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Article

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A revision of the genus *Neoliparina* Schultz, 1934, with descriptions of three new species (Lepidoptera, Erebidae, Lymantriinae)

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Abstract

The tussock moth genus *Neoliparina* Schultz, 1934, has been regarded as monotypic since its erection 90 years ago, however, investigation into material housed in the Lymantriinae collections of the African Natural History Research Trust revealed a further three species belonging to this genus, which are described in this paper: *Neoliparina smithi* sp. n., *N. schultzei* sp. n. and *N. nyonie* sp. n. Schultz's (1934) original descriptions of *Neoliparina* and its type species *N. paradoxa* Schultz, 1934 were based upon a single female specimen, and as such a detailed morphological examination of both sexes is provided in this paper. All four species show remarkably strong divergence in genitalia morphology and external habitus perhaps unusual for the Lymantriinae. The paper is illustrated with 12 diagnostic figures of adults and genitalia of both sexes of each species.

Key words Afrotropics, Cameroon, Gabon, taxonomy, Zambia.

Introduction

Neoliparina Schultz, 1934 is a characteristic genus of Lymantriinae containing species with a distinctive bright, orangey ground colour ornamented with diffuse greyish medial and postmedial transverse lines and the presence of a dark rounded discal spot. Schultz (1934) erected the genus with its type species *Neoliparina paradoxa* Schultz, 1934 based on a single female specimen from Mongoumba, Central African Republic. In the same year, Bryk (1934) published the Lymantriinae section of Junk's *Catalogus Lepidopterorum*, where he gave the distribution of the species simply as "Kongo", no doubt in reference to the proximity of the type locality to the Ubangi-Congo watershed. It was not until 1960 that a second female specimen of the genus with West African provenance was found in the collections of the Natural History Museum, London (NHMUK) by Collenette (1960), who identified it as *N. paradoxa* (Fig. 11), however, upon detailed examination of this specimen it was found to belong to a separate species, described in this paper as *N. smithi* sp. n. Upon thorough investigation of the Lymantriinae collections of the African Natural History Research Trust, Leominster (ANHRT)

two further species belonging to this genus were discovered from Gabon and Zambia: *N. nyonie* **sp. n.** and *N. schultzei* **sp. n.** both described herein.

Material and methods

The material collected during ANHRT expeditions in Gabon, Cameroon, Zambia and Liberia was sampled using a light tent illuminated with a 125 W mercury vapour light bulb or a 250 W blended bulb. Genital apparatuses were extracted and stained with Eosin red and embedded in Euparal on microscope slides, applying standard methods of preparation (Lafontaine & Mikkola 1987, Robinson 1976). Images of adults were captured using a Canon EOS 80D equipped with a Canon EF Macro 100mm lens or a Nikon D90 SLR camera equipped with a Nikkor AF Micro 60 mm lens. Genitalia were imaged using a Canon EOS 700D camera mounted on a Leitz Diaplan compound microscope.

Terminology of genital structures follows Volynkin (2024).

Collection acronyms used in text:

ANHRT – African Natural History Research Trust, Leominster, United Kingdom;
MfN – Museum für Naturkunde, Berlin, Germany;
NHMUK – Natural History Museum, London, United Kingdom.

Other acronyms used in text:

BP – genitalia slide prepared by Bethany Powell;
HT – holotype;
PT – paratype.

Taxonomic section

Genus *Neoliparina* Schultze, 1934

Neoliparina Schultze, 1934, *Deutsche Entomologische Zeitschrift 'Iris'*, 48 (3): 107.

Type species: *Neoliparina paradoxa* Schultze, 1934 by monotypy.

Characterisation of the genus.

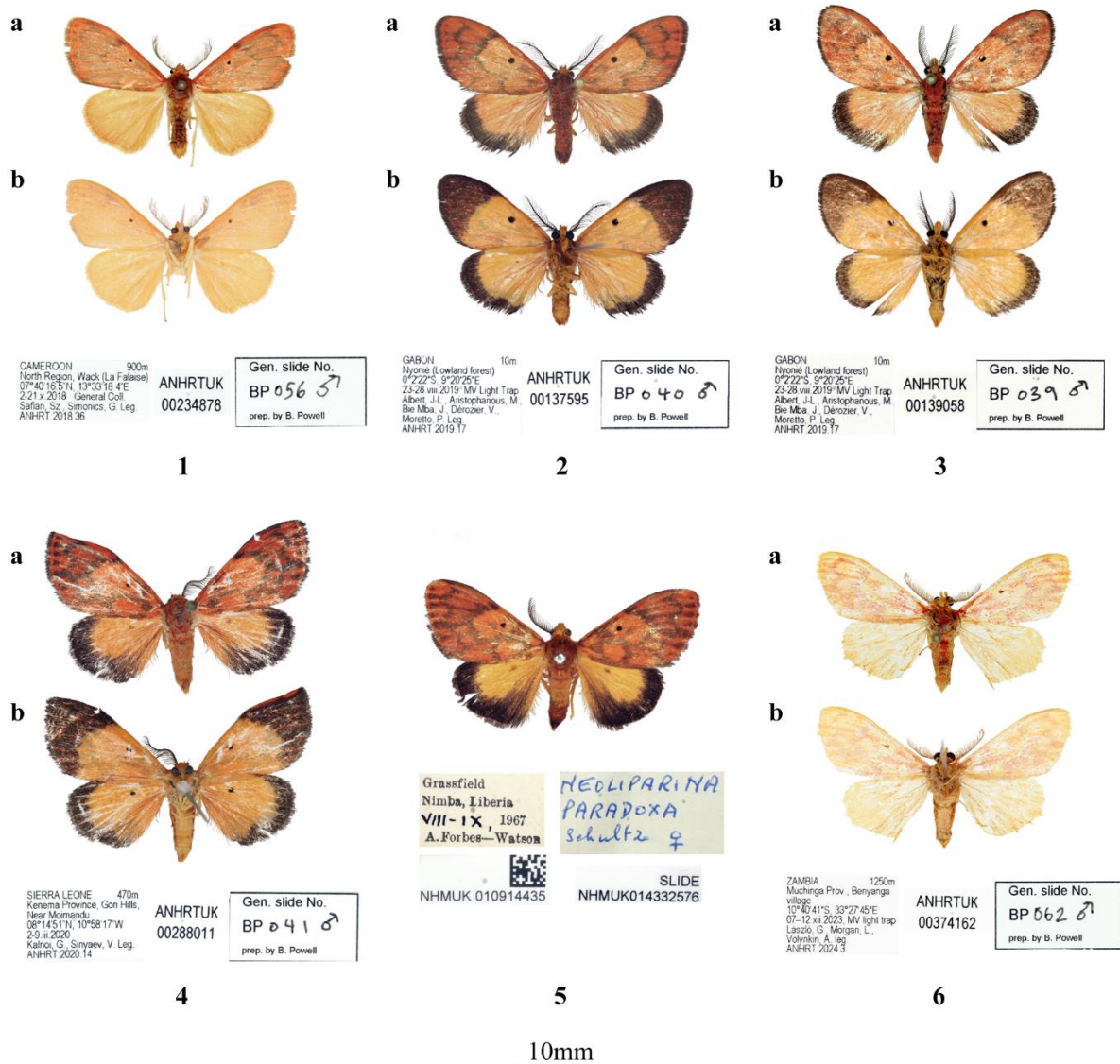
The species belonging to *Neoliparina* have largely characteristic external morphology demonstrated by the very feathery bipectinate-fasciculate antenna and the short and broad forewing with orange-red ground colour in males, ornamented with diffuse greyish transverse lines and a dark, rounded discal spot. Sexual dimorphism is prominent in this genus, the females being ca. 1.5 times larger, with shorter, less feathery antenna, more elongate forewings, a darker, generally more ochreous ground colour and reduced markings, whilst retaining the contrasting discal spot. Male genitalia are characterised by a broad-based, truncate uncus, ribbon-like arms of the tegumen, valvae, which are broad at the base and gradually tapered towards their apex, a thick U- or V-shaped juxta, a short triangular vinculum, a short phallus without a carinal process and a short proximally inflated vesica, bearing a small rugose sclerotised area. The female genitalia are characterised by the short, broad, rounded papillae anales, triangular pseudopapillae, the medium-long posterior apophyses and similarly long anterior apophyses, and the broad, rounded quadrangular antevaginal plate. The ostium bursae is wide with a heavily sclerotised margin, the distal end of the ductus bursae forming a heavily sclerotised antrum, the shape of which is a specific character. The proximal section of the ductus bursae is thick and membranous, the corpus bursae is large, ovoid, bearing two equally sized membranous appendices and may have a sclerotised signum.

***Neoliparina paradoxa* Schultze, 1934**

(Figs 1, 7, 8, 13, 17)

Neoliparina paradoxa Schultze, 1934, *Deutsche Entomologische Zeitschrift 'Iris'*, 48 (3): 107. Type locality: [Central African Republic] Mongoumba.**Primary type material examined.****Holotype.** Female (MfN). “Typus” [red rectangular label] // “*Neoliparina* / Schultze / 1934” [partially handwritten] // “*paradoxa* / Schultze 1934” [blue label] // “Lymantrid / Mongoumba / 30.IV.30” [handwritten] // “ex coll. / A. SCHULTZE” // QR code label with URI: MfN URI <http://coll.mfn-berlin.de/u/09c5ed>**Additional material examined.****Cameroon.** 1 male, North Region, Wack (La Falaise), 07°40'16.5"N, 13°33'18.4"E, 2–21.x.2018, Light Trap, Sáfián, Sz., Simonics, G. Leg., ANHRT:2018.36, unique id: ANHRTUK 00234878, gen slide No.: BP 056 (ANHRT). 1 female with same data as male, unique id: ANHRTUK 00234733, gen slide No.: BP 058 (ANHRT).**Description.****Adult. Male** (Fig. 1). Forewing length 12 mm. Head large; antenna bipectinate-fasciculate, rami of antenna very long, seven to ten times longer than diameter of antennal shaft, ventral rami 1.5 times longer than dorsal rami, greyish brown, dorsal side of antennal shaft ochreous; labial palp short and broad, covered in orange piliform scales. Frons, vertex and collar orange. Tegula covered with long, orange, piliform scales turning yellow apically; mesothorax dark orange. Fore- and midleg covered in long, orange and yellow, piliform scales; hindleg pale yellow; index of spurs 0-2-4. Abdomen yellowish orange. Forewing short and broad, costal margin gently arched, apex rounded, termen smoothly convex, anal margin almost straight. Forewing ground colour reddish orange; discal spot small, black, rounded, highly contrasting; medial line zig-zagged, angled outward medially; postmedial line sinuous, both lines greyish brown; subterminal line substituted by a row of greyish brown spots; terminal line red. Cilia longish, greyish brown. Underside orange, without markings except for discal spot. Hindwing orange, darkening near outer margin. Cilia longish, yellow. Underside as on upperside, slightly paler.**Male genitalia** (Fig. 13). Uncus short and broad, trapezoidal, with shallow apical notch. Arms of tegumen narrow, ribbon-like, heavily sclerotised. Valva medium-long, elongate-triangular, broad at base, costa gently concave in basal three-quarters, ventral margin gently sinuous, apical quarter of valva rounded-triangular. Juxta with broad arms and U-shaped posteromedial notch, thickened proximally. Vinculum short and broad, triangular. Phallus short, attenuated, slightly curved, coecum rounded, carina unmodified; vesica very short, basal section inflated spherical, with small rugose sclerotised area; vesica ejaculatorius narrow tubular.**Female** (Figs 7, 8). Forewing length 17–18 mm. Head large; antenna bipectinate-fasciculate, length ca. two-thirds that of male, rami of antenna short, ca. half the length of those of male, three to five times longer than diameter of antennal shaft, ventral rami 1.5 times longer than dorsal rami, greyish brown, dorsal side of antennal shaft ochreous; labial palp as in male. Frons, vertex and collar pale orange. Tegula covered with long, pale orange, piliform scales turning yellow apically. Fore-, mid- and hindleg covered in long, very pale yellow, piliform scales; index of spurs 0-2-4. Abdomen yellowish orange. Forewing elongate and broad, ca. 1.5 times size of male, costal margin gently arched, apex rounded, termen smoothly convex, anal margin almost straight. Forewing ground colour dull reddish ochre; discal spot small, black, rounded, highly contrasting; medial line greyish zig-zagged, angled outward medially; terminal area pale reddish. Cilia longish, greyish brown. Underside pale ochre, without markings except for small, pale discal spot. Hindwing pale ochre, pale orange near outer margin. Cilia longish, yellowish. Underside as on upperside, slightly paler.**Female genitalia** (Fig. 17). Papilla analis short and very broad with small rounded triangular pseudopapilla; apophysis posterioris thin, medium-long, as long as apophysis anterioris. Eighth tergite very short, ribbon-like; antevaginal plate broad, rounded quadrangular. Ostium bursae wide with sclerotised margin; antrum medium-long, narrow funnel-shaped; ductus bursae 1.5 times longer than

antrum, somewhat dilated proximally. Corpus bursae large, ovoid, fully membranous bearing two equally sized, somewhat small, ovoid, membranous appendices; signum absent.



Figures 1–6. Adults, male, a: upperside, b: underside. **1.** *Neoliparina paradoxa* (ANHRT). **2.** *N. nyonie* sp. n., HT (ANHRT). **3.** *Ibid*, PT (ANHRT). **4.** *N. smithi* sp. n., HT (ANHRT). **5.** *Ibid*, PT (NHMUK). **6.** *N. schultzei* sp. n., HT (ANHRT).

Diagnosis. *Neoliparina paradoxa* Schultze, 1934 is readily distinguished from both *N. nyonie* sp. n. and *N. smithi* sp. n. by the paler forewing markings, the markedly smaller discal spot, the absence of a wide blackish brown hindwing margin and the uniformly orange wing underside lacking the black distal areas typical for the last two species. Compared with *N. schultzei* sp. n., *N. paradoxa* has a darker, orange forewing ground colour, the former species however, having a paler, more yellowish colouration. The female of *N. paradoxa* can be distinguished from *N. nyonie* sp. n. and *N. smithi* sp. n. by its paler ground colour displaying a more ochreous tint and the somewhat discernible medial transverse line, which is absent in these last two species. In comparison with *N. schultzei* sp. n., *N. paradoxa* is readily distinguished by its markedly larger size, and the paler forewing colouration lacking extensive greyish brown areas.

In the male genitalia, *N. paradoxa* can be distinguished from other *Neoliparina* species by the considerably shorter uncus with a conspicuous apical notch, and the shape of its valva, the apex of which is rounded triangular, unlike in *N. nyonie* sp. n. where there is an acute apical process, *N. schultzei* sp. n. where it is truncated and in *N. smithi* sp. n. where it is smoothly rounded. Although the characteristics

of the phallus and vesica in *Neoliparina* remains somewhat similar between species, the coecum of *N. paradoxa* is distinctly rounded, however, in other species this character is somewhat angular.

The female genitalia can be readily distinguished by the much broader papillae anales (compared to *N. nyonie* sp. n. and *N. smithi* sp. n.); the broadest and largest, rounded quadrangular antevaginal plate; the shape of the antrum, which is narrow funnel-shaped only in *N. paradoxa* and the absence of a signum, which is present in *N. schultzei* sp. n. and *N. nyonie* sp. n.

Bionomics and distribution (Fig. 21). The species was originally described from a single female holotype from southwestern Central African Republic. A male and a female specimen were recently collected in northern Cameroon suggesting that the species is associated with the Northern Congolian Forest-Savanna Mosaic ecoregion.

***Neoliparina nyonie* sp. n.**

<https://zoobank.org/urn:lsid:zoobank.org:act:21F09444-A658-481F-B1BC-147FF28CF245>

(Figs 2, 3, 9, 14, 18)

Holotype. Male, “GABON 10m / Nyonié (Lowland forest) / 0°2’22”S, 9°20’25”E / 23–28.viii.2019, MV Light Trap / Albert, J-L., Aristophanous, M., / Bie Mba, J., Dérozier, V., / Moretto, P. Leg. / ANHRT:2019.17” // unique id.: ANHRTUK 00137595, gen. slide No.: BP 040 (ANHRT).

Paratypes. Gabon. 1 male and 1 female, with same data as the holotype, unique ids: ANHRTUK 00139058, ANHRTUK 00172502, gen. slide Nos: BP 039, BP 057 (ANHRT).

Description.

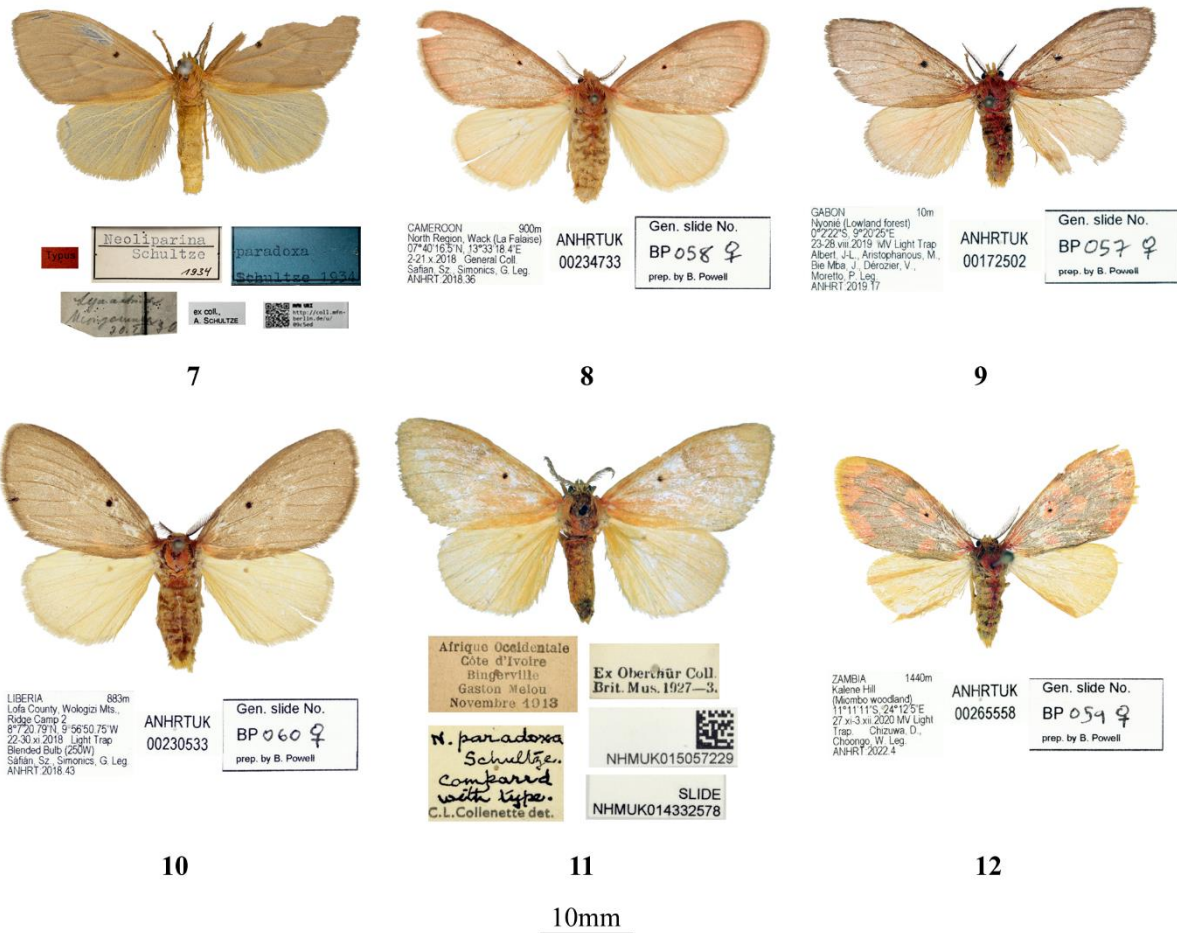
Adult. Male (Figs 2, 3). Forewing length 11–12 mm. Head large; antenna bipectinate-fasciculate, rami of antenna very long, seven to ten times longer than diameter of antennal shaft, ventral rami 1.5 times longer than dorsal rami, ochreous brown, dorsal side of antennal shaft black; labial palp short and broad covered in dark yellow, piliform scales. Frons and vertex dark yellow; collar orange. Tegula covered with long, dark orange, piliform scales turning paler apically; mesothorax red. Fore- and midleg covered in long, yellow and black, piliform scales; hindleg yellow; index of spurs 0-2-4. Abdomen red. Forewing short and broad, costal margin gently arched, apex rounded, termen smoothly convex, anal margin almost straight. Forewing ground colour reddish orange; basal and antemedial area orange; postmedial and terminal area red; discal spot large, black, round, sharply defined; medial line zig-zagged, angled outward medially; postmedial line sinuous, both lines black and diffuse; subterminal line consisting of black spots; terminal line black. Cilia longish, blackish. Underside orange proximal two-thirds, discal spot large and highly contrasting, apical third blackish brown. Hindwing orange, with thick blackish brown band along termen, ending at tornus. Cilia longish, blackish brown, orange along anal margin. Underside as on upperside.

Male genitalia (Fig. 14). Uncus moderately long and broad, rounded quadrangular, with very slightly depressed distal margin and with two teeth-like ventral processes. Arms of tegumen heavily sclerotised, somewhat ribbon-like, broadened in proximal half with arched outer margin. Valva medium-long, broad at base, costa gently concave, ventral margin almost straight in proximal third then angled at ca. 30°, distal section straight; apical section of valva ventrally rounded, dorsally with an acute triangular process. Juxta very broad, with V-shaped posteromedial notch, very thick proximally. Vinculum short and broad triangular. Phallus short, somewhat thin, slightly curved, coecum truncate, slightly dilated apically, carina unmodified; vesica very short, basal section inflated spherical with small rugose sclerotised area; vesica ejaculatorius narrow tubular.

Female (Fig. 9). Forewing length 16 mm. Head large; antenna bipectinate-fasciculate, length ca. two-thirds that of male, rami ca. half the length of those of male, three to five times longer than diameter of antennal shaft, ventral rami 1.5 times longer than dorsal rami, colour as in male; labial palp short, narrow, covered in dark yellow, piliform scales. Frons, vertex, collar, tegula and mesothorax as in male. Legs as in male. Forewing more elongate and rounded at apex than in male. Forewing ground colour reddish grey, with dense reddish suffusion at base; discal spot black, large, round; transverse lines absent. Cilia longish, ochreous grey. Underside pale ochreous grey, discal spot reduced but visible.

Hind wing pale ochreous, with some orange suffusion. Cilia longish, ochreous grey. Underside pale ochre.

Female genitalia (Fig. 18). Papilla analis short and narrow with small triangular pseudopapilla; apophysis posterioris thin, medium-long, as long as apophysis anterioris. Eighth tergite very short, ribbon-like; antevaginal plate moderately broad, rounded quadrangular. Ostium bursae wide, with sclerotised margin; antrum short, goblet-shaped; ductus bursae long, three times longer than antrum, somewhat dilated proximally. Corpus bursae large, ovoid, fully membranous, bearing two equally sized, somewhat small, ovoid, membranous appendices; signum moderately sclerotised, concave.



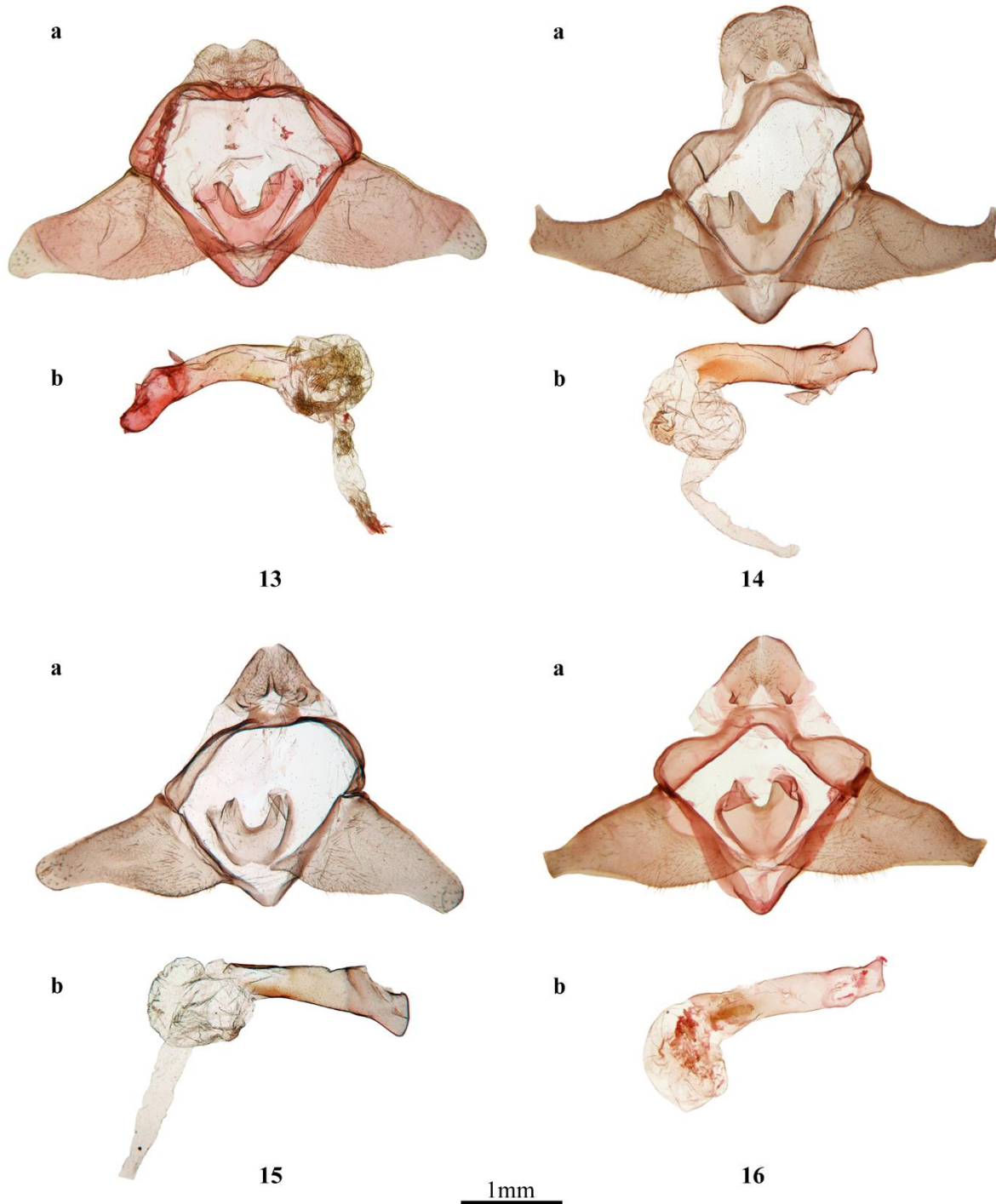
Figures 7–12. Adults, female. **7.** *Neoliparina paradoxa*, HT (MfN/© Eran Wolff). **8.** *Ibid* (ANHRT). **9.** *N. nyonie* sp. n., PT (ANHRT). **10.** *N. smithi* sp. n., PT (ANHRT). **11.** *Ibid*, PT (NHMUK). **12.** *N. schultzei*, sp. n., PT (ANHRT).

Diagnosis. The differences between *N. nyonie* sp. n. and *N. paradoxa* are discussed under the latter's diagnosis. *Neoliparina nyonie* sp. n. can be distinguished externally from *N. schultzei* sp. n. by the darker orange ground colour of the forewing (it is yellowish in the latter species), the dark apical third of the forewing underside (which is uniform in *N. schultzei* sp. n.) and the wide blackish brown hindwing border which is absent in the latter species. From *N. smithi* sp. n., it can be distinguished by its less intense and reduced forewing markings, the considerably smaller patches of the subterminal line and the absence of the hindwing discal spot. The female of this species can be diagnosed by the somewhat reddish tinge to its ground colour in contrast to the more ochreous colouration of *N. smithi* sp. n. and the predominantly brownish grey *N. schultzei* sp. n.

In the male genitalia, *N. nyonie* sp. n. is readily distinguished from *N. smithi* sp. n. and *N. schultzei* sp. n. by its rounded quadrangular uncus, bearing a pair of tooth-like basoventral processes compared to the rounded triangular uncus of the last two species with similar, but longer processes being present only in *N. schultzei* sp. n. As a further diagnostic feature, *N. nyonie* sp. n. has a conspicuous

dorsal process of the valva apex in contrast to the smoothly rounded apical section in *N. smithi* **sp. n.** and the truncate valva tip of *N. schultzei* **sp. n.** Furthermore, the somewhat longer valva of *N. nyonie* **sp. n.** is slightly curved caudad, as opposed to the shorter, straight valvae of *N. smithi* **sp. n.** and *N. schultzei* **sp. n.**

The female genitalia of *N. nyonie* **sp. n.** are readily distinguished from those of *N. schultzei* **sp. n.** by the markedly narrower papillae anales and the goblet-shaped antrum which is tubular in the latter species. The antrum is similarly goblet-shaped in *N. smithi* **sp. n.** however, *N. nyonie* **sp. n.** has a sclerotised, concave signum which is absent in the former species, but present and raised in *N. schultzei* **sp. n.**



Figures 13–16. Male genitalia, a: clasp apparatus, b: phallus. **13.** *Neoliparina paradoxa*, Cameroon, Wack, BP 056 (ANHRT). **14.** *N. nyonie* **sp. n.**, HT, Gabon, Nyonié, BP 039 (ANHRT). **15.** *N. smithi* **sp. n.**, HT, Sierra Leone, Gori Hills, BP 041 (ANHRT). **16.** *N. schultzei*, **sp. n.**, PT, BP 062 (ANHRT).

Etymology. The new species is named after Nyonié, a village on the Atlantic coast of Gabon, the only locality this taxon is known from to date.

Bionomics and distribution (Fig. 21). *Neoliparina nyonie* **sp. n.** is known exclusively from Nyonié, Gabon where it inhabits lowland Atlantic coastal forest.

***Neoliparina smithi* sp. n.**

<https://zoobank.org/urn:lsid:zoobank.org:act:578F3A67-4916-48E4-A871-41D1C0020969>

(Figs 4, 5, 10, 11, 15, 19)

Holotype. Male, “SIERRA LEONE 470m / Kenema Province, Gori Hills, / Near Moimandu / 08°14’51”N, 10°58’17”W / 2–9.iii.2020 / Kalnoi, G., Sinyaev, V. Leg. / ANHRT:2020.14” // unique id.: ANHRTUK 00288011, gen. slide No.: BP 041 (ANHRT).

Paratypes. Ivory Coast. 1 female, Bingerville, xi.1913, leg. Melou, G., ex. coll. Oberthür, QR code label with unique id.: NHMUK 015057229, gen. slide No.: NHMUK 014332578 (prepared by B. Powell) (NHMUK). **Liberia.** 2 females, 883m, Wologizi Mountains, 08°07’20.79”N, 09°56’50.75”W, 22–30.xi.2018, blended bulb light trap, Leg. Sáfián, Sz., Simonics, G., ANHRT:2018.43, unique ids: ANHRTUK 00230695, ANHRTUK 00230533, gen. slide Nos: BP 060, BP 061 (ANHRT); 1 male, Nimba, Grassfield, viii–ix.1967, Leg. Forbes-Watson, A., QR code label with unique id.: NHMUK010914435, gen. slide No.: NHMUK 014332576 (prepared by B. Powell); 1 female, same locality and collector as previous male, vi–vii.1967, QR code label with unique id.: NHMUK010914436, gen. slide No. NHMUK 014332577 (prepared by B. Powell) (NHMUK).

Description.

Adult. Male (Figs 4, 5). Forewing length 13 mm. Head large; antenna bipectinate-fasciculate, rami of antenna very long seven to ten times longer than diameter of antennal shaft; ventral rami 1.5 times longer than dorsal rami, dark brown, dorsal side of antennal shaft ochreous brown; labial palp absent. Frons and vertex yellowish orange, collar pale orange. Tegula covered with long, pale orange, piliform scales turning ochreous apically; mesothorax dark orange. Foreleg absent; midleg covered in long, yellowish orange, piliform scales; hindleg pale yellow. Abdomen orange. Forewing short and broad, costal margin gently arched, apex rounded, termen smoothly convex, anal margin almost straight. Forewing ground colour reddish orange, basal and antemedial area somewhat lighter than postmedial and terminal area. Antemedial line very broad, sinuous; discal spot large, round, contrasting; medial line zig-zagged, angled outward medially; postmedial line sinuous; subterminal line consisting of a row of wedge-shaped spots pointing inwards; terminal line thin; all markings black. Cilia longish, black. Underside orange in proximal two-thirds, apical third blackish brown; discal spot large, black, highly contrasting. Hindwing orange, discal spot somewhat small, diffuse black, termen with very broad blackish brown band, dark area penetrating cranially along anal margin. Cilia longish, black. Underside as on upperside but margin somewhat narrower ending at tornus.

Male genitalia (Fig. 15). Uncus somewhat long and broad, triangular, with two small, rounded basal lobes. Arms of tegumen, heavily sclerotised, very narrow, ribbon-like. Valva medium-long, broad at base, gradually tapering, costa straight, ventral margin gently sinuous, apical section of valva smoothly rounded. Juxta moderately broad, with U-shaped posteromedial notch, somewhat thickened proximally. Vinculum very short and broad, triangular. Phallus short, thin, straight, coecum quadrangular, carina unmodified; vesica very short, basal section inflated spherical, with very small rugose sclerotised area; vesica ejaculatorius narrow tubular.

Female (Figs 10, 11). Forewing length 15–16 mm. Head large; antenna bipectinate-fasciculate, length ca. two-thirds that of male, rami ca. half the length of those of male, three to five times longer than diameter of antennal shaft, ventral rami 1.5 times longer than dorsal rami, ochreous, dorsal side of antennal shaft ochreous; labial palp short and broad, covered in yellow piliform scales. Frons, vertex and collar covered in yellow scales. Tegula and mesothorax pale orange. Fore-, mid- and hindleg covered in hay-coloured scales; index of spurs 0-2-4. Abdomen ochreous yellow. Forewing similar shape as in male, more rounded at apex. Ground colour ochreous brown, with groups of reddish scales

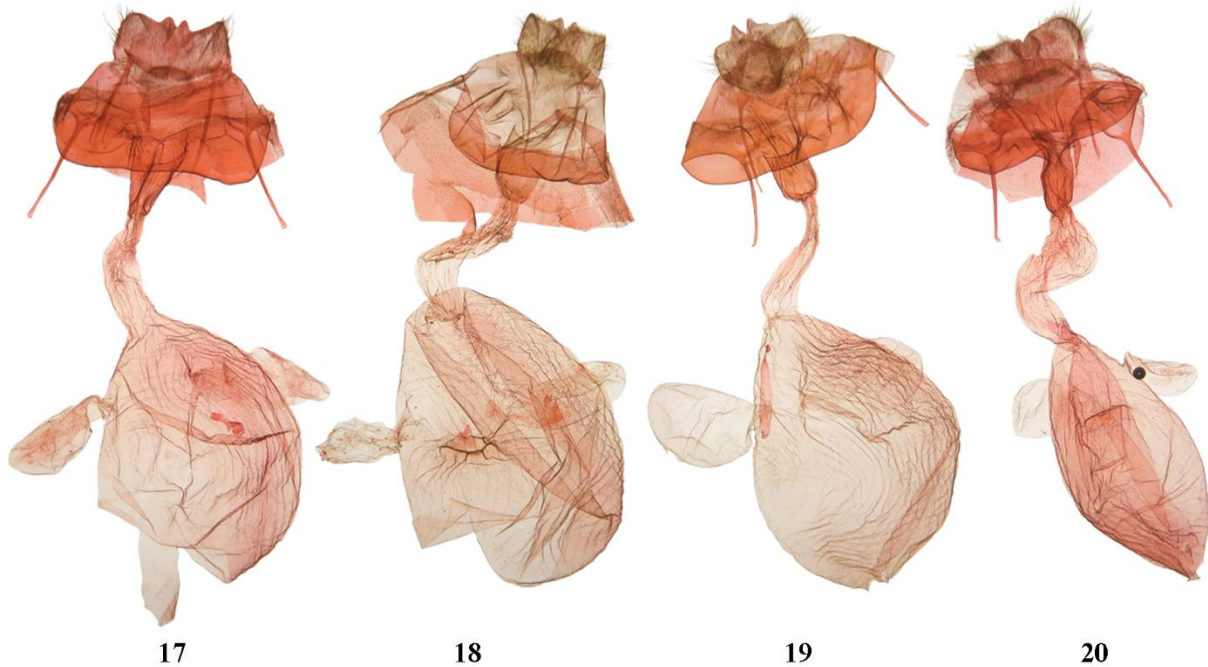
along anal margin near base; discal spot large, black, highly contrasting. Cilia longish, ochreous grey. Underside as on upperside, without reddish markings. Hindwing pale ochreous, discal spot present but diffuse. Cilia longish, ochreous. Underside as on upperside.

Female genitalia (Fig. 19). Papilla analis short and narrow with small triangular pseudopapillae; apophysis posterioris thin, medium-long, as long as apophysis anterioris. Eighth tergite very short, ribbon-like; antevaginal plate broad, rounded quadrangular. Ostium bursae wide, with sclerotised margin; antrum short, goblet-shaped; ductus bursae long, ca. 3 times longer than antrum, somewhat dilated proximally. Corpus bursae large, ovoid, fully membranous, bearing two equally medium-sized, spherical, membranous appendices; signum absent.

Diagnosis. The differences between *N. smithi* sp. n., *N. paradoxa* and *N. nyonie* sp. n. are discussed under their respective diagnoses. *Neoliparina smithi* sp. n. is readily distinguished externally from its congeners by the more prominent forewing markings and the presence of a hindwing discal spot. *Neoliparina smithi* sp. n. is distinguishable from *N. schultzei* sp. n. externally by its considerably darker orange ground colour, the dark apical third of the underside of its forewing (it is uniformly pale orange in *N. schultzei* sp. n.), and the dark terminal margin of the hindwing. The female of *N. smithi* sp. n. is distinguished from *N. schultzei* sp. n. by the lack of forewing markings and the presence of a hindwing discal spot, absent in *N. schultzei* sp. n.

In the male genitalia, *N. smithi* sp. n. can be distinguished from *N. schultzei* sp. n. by its less heavily sclerotised, rather rounded basal lobes of the uncus (these are more heavily sclerotised and tooth-like in *N. schultzei* sp. n.), the smoothly rounded apical part of the valvae (which are truncate in *N. schultzei* sp. n.) and the proximally narrower juxta.

The female genitalia of *N. smithi* sp. n. can be readily distinguished from *N. schultzei* sp. n. by the narrower papillae anales, the broader antevaginal plate, the goblet-shaped antrum (it is tubular in *N. schultzei* sp. n.), the considerably larger appendices of the corpus bursae and the absence of a sclerotised signum which is present in *N. schultzei* sp. n.



1mm

FIGURES 17–20. Female genitalia. **17.** *Neoliparina paradoxa*, Cameroon, Wack, BP 058 (ANHRT). **18.** *N. nyonie* sp. n., PT, Gabon, Nyonié, BP 057 (ANHRT). **19.** *N. smithi* sp. n., PT, Liberia, Wologizi Mts, BP 061 (ANHRT). **20.** *N. schultzei* sp. n., PT, Zambia, Kalene Hill, BP 059 (ANHRT).

Etymology. It is with great pleasure that this new species is dedicated to Richard Smith, Chairman of the Board of Trustees, African Natural History Research Trust, for his continuous commitment to African entomological research.

Bionomics and distribution (Fig. 21). *Neoliparina smithi* sp. n. is known from Sierra Leone, Liberia and Ivory Coast and appears to be restricted to the Upper Guinean forests; based on this distribution and its morphological characteristics, it is thought to be the West African variant of *N. nyonie* sp. n.

***Neoliparina schultzei* sp. n.**

<https://zoobank.org/urn:lsid:zoobank.org:act:FF06F34D-DD5C-449D-92DC-F5075750581F>

(Figs 6, 12, 16, 20)

Holotype. Male, "ZAMBIA 1250m / Muchinga Prov., Benyanga / village / 10°40'41"S, 33°27'45"E / 07–12.xii.2023, MV light trap / László, G., Morgan, L., / Volynkin, A. leg. / ANHRT:2024.3 // unique id: ANHRTUK 00374162, gen. slide No. BP 062 (ANHRT).

Paratypes. Zambia. 1 female, 10m, Kalene Hill (Miombo woodland), 11°11'11"S, 24°12'5"E, 27.xi–3.xii.2020, MV light trap, Chizuwa, D., Choongo, W. Leg. ANHRT:2022.4, unique id.: ANHRTUK 00265558, gen. slide No.: 059 (ANHRT).

Description.

Adult. Male (Fig. 6). Forewing length 12 mm. Head large; antenna-bipectinate fasciculate, rami of antenna very long seven to ten times longer than diameter of antennal shaft, ventral rami 1.5 times longer than dorsal rami, ochreous brown, dorsal side of antennal shaft ochreous yellow; labial palp short and narrow covered in yellowish scales. Frons, vertex and collar yellow. Tegula covered in long, yellowish, piliform scales, interspersed with some red scales; mesothorax red. Foreleg femur covered in some long, reddish, piliform scales, tibia yellow; midleg absent; hindleg covered in pale yellow scales. Abdomen ochreous yellow, with reddish scales on medial line. Forewing short and broad, costal margin very gently arched, apex rounded, termen smoothly convex, anal margin almost straight. Forewing ground colour yellowish with some orange suffusion, discal spot very small, blackish brown, somewhat rounded, lightly contrasting; medial line zig-zagged, angled outward medially, postmedial sinuous line, both lines faint greyish, subterminal area yellow with diffuse orange spots, terminal line ochreous. Cilia longish, ochreous. Underside pale ochre, discal spot diffuse. Hindwing pale ochre, no markings. Cilia longish, ochreous. Underside as on upperside.

Male genitalia (Fig. 16). Uncus moderately long and broad, triangular, with two teeth-like ventral processes. Arms of tegumen, heavily sclerotised, ribbon-like, broadened in proximal half with arched outer margin. Valva, medium-long, broad at base, costa gently convex, ventral margin gently sinuous; apical section of valva small, truncate, squarish. Juxta very broad with V-shaped posteromedial notch, thick proximally. Vinculum short and broad, triangular. Phallus short, thin, straight, coecum truncate, carina unmodified; vesica very short, basal section inflated spherical; vesica ejaculatorius not inverted.

Female (Fig. 12). Forewing length 15 mm. Head large; antenna bipectinate-fasciculate, rami of antenna short, length ca. two-thirds of that of male, rami ca. half the length of those of male, three to five times longer than diameter of antennal shaft, ventral rami 1.5 times longer than dorsal rami, ochreous grey, dorsal side of antennal shaft ochreous grey; labial palp short and narrow covered in hay-coloured scales. Frons and vertex yellow; collar pale orange. Tegula covered in long, reddish orange, piliform scales, turning ochreous apically; mesothorax red. Fore-, mid- and hindleg all covered in yellow scales; index of spurs 0-2-4. Abdomen as in male. Forewing broad and elongate, costal margin very gently arched, apex very rounded, termen smoothly convex, anal margin almost straight. Forewing ground colour dark grey; discal spot small, black, surrounded by red circle; where median line is in male, four rounded areas of red scales follow median line; subterminal area red turning yellow apically, with row of greyish spots; terminal line dark yellow. Cilia longish, ochreous. Underside as on upperside, paler. Hindwing ochreous, no markings. Cilia longish, yellow. Underside as on upperside.

Female genitalia (Fig. 20). Papilla analis short and very broad with small, triangular pseudopapillae; apophysis posterioris thin, medium-long, as long as apophysis anterioris. Eighth tergite very short, ribbon-like; antevaginal plate somewhat elongate but short. Ostium bursae wide, with sclerotised margin; antrum long, tube-shaped; ductus bursae two times longer than antrum, moderately thick. Corpus bursae large, ovoid, fully membranous bearing two equally sized, very small, spherical appendices; signum weakly sclerotised, gently convex.

Diagnosis. More detailed comparisons between *Neoliparina schultzei* **sp. n.** and its congeners can be found under the other respective diagnoses.

Neoliparina schultzei **sp. n.** can be readily distinguished by the more yellowish ground colour and more diffuse forewing markings in the male and pronounced greyish markings of the forewing in the female.

The male genitalia can be easily distinguished by the teeth-like ventral processes of the uncus (longer than those in *N. nyonie* **sp. n.**) and the abruptly truncate and narrow apices of the valva.

In the female genitalia the differing characters include the papillae analis which is very broad, the much shorter antevaginal plate, the tubular antrum (this shape being exclusive to *N. schultzei* **sp. n.**) and the weakly sclerotised, slightly convex signum.

Etymology. This species is named in honour of Arnold Schultze, whose work in equatorial Africa resulted in the discovery of numerous new species including the type species of this genus.

Bionomics and distribution (Fig. 21). *N. schultzei* **sp. n.** is known thus far from Zambia, where it inhabits high elevation Miombo woodlands.

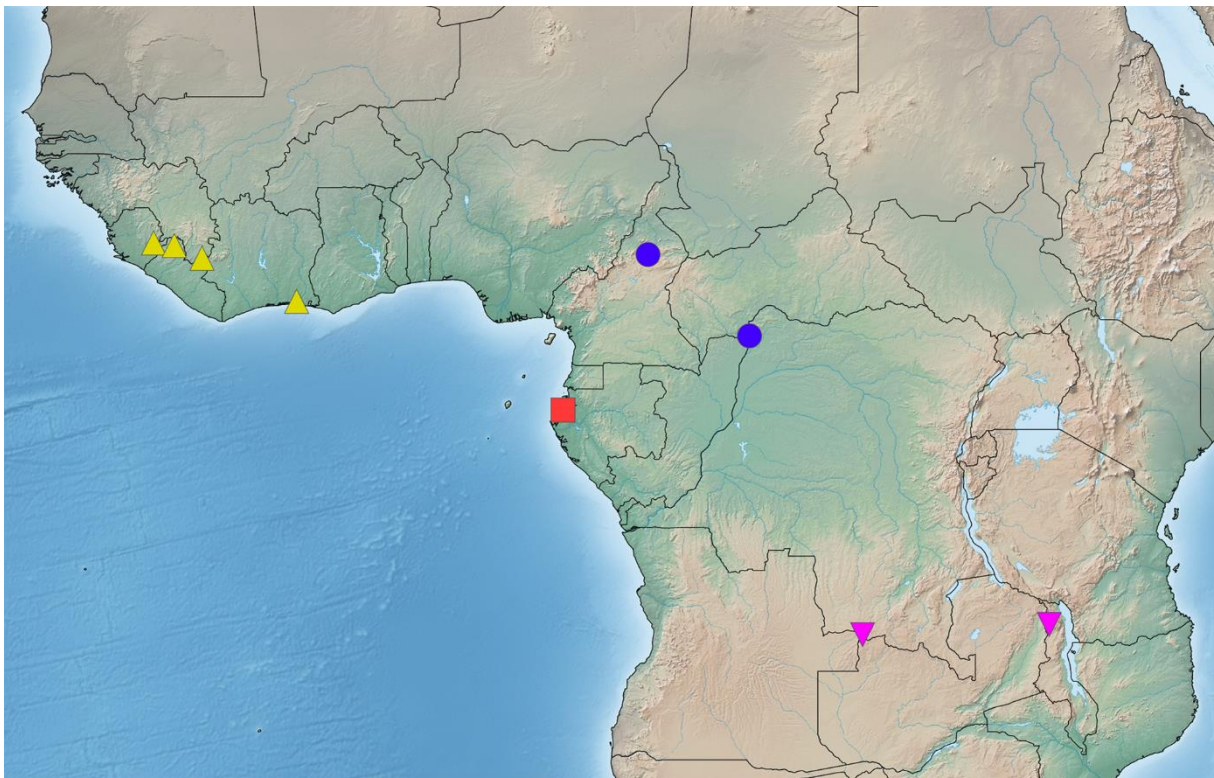


Figure 21. Distribution map of *Neoliparina paradoxa* (circles), *N. nyonie* **sp. n.** (squares), *N. smithi* **sp. n.** (triangles) and *N. schultzei* **sp. n.** (inverse triangles).

Discussion

The genus *Neoliparina* has for a long time been considered monotypic but examination of recently collected material has revealed a further three species described as new to science in this paper. One of

these includes the specimen Collenette considered to be conspecific with the type species from Ivory Coast, however, the genitalia of the West African population has proved to be notably different. Although based on limited material, it appears all four species are allopatrically distributed (Fig. 21) with two found in tropical rainforest environments, and the other two in more open woodland transition zones. Based on the habitus and biogeography, *Neoliparina smithi* **sp. n.** may be the West African vicariant of *N. nyonie* **sp. n.**, whilst the genitalia of the former is perhaps closer in appearance to *N. paradoxa*; further analyses incorporating molecular markers may yet shed light on their evolutionary relationship.

In many Lymantriinae genera, it can be difficult to determine any notable differences in genitalia between species (cf. László & Volynkin 2023, László & Powell 2024), however in the case of *Neoliparina* both male and female genitalia characteristics are diagnostic for each species.

The colouration of *Neoliparina* species is another unusual trait for Lymantriinae, as most tussock moth species express darker, more cryptic brown and grey colouration. The more vibrant appearance of *Neoliparina* species (most similar to Lymantriinae genus *Barlowia* Talbot, 1929) suggests a form of aposematism which may indicate diurnal behaviour, however, there are no records of these particular moths being encountered during the day. All specimens where the collection methods were recorded, were caught at MV light which could allude to nocturnal (or crepuscular) behaviour, but since such few specimens are known, it may be possible to conclude that they are generally not attracted to light sources. There are cases where aposematic moth species are active at night (e.g., the footman genus *Mitochrista* Hübner, [1819] (Arctiinae, Lithosiini)) and whilst unusual this trait would still result in lower predation when at rest during the day (Nokelainen *et al.* 2024).

Whilst only 13 specimens were found in the collections of ANHRT and NHMUK during the preparation of this present study, the discovery of three new species from this material with good differing characteristics, both in habitus and in genitalia, demonstrates the importance of thorough morphological investigations in revealing the hidden biodiversity of the Afrotropics (cf. Volynkin 2023, Takano 2024, Takano & László 2024).

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The Author declares that to the best of her knowledge she conforms to the national regulations and meets with the conditions and requirements of international conventions concerning collecting/export and handling of the specimens presented in this Article.

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