works, Walker listed all specimens available to him under multiple consecutive letters (see e.g. the description of *Setina apicalis* Walker, 1854), which is not the case in the description of *S. rejecta*, therefore we consider *S. rejecta* to have been described from the holotype only.

**Diagnosis.** The forewing length is 10–12 mm in males and 11–12 mm in females. Most specimens of *C. rejecta* are slightly smaller than *C. cornutissima* sp. n. occurring in the northern part of South Africa. The male genitalia of *C. rejecta* are distinguished by the large, bilobate dorsal subbasal diverticulum (which is also bilobate in *C. yao*

**sp. n.** and *C. cornutissima* **sp. n.**, but markedly shorter), the broad and globular 2<sup>nd</sup> medial diverticulum, and the moderately broad distal diverticulum bearing two rows of robust spine-like cornuti almost connected apically (in *C. occidentalis* **sp. n.** the two rows of cornuti are well-separated; in *C. yao* **sp. n.** the rows of cornuti are very short and connected apically; and in *C. cornutissima* **sp. n.** there is only a single, conspicuously long row of more numerous and longer cornuti). The female genitalia of *C. rejecta* differ from those of *C. occidentalis* **sp. n.** and *C. cornutissima* **sp. n.** by their considerably shorter ductus bursae and the less prominent, less sclerotized appendix bursae and from *C. yao* **sp. n.** by their longer, more heavily sclerotized appendix bursae. The presence of a lateral rugose sclerotized area and the band-like weakly scobinated area medially in the corpus bursae separates *C. rejecta* from all other species in this species-group.

**Distribution.** The nominotypical subspecies is known only from South Africa (KwaZulu-Natal, Gauteng and Eastern Cape Provinces).

### *Cyana (Cornutivulpecula) rejecta viettei* **ssp. n.**

(Figs 5–10, 28, 29, 40)

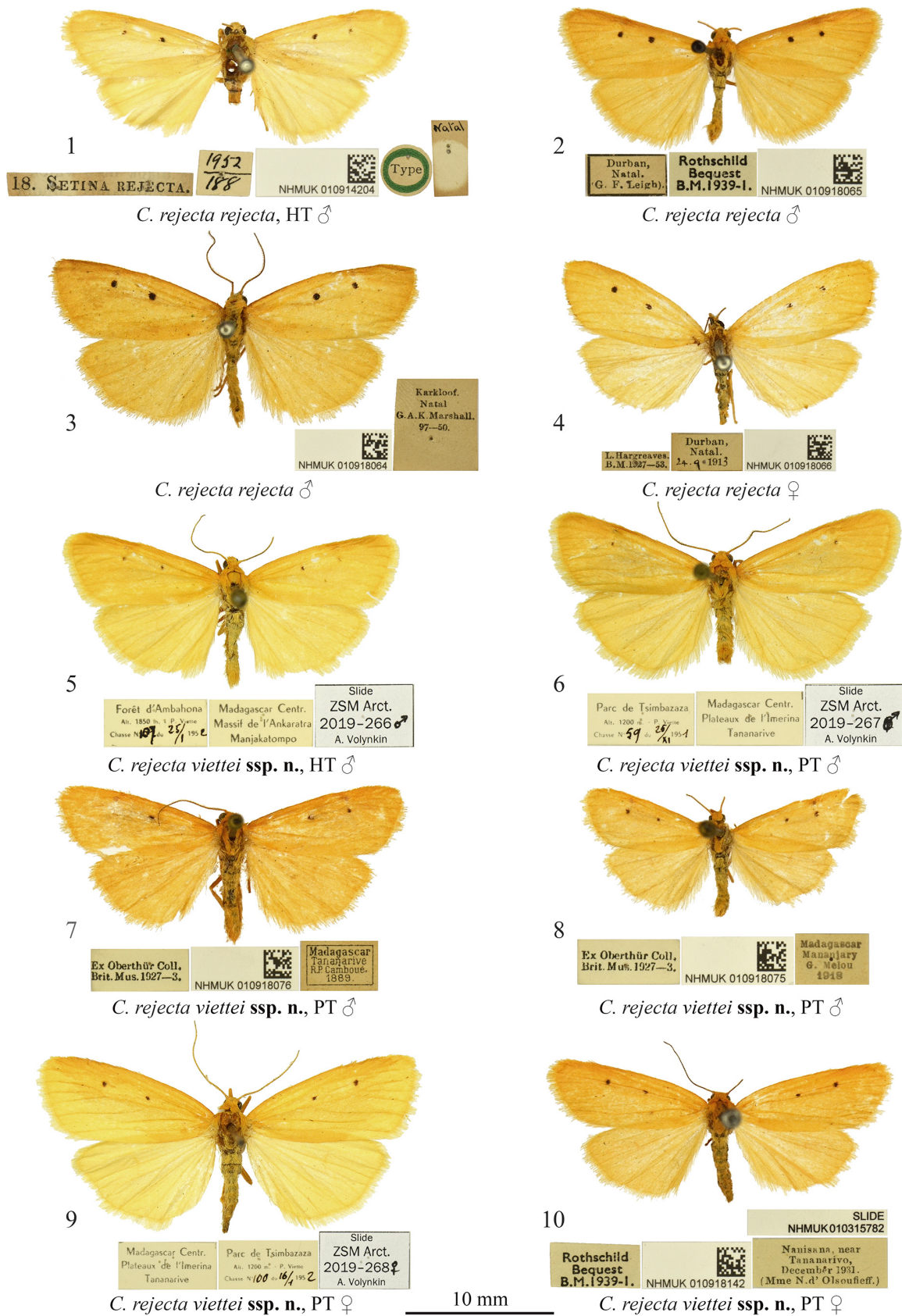
**Type material. Holotype** (Figs 5, 28): male, “Madagascar Centr., Massif de l’Ankaratra [Ankaratra Massif], Manjakatempo” / Forêt d’Ambahona [Ambahona Forest], Alt. 1850m - P. Viette, Chasse N [exp. No.] 107 du 25/I 1952”, gen. slide No.: ZSM Arct. 2019-266 Volynkin (Coll. ZSM).

**Paratypes (10 males and 27 females in total). MADAGASCAR:** 1 female, with the same locality and collector as in the holotype, exp. No. 16, 4.X.1951; 1 female, same locality and collector, exp. No. 61, 27.XI.1951; 1 male, 2 females, same locality and collector, exp. No. 62, 28.XI.1951; 1 male, same locality and collector, exp. No. 82, 21.XII.1951; 2 females, same locality and collector, exp. No. 104, 21.I.1952; 1 female, same locality and collector, exp. No. 105, 23.I.1952; 1 female, same locality and collector, exp. No. 106, 24.I.1952; 1 male, Madagascar Centr., Imerina Plateau, Tananarive, Tsimbazaza Park, 1200m, P. Viette, exp. No. 59, 25.XI.1951, gen. slide No.: ZSM Arct. 2019-267 (prepared by Volynkin); 1 female, same locality and collector, exp. No. 100, 16.I.1952, gen. slide No.: ZSM Arct. 2019-268 (prepared by Volynkin); 1 female, the same locality and collector, exp. No. 100, 16.I.1952 / gen. slide No.: 1820 Karisch, 2004 / *Cornutivulpecula rejecta* (Walker, 1854) ♀ det. Karisch, 2008 / gen. slide No.: [ZSM] 3671, (prepared by T. Karisch); 1 female, same locality and collector, exp. No. 57, 23.XI.1951; 1 male, same locality and collector, exp. No. 66, 3.XII.1951; 1 female, same locality and collector, exp. No. 109, 31.I.1952; 1 female, same locality and collector, exp. No. 127, 25.II.1952; 1 female, same locality and collector, exp. No. 128, 25.II.1952; 1 female, Péronet, 950 m, 11–19.III.55, H. de Toulgoët; 2 females, road to the south, Km. 303, 1700 m, 22–25.III.55, H. de Toulgoët; 1 female, Madagascar East, vic. of Perineat, 910 m, Analamazoaltra Forest, P. Vielle, 16.XI.1954; 1 male, Moramanja, 25.V.57, Vieu (ZSM); 3 females, Ambohitantely Special Reserve, 24–29.XI.2011, 1530m, S18°11’51” E47°17’03”, at light, M. Trýzna lgt., ANHRT:2018.4, unique numbers: ANHRTUK 00073475, 00073476, 00073477, gen. slide No.: AV5032 (ANHRT); 1 male, Station Perinet, 149 km east of Tananarivo, January 1933 (Mme N. d’Olsoufieff) / Rothschild Bequest B.M.1939-1, unique number: NHMUK 10918074, gen. slide No.: NHMUK010315736 (prepared by Volynkin); 1 female, same locality and collector, December 1932; 1 female, Nanisana, near Tananarivo, December 1931 (Mme N. d’Olsoufieff); 2 females, Nanisana, near Tananarivo, January 1932 (Mme N. d’Olsoufieff); 1 male, Mananjari, G. Melou, 1918 / Ex Oberthür Coll. Brit. Mus. 1927-3, unique number: NHMUK 10918075, gen. slide No.: NHMUK010315737 (prepared by Volynkin); 2 males, Mananjara, Nov. 1918, M. Le Moulton / B.M. 1932-200; 2 females, Tananarive, collection Le Moulton / Collection Chulliat / Rothschild Bequest B.M.1939-1; 1 male, Mahatsinjo, pres. Tananarive / 458 / Rothschild Bequest B.M.1939-1; 1 male, 1 female, Tananarive, R.P. Camboué, 1889 / Ex Oberthür Coll. Brit. Mus. 1927-3, unique number: NHMUK 10918076 (male), gen. slide No.: NHMUK010315738 (male) (prepared by Volynkin); 1 female, Nanisana, near Tananarivo, December 1931 (Mme N. d’Olsouffiev) / Rothschild Bequest B.M.1939-1, unique number: NHMUK 10918142, gen. slide No.: NHMUK010315782 (prepared by Volynkin) (NHMUK).

**Remark.** Specimens from eastern Madagascar differ slightly from the topotypical ones of central Madagascar by their somewhat narrower forewing, darker coloration and slightly larger black dots on the forewing. As their genitalia display no noticeable differences, the taxonomic value of the differences expressed in external morphology between the two populations can only be clarified by molecular studies.

**Diagnosis.** The forewing length is 10–12 mm in males and 11–13 mm in females. *Cyana rejecta viettei* **ssp. n.**





FIGURES 1–10. *Cyana rejecta* ssp.: adults. Depositories of specimens: 1–4, 7, 8 and 10 in NHMUK (©); 5, 6 and 9 in ZSM.



11

ANHRTUK 00050582 Slide AV5204 ♂  
A. Volynkin

MOZAMBIQUE 1130m  
Zambezia Province, Mt. Namuli  
SW slopes near Mucunha village  
(secondary vegetation/farmland)  
15°21'27"S, 37°05'18"E  
14-15 viii 2018 MV Light Trap  
Laszlo G., Miles W., Velina A. Leg  
ANHRT 2018.30

*C. yao* sp. n., HT ♂



12

Nyassaland,  
Mt. Milanje,  
24. viii 1913,  
S. A. Neave.  
1914-171.

NHMMUK 010914205

*C. yao* sp. n., PT ♂



13

Nyassaland,  
Mt. Milanje,  
24. viii 1913,  
S. A. Neave.  
1914-171.  
in cop

NHMMUK 010914206

*C. yao* sp. n., PT ♀



14

Joicey  
Bequest.  
Brit. Mus.  
1934-120.

56. 30.  
Mt. Kenya  
north-east to south-east  
vii. 30.  
E. Barns.

NHMMUK 010918069

*C. yao* sp. n., PT ♂



15

Joicey  
Bequest.  
Brit. Mus.  
1934-120.

56. 30.  
Mt. Kenya  
West to North  
13-30. vi. 30.  
E. Barns.

NHMMUK 010918119

*C. yao* sp. n., PT ♀



16

LIBERIA  
Lofa County, Wologizi Mts,  
Ridge Camp 2  
8° 7' 20.79" N, 9° 56' 50.75" W  
22-31. xi. 2018 Light Trap  
Blended Bulb (250W)  
Safian, Sz., Simonic, G. Leg.  
ANHRT 2018.43

Slide AV5255  
A. Volynkin

ANHRTUK 00070119

*C. occidentalis* sp. n., HT ♂



17

CAMEROON 1246m  
Adamawa Region, Adamawa  
Plateau, 7.3km West  
of Bazanga, Chute De Tello  
07° 13' 50.6" N, 13° 56' 29.2" E  
24-30. ix. 2018 MV Light Trap  
Safian, Sz., Simonic, G. Leg.  
ANHRT 2018.36

Slide AV5731 ♂  
A. Volynkin

ANHRTUK 00078429

*C. occidentalis* sp. n., PT ♂



18

Libollo,  
Angola  
[Pemberlon].

Rothschild  
Bequest  
B.M. 1939-1.

NHMMUK 010918068

*C. occidentalis* sp. n., PT ♂

10 mm

FIGURES 11–18. *Cyana* spp.: adults. Depositories of specimens: 11, 16 and 17 in ANHRT; 12–15 and 18 in NHMMUK (©).

differs externally from the nominate subspecies by the smaller black dots of the forewing. In the male genitalia of ssp. *viettei*, the aedeagus is considerably broader, more robust than that of *C. rejecta rejecta*, the spines in the proximal lobe of the subbasal diverticulum are shorter, and the 1<sup>st</sup> medial diverticulum is smaller. The female genitalia



of the new subspecies differ conspicuously from those of *C. rejecta rejecta* by the somewhat longer and narrower ductus bursae and the absence of a band-like scobinated area in the medial section of the corpus bursae.

**Distribution.** Central and eastern Madagascar.

**Etymology.** The new subspecies is named after Pierre Viette, renowned expert of Madagascan Lepidoptera and the collector of the holotype.

### *Cyana (Cornutivulpecula) yao sp. n.*

(Figs 11–15, 30–32, 41)

**Type material. Holotype** (Figs 11, 30): male, “Mozambique, 1139m, Zambezia Province, Mt. Namuli, SW slopes near Mucunha village (secondary vegetation/farmland) 15°21'27”S 37°05'18”E, 14–15.VIII.2018, MV Light Trap, László, G., Miles, W., Vetina, A. leg. ANHRT:2018.30” / “ANHRTUK 00050582”, gen. slide No.: AV5204 (ANHRT).

**Paratypes (2 males and 3 females in total). MALAWI:** 1 male, 1 female, Nyasaland, Mt. Mlanje, 24.III.1913, S.A. Neave, 1914-171., in cop., NHMUK unique numbers 010914205 (male) and 010914206 (female), gen. slide Nos: NHMUK010315739 (male) and NHMUK010315761 (female) (prepared by Volynkin) (NHMUK); **KENYA:** 1 male, 56.30 Mt. Kenya, north-east to south-east, VII.[19]30, E. Barns / Joicey Bequest. Brit. Mus. 1934-120., NHMUK unique number 010918069, gen. slide No.: NHMUK010315731 (prepared by Volynkin); 2 females, 56.30 Mt. Kenya, West to North, 13–30.VI.[19]30, E. Barns / Joicey Bequest. Brit. Mus. 1934-120., NHMUK unique number 010918119, gen. slide No.: NHMUK010315760 (prepared by Volynkin) (NHMUK).

**Remark.** The male exemplar from Mount Kenya has a smaller 1<sup>st</sup> medial diverticulum and slightly larger cornuti in the distal diverticulum than the specimens from Mozambique and Malawi. Clarification of the taxonomic status of this population requires examination of further material.

**Diagnosis.** The forewing length is 11–13 mm in males and 12.5–14 mm in females. *Cyana yao sp. n.* is nearly identical externally with the sympatric *C. cornutissima sp. n.* The reliable identification of the two species requires the examination of their genitalia morphology. The male genitalia of *C. yao sp. n.* have a somewhat shorter and broader uncus and fundamentally different configuration of vesica, bearing a conspicuously larger and longer 2<sup>nd</sup> medial diverticulum compared to those characters of *C. cornutissima sp. n.* The vesica structure of *C. yao sp. n.* resembles that of *C. rejecta*, but can be easily distinguished by its more heavily granulated 1<sup>st</sup> medial diverticulum, the larger, longer and more heavily scobinated 2<sup>nd</sup> medial diverticulum (which is short, broad and weakly scobinated in *C. rejecta*), the presence of the 3<sup>rd</sup> medial diverticulum (absent in *C. rejecta*), the absence of a subdistal diverticulum (present in *C. rejecta*), and a shorter, narrower, membranous distal diverticulum bearing two short rows of smaller cornuti connected at the apex of diverticulum (whereas in *C. rejecta* the distal diverticulum is broad, heavily scobinated, bearing two rows of longer and more robust spine-like cornuti which are almost joined at the apex of the diverticulum). The female genitalia of *C. yao sp. n.* are reminiscent of those of *C. rejecta*, but differ by the slightly shorter sclerotized wrinkles in the posterior section of the corpus bursae at the connection with the ductus bursae, the absence of a lateral area of rugose sclerotization in the corpus bursae (present in both subspecies of *C. rejecta*), and the presence of a weak scobination evenly spread in the medial and anterior sections of the corpus bursae (absent in both subspecies of *C. rejecta*). In addition, the female genitalia of *C. yao sp. n.* lack a band-like area of heavy scobination, which is present in the corpus bursae of *C. rejecta rejecta*.

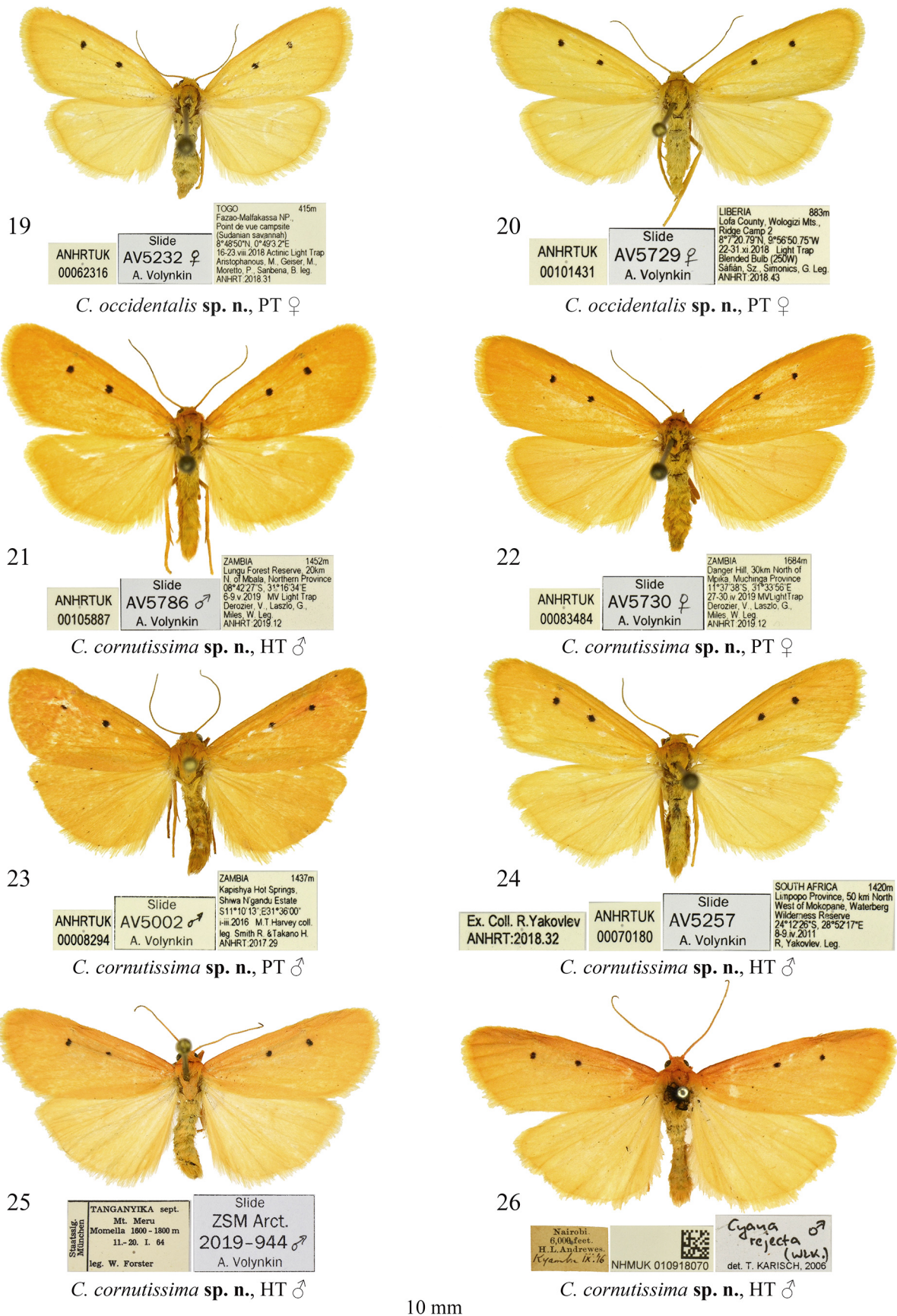
**Distribution.** Northern Mozambique, Malawi and Kenya.

**Etymology.** The name of the new species refers to the Yao people inhabiting northern Mozambique, Malawi and southern Tanzania.

### *Cyana (Cornutivulpecula) occidentalis sp. n.*

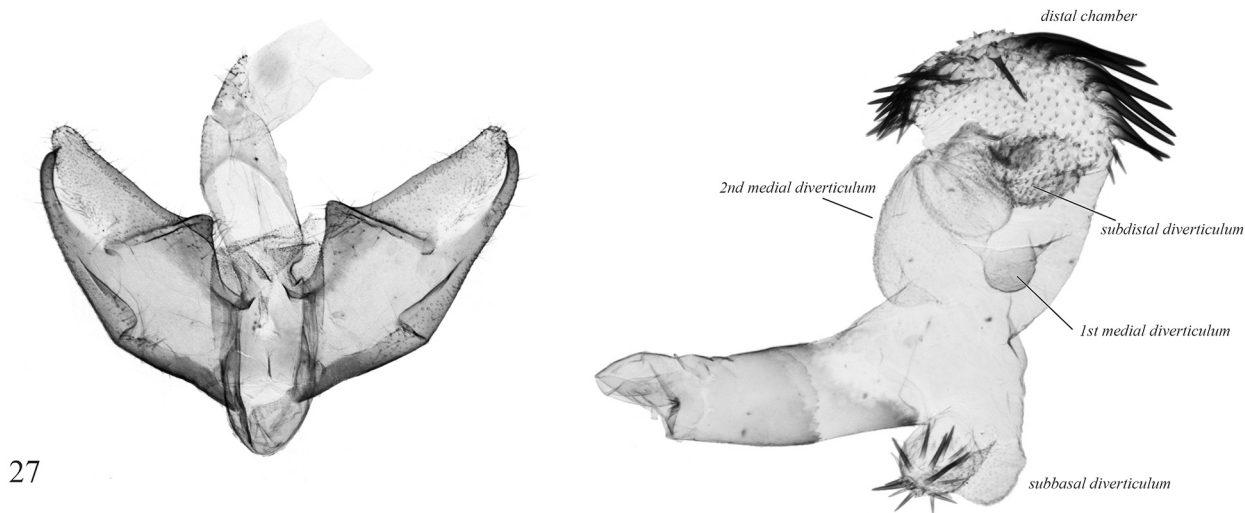
(Figs 16–20, 33–35, 42)

**Type material. Holotype** (Figs 16, 33): male, “Liberia, 883m, Lofa County, Wologizi Mts., Ridge Camp 2, 8°7'20.79”N 9°56'50.75”W 22–31.XI.2018, Light Trap, Blended Bulb (250 W), Sáfián, Sz., Simonics, G. leg., ANHRT:2018.43” / “ANHRTUK 00070119”, gen. slide No.: AV5255 (ANHRT).

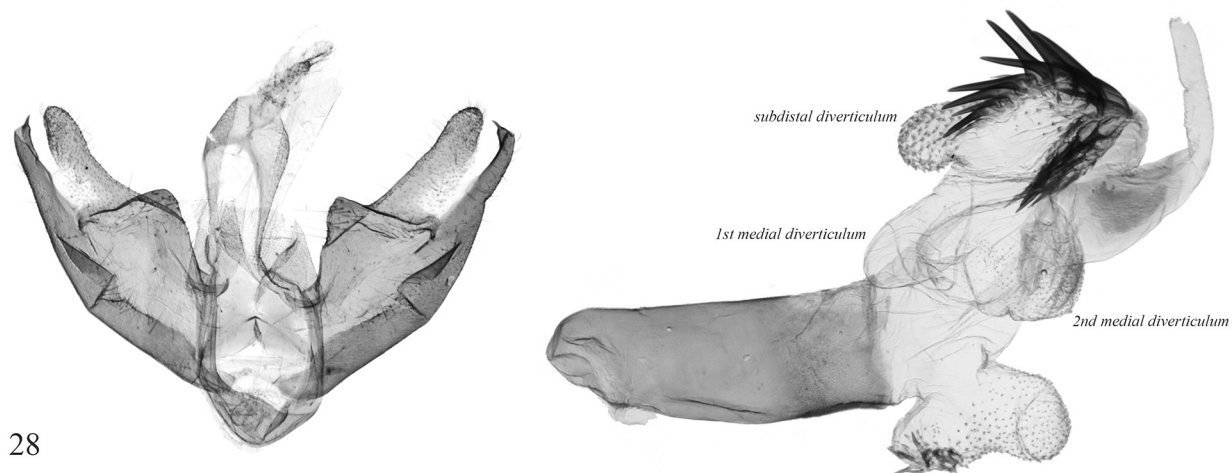


FIGURES 19–26. *Cyana* spp.: adults. Depositories of specimens: 19–24 in ANHRT; 25 in ZSM; 26 in NHMUK (©).

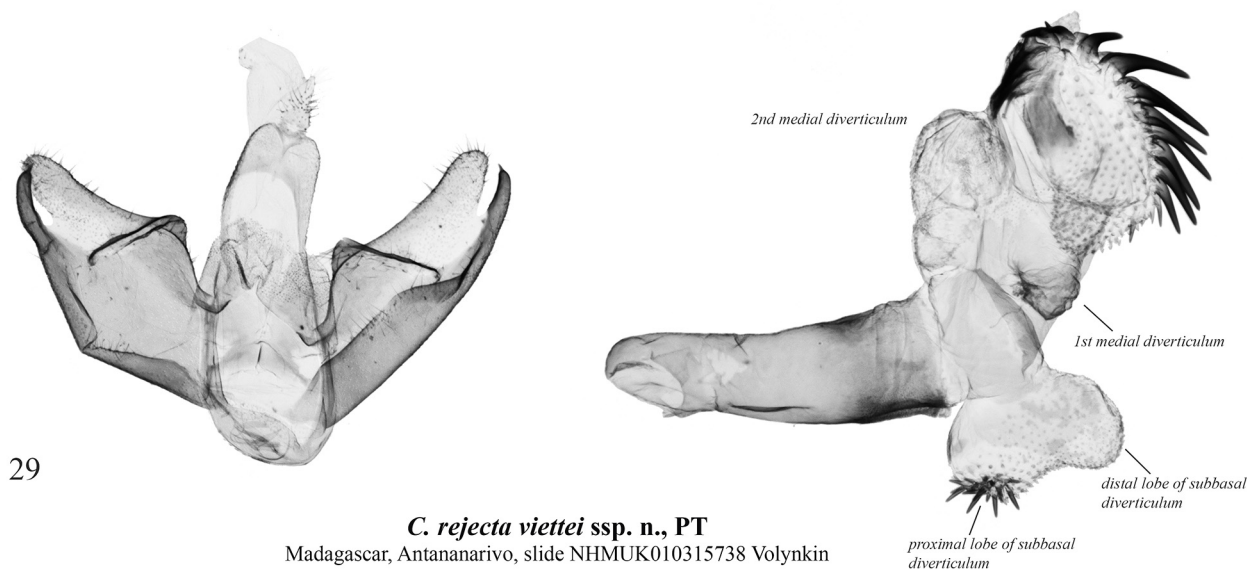




***C. rejecta rejecta***  
S Africa, KwaZulu-Natal Prov., Durban, slide NHMUK010315727 Volynkin



***C. rejecta viettei* ssp. n., HT**  
C Madagascar, Ankaratra Massif, slide ZSM Arct. 2019-266 Volynkin



***C. rejecta viettei* ssp. n., PT**  
Madagascar, Antananarivo, slide NHMUK010315738 Volynkin

FIGURES 27–29. *Cyana rejecta* spp.: male genitalia. Depositories of specimens: 27 and 29 in NHMUK (©); 28 in ZSM.

**Paratypes (9 males and 7 females in total).** **GUINEA:** 1 male, 700m, Guinée Forestière, Monts Nimba UNESCO World Heritage Site, Serengbara Village to Yie River Valley (Lowland Forest–Farmland), 07°36'56"N, 08°26'54"W, 1–8.VII.2019, UV Cold Cathode Light Trap, Deroziér, V., Koivagui, S., Miles, W., Sáfián, S., Warner, R. leg. ANHRT:2019.11, unique number: ANHRTUK 00150622, gen. slide No.: AV5997 (ANHRT); **LIBERIA:** 2 males, 3 females, with the same data as the holotype, unique numbers: ANHRTUK 00070118, 00070120, 00070391, 00101430, 00101431, gen. slide Nos: AV5254 (male), AV5729 (female); 1 male, 1327m, Nimba County, ENNR, Nimba Mts. main ridge (montane forest), 7°311.3N, 8°311.0W, 9.XII.2017, Light Tra (blended bulb 250W), Aristophanous, M., Sáfián, Sz., Simonics, G., Smith, L. leg., ANHRT:2017.33, unique number: ANHRTUK 00148090 (ANHRT); **TOGO:** 1 male, 505m, Fazao-Malfakassa NP, Mare aux crocodiles campsite (Sudanian savannah/dry forest), 8°44'58.8"N 0°48'51.8"E, 26.VIII.–7.IX.2018, MV Light Trap, Aristophanous, M., Geiser, M., Moretto, P., Sanbena, B. leg., ANHRT:2018.31, unique number: ANHRTUK 00062251, gen. slide No.: AV5231; 1 female, 415m, Fazao-Malfakassa NP, Point de vue campsite (Sundanian savannah), 8°48'50"N 0°49'3.2"E, 16–23.VIII.2018, Actinic Light Trap, Aristophanous, M., Geiser, M., Moretto, P., Sanbena, B. leg., ANHRT:2018.31, unique number: ANHRTUK 00062316, gen. slide No.: AV5232 (ANHRT); **CAMEROON:** 1 male, 1246m, Adamawa Region, Adamawa Plateau, 7.3 km West of Bazanga, Chute De Tello, 07°13'50.6"N 13°56'29.2"E, 24–30.IX.2018, MV Light Trap, Sáfián, Sz., Simonics, G. leg., ANHRT:2018.36, unique number: ANHRTUK 00078429, gen. slide No.: AV5731 (ANHRT); **ANGOLA:** 1 male, Libollo, Angola [Pemberton] / Rothschild Bequest B.M.1939-1, unique number: NHMUK10918068, gen. slide No.: NHMUK010315730 (prepared by Volynkin); 1 male, N'Dalla Tando, N Angola, 2700 feet, 28.XI.1908, Dr. W.J. Ansorge; 1 female, same locality and collector, 23.XI.1908; 2 females, Fazenda Congulu, Amboim district, 7–800m, 12–16.IV.1934; 1 female, Calweha R., Angola 13.V.[19]96 (Penrice) (NHMUK); **ZAMBIA:** 1 male, 1400m, Hillwood, Ikelenge, S11°16'02" E24°18'59", 9–16.V.2015, Light Trap, leg. Smith, R., Takano, H. & Aristophanous, M., ANHRT:2017.13, unique number: ANHRTUK 00042382, gen. slide No.: AV5233 (ANHRT).

**Diagnosis.** The forewing length is 10.5–12 mm in males, 11.5–12.5 mm in females. The new species differs externally from *C. yao* **sp. n.** and *C. cornutissima* **sp. n.** by its slightly paler coloration, but reliable identification requires examination of genitalia morphology. The male genitalia of the new species are reminiscent of those of *C. rejecta*, but are distinguished by their more heavily setose anellus, and a more robust aedeagus. The vesica of the new species is markedly shorter, with smaller and unilobate subbasal diverticulum bearing smaller spinules (which is bilobate with longer spinules in its congeners), more heavily scobinated 1<sup>st</sup> medial diverticulum and much smaller and more heavily scobinated 2<sup>nd</sup> medial diverticulum compared to those of *C. rejecta*. In addition, *C. occidentalis* has a 3<sup>rd</sup> medial diverticulum of the vesica which is absent in *C. rejecta*, and its distal diverticulum bears two well-separated rows of robust spine-like cornuti, whereas the two rows of spines of the distal diverticulum are apically connected in *C. rejecta*. The female genitalia of *C. occidentalis* differ from those of the other members of the species-group by the markedly wider ostium bursae, the more heavily sclerotized and extended wrinkles of the posterior section of the corpus bursae (which is weakly sclerotized in *C. rejecta* and *C. yao* **sp. n.**; whereas in *C. cornutissima* **sp. n.** the wrinkles are also heavily sclerotized, but thinner and longer), the clearly separated corpus and appendix bursae (usually fused, forming a single, unified sack of the corpus and appendix bursae in the other related taxa) and the presence of a small, button-like signum bursae which is also present in *C. cornutissima* **sp. n.** In addition, *C. occidentalis* has a dentate, band-like sclerotization at the base of the appendix bursae (which is absent in other species), and a large, globular, heavily sclerotized and rugose appendix bursae (the appendix bursae is also heavily sclerotized in *C. cornutissima* **sp. n.**, but is conspicuously elongate with a wrinkled area only on the posterior wall of the basal section).

**Distribution.** Sierra Leone (Hampson 1900, as *rejecta*), Guinea, Liberia, Togo, Cameroon, northern Angola and north-western Zambia.

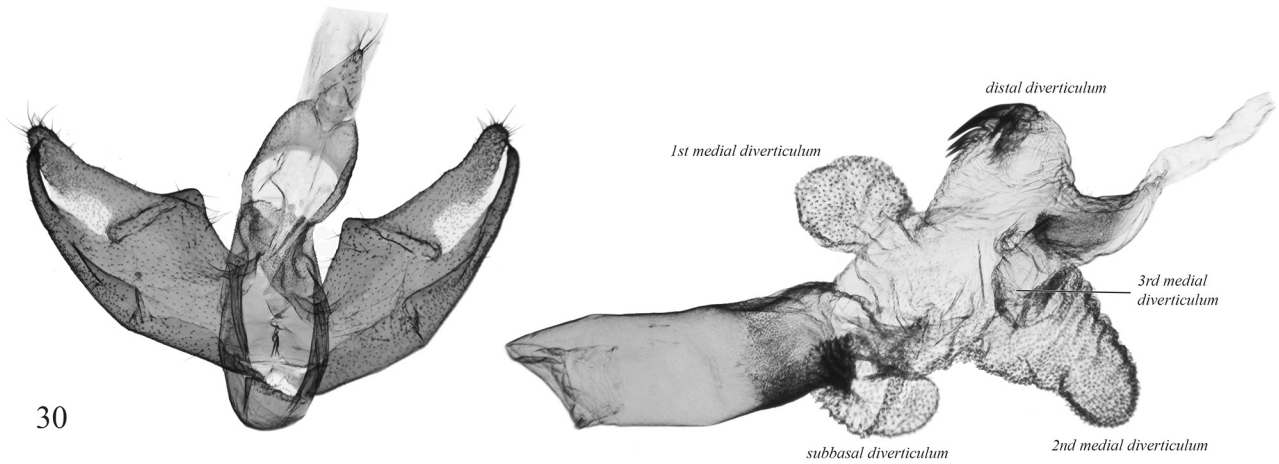
**Etymology.** In Latin, 'occidentalis' means 'western'. The specific epithet refers to the species' West African distribution.

### *Cyana (Cornutivulpecula) cornutissima* **sp. n.**

(Figs 21–26, 36–38, 43)

**Type material. Holotype** (Figs 21, 36): male, "Zambia, 1452m, Lungu Forest Reserve, 20 km N of Mbala, North-

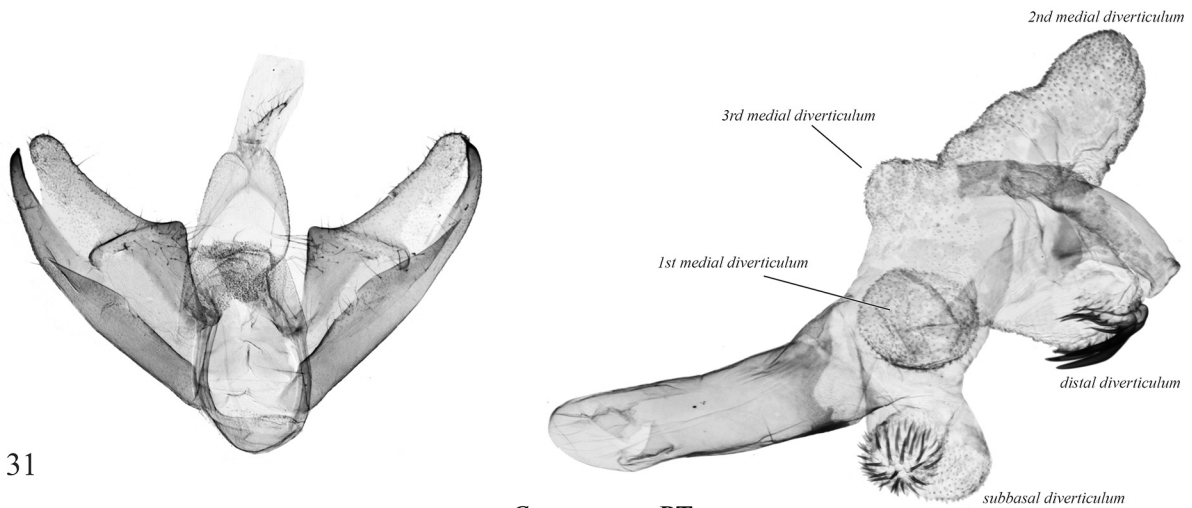
ern Province, 08°42'27"S 31°16'34"E, 6–9.V.2019, MV Light Trap, Deroziér, V., László, G., Miles, W. Leg., ANHRT:2019.12" / "ANHRTUK 00105887", gen. slide No.: AV5786 (ANHRT).



30

***C. yao* sp. n., HT**

N Mozambique, Zambezia Prov., Mt. Namuli, slide AV5204 Volynkin



31

***C. yao* sp. n., PT**

S Malawi, Mulanje Massif, slide NHMUK010315739 Volynkin



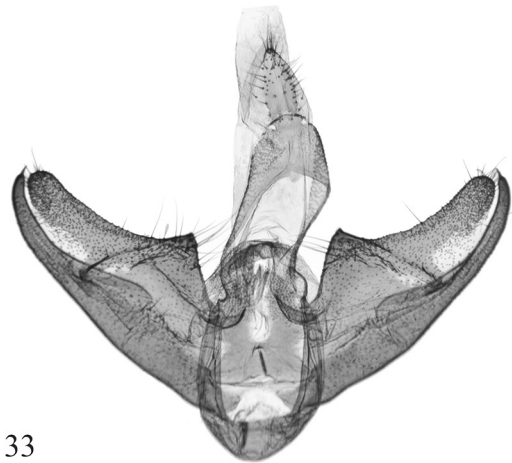
32

***C. yao* sp. n., PT**

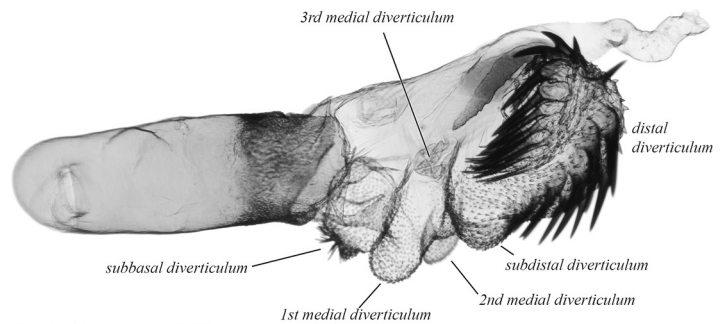
Kenya, Kenya Mt., slide NHMUK010315731 Volynkin

**FIGURES 30–32.** *Cyana yao* sp. n.: male genitalia. Depositories of specimens: 30 in ANHRT; 31 and 32 in NHMUK (©).

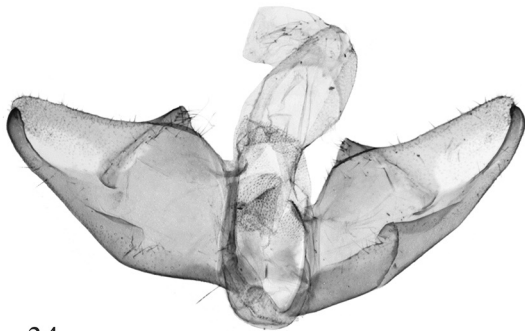




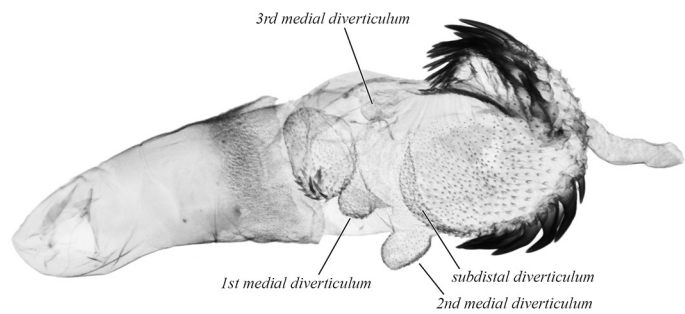
33



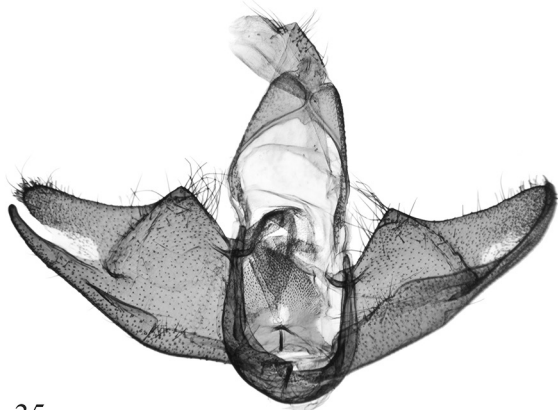
***C. occidentalis* sp. n., HT**  
Liberia, Lofa County, Wologizi Mts, slide AV5255 Volynkin



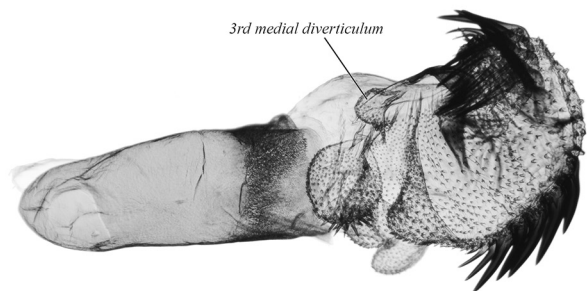
34



***C. occidentalis* sp. n., PT**  
Angola, Cuanza Sul Province, Libolo, slide NHMUK010315730Volynkin



35



***C. occidentalis* sp. n., PT**  
Zambia, Hillwood Ikelenge, slide AV5233 Volynkin

**FIGURES 33–35.** *Cyana occidentalis* sp. n.: male genitalia. Depositories of specimens: 33 and 35 in ANHRT; 34 in NHMUK (©).

**Paratypes (13 males and 26 females in total).** **ZAMBIA:** 2 females, with the same data as the holotype, unique numbers: ANHRTUK 00105885, 00136597, gen. slide No.: AV6001; 1 female, same data, but collected by actinic light trap, unique number: ANHRTUK 00105885, gen. slide No.: AV5787; 1 male, 1437m, Kapishya Hot Springs, Shiwa N'gandu Estate, S11°10'13" E31°36'00", I–III.2016, M.T. Harvey coll., leg. Smith, R. & Takano, H., ANHRT:2017.29, unique number: ANHRTUK 00008294, gen. slide No.: AV5002; 1 female, same lo-



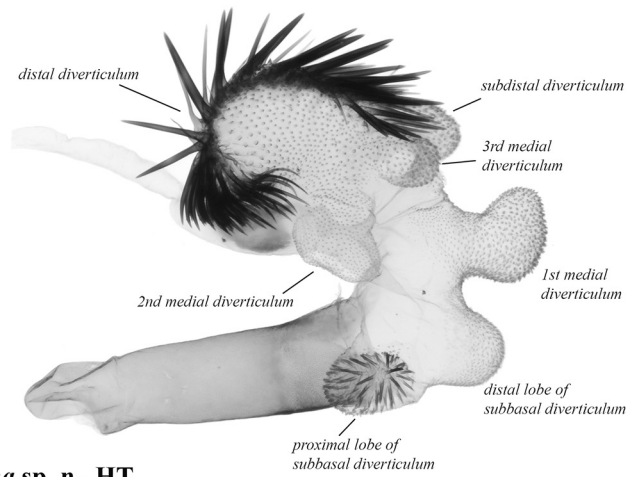
cality and collectors, I.2015, unique number: ANHRTUK 00003634, gen. slide No.: AV5114; 1 female, same locality, 16–17.V.2019, LepiLED Light Trap, Deroziér, V., László, G., Miles, W. leg., ANHRT:2019.12, unique number: ANHRTUK 00105884, gen. slide No.: AV5788; 1 male, 1460m, Mutinondo Wilderness Area, Northern Province, 12°27'06''S 31°17'30''E, 17–20.V.2019, MV Light Trap, Deroziér, V., Imakando, M., László, G., Miles, W. leg., ANHRT:2019.12, unique number: ANHRTUK 00101032, gen. slide No.: AV5728; 1 female, 1684m, Danger Hill, 30 km North of Mpika, Muchinga Province, 11°37'28''S 31°33'56''E, 27–30.IV.2019, MV Light Trap, Deroziér, V., László, G., Miles, W. leg., ANHRT:2019.12, unique number: ANHRTUK 00083484, gen. slide No.: AV5730; 1 male, 1 female, 1566m, Senka Hill, Mukulizi Forest Reserve, Muchinga Province, 09°05'43''S 32°05'06''E, 1–6.V.2019, LepiLED Light Trap, Deroziér, V., László, G., Miles, W. leg., ANHRT:2019.12, unique numbers: ANHRTUK 00083653, 00083652, gen. slide Nos.: AV5820 (male), AV5999 (female); 1 female, same data but collected by MV Light Trap, unique number: ANHRTUK 00082412 (ANHRT). **KENYA**: 1 male, Nairobi, 6,000 feet, Kyambu, IX.[19]46, H.L. Andrewes, unique number: NHMUK 10918070, gen. slide No.: NHMUK010315732 (prepared by Volynkin); 2 females, Nairobi, 6,000 feet, H.L. Andrewes, Kyamla, IX.16; 1 male, 2 females, Nairobi, June 1919, Dr van Someren / Rothschild Bequest B.M.1939-1, unique number: NHMUK 10918141 (female), gen. slide No.: NHMUK010315781 (female) (prepared by Volynkin); 1 female, same locality and collector, Apr.–June 1919; 1 male, 1 female, Eldoma Ravine, 4.XII.[18]96, Dr. Ansoerge, unique number: NHMUK 10918071 (male), gen. slide No.: NHMUK010315733 (male) (prepared by Volynkin); 1 female, same locality, 10.IX.1912, H.R. Gallatly; 1 female, same locality and collector, 9.IX.1912; 1 male, Brit. E. Africa: Lumbwa, 25.VIII.1922, G.W. Jeffery, B.M. 1922-377, unique number: NHMUK 10918072, gen. slide No.: NHMUK010315734 (prepared by Volynkin); 1 female, same locality and collector, 4.VI.1923, B.M. 1923-403; 1 female, Suna, S. Karirondo, Jan. 1932 (W. Feather); 1 female, B. E. Africa, Njoro, A.J. Cholmley, 1906-265 (NHMUK); **UGANDA**: 1 male, 67. 26, Western Uganda, Nr. Congo border, March & April 1926, Mrs. E. Barns / Joicey Bequest, Brit. Mus. 1934-120, unique number: NHMUK 10918073, gen. slide No.: NHMUK010315735 (prepared by Volynkin); 1 female, Mile 478 on Uganda Rly, B. E. Africa, 19.XI.1900, C.S. Betton, 1901-136; 1 female, SE Ruwenzori, 3500 ft., 19.V.1906, 1906-153 / Coll. by Hon. G. Legge & A.F.R. Wollaston (NHMUK); **TANZANIA**: 1 male, Tanganyika sept., Mt. Meru, Mommella, 1600–1800m, 11–20..I.1964, leg. W. Forster, gen. slide No.: ZSM Arct. 2019-944 (prepared by Volynkin) (ZSM); 1 female, Mamba, Kilimanjaro, March to Oct. [18]97 / Rothschild Bequest B.M.1939-1, unique number: NHMUK 10918118, gen. slide No.: NHMUK010315759 (prepared by Volynkin) (NHMUK); **ZIMBABWE**: 1 female, 1900m, Manicaland Province, Vukutu, 18°21'52''S, 32°36'29''E, 25–26.IV.2011, R. Yakovlev leg., Ex Coll. R. Yakovlev, ANHRT:2018.32, unique number: ANHRTUK 00143200, gen. slide No.: AV5998 (ANHRT); **MALAWI**: 1 male, Nyasaland, valley of S Rukuru R., 3,000 ft., 20.VI.1910, S.A. Neave, 1910-406, unique number: NHMUK 10918120, gen. slide No.: NHMUK010315762 (prepared by Volynkin); 1 female, Zomba, Nyasal'd, Jan.-Feb. 1924, H. Barlow / Rothschild Bequest B.M.1939-1, unique number: NHMUK 10918117, gen. slide No.: NHMUK010315758 (prepared by Volynkin) (NHMUK); **MOZAMBIQUE**: 1 female, 937m, Sofala Province, Gorongosa N.P., Mt. Gorongosa SE slope (Riverine forest / Grassland), 18°28'58.9''S, 34°02'40.6''E, 8–9.VIII.2018, Actinic Light Trap, László, G., Miles, W., Vetina, A. leg., ANHRT:2018.30, unique number: ANHRTUK 00075673, gen. slide No.: AV6000 (ANHRT); **SOUTH AFRICA**: 3 males, 1 female, 1420m, Limpopo Province, 50 km North West of Mokopane, Waterberg Wilderness Reserve, 24°12'26''S, 28°52'17''E, 8–9.IV.2011, R. Yakovlev leg. / Ex Coll. R. Yakovlev, ANHRT:2018.32, unique numbers: ANHRTUK 00070180, 00070181, 00070182, 00070183, gen. slide Nos.: AV5256, AV5257 (males) and AV5258 (female) (ANHRT and TMSA).

**Remark.** The male genitalia of the specimens from Tanzania and Kenya differ from those of the specimens from South Africa, Malawi, Zambia and western Uganda by the slightly narrower vesica with a distal diverticulum bearing a smaller number of cornuti. To clarify the taxonomic status of these populations, molecular studies would be required.

**Diagnosis.** Forewing length is 12–16 mm in males, 11.5–14 mm in females. As the external appearance of *Cyana cornutissima* sp. n. is nearly identical with that of the sympatric *C. yao* sp. n., the examination of the genitalia is required for reliable identification. The male genital capsule of the new species differs from those of the other taxa of the species-group by the longer and narrower uncus. The vesica of *C. cornutissima* sp. n. differs clearly from those of the other species of the *C. rejecta* species-group by the considerably larger distal diverticulum bearing a markedly more extensive row of numerous long cornuti. The configuration of the diverticula of the vesica of *C. cornutissima* sp. n. is most similar to that of *C. rejecta*, but in *C. cornutissima* sp. n. the subbasal diverticulum

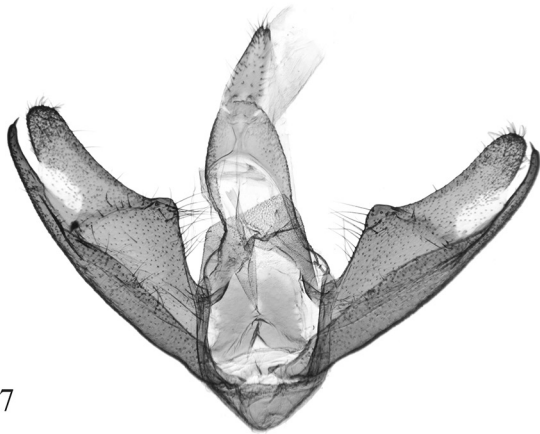


36

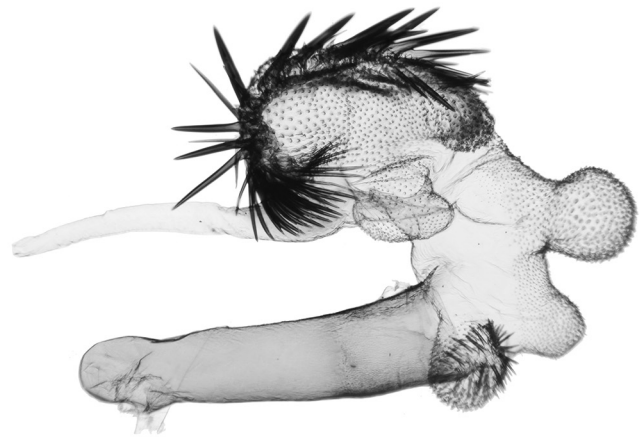


***C. cornutissima* sp. n., HT**

Zambia, Northern Province, Lungr Forest Reserve, slide AV5786 Volynkin

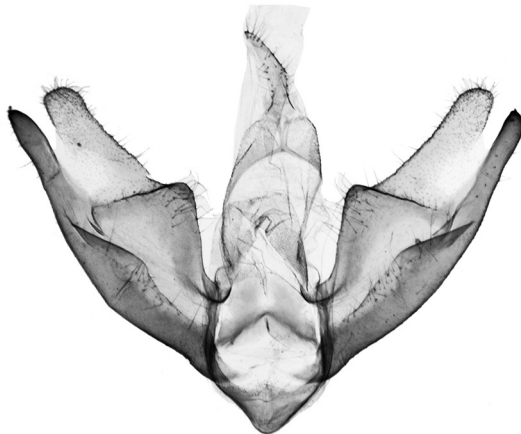


37



***C. cornutissima* sp. n., PT**

South Africa, Limpopo Province, Waterberg Wildness Reserve, slide AV5257 Volynkin



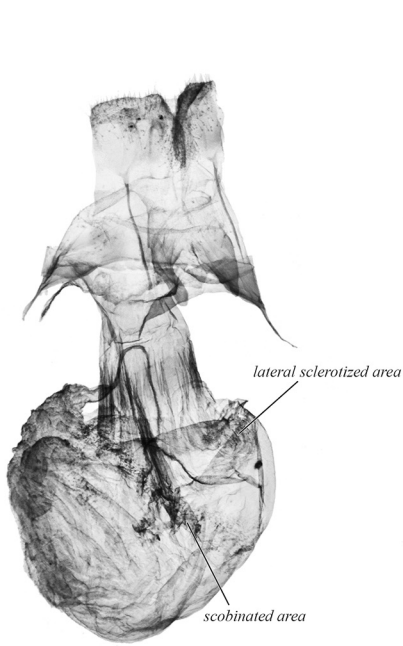
38



***C. cornutissima* sp. n., PT**

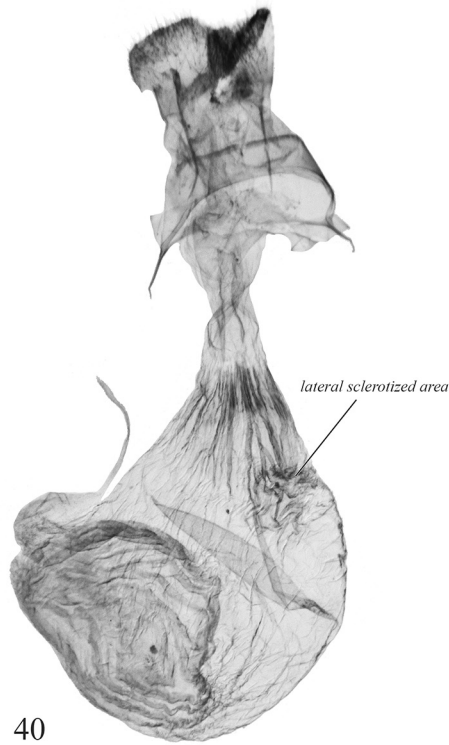
Kenya, Rift Valley Province, Lumbwa, slide NHMUK010315734 Volynkin

**FIGURES 36–38.** *Cyana cornutissima* sp. n.: male genitalia. Depositories of specimens: 36 and 37 in ANHRT; 38 in NHMUK (©).



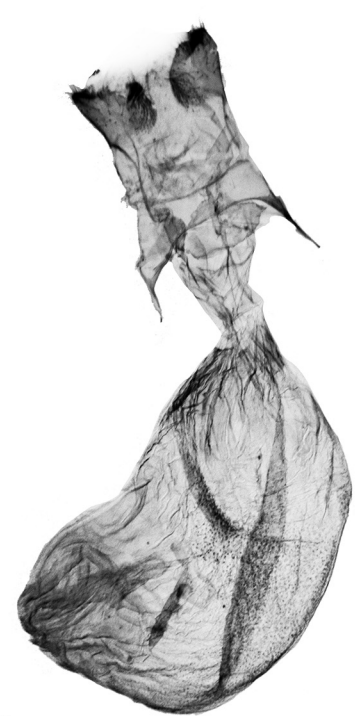
39

*C. rejecta rejecta*  
South Africa, KwaZulu-Natal Prov., Durban,  
slide NHMUK010315728 Volynkin



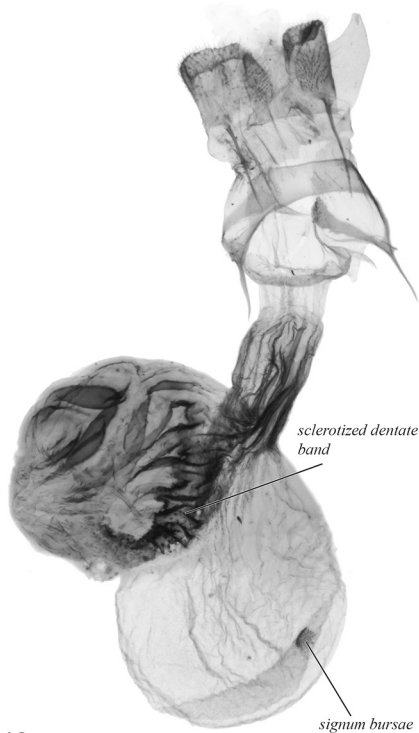
40

*C. rejecta viettei* ssp. n., PT  
C Madagascar, near Antananarivo,  
slide NHMUK010315728 Volynkin



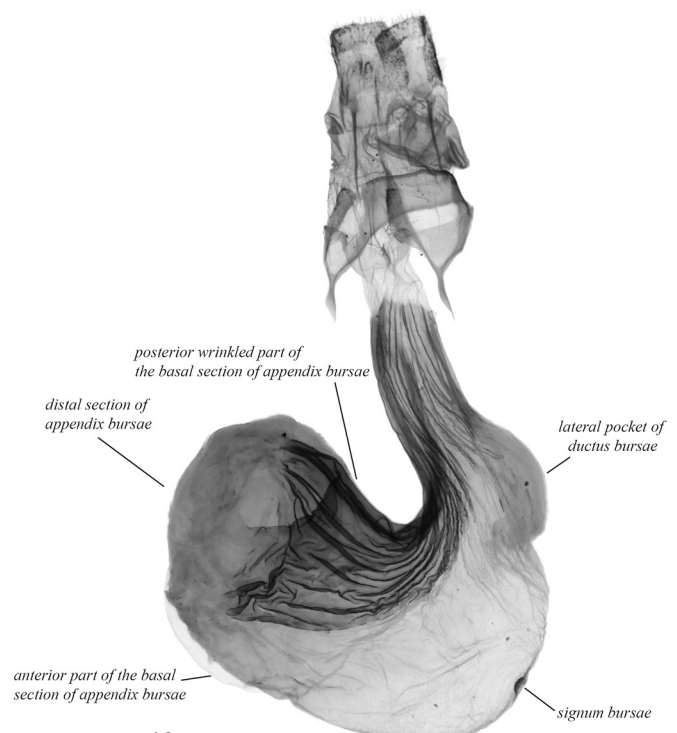
41

*C. yao* sp. n., PT  
S Malawi, Mulanje Massif,  
slide NHMUK010315761 Volynkin



42

*C. occidentalis* sp. n., PT  
Liberia, Lofa County, Wologizi Mts,  
slide AV5729 Volynkin



43

*C. cornutissima* sp. n., PT  
Zambia, Northern Province,  
slide AV5787 Volynkin

FIGURES 39–43. *Cyana* spp.: female genitalia. Depositories of specimens: 39–41 in NHMUK (©); 42 and 43 in ANHRT.



is broader basally; the 1<sup>st</sup> medial diverticulum is larger, more elongate and more heavily scobinated; the 2<sup>nd</sup> medial diverticulum is smaller; the 3<sup>rd</sup> medial diverticulum is present (absent in *C. rejecta*), and the subdistal diverticulum is slightly smaller and more weakly scobinated compared to those characters of *C. rejecta*. The female genitalia of *C. cornutissima* **sp. n.** are easily distinguishable from those of its congeners by their conspicuously long ductus bursae (the longest in the species-group) with a weakly sclerotized lateral pocket anteriorly and heavily sclerotized longitudinal wrinkles deeply protruding to the basal part of the appendix bursae, the presence of a small, button-like signum bursae (as in *C. occidentalis* **sp. n.**), and the large, sack-like, heavily sclerotized appendix bursae, which is smooth distally and anteriorly (which is short, conical and weakly sclerotized in *C. rejecta* and *C. yao* **sp. n.**; whereas in *C. occidentalis* **sp. n.** the appendix bursae is globular and wrinkled all over its surface).

**Distribution.** Northern part of South Africa, Mozambique, Malawi, Zimbabwe, Zambia, Uganda, Tanzania and Kenya.

**Etymology.** In Latin, the suffix ‘-issimus’ expresses the superlative. The specific epithet refers to the conspicuously long and dense cornuti of the distal diverticulum of the vesica, the longest and most numerous among the species of the *C. rejecta* species-group.

## Acknowledgements

The senior author is grateful to Dr Axel Hausmann, Dr Wolfgang Speidel and Mr Ulf Buchsbaum (ZSM) for their kind assistance provided during his studies at the MWM/ZSM collection. Both authors are indebted to Mr Geoff Martin and Dr Alberto Zilli (NHMUK) for the opportunity to study the type and accession material of the NHMUK. Our special thanks go to the following co-operative partners in Africa for the diverse administrative and technical assistance provided during fieldwork as well as for issuing research and export permits: Ms Rhoda Kachali (Department of National Parks and Wildlife – ZAWA, Lusaka), Ms Claire Mateke and Ms Martha Imakando (Livingstone Museum, Livingstone) (Zambia); Dr Lucilia Chuquela, Mr Alvaro Vetina, Mr Anacleto Cossa (Museu de História Natural de Maputo), Dr Mateus José Mutemba, Mr Antony Chilengue (Administração Nacional das Áreas de Conservação – ANAC, Maputo), Ms Majka Burhardt, Mr Marcos Assane (LEGADO Namuli, Gurue) (Mozambique); Ms Annika Hiller (Wild Chimpanzee Foundation, Liberia), Mr Jerry Garteh (Society for the Conservation of Nature, Liberia), Mr Darlington Tuaben, Mr Mike C. Doryan (Forestry Department Authority, Liberia). Last but not least Dr Hitoshi Takano (ANHRT) is thanked for the linguistic correction of the manuscript.

The Authors declare that to the best of their knowledge they conform to the national regulations and meet with the conditions and requirements of International Conventions concerning collecting/export and handling of the specimens presented in this Article.

## References

- Baron, T.R. & Karisch, T. (2016) A new species of *Cyana* Walker, 1854 from Uganda (Lepidoptera: Erebiidae: Arctiinae). *Metamorphosis*, 27, 31–33.
- Butler, A.G. (1898) On a collection of Lepidoptera made in British East Africa by Mr. C. S. Betton. *Proceedings of the Zoological Society of London*, 57, 395–444.  
<https://doi.org/10.1111/j.1096-3642.1898.tb03161.x>
- De Prins, J. & De Prins, W. (2020) Afromoths, online database of Afrotropical moth species (Lepidoptera). World Wide Web electronic publication. Available from: <http://www.afromoths.net> (accessed 7 June 2020)
- Druce, H. (1887) Lepidoptera Heterocera. In: *Moloney, A.C., Sketch of the forestry of West Africa with particular reference to its present principal commercial products*. S. Low, Marston, Searle, & Rivington, London, pp. 492–507.
- Hampson, G.F. (1900) Catalogue of the Arctiadae (Nolinae, Lithosiinae) in the British Museum. *Catalogue of the Lepidoptera Phalaenae in the British Museum*, 2, 1–590.
- Hampson, G.F. (1909) Ruwenzori Expedition Reports. 11. Lepidoptera Heterocera. *Transactions of the zoological Society of London*, 19 (2), 103–140.  
<https://doi.org/10.1111/j.1469-7998.1909.tb08563.x>
- Karisch, T. (2003) Eine neue *Cyana*-Art vom Nyiragongo. *Lambillionea*, 103, 416–417. [in German]
- Karisch, T. (2013) Taxonomic revision of the African *Cyana*-species (Lepidoptera: Arctiidae, Lithosiinae) (plates 15–19). *Esperiana*, 18, 39–197.
- Kiriakoff, S.G. (1963) Lepidoptera Heterocera (partim). *Exploration du Parc Albert, Deuxième Série*, 16 (3), 73–124. [in



French]

- Pagenstecher, A. (1903) Wissenschaftliche Resultate der Reise des Freiherrn Carlo von Erlanger durch Süd-Schoa, die Galla- und Somaliländer in 1900 und 1901. Sphingiden und Bombyciden. *Jahrbücher des Nassauischen Vereins für Naturkunde, Wiesbaden*, 56, 1–28. [in German]
- Pinhey, E.C.G. (1975) *Moths of southern Africa. Descriptions and colour illustrations of 1183 species*. Tafelberg, Cape Town, 273 pp., 63 pls.
- Strand, E. (1912) Zur Kenntnis äthiopischer Lithosiinae. *Archiv für Naturgeschichte, Abteilung A*, 78 (7), 171–195. [in German]  
<https://doi.org/10.5962/bhl.part.27906>
- Strand, E. (1922) Arctiidae: Subfam. Lithosiinae. In: Wagner, H. (Ed.), *Lepidopterorum Catalogus. Vol. 26*. W. Junk, Berlin, pp. 1–899.  
<https://doi.org/10.5962/bhl.title.146589>
- Volynkin, A.V. & László, Gy. M. (2019a) *Cyana smithi*, a new species from Liberia (Lepidoptera: Erebidae: Arctiinae: Lithosiini). *Ecologica Montenegrina*, 20, 215–221.  
<https://doi.org/10.37828/em.2019.20.18>
- Volynkin, A.V. & László, Gy.M. (2019b) On the taxonomy of the subgenera *Cyabarda* Karisch, 2013, *Idiovulpecula* Karisch, 2013 and *Paravulpeculella* Karisch, 2013 of the genus *Cyana* Walker, 1854, with descriptions of three new species from Africa (Lepidoptera, Erebidae, Arctiinae, Lithosiini). *Zootaxa*, 4664 (3), 377–389.  
<https://doi.org/10.11646/zootaxa.4664.3.5>
- Volynkin, A.V. (2019) Two new ‘*Asura*-like’ *Cyana* Walker, 1854 from Africa (Lepidoptera, Erebidae, Arctiinae). *Zootaxa*, 4576 (2), 395–400.  
<https://doi.org/10.11646/zootaxa.4576.2.13>
- Volynkin, A.V. (2020) On the taxonomy of the subgenus *Gigantovulpecula* Karisch, 2013 of the genus *Cyana* Walker, 1854, with description of a new species (Lepidoptera: Erebidae: Arctiinae: Lithosiini). *Zootaxa*, 4861 (3), 376–384.  
<https://doi.org/10.11646/zootaxa.4861.3.4>
- Walker, F. (1854) Part I—Lepidoptera Heterocera. *List of the specimens of lepidopterous insects in the collection of the British Museum*, 2, 1–775.
- Wallengren, H.D.J. (1860) Lepidopterologische Mittheilungen. *Wiener entomologische Monatschrift*, 4 (2), 33–46. [in German]