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A new genus of Afrotropical Lasiocampini: *Mckenziana* gen. n. (Lepidoptera, Lasiocampidae, Lasiocampinae)

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Abstract

A new genus *Mckenziana* gen. n. with *Mckenziana maighreadae* sp. n. (type-species), *Mckenziana roganae* sp. n. and *Mckenziana ciani* sp. n. are described. Detailed diagnosis for the new genus is provided and compared with four closely

related genera: *Ptyssophlebia* Berio, 1937; *Catalebeda* Aurivillius, 1902; *Oplometa* Aurivillius, 1894; and *Muzunguja* Zolotuhin & Gurkovich, 2009.

Key words: Africa, *Catalebeda*, lappet moths, *Muzunguja*, new record, *Oplometa*, *Ptyssophlebia*.

Introduction

The family Lasiocampidae Harris, 1841 is a sole member of the superfamily Lasiocampoidea (Minet, 1994; Regier *et al.*, 2009; Zwick *et al.*, 2011; Hamilton *et al.*, 2019). The last discovery in the suprageneric system of the family was done by Zolotuhin with co-authors (2012a, 2012b) based on the nucleotide sequence of the gene elongation factor-1 alpha. The family resulted in containing five subfamilies and 14 tribes, among which Argudini Zolotuhin, 2012 was established new and briefly described for eleven Indomalayan and one African genera. Lees & Minet (2022) in the note on Madagascan Lasiocampidae legitimately state that “tribes are not yet clearly established,” though the statement is applicable to the whole family.

Lasiocampidae occur worldwide, except New Zealand. According to Zolotuhin (2015), among the eight biogeographic realms on Earth, the most diverse fauna of the family Lasiocampidae is in the Afrotropical realm. The fauna is represented by more than 700 species in 115 genera, while about 100 species and 20 genera are yet to be discovered. The Afrotropical fauna shares the genus *Bombycopsis* Felder & Felder, 1874 with the Palearctic realm (see Joannou & Krüger, 2009); and *Estigena* Moore, 1860; *Trabala* Walker, 1856 and *Strebote* Hübner, 1820 with the Indomalayan realm (see Prozorov, 2011; Prozorov *et al.*, 2022a).

Upon reviewing several collections of African Lasiocampinae specimens, some unusual specimens were identified that shared external affinities to members of *Ptyssophlebia* Berio, 1937; *Catalebeda* Aurivillius, 1902; *Oplometa* Aurivillius, 1894; and *Muzunguja* Zolotuhin & Gurkovich, 2009. Upon further investigation, it was determined that there were sufficient morphological differences to the aforementioned genera, thus the new genus *Mckenziana* gen. n. is described herein.

Abbreviations of the depositories used:

- CAC** – collection of Alexandre Cipolla (Grivegnée, Belgium);
- CAS** – collection of Anton Skrobotov (Moscow, Russia);
- CGM** – collection of Günter Müller (Freising, Germany);
- CMS** – collection of Manfred Ströhle (Weiden, Germany);
- CPB** – collection of Patrick Basquin (Yvetot-Bocage, France);
- MWM** – Museum Witt Munich (Munich, Germany);
- NHML** – Natural History Museum (London, UK);
- RMCA** – Royal Museum for Central Africa (Tervuren, Belgium);
- USTTB** – University of Sciences, Techniques and Technologies of Bamako (Mali);
- ZSM** – Bavarian State Collection of Zoology (Munich, Germany).

Other abbreviations used:

- BOLD** – Barcode of Life Data System;
- CAR** – Central African Republic;
- COI** – cytochrome *c* oxidase subunit I;
- DRC** – Democratic Republic of the Congo;
- GS** – genitalia slide;
- HT** – holotype;
- PT** – paratype;
- RSA** – Republic of South Africa.

Material and methods

Some adults (Figs 28–30) were collected near the Ekongo camp (2.75613S, 20.31538E; see Prozorov *et al.*, 2021a; Prozorov *et al.*, 2021b), Mai-Ndombe, DRC, another specimen (Fig. 32) was collected in the

scientific station Ziela, Mount Nimba, Guinea using a traditional white screen lit with a Sylvania Mini-Lynx Blacklight BL368 and a chain of locally made auto-traps with similar bulbs. A Honda EU 10i and a Honda EU 20i generators provided the electricity for the screen and the traps.

Genitalia preparations were made generally following Hardwick (1950). Distal one third of the abdomen of each specimen was put into a separate 50 ml Falcon tube with 10 ml of 13% solution of potassium hydroxide (KOH). Several tubes with abdomens and KOH were put together into a small pot with hot water for 20 minutes. The tubes thereafter were taken out from the pot and the abdomens were rinsed with water once or twice to wash off remaining scales and soft tissue. Cleaned abdomens then were transferred into separate cells of the Corning Costar 96 Well Cell Culture Cluster with a little amount of water to keep them moist during preparation. One after another, abdomens were cleaned with soft brush and dissected using Dumont Tweezers Style 5 and “no name” micro scissors in a Petri dish. Aedeagus was extracted and vesica everted with an insulin syringe and a 32G needle for mesotherapy. Male’s vesica and female’s bursa were stained with the Evans blue. The dissected genitalia were rinsed in 50, 70 and 96% ethanol and then mounted on a microscope slide in Euparal and covered with a cover slip.

Adults were photographed with an Olympus C-750 UZ, a Nikon D3300, a Nikon 40mm f/2.8G and a Nikon R1C1. Slides were photographed using an Olympus C-750 UZ and a Leica MC170 HD. All images were processed with Photoshop CS6 and InDesign CS6 (Adobe, 2012).

DNA barcodes of 11 specimens from BOLD projects were used for this study (Ratnasingham & Hebert, 2007, 2013). The samples were collected in DRC, Guinea, Liberia, Lithuania, Sierra Leone, and RSA, and stored in five entomological collections: ANHRT, CGM/USTTB, CMS, MWM/ZSM, and RMCA (Table 1). One leg from each individual was used for analysis. Legs were stored in tubes with 96% ethanol. The sequences were obtained at the Biodiversity Institute of Ontario, Canada. DNA isolation, PCR amplification, and DNA sequencing followed standard protocols (Hebert *et al.*, 2003; deWaard *et al.*, 2008). The sequences are released publicly in the dataset DS-MCKENZIE (dx.doi.org/10.5883/DS-MCKENZIE) on BOLD (Table 1).

Sequence alignment and calculation of pairwise distances were conducted using MEGA X (Kumar *et al.*, 2018). Bootstrap analysis (1000 replicates) and the Maximum Likelihood (ML) tree of the COI sequences (the Kimura 2-parameter was used; Kimura, 1980) were also conducted using MEGA X. The values shown in the ML tree display the ultrafast bootstrap (UFBoot2) approximations (Hoang *et al.*, 2018). BI analysis was performed in Mr Bayes 3.2.6 (Ronquist & Huelsenbeck, 2003) with four independent runs, each having three heated and one cold chain. Analyses were conducted for 6 million generations, with a tree sampled every 1000 generations. The first 25% of each run was discarded as burn-in. The values shown in the BI tree display the estimated posterior probability. The trees were visualised using MEGA X software.

Morphological terminology follows Zolotuhin (2015) and Prozorov *et al.* (2023e). Elevation ranges if missed on labels were taken from Google Earth Pro. Distribution map was made with Google My Maps service (<https://www.google.com/maps/>). Ecoregions listed in the Distribution section follow Dinerstein *et al.*, 2017.

Table 1. Information on the barcodes stored in the public dataset DS-MCKENZIE and specimens used in the phylogenetic analysis.

TAXON	BOLD SAMPLE ID	COLLECTION DATA (DEPOSITORY)
<i>Catalebeda producta</i>	LBEOW1163-11	DRC, 35 km SSE Kisangani, Yoko, 0.17N, 25.17E, 413 m, 13.II.2008, leg. A. Gurkovich & V. Zolotuhin (CGM/USTTB)
<i>Chondrostegoides magna</i>	LBEOW1763-11	Paratype , RSA, Swellendam, Bontebok National Park, 34S, 20.25E, 220 m, 20.III.1999, leg. J. de Freina (MWM/ZSM)
<i>Malacosoma castrensis</i>	LBEOA1136-11	Lithuania, Molėtai, environs of Zelvos Lake, 1–20.06.2007, leg. V. Pacevicius (MWM/ZSM)
<i>Mckenziana ciani</i>	LBEOW092-10	Paratype , DRC, 17 km N Kisangani, Masako Field Station, 0.36N, 25.15E, 388 m, 8.II.2008, leg. V. Zolotuhin (CGM/USTTB)
	LBEOW573-10	Holotype , DRC, Bas-Kongo, Mayumbe, Luki Natural Reserve, 5.617N, 13.083E, 320 m, 16.V.2007 leg. J. & W. De Prins (RMCA)

..continued on the next page

TABLE 1.

	ANLMO8762-23	Paratype , Liberia, Lofa County, Wonegizi Nature Reserve, Wetezu Camp, 8.082531N, 9.579961W, 551m, 19–27.III.2019, leg. S. Sáfián & S. Koivogui (ANHRT)
	ANLMO8763-23	Paratype , Guinea, Forêt Classée de Ziama, Seredou camp, 8.354036N, 9.325536W, 870m, 24.II–6.III.2019, leg. S. Sáfián, G. Simonics, K. Florczyk & S. Koivogui (ANHRT)
<i>Mckenziana maighreadae</i>	ANLMO8774-23	Paratype , Liberia, Lofa County, Wologizi Mts., Ridge Camp 2, 8.122442N, 9.947431W, 883m, 22–30.XI.2018, leg. S. Sáfián & G. Simonics (ANHRT)
	ANLMO8775-23	Paratype , Liberia, Nimba Mountains, W slope of Mount Gangra, 7.558258N, 8.637889W, 700 m, 16–17.III.2017, leg. Sz. Sáfián, G. Simonics (ANHRT)
	LBEOW1361-11	Paratype , Sierra Leone, Singi-Singi Mts, 46 km NE Koido-Sefadu, Bandaperei-Kono, 8.57083N, 10.448W, 800 m, 14.IV.2010, leg. Rudloff (CMS)
<i>Ptyssophlebia discocellularis</i>	LBEOW1560-11	DRC, 17 km N Kisangani, Masako Field Station, 0.36N, 25.15E, 388 m, 5.II.2008, leg. A. Gurkovich & V. Zolotuhin (CGM/USTTB)

Taxonomical part

Mckenziana gen. n.

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(Figs 1–24, 35–44, 49–50, 58–60)

Type species: *Mckenziana maighreadae* sp. n., by present designation.

Description. Male (Figs 1–4, 6–20). Flagellum covered with brown scales or speckled, rami brown. Head, thorax and abdomen brown or cream-colored. *Forewing*. Forewing length: 24–30 mm. Elongated, apex blunt, external margin smooth. Background color brown or speckled. Pattern consists of white medial dot, pair of pale postmedial lines, dark brown and cream-colored wavy external line. Fringe brown or speckled. *Hindwing*. Somewhat triangular or oval, indentation on veins may be pronounced. Background color and fringe brown or speckled brown. *Genitalia* (Figs 35–44). Tegumen a narrow band, medially widened; laterally bears a pair of socii. Socii papilla-shaped, covered with setae. Vinculum ventrally elongated, distally bears cubile with small proximal apodeme. Cubile divided medially into a pair of somewhat oval processes with one medial spur and some indentations along the inner margin. Cucullus elongated, finger shaped with blunt apex, basally covered with setae. Sacculus about half the length of cucullus, basally covered with setae. Juxta knob-like, fused with aedeagus. Aedeagus straight with very short basal apodemes, ventromedially bears claw-like extension or spur with pointed apex. Vesica spherical may be covered with minute dents. The eight sternite somewhat oval, medially membranous, basally more sclerotized with barely pronounced apodemes. The eight tergite elongated, somewhat pentagonal, medially membranous, basally has a pair of lateral apodemes. **Female** (Figs 5, 21–24). Flagellum speckled cream-colored and brown; rami brown, shorter than of male. Head, thorax and abdomen speckled cream-colored and brown; abdomen also may be cream-colored. *Forewing*. Forewing length: 35–51 mm. Oval, elongated, apex blunt, external margin smooth. Background color speckled cream-colored and brown. Pattern consists of white discal dot, pair of pale medial lines and dark brown and orangish wavy external line. Fringe speckled cream-colored and brown. *Hindwing*. Oval, external margin wavy with peaks on veins. Background color cream-colored and brown, costal and anal angles darker. Fringe speckled cream-colored and brown. *Genitalia* (Figs 49–50). Papillae anales oval, densely covered with setae. Posterior and anterior apophyses about the same length. Antevaginal plate a narrow band with medial spherical membranous extension forming antrum. Postvaginal plate somewhat hexagonal with mediocaudal concavity around spherical extension of antevaginal plate. Ostium amorphous. Ductus bursae not pronounced. Corpus bursae elongated, bears no singum.



Figures 1–11. Adults of *Mckenziana maighreadae* sp. n. 1–3. Ghana. 1. HT ♂, Kubease, GS 1273 (CGM/USTTB). 2. PT ♂, Juaso (NHML). 3. PT ♂, Kumasi. 4. PT ♂, Sierra Leone, Tingi Hills Forest Reserve, LBEOW1361-11 (CMS). 5–6. Guinea. 5. PT ♀, Zigépko, GS 0927 (CGM/USTTB). 6. PT ♂, Forêt Classée de Ziama, ANLMO8763-23 (ANHRT). 7–9. Liberia. 7. PT ♂, Wonegizi Nature Reserve, ANLMO8762-23 (ANHRT). 8. Wologizi Mts., ANLMO8774-23 (ANHRT). 9. Nimba Mts, ANLMO8775-23 (ANHRT). 10–11. Ivory Coast. 10. Vavoua, GS 10-029 (CGM/USTTB). 11. Mt Tonkoui, GS 2023-07-02 (CPB).

Diagnosis. The following four genera are morphologically close or may be mixed up with *Mckenziana* gen. n. and, thus, compared with its members: 1) *Ptyssophlebia*; 2) *Catalebeda*; 3) *Oplometa*; 4) *Muzunguja*.

1) *Ptyssophlebia* contains two valid species (Prozorov & Zolotuhin, 2013a, 2013b), the type species is *Ptyssophlebia avis* Berio, 1937 – a junior subjective synonym of *Ptyssophlebia discocellularis* (Strand, 1912) (Figs 25–27). Adults of *Mckenziana* gen. n. have only two dull postmedial lines on forewings (Figs 1–24), while the ones of *Ptyssophlebia* have a complex pattern consisting of several medial lines and contrastingly colored fields (Figs 25–27). In male genitalia of *Mckenziana* gen. n. tegumen is medially widened, valvae are bilobed, aedeagus has ventromedial claw-like extension, vesica is proportional and spherical, processes of cubile oval, the eighth sternite is not modified (Figs 35–44), while in *Ptyssophlebia*

tegumen is medially membranous, valvae are not bilobed, aedeagus has apical and ventral spurs, vesica is tiny and narrow, processes of cubile are narrow and finger-shaped, the eighth sternite has two pairs of distal extensions and well-developed basal apodemes (Fig. 46). In female genitalia of *Mckenziana* gen. n. apophyses are long, antevaginal plate is a narrow band, postvaginal plate is somewhat hexagonal, bursa is narrow (Figs 49–50), while in *Ptyssophlebia* apophyses are short, antevaginal plate is reduced to medial semi-ring with ventral V-shaped sclerotization and lateral amorphous sclerotized formations, postvaginal plate with medial dentated ridge, bursa is wide (Figs 51–52).

2) *Catalebeda* contains five valid species (De Prins & De Prins, 2023), the type species is *Catalebeda* (=*Lebeda*) *producta* Walker, 1855 (Figs 28–29). Adults of *Mckenziana* gen. n. have only two dull postmedial lines on forewings (Figs 1–24), while the ones of *Catalebeda* have numerous antemedial and postmedial wavy lines (Figs 28–29). In male genitalia of *Mckenziana* gen. n. valvae are bilobed, aedeagus has ventromedial spur, vinculum is somewhat trapezoid, processes of cubile have dents along the inner margin (Figs 35–44), while in *Catalebeda* valvae are of one piece, aedeagus has ventroapical spur, vinculum is somewhat heart-shaped and cup-like outwards, processes of cubile have no dents (Fig. 45). In female genitalia of *Mckenziana* gen. n. antevaginal plate is a narrow band (Figs 49–50), while in *Catalebeda* it is a relatively big sclerotized plate (Figs 54–55).

3) *Oplometa* contains one valid species (Zolotuhin & Garkovich, 2009b), the type species is *Oplometa cassandra* (Druce, 1887) (Figs 30–31). Female of *Oplometa* remains unknown. Adult males of *Mckenziana* gen. n. have only two dull postmedial lines on forewings (Figs 1–4, 6–20), while the ones of *Oplometa* have barely visible numerous antemedial and postmedial wavy lines (Figs 30–31). In male genitalia of *Mckenziana* gen. n. valvae are bilobed, aedeagus has ventromedial spur, vinculum is somewhat trapezoid, processes of cubile have dents along the inner margin (Figs 35–44), while in *Oplometa* valvae are of one piece, aedeagus has ventroapical spur, vinculum is somewhat heart-shaped and cup-like outwards, processes of cubile have no dents (Fig. 48).

4) *Muzunguja* contains one species (Zolotuhin & Garkovich, 2009a), the type species is *Pachypasa madelineae* Tams, 1936 – a junior subjective synonym of *Muzunguja rectilineata* (Aurivillius, 1900) (Figs 32–34). *Mckenziana* gen. n. has sexual dimorphism in size (Figs 1–24), while *Muzunguja* has different forewing cut in males and females (Figs 32–34). Adult males of *Mckenziana* gen. n. have two dull medial lines and white discal dot on forewings (Figs 1–4, 6–20), while the ones of *Muzunguja* have four pale medial lines and dark discal dot (Figs 32–33). Adult females *Mckenziana* gen. n. have oval forewings with wavy external line (Figs 5, 21–24), while the ones of *Muzunguja* have triangle forewing with almost straight external line (Fig. 34). In male genitalia of *Mckenziana* gen. n. sacculus is undivided, aedeagus has a single ventromedial spur, surface of vesica is covered with minute dents (Figs 35–44), while in *Muzunguja* sacculus is bilobed, aedeagus has divided ventroapical spur, vesica dorsobasally has an extension covered with minute dents and ventrodistally bears a dense cluster or cornuti (Fig. 47). In female genitalia of *Mckenziana* gen. n. antevaginal plate is a narrow band (Figs 49–50), while in *Muzunguja* antevaginal plate is somewhat rhomboid and well sclerotized (Fig. 53).

DNA comparison (Figs 58–60). Two of three newly described species of the genus *Mckenziana* have been barcoded: *Mckenziana maighreadae* sp. n. and *Mckenziana ciani* sp. n. The ML and BI trees display similar topologies (Figs 58, 59). In both analyses *M. maighreadae* sp. n. and *M. ciani* sp. n. are recovered as sister taxa, forming a monophyletic clade with a strong branch support (ML 100; BI 1). The *p*-distance (Fig. 60) between *Mckenziana* spp. and *C. producta* is 7.75–8.81%; between *Mckenziana* spp. and *P. discocellularis* is 10.49–10.94%; between *Mckenziana* spp. and *M. castrensis* is 11.4–12.01%; between *Mckenziana* spp. and *Ch. magna* is 14.89–15.65%. Numbers are comparable with earlier shown intergeneric *p*-distances between:

1. two species of the genus *Pachypasa* Walker, 1855 and *Macrothylacia rubi* (Linnaeus, 1758) – 14.6–15.5% (Prozorov et al., 2022b);
2. three species of the genus *Streblote* and *Pachygastria editae* (Speidel et al., 2015) – 13.7–15.2% (Prozorov et al., 2022a);
3. some species of the genera *Braura* Walker, 1865; *Cheligion* Zolotuhin & Garkovich, 2009; *Cleopatrina* Zolotuhin & Garkovich, 2009; *Eutricha* Hübner, 1814; *Grellada* Zolotuhin & Garkovich, 2009; *Lasiocesa* Koçak, 2013; *Muzunguja* Zolotuhin & Garkovich, 2009; *Pachytrina* Zolotuhin & Garkovich, 2009; *Pallastica* Zolotuhin & Garkovich, 2009; and *Vavizola* Prozorov et al., 2023 – 4.7–12% (Prozorov et al., 2023a);



Figures 12–24. Adults of *Mckenziana* spp. 12–17. *Mc. ciani* sp. n. 12. HT ♂, DRC, Luki Natural Reserve, GS GU-2008-34, LBEOW573-10 (RMCA). 13–15. Cameroon, PT ♂. 13. Zalom (CAC). 14. Forest of Dzeng (CPB). 15. Ngila (CPB). 16. PT ♂, Gabon, Mvoum, GS 2023-07-01 (CPB). 17. PT ♂, CAR, forest of Sabokiri (CPB). 18–24. *Mc. roganae* sp. n. 18. HT ♂, Nigeria, Obudu Cattle Ranch, GS 1272 (CGM/USTTB). 19–20. PT ♂, DRC, River Luvua (CAC). 19. GS LazLas037. 20. GS LazLas041. 21–24. PT ♀. 21. Cameroon, 2 km E Nyasoso (ZSM). 22. CAR, Mbale (CPB). 23. Congo, Domvi [?] (CPB). 24. Uganda, Katera – Sango Bay, GS 1514 (NHML).



Figures 25–34. Adults. 25–27. *Ptyssophlebia discocellularis*. 25–26. ♂, N DRC, Isiro, GS 2011-125 (RMCA). 27. ♀, SW Cameroon, 15 km on the road Edela – Douala, GS 2011-126 (RMCA). 28–29. *Catalebeda producta*, ♂ and ♀, C DRC, Ekongo camp. 30. GS 1225 (CGM/USTTB). 31. GS 1119 (CGM/USTTB). 30–31. *Oplometa cassandra*, ♂. 30. C DRC, Ekongo camp, GS 0960 (CGM/USTTB). 31. W DRC, Eala (RMCA). 32–34. *Muzunguja rectilineata*. 32. ♂, Guinea, Mt Nimba, GS 1186 (CGM/USTTB). 33. ♂, S Ivory Coast, Lamto, GS 2006-44 (RMCA). 34. ♀, S Cameroon, Bitye, GS 1428 (NHML) Scale bar – 1 cm.

4. some species of the genera *Bombycopsis*; *Pallastica*; and *Chionopsyche montana* Aurivillius, 1909 – 11.1–13.5% (Prozorov et al., 2023b);
5. some species of the genera *Dollmania* Tams, 1930; *Mallocampa leighi* Aurivillius, 1922; and *Ch. montana* – 8.8–13.2% (Prozorov et al., 2023b);
6. two species of the genus *Odontopacha* Aurivillius, 1909; two species of *Philotherma* Möschler, 1887; and *Ch. montana* – 9.6–15.2% (Prozorov et al., 2023b);

7. *Catalebeda producta*; *P. discocellularis*; *Revaya yahya* Prozorov et al., 2023; and *Ch. magna* – 9.4–15.4% (Prozorov et al., 2023e);

8. *Dinometa maputuana* (Wichgraff, 1906) and *Ch. montana* – 14.6% (Prozorov et al., 2023c);

9. *Chryseacampa evani* Prozorov et al., 2023; *Mallocampa audea* (Druce, 1887); *Pachymetana custodita* Strand, 1912; *Dollmania cuprea* (Distant, 1897); and *Ch. magna* – 5.6–13.9% (Prozorov et al., 2023d)

Included species: *Mckenziana maighreadae* sp. n. (type species), *Mckenziana ciani* sp. n., and *Mckenziana roganae* sp. n.

Etymology. The genus is named in honor of Dr. Karen McKenzie, a medical entomologist.

Mckenziana maighreadae sp. n.

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(Figs 1–11, 35–37, 49, 56)

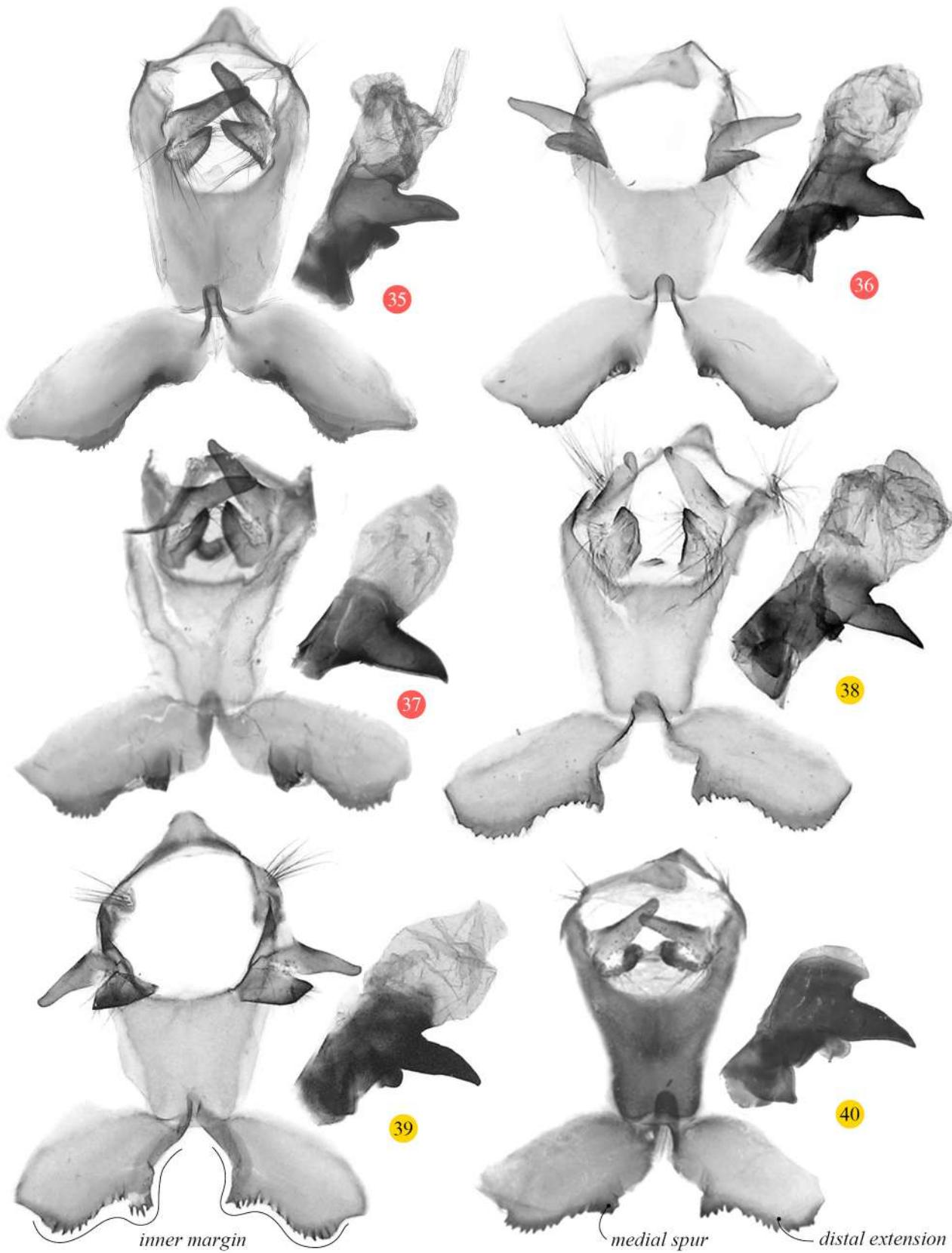
Holotype: ♂, Ghana, Ashanti Region, Kubease, 6.6759N, 1.3775W, 230 m, mid X.2011, GS 1273 (CGM/UStTB). **Paratypes** (12♂, ♀). **Sierra Leone:** ♂, Eastern Province, Kono District, Tingi Hills Forest Reserve, 8.9514N, 10.7459W, 800 m, 13–15.IV.2010, leg. Rudloff, LBEOW1361-11 (CMS). **Liberia:** 3♂, Lofa County, Wologizi Mts., Ridge Camp 2, 8.122442N, 9.947431W, 883m, 22–30.XI.2018, leg. S. Sáfián & G. Simonics, ANLMO8774-23 (ANHRT); ♂, Lofa County, Wonegizi Nature Reserve, Wetezu Camp, 8.082531N, 9.579961W, 551m, 19–27.III.2019, leg. S. Sáfián & S. Koivogui, ANLMO8762-23 (ANHRT); ♂, Nimba Mountains, W slope of Mount Gangra, 7.558258N, 8.637889W, 700 m, 16–17.III.2017, leg. Sz. Sáfián, G. Simonics, ANLMO8775-23 (ANHRT). **Guinea:** ♀, NW slopes of Mt Nimba, Zigépko, IV.2010, GS 0927 (CGM/UStTB); ♂, Forêt Classée de Ziama, Seredou camp, 8.354036N, 9.325536W, 870m, 24.II–6.III.2019, leg. S. Sáfián, G. Simonics, K. Florkzyk & S. Koivogui, ANLMO8763-23 (ANHRT). **Ivory Coast:** ♂, Sassandra-Marahoué District, Vavoua, 7.37506N, 6.47698W, 275 m, 4.IV.1981, leg. H. Politzar, GS 10-029 (ex coll. Kuchler, CGM/UStTB); ♂, north of Guiglo, galleries and wetlands of the Nzo River, XI.2010 (CGM/UStTB); ♂, Montagne District, Man, Mount Tonkoui, 7.454167N, 7.636667E, 1200 m, IV.2016, leg. Ph. Moretto (CPB). **Ghana:** ♂, Ashanti Region, Kumasi, 6.6801N, 1.6522W, 260 m, [year] 1912, leg. J.D.G. Sanders, GS 437 (NHML); ♂, Ashanti Region, Juaso, 6.5837N, 1.1213W, 230 m, 19.III.1937, leg. G.S. Cansdale (NHML).

Description. Male (Figs 1–4, 6–11). Flagellum speckled cream-colored and brown, rami brown. Head, thorax and abdomen speckled brown and cream-colored. **Forewing.** Forewing length: 24–26 mm. Oval, elongated. Background color speckled brown and dark brown. **Hindwing.** Somewhat oval with indentation on veins and concavity on CuP. Background color reddish brown, basally orangish. Fringe speckled brown and dark brown. **Genitalia** (Figs 35–37). Cubile divided medially into a pair of somewhat oval processes with medial spur on the inner margin and short ventrodistal extension with dentated edge. Cucullus elongated, finger shaped with blunt apex, basally covered with setae. Sacculus is similar to cucullus but about half the length of it. Surface of vesica covered with minute dents. **Female** (Fig. 5). Head, thorax and abdomen speckled cream-colored and brown. **Forewing.** Forewing length: 39 mm. **Hindwing** and **genitalia** (Fig. 49) with generic characters, see above.

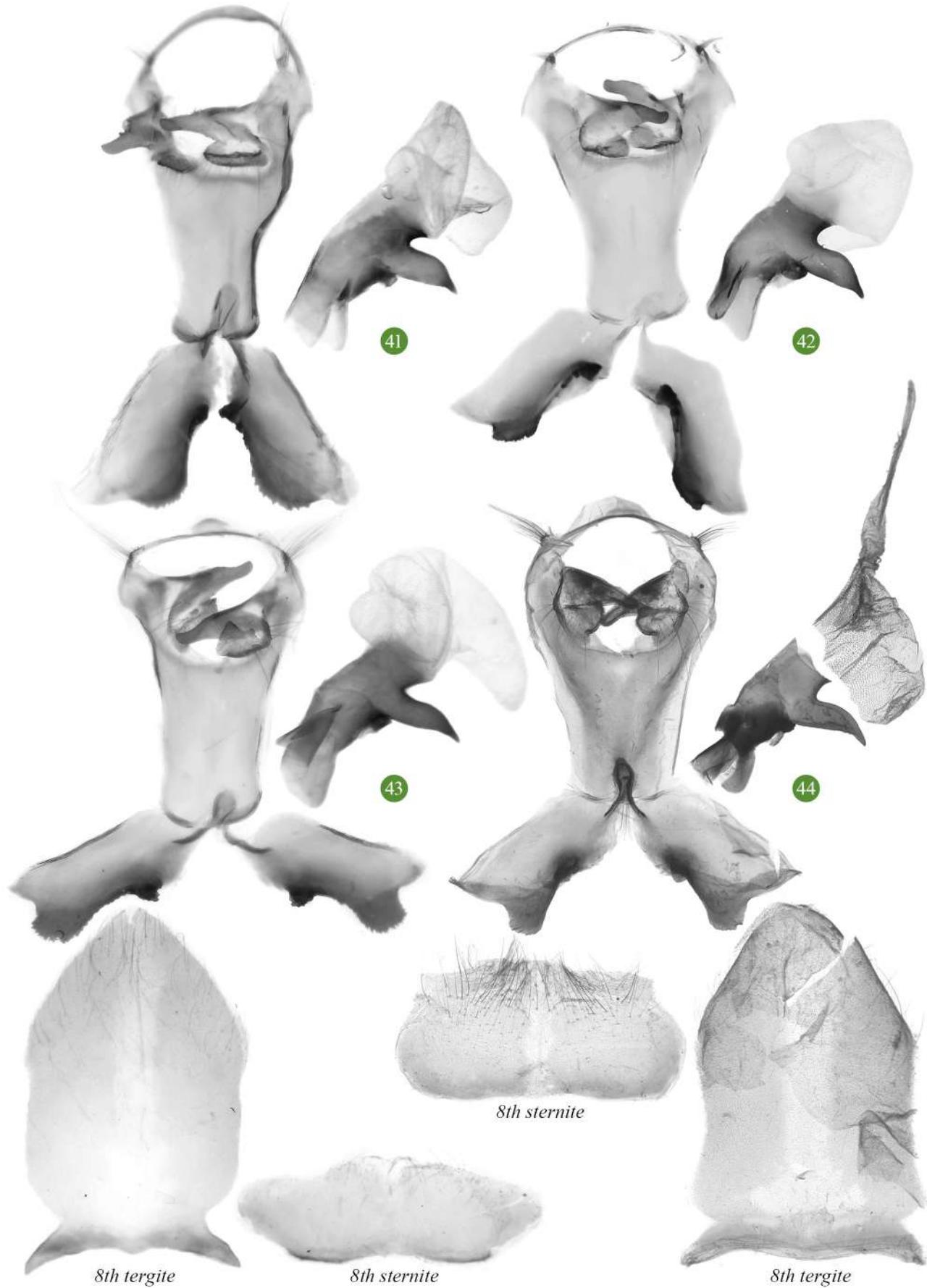
Variability. Male may be darker (Fig. 9) or lighter colored (Fig. 3); hindwing and abdomen may be brown (Figs 2), dark brown (Fig. 10) or reddish brown (Fig. 4). Ventromedial spur of aedeagus may be pointed (Fig. 36) or blunt (Fig. 35); medial spur on the inner margin of process of cubile may be smaller (Fig. 35) or bigger (Fig. 37).

Diagnosis. Adult males of *M. maighreadae* sp. n. are brown (Figs 1–4) to dark brown (Figs 6–11) with convex external margin of the hindwing (Figs 1–4, 6–11), have relatively small dents on the inner margin of cubile (Figs 35–37), distributed westwards from the Dahomey Gap (Fig. 56); while adult males of *M. ciani* sp. n. are dark brown with straight or concave external margin of the hindwing (Figs 12–17), have slightly bigger dents on the inner margin of cubile (Figs 38–40), distributed eastwards from the Dahomey Gap (Fig. 57). The two species have the *p*-distance of 2.28–3.04% (Fig. 60).

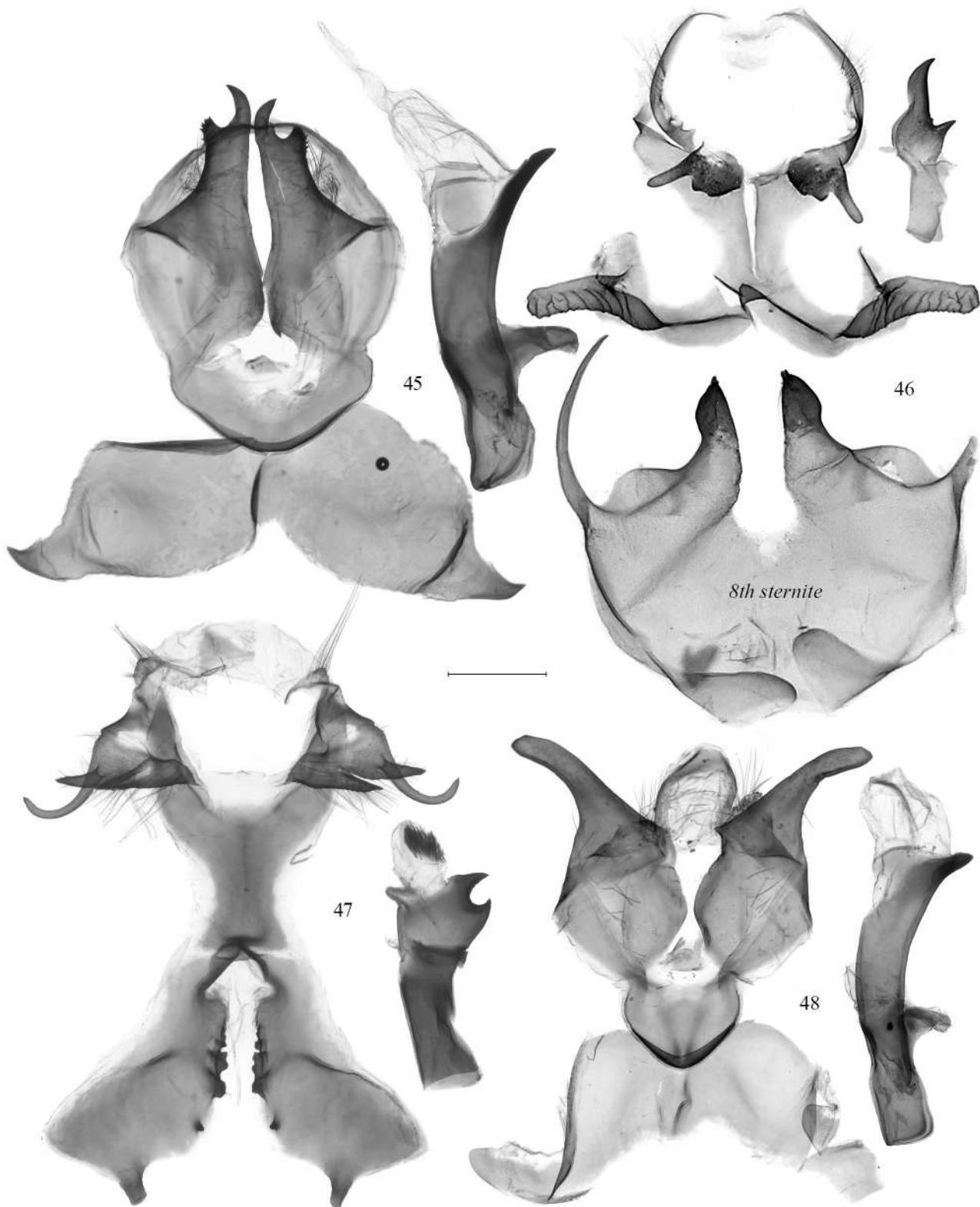
Adult males of *M. maighreadae* sp. n. are brown (Figs 1–4) to dark brown (Figs 6–11), have short distal extension in cubile (Fig. 35–37), distributed westwards from the Dahomey Gap (Fig. 56); while adult males of *M. roganae* sp. n. do not get dark brown (Figs 18–20), have well pronounced distal extension in cubile (Figs 41–44), distributed eastwards from the Dahomey Gap (Fig. 57).



Figures 35–40. ♂ genitalia of *McKenziana* spp. 35–37. *Mc. maighreadae* sp. n. 35. HT, Ghana, Kubease, GS 1273 (CGM/USTTB). 36. PT, Ivory Coast, Vavoua, 10-029 (CGM/USTTB). 37. PT, Ivory Coast, Mt Tonkoui, GS 2023-07-02 (CPB). 38–40. *Mc. ciani* sp. n. 38. HT, DRC, Luki Natural Reserve, GS GU-2008-34, LBEOW573-10 (RMCA). 39. PT, DRC, Masako Field Station, GS 0096 (CGM/USTTB). 40. Gabon, Mvoum, GS 2023-07-01 (CPB).



Figures 41–44. ♂ genitalia of *McKenziana roganae* sp. n. 41–43. PT, DRC, Luvua River, GS LazLas037, LazLas040, LazLas041 (CAC). 44. HT, Nigeria, Obudu Cattle Ranch, GS 1272 (CGM/USTTB).



Figures 45–48. ♂ genitalia. 45. *Catalebeda producta*, DRC, Ekongo camp, GS 1225 (CGM/USTTB). 46. *Ptyssophlebia discocellularis*, S Cameroon, Yaoundé, GS 1494 (NHML). 47. *Muzunguja rectilineata*, Guinea, Mt Nimba, GS 1186 (CGM/USTTB). 48. *Oplometes cassandra*, DRC, Ekongo camp, GS 0960 (CGM/USTTB). Scale bar – 1 mm.

Distribution (Fig. 56). Westwards from the Dahomey Gap: Guinean montane forests in Sierra Leone, Liberia, Guinea and Ivory Coast; eastern Guinean forests in Ivory Coast and Ghana.

Biology. Adults were collected in February – April and October – November from an altitude of 230 to 1200 meters a.s.l. Preimaginal stages are unknown.

Etymology. The species is named in honor of Maighread Isolina Diaz-McKenzie, beloved daughter of Sara Diaz and Dr. Karen McKenzie.



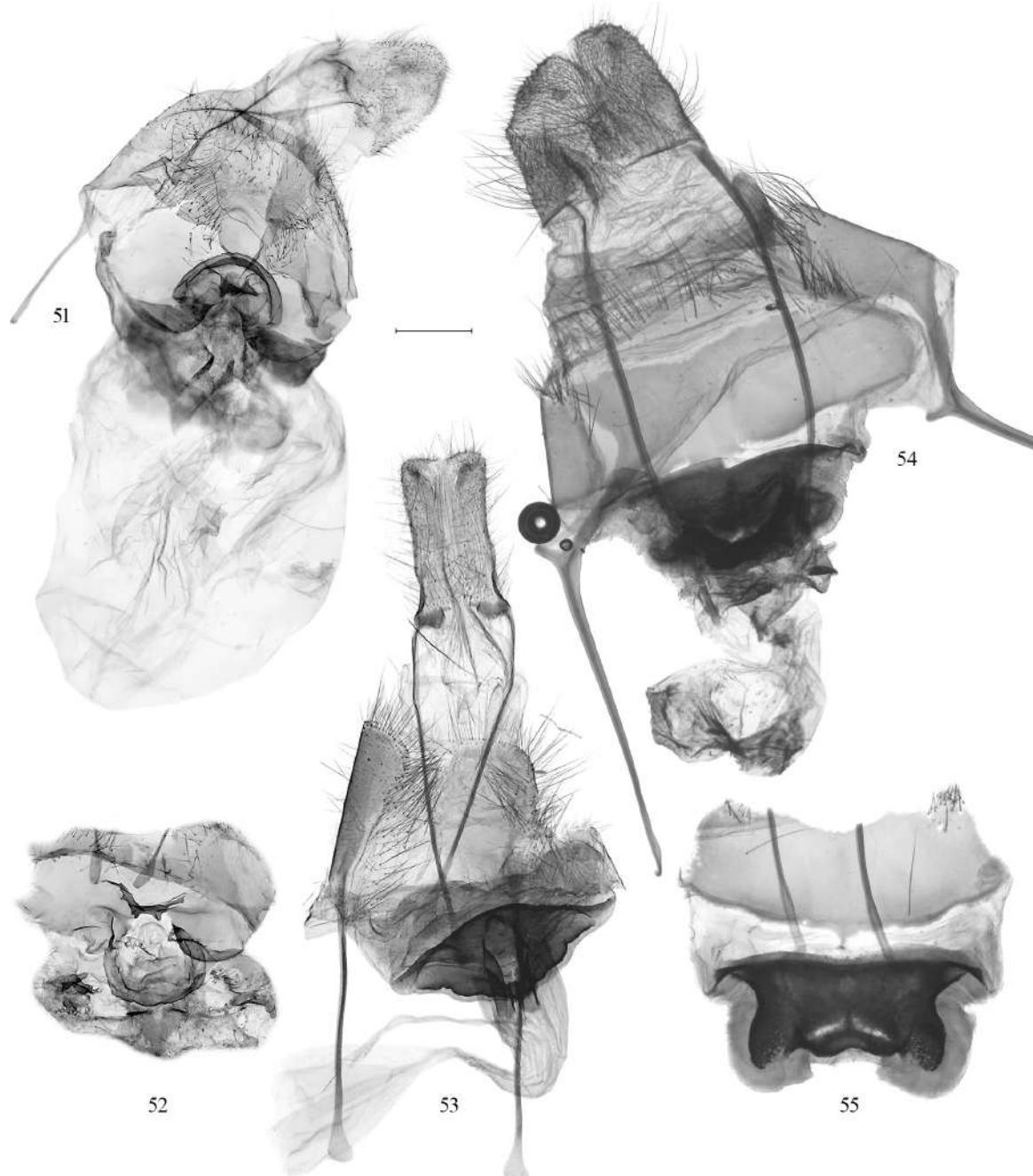
Figures 49–50. ♀ genitalia of *Mckenziana* spp. 49. *Mc. maighreadae* sp. n., Guinea, Zigépko, GS 0927 (CGM/USTTB). 50. *Mc. roganae* sp. n., PT, S Uganda, Katera – Sango Bay, GS 1514 (NHML). Scale bar for Fig. 49 – 1 mm.

McKenziana ciani sp. n.

<https://zoobank.org/urn:lsid:zoobank.org:act:A23DFAB2-8A4D-4620-B77B-7883638139E2>
(Figs 12–17, 38–40, 57)

Holotype: ♂, DRC, Kongo Central Province, Mayumbe, Luké Natural Reserve, 5.617N, 13.083E, 320 m, 16.V.2007 leg. J. & W. De Prins, GS GU-2008-34, LBEOW573-10 (RMCA). **Paratypes (23♂).** Cameroon: ♂, Littoral Region, Mount Kupe, 4.80138N, 9.70805E, 1200m, II.2001, leg D. Bouchard (CAC); ♂, Centre

Region, Nkolmetet, 3.44N, 11.76E, 700 m, IV.2016 (CAC); ♂, Centre Region, Zalom, 3.8N, 11.61E, 700 m, IX.2018 (CAC); 13♂, Centre Region, Obout, 3.47085N, 11.73613E, 675 m, 1999–2001, IV.2019, II.2020, XI.2021, II.2022 (CAC); ♂, Centre Region, Ngila, 4.70897N, 11.67552E, 645 m (CPB); ♂, Centre Region, forest of Dzeng, 3.76047N, 11.88632E, 700 m, 20.III.1975, leg. Ph. Darge (CPB). **Gabon:** ♂, Estuaire Province, Crystal Mountains National Park, 750 m, 24.VI.1993, leg. P. Basquin (CPB); ♂, Estuaire Province, Mvoum, 0.31204N, 9.82195E, 30 m, 1.VI.1989, leg. P. Basquin, GS 2023-07-01 (CPB). **CAR:** ♂, Ombella-M'Poko Prefecture, forest of Sabokiri, 30.III.1982 (CPB). **DRC:** ♂, Tshopo Province, 17 km N Kisangani, Masako Field Station, 0.6N, 25.25E, 388 m, 2–8.II.2008, leg. A. Gurkovich & V. Zolotuhin, GS 13719, LBEOW092-10 (CGM/USTTB); ♂, Maniema Province, Lubutu, 0.75S, 26.57E, 525 m, X.2018, leg. Th. Bouyer (CAC).



Figures 51–55. ♀ genitalia. 51–52. *Ptyssophlebia discocellularis*. 51. Cameroon, 15 km on the road Edea – Douala, GS 2011-126 (RMCA). 52. DRC, Masako Field Station, GS 17474 (CGM/USTTB). 53. *Muzunguja rectilineata*, Cameroon, GS 1428 (NHML). 54–55. *Catalebeda* spp., DRC, Ekongo camp (CGM/USTTB). 54. *Catalebeda producta*, GS 1119. 55. *Catalebeda* sp., GS 1118. Scale bars for Figs 51–52 and 54–55 – 1 mm.

Description. **Male** (Figs 12–17). Flagellum covered with dark and light brown scales, rami brown. Head, thorax and abdomen dark brown. *Forewing*. Forewing length: 24–30 mm. Narrow, elongated. Background color dark brown. Fringe dark brown. *Hindwing*. Somewhat triangular, external margin more or less concave with indentation on veins. Background color dark brown. Fringe dark brown. *Genitalia* (Figs 38–40). Each process of cubile bears big medial spur and numerous small dents along the inner margin with short distal extension. Sacculus wide with pointed apex. **Female** remains unknown but expected to be similar to male in coloration but larger in size.

Variability. External margin of hindwing may be almost straight (Fig. 12) or concave (Fig. 14). Apex of sacculus may be almost straight (Fig. 39) or bent (Fig. 38).

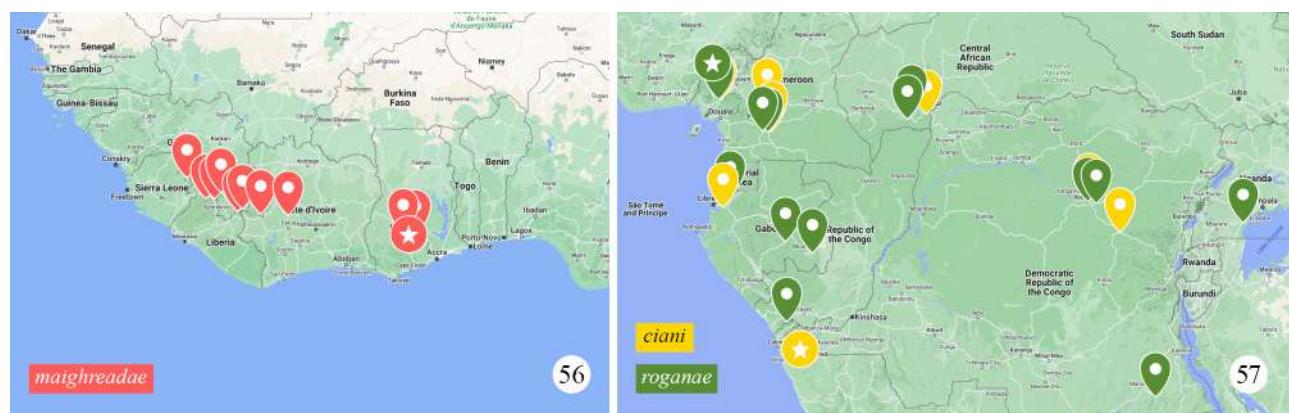
Diagnosis. Adult males of *M. ciani* sp. n. are dark brown with straight or concave external margin of the hindwing (Figs 12–17), have slightly bigger dents on the inner margin of cubile (Fig. 38–40), distributed eastwards from the Dahomey Gap (Fig. 57); while adult males of *M. maighreadae* sp. n. are brown (Figs 1–4) to dark brown (Figs 6–11) with convex external margin of the hindwing (Figs 1–4, 6–11), have relatively small dents on the inner margin of cubile (Figs 35–37), distributed westwards from the Dahomey Gap (Fig. 56). The two species have the *p*-distance of 2.28–3.04% (Fig. 60).

Adult males of *M. ciani* sp. n. are dark brown with straight or concave external margin of the hindwing (Figs 12–17), have short distal extension in cubile (Figs 38–40); while adult males of *M. roganae* sp. n. are brown with convex external margin of the hindwings (Figs 18–20), has well pronounced distal extension in cubile (Figs 41–44).

Distribution (Fig. 57). Eastwards from the Dahomey Gap: northwest Congolian lowland forests in central and southern Cameroon and southwestern CAR; Congolian coastal forest in northern and western Gabon and Kongo Central Province of DRC; northeast Congolian lowland forests in Tshopo Province of DRC.

Biology. Adults were collected from February to June and from September to November from an altitude up to 1200 meters a.s.l. Preimaginal stages are unknown.

Etymology. The species is named in honor of Cian Mikheil Diaz-McKenzie, beloved son of Sara Diaz and Dr. Karen McKenzie.



Figures 56–57. Collecting sites of *McKenziana* spp. 56. *Mc. maighreadae* sp. n. 57. *Mc. ciani* sp. n. (yellow) and *Mc. roganae* sp. n. (green). Circle with star is for the HT, other tags are PT.

McKenziana roganae sp. n.

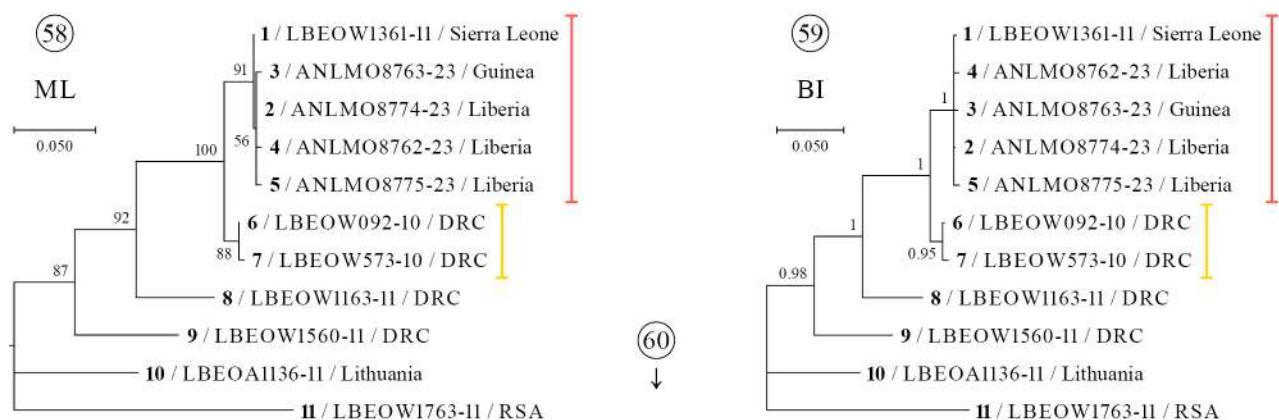
<https://zoobank.org/urn:lsid:zoobank.org:act:49FB139B-F16F-4764-AA6F-B6F3C012040F>
(Figs 18–24, 41–44, 50, 57)

Holotype: ♂, Nigeria, Cross River State, Obudu Cattle Ranch, 6.38683N, 9.37409E, 1626 m, 19–20.XII.1970, leg. H. Politzar, GS 1272 (ex coll. Kuchler, CGM/USTTB). **Paratypes** (3♂, 15♀). **Cameroon:** 3♀, Centre Region, Obout, 3.47085N, 11.73613E, 675 m, 1999–2001, IV.2019, II.2020, leg. T. Bouyer (CAC); ♀, Centre Region, environs of Ebogo, 3.38914N, 11.47152E, 660 m, 26.X–10.XI.2012, leg. A. Delassise (CAS); ♀, Centre Region, Mbalmayo, 3.51415N, 11.50788E, 650 m, VIII.2008, leg. J. Nicat (CPB); ♀, Southwest Region, 2 km E Nyasoso, 4.823444N, 9.687611E, 990 m, 23.V.2009, leg. M. Ochse (ZSM). **Gabon:** ♀, Ogoué-Lolo Province, Koulamoutou, 1.15322S, 12.46741E, 230 m, 5.V.1992, leg. P.

Basquin (CPB); ♀, Crystal Mountains National Park, 750 m, 24.VI.1993, leg. P. Basquin (CPB); ♀, Franceville, Moyabi I, 1.9S, 13.57E, 440 m, 13.V.1994, leg. P. Basquin (CPB). CAR: ♀, Lobaye Prefecture, Mbale [?], VI.1982, leg. L. Beaudouin (CPB); ♀, Lobaye Prefecture, Bolamba, 4.03852N, 17.4795E, 525 m, 26.XI.1981, leg. P. Basquin (CPB). Congo: ♀, Mayombe [?], Domvi [?], XI.2008, leg. Ph. Darge (CPB). DRC: 3♂, Katanga Province, River Luvua, 20–26.X.2003, leg. Hasson & Bouyer, GS LazLas037, LazLas040, LazLas041 (CAC); ♀, Tshopo Province, 40 km E Kisangani, 6.X.2016, leg. T. Bouyer (CAC); ♀, Tshopo Province, Kisangani, 0.524N, 25.1973E, around 450 m, X.1925, leg. J. Chesquière, GS 2011-123 (RMCA). Uganda: ♀, Kyotera District, Masaka, Katera – Sango Bay, X.1960, leg. R.H. Carcasson, GS 1514 (NHML).

Description. Male (Figs 18–20). Flagellum covered with brown scales, rami brown. Head, thorax and abdomen pale brown to reddish brown. *Forewing*. Forewing length: 26–28 mm. Oval, elongated. Background color speckled brown and dark brown. Fringe speckled brown and dark brown. *Hindwing*. Somewhat oval with indentation on veins and concavity on CuP. Background color reddish brown, basally orangish. Fringe speckled brown and dark brown. *Genitalia* (Figs 41–44). Each process of cubile bears medial spur on the inner margin and elongated distal extension with serrated edge. Cucullus wide. Sacculus wide, with nearly pointed apex. Surface of vesica covered with minute dents. **Female** (Figs 21–24). Head and thorax speckled cream-colored and brown. Abdomen rather cream-colored. *Forewing*. Forewing length: 35–51 mm. *Hindwing and genitalia* (Fig. 50) with generic characters, see above.

Variability. Male may be darker (Fig. 18) or paler (Fig. 19). Female may be overall lighter (Fig. 21) or darker (Fig. 22) with lighter (Fig. 21) or darker colored (Fig. 22) abdomen.



BIN	Process ID	Country	Species	Nº	1	2	3	4	5	6	7	8	9	10	11
ABW0343	LBEOW1361-11	Sierra Leone	<i>Mc. maighreadae</i>	1	0.15	0.46	0.46	0.46	2.28	2.58	8.36	10.64	11.55	15.35	
ABW0343	ANLMO8774-23	Liberia	<i>Mc. maighreadae</i>	2	0.15		0.30	0.30	0.30	2.43	2.74	8.51	10.79	11.70	15.35
ABW0343	ANLMO8763-23	Guinea	<i>Mc. maighreadae</i>	3	0.46	0.30		0.61	0.61	2.43	2.74	8.21	10.49	12.01	15.35
ABW0343	ANLMO8762-23	Liberia	<i>Mc. maighreadae</i>	4	0.46	0.30	0.61		0.61	2.74	3.04	8.66	10.64	11.70	15.35
ABW0343	ANLMO8775-23	Liberia	<i>Mc. maighreadae</i>	5	0.46	0.30	0.61	0.61		2.74	3.04	8.81	10.94	11.85	15.65
AAI4259	LBEOW092-10	DRC	<i>Mc. ciani</i>	6	2.28	2.43	2.43	2.74	2.74		0.30	7.75	10.49	11.40	14.89
AAI4259	LBEOW573-10	DRC	<i>Mc. ciani</i>	7	2.58	2.74	2.74	3.04	3.04	0.30		8.05	10.49	11.70	15.20
AAW4048	LBEOW1163-11	DRC	<i>C. producta</i>	8	8.36	8.51	8.21	8.66	8.81	7.75	8.05		9.42	11.55	15.20
AAL8695	LBEOW1560-11	DRC	<i>P. discocellularis</i>	9	10.64	10.79	10.49	10.64	10.94	10.49	10.49	9.42		10.79	15.20
AAK7339	LBEOAII136-11	Lithuania	<i>M. castrensis</i>	10	11.55	11.70	12.01	11.70	11.85	11.40	11.70	11.55	10.79		13.98
ABV0037	LBEOW1763-11	RSA	<i>Ch. magna</i>	11	15.35	15.35	15.35	15.35	15.65	14.89	15.20	15.20	15.20		

Figures 58–60. Phylogenetic relationships and pairwise distances between *Mckenziana* spp. (№№ 1–7), closely related *Catalebeda producta* (№ 8) and *Ptyssophlebia discocellularis* (№ 9), and *Chondrostegoides magna* (№ 10) and *Malacosoma castrensis* (№ 11) as outgroup. 58. Maximum Likelihood tree. 59. Bayesian Inference tree. 60. Pairwise distances in %.

Diagnosis. Adult males of *M. roganae* sp. n. do not get dark brown (Figs 18–20), have well pronounced distal extension in cubile (Figs 41–44), distributed eastwards from the Dahomey Gap (Fig. 57); while adult males of *M. maighreadae* sp. n. are brown (Figs 1–4) to dark brown (Figs 6–11), have short distal extension in cubile (Figs 35–37), distributed westwards from the Dahomey Gap (Fig. 56).

Adult males of *M. roganae* sp. n. are brown with convex external margin of the hindwings (Fig. 18–20), has well pronounced distal extension in cubile (Fig. 41–44); while adult males of *M. ciani* sp. n. are dark brown with straight or concave external margin of the hindwing (Figs 12–17), have short distal extension in cubile (Figs 38–40).

Distribution (Fig. 57). Eastwards from the Dahomey Gap: cross-Sanaga-Bioko coastal forests in Nigeria, Cameroonian Highlands forests in Cameroon, western Congolian forest-savanna in Gabon, northern Congolian forest-savanna in CAR, northeast Congolian lowland forests in DRC, and Victoria Basin forest savanna in Uganda.

Biology. Adults were collected from April to June, August and from October to December from an altitude of 440 to 1626 meters a.s.l. Preimaginal stages are unknown.

Etymology. The species is named in honor of Rogan Sahara Diaz-McKenzie, beloved daughter of Sara Diaz and Dr. Karen McKenzie.

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