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Integrative taxonomic revision of the Afrotropical *Ezishnola* László, Ronkay & Witt, 2010 (Lepidoptera, Noctuoidea, Nolidae, Nolinae), with descriptions of six new species

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Abstract

Following an integrative approach, the Afrotropical taxa of the noline genus *Ezishnola* László, Ronkay & Witt, 2010 is revised. As a result of the Maximum Likelihood analysis of 29 DNA barcodes combined with morphological assessment of 160 *Ezishnola* specimens, ten species are differentiated, six of which (*Ezishnola congolana* sp. n., *E. inscripta* sp. n., *E. magnisignata* sp. n., *E. nitidipicta* sp. n., *E. pindura* sp. n. and *E. truncata* sp. n.) are described as new to science, and *Meganola xantholeuca* Hacker, 2012 is transferred to *Ezishnola* (*E. xantholeuca* (Hacker, 2012) comb. n.). The paper is illustrated with 74 diagnostic figures of all species and their genitalia, along with a dendrogram inferred from the ML analysis.

Key words Afrotropics, DNA barcode, genital morphology, Maximum Likelihood, new combination, taxonomy.

Introduction

The genus *Ezishnola* László, Ronkay & Witt, 2010 was established to include a single peculiar noline species, *E. fuscographa* László, Ronkay & Witt, 2010, described from Thailand. The genus remained monotypic until László (2020) identified three Afrotropical taxa exhibiting close morphological affinities to the Asian *Ezishnola* species and treated them as members of the genus. In his paper, László (2020) also clarified multiple errors concerning *Meganola cretacea* (Hampson, 1914), as published by Hacker *et al.* (2012), and transferred the species from *Meganola* to *Ezishnola*. Based on a limited material available to him at the time, László (2020) suggested that *Ezishnola* comprises morphologically variable species and distinguished three allopatric Afrotropical taxa: the West African *E. cretacea* (Hampson, 1914), the East African *E. carcassoni* László, 2020, and the southern-central African *E. inopinata* László, 2020.

The most notable diagnostic features in *Ezishnola* are found in the female genitalia configuration, where the presence or absence, as well as the shape and size of the signa bursae, serve as reliable identification traits. In contrast, the male genitalia appear to be more conservative, showing only subtle differences in valva shape among species. László (2020) considered these minor morphological

variations to be within infraspecific variability, given the limited material available for examination at that time.

Extensive morphological examinations and DNA barcode analyses conducted on recent material collected during expeditions by teams from the African Natural History Research Trust in central and western Africa have revealed a more complex taxonomy of the genus. The apparent external differences that were previously thought to be mere phenotypic variations actually correspond to several distinct species, often found sympatrically. In addition, the designation and dissection of the female lectotype of *E. cretacea* revealed several misidentifications in László's (2020) paper, which are corrected in this study. The integrative studies have helped define ten Afrotropical species within the genus. This paper provides the characterisation of each species, describes the new taxa, and includes updated information on the distribution of the Afrotropical *Ezishnola* species.

Material and methods

Morphological studies

The material collected during ANHRT expeditions was sampled using a light tent illuminated with a 125 W mercury vapour light bulb or automatic actinic and LepiLED light bucket traps.

Genital apparatuses were extracted and stained with Eosin red and embedded in Euparal on microscope slides, applying standard methods of preparation (Lafontaine & Mikkola 1987). Images of adults were captured using 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.

Holotype label data are quoted exactly as they appear. A division slash (/) denotes the commencement of a new line, two division slashes (//) data on a further label.

Collection acronyms used in the text:

ANHRT – African Natural History Research Trust, Leominster, U.K.;
HNHM – Hungarian Natural History Museum, Budapest, Hungary;
NHMUK – The Natural History Museum, London, U.K.;
RMNH – Naturalis Biodiversity Centre, Leiden, The Netherlands;
ZSM – Bavarian State Collection of Zoology (Zoologische Staatssammlung München), Munich, Germany.

Other abbreviations:

BIN – Barcode Index Number
GS – genitalia slide
HT – holotype
LG – genitalia slide prepared by Gyula M. László
LT – lectotype
PT – paratype
PWD – pairwise distance
RSA – Republic of South Africa
SL – sequence length
URI – Uniform Resource Identifier

Molecular studies

DNA barcodes were obtained by removing tarsal segments or whole legs from 29 adult Afrotropical *Ezishnola* (Table 1.). *Nola socotrens* (Hampson, 1901) was selected as an outgroup taxon. The tissues were submitted to the Canadian Centre for DNA Barcoding (CCDB, Biodiversity Institute of Ontario, University of Guelph) for DNA extraction, amplification and sequencing of cytochrome oxidase subunit I (COI-5P) applying either standard high through-put protocols (Ivanova *et al.* 2006) or Single Molecule Real-Time sequencing through the Sequel (PacBio) pipeline (Hebert *et al.* 2018). Sequences were aligned using MUSCLE and edited in MEGA version 11 (Kumar *et al.* 2018), genetic divergences within and between species were calculated using the Kimura 2-parameter model (Kimura 1980). Phylogenetic

Table 1. Data of specimens used in the DNA barcode analysis.

Taxon	Sex	Locality	Sample ID	Process ID	SL	BIN URI	GS
<i>E. carcassoni</i>	♂	Liberia, Wologizi Mts	ANHRTUK00186178	ANLMO2269-23	654	BOLD:AEL6061	LGNA 1840
<i>E. carcassoni</i>	♂	Côte d'Ivoire, Mt Tonkoui	ANHRTUK00017526	ANLMN2817-21	655	BOLD:AEL6061	LGNA 594
<i>E. carcassoni</i>	♂	Guinea, Nimba Mts	ANHRTUK00059224	ANLMN2818-21	655	BOLD:AEL6061	LGNA 835
<i>E. carcassoni</i>	♀	Côte d'Ivoire, Mt Tonkoui	ANHRTUK00223414	ANLMO2825-23	652	BOLD:AEL6061	LGNA 1310
<i>E. carcassoni</i>	♂	Côte d'Ivoire, Mt Tonkoui	ANHRTUK00035378	ANLMO222-23	654	BOLD:AEL6061	-
<i>E. congolana</i> sp. n.	♂	Republic of Congo, Nouabale-Ndoki NP	ANHRTUK00275696	ANLMO3228-23	654	BOLD:AFG9379	-
<i>E. congolana</i> sp. n.	♂	Republic of Congo, Nouabale-Ndoki NP	ANHRTUK00276771	ANLMO3242-23	651	BOLD:AFG9379	LGNA 1848
<i>E. congolana</i> sp. n.	♂	Republic of Congo, Nouabale-Ndoki NP	ANHRTUK00275697	ANLMO3229-23	654	BOLD:AEK4427	-
<i>E. congolana</i> sp. n.	♂	Republic of Congo, Nouabale-Ndoki NP	ANHRTUK00276770	ANLMO3241-23	648	BOLD:AEK4427	LGNA 1847
<i>E. cretacea</i>	♂	Liberia, Foya	ANHRTUK00037437	ANLMO230-23	653	BOLD:AEL0515	LGNA 1836
<i>E. cretacea</i>	♂	Liberia, Foya	ANHRTUK00142225	ANLMO1781-23	654	BOLD:AEL0515	LGNA 1838
<i>E. cretacea</i>	♀	Guinea, Ziela	ANHRTUK00192825	ANLMO2280-23	653	BOLD:AEL0515	LGNA 1307
<i>E. cretacea</i>	♂	Guinea, Ziela	ANHRTUK00260055	ANLMO3105-23	652	BOLD:AEL0515	LGNA 1837
<i>E. cretacea</i>	♀	Guinea, Ziela	ANHRTUK00246904	ANLMO3059-23	653	BOLD:AEL0515	-
<i>E. inopinata</i>	♀	Zambia, Chingola	ANHRTUK00132526	ANLMN2827-21	654	BOLD:AEL5007	-
<i>E. inopinata</i>	♂	Zambia, Lukwakwa	ANHRTUK00066639	ANLMN2825-21	652	BOLD:AEL5007	-
<i>E. inopinata</i>	♂	Zambia, Lukwakwa	ANHRTUK00055332	ANLMN2828-21	655	BOLD:AEL5007	-
<i>E. inopinata</i>	♂	Zambia, Lukwakwa	ANHRTUK00055436	ANLMN2826-21	655	BOLD:AEL5007	-
<i>E. inscripta</i> sp. n.	♀	Gabon, Mikongo	ANHRTUK00192633	ANLMN2821-21	663	BOLD:AEK4428	LGNA 1843
<i>E. inscripta</i> sp. n.	♂	Liberia, Nimba Mts	ANHRTUK00219621	ANLMO2742-23	651	BOLD:AEK4428	LGNA 1844

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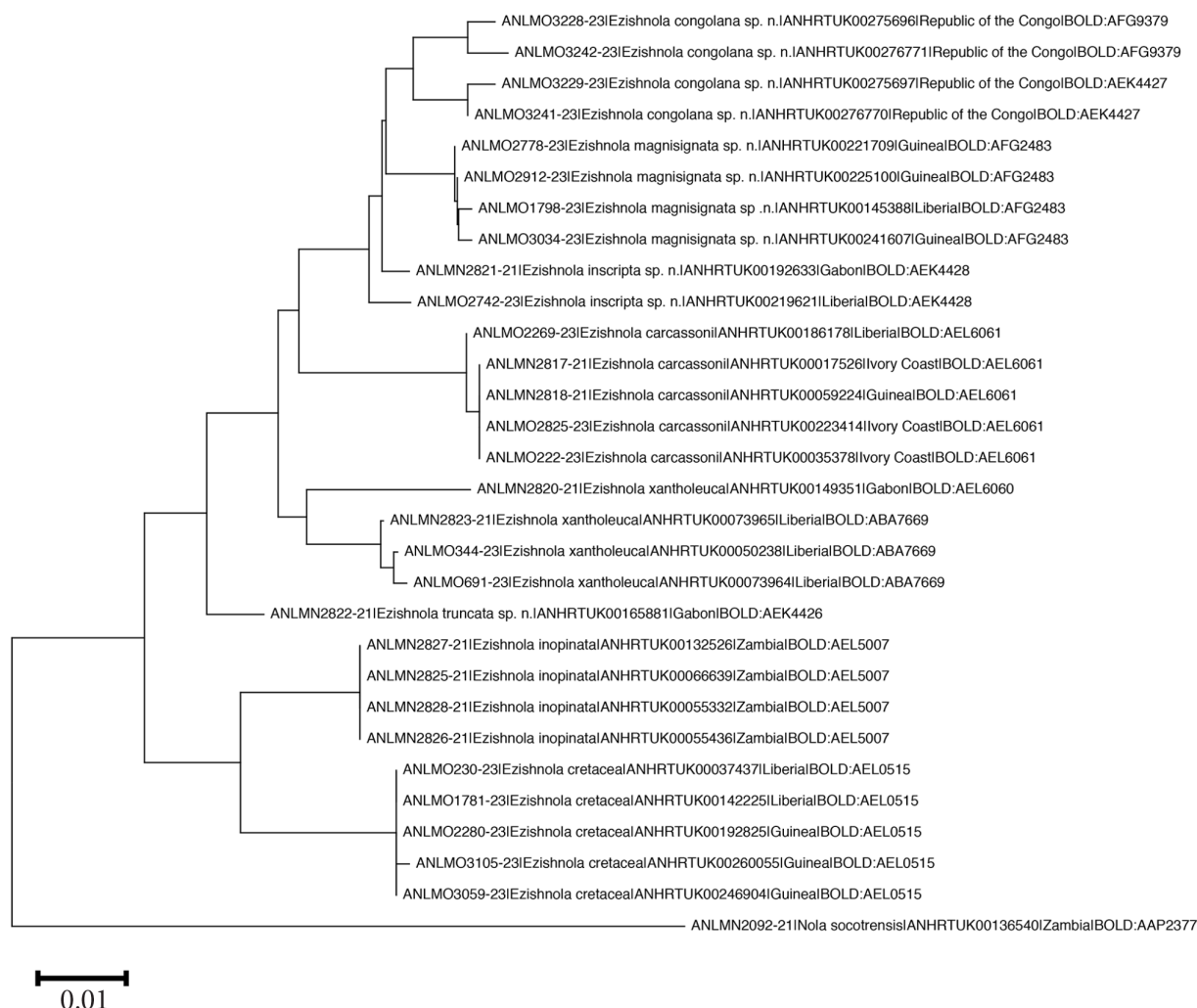
Table 1

<i>E. magnisignata</i> sp. n.	♀	Guinea, Ziela	ANHRTUK00221709	ANLMO2778-23	651	BOLD:AFG2483	LGNA 1842
<i>E. magnisignata</i> sp. n.	♀	Guinea, Ziela	ANHRTUK00225100	ANLMO2912-23	653	BOLD:AFG2483	LGNA 1309
<i>E. magnisignata</i> sp. n.	♀	Liberia, Wologizi Mts	ANHRTUK00145388	ANLMO1798-23	652	BOLD:AFG2483	LGNA 1841
<i>E. magnisignata</i> sp. n.	♂	Guinea, Ziela	ANHRTUK00241607	ANLMO3034-23	653	BOLD:AFG2483	LGNA 1311
<i>E. truncata</i> sp. n.	♂	Gabon, Mikongo	ANHRTUK00165881	ANLMN2822-21	654	BOLD:AEK4426	LGNA 1846
<i>E. xantholeuca</i>	♂	Gabon, Mikongo	ANHRTUK00149351	ANLMN2820-21	641	BOLD:AEL6060	LGNA 1256
<i>E. xantholeuca</i>	♂	Liberia, Nimba Mts	ANHRTUK00073965	ANLMN2823-21	656	BOLD:ABA7669	LGNA 953
<i>E. xantholeuca</i>	♂	Liberia, Nimba Mts	ANHRTUK00050238	ANLMO344-23	654	BOLD:ABA7669	LGNA 1845
<i>E. xantholeuca</i>	♂	Liberia, Nimba Mts	ANHRTUK00073964	ANLMO691-23	653	BOLD:ABA7669	LGNA 954

tree searches were performed using Maximum Likelihood (ML). ML analyses and tree visualisations were performed in MEGA 11; dendrogram was annotated in Adobe Photoshop CC 2018 software. The COI-5P sequences are available from the BOLD Systems website (DOI: <https://dx.doi.org/10.5883/DS-EZISHN>).

Genetic analyses (Text fig. 1)

The ML dendrogram, derived from the analysis of 29 DNA barcodes, reveals two main lineages within the Afrotropical members of the genus *Ezishnola* (Text Fig. 1). *Ezishnola cretacea* and *E. inopinata* are identified as sister taxa, forming a distinct lineage, while the remaining taxa belong to a more diverse second lineage. The shared morphological features of the *E. cretacea-inopinata* species pair are the absence of signa bursae and the presence of a tubular distal section of the corpus bursae possessing a well-developed, inflated cervix bursae. In contrast, all but one member of the second lineage exhibit a pair of ovoid-elliptical signa within the bursa and an inflated cervix bursae; the exception is *E. carcassoni*, which has neither a modified cervix nor signa bursae. The male genitalia do not display specific characteristics that distinguish the two main lineages; rather, the overall structure is uniform across all Afrotropical *Ezishnola*, with only subtle differences between species. Within the second lineage, *E. truncata* sp. n. is positioned as a sister taxon to all subsequent species. This species is notable for its distinctly short, distally truncated valva in the male genitalia, which serves as a reliable diagnostic feature when compared to other species in the lineage, corresponding to the distinct phylogenetic position of *E. truncata* sp. n. *Ezishnola xantholeuca* and *E. carcassoni* are found to be well-separated branches, supported by distinct traits in their external morphology and the configuration of their female



Text figure 1. ML dendrogram of the Afrotropical *Ezishnola* species based on COI barcodes, rooted with *Nola socotrensis* as outgroup taxon.

genitalia. Unlike other species in the lineage, which all feature a tubular distal section of the corpus bursae with an inflated sack-like cervix and a pair of rounded signa bursae, *E. carcassoni* lacks these characters and has a relatively long and narrow ductus bursae connected directly to a large, sphaerical corpus bursae. The genetic divergence among the three remaining species – *E. congolana* **sp. n.**, *E. magnisignata* **sp. n.**, and *E. inscripta* **sp. n.** – is significantly lower than that observed between other *Ezishnola* species, forming a monophyletic cluster. However, these species display distinct diagnostic characteristics in the female genitalia, such as the shape and size of the signa bursae, which correlate with the genetic separation and support the recognition of the three species within the cluster. Interestingly, the genetic split observed within *E. congolana* **sp. n.** does not align with any particular morphological features or differences in distribution. As a result, this species is regarded as a single, genetically diverse taxon associated with two different BIN URIs.

Taxonomic account of the Afrotropical *Ezishnola*

Ezishnola László, Ronkay & Witt, 2010

Esperiana 15: 26. Type species: *Ezishnola fuscographa* László, Ronkay & Witt, 2010, by original designation and monotypy.

Ezishnola cretacea (Hampson, 1914)

(Figs 1–4, 39–40, 59–60)

Roeselia cretacea Hampson, 1914, *Catalogue of the Lepidoptera Phalaenae in the British Museum*, Supplement 1: 431. Type locality: [Ghana] Gold Coast, Bibianaha. Lectotype, female, in coll. NHMUK (hereby designated).

Designation of lectotype

Female, [circular label with red margin] “Type” // [Ghana] “Gold Coast. / Bibianaha. / 700 ft. / II.1912. / H.G.F. Spurrell. / 1912-275.” // [with handwritten] “*Roeselia / cretacea / type ♀ Hmpsn*” // [QR code label with unique id.] „NHMUK010598832“ // gen. slide No.: NHMUK010317593 (prepared by László) (NHMUK).

Additional material examined.

Guinea. 7 males, 5 females, 619km ESE of Conakry, Nzerekore Region, Prefecture de Lola, Ziela env., 540–600m, x.2017, 7°42'N, 8°21'W, local collectors leg., gen. slide Nos: LGNA 1837 (male), LGNA 1307, 1814 (females); 1 male, Nimba Mts, SMFG concession area, (Societe des Mines de Fer de Guinee), Cite 1, 7°42'2.83"N, 8°23'58.60"W, 700m, 25.viii–05.ix.2017, general coll., Sáfián, Sz., Simonics, G. leg., gen. slide No.: LGNA 1306; 1 male, 625m, Guinée Forestière, Forêt Classée de Ziamá, Sérédou (Lowland Forest-Farmland), 08°21'26"N, 09°17'48"W, 9–16.vii.2019, MV light trap, Dérozier, V., Koivagui, S., Miles, W., Sáfián, S., Warner, L. leg. (ANHRT). **Liberia.** 2 males, Lofa County, Foya Proposed Protected Area, 7°56'36"N, 10°16'36"W, 530m, 10–19.xi.2017, MV light trap (125W), Aristophanous, M., Sáfián, Sz., Simonics, G. & Smith, L. leg., gen. slide Nos: LGNA 1836, LGNA 1838; 1 male, Lofa county, Wologizi Mts, Rosewood Camp 8°06'14.9"N, 9°58'27.3"W, 585m, 18.xi–1.xii.2018 MV light trap (8W), Sáfián, Sz., Simonics, G. leg. (ANHRT).

Diagnosis. Forewing length 9.0–11.0 mm in males, 11.0–12.0 mm in females. *Ezishnola cretacea* and *E. inopinata* are closely related allopatric species that can be distinguished from other *Ezishnola* taxa by their sharply defined, continuous, and widely curved postmedial line on the forewing. In contrast, this line is interrupted or represented by a series of dots in other species. Additionally, both *E. cretacea* and *E. inopinata* exhibit a variably broad, dark, oblique longitudinal fascia located between the outer angle of the postmedial line and the termen, along with a similarly dark, amorphous tornal patch of variable size. The combination of these features is typically absent in most other *Ezishnola* species; however, two species have a similar postmedial fascia: *E. nitidipicta* **sp. n.**, which has a markedly narrower, darker and more contrasting fascia than that found in *E. cretacea* and *E. inopinata*, but these species typically

have a more extensive tornal patch. The other species with similar characteristics is *E. pindura* **sp. n.**; however it is considerably larger and has a much darker forewing ground colour, a considerably broader costal section of the postmedial and subterminal lines which differentiates it from all other *Ezishnola* species. *Ezishnola cretacea* and *E. inopinata* can be distinguished by the darker grey ground colour and the broader, more contrasting postmedial line and longitudinal fascia observed in the latter species.

In the male genitalia, *E. cretacea* and *E. inopinata* have a moderately elongated valva with a short and relatively broad, rounded-quadrangular apical section, which serves as the primary character distinguishing these species from their congeners (the differential characters are discussed under the diagnoses of each species). Regarding *E. cretacea* and *E. inopinata*, the only notable distinctive feature between the two species is the ca. 10% longer uncus observed in the former taxon.

In the female genitalia, the *E. cretacea-inopinata* species pair is distinguished from other congeners except for *E. carcassoni* by the absence of a pair of rounded-ovoid signa bursae. This latter species also lacks signa bursae; however, it also lacks a tubular distal section of the corpus bursae with a well-developed, inflated cervix bursae, where the ductus seminalis is connected directly to the distal section of the bursa copulatrix. In all other species of the genus, the cervix bursae is inflated and situated at the distal end of a tubular section of the corpus bursae. The female genitalia configuration is very similar in *E. cretacea* and *E. inopinata*; however, the former species has a slightly longer anterior apophysis, a ca. 25–30% shorter ductus bursae, a noticeably broader and more inflated cervix bursae and a more spherical corpus bursae compared to those of *E. inopinata*.

Genetic information. *Ezishnola cretacea* has been assigned the BIN URI: BOLD AEL0515. The infraspecific divergence calculated from five samples is 0.00–0.15%. The closest relative of this species is *E. inopinata* László, 2020 diverging by 3.16–3.32%. The genetically second closest species is *E. truncata* **sp. n.**, diverging by 3.78–3.95%.

Distribution. *Ezishnola cretacea* has confirmed records from Ghana (lectotype), Guinea and Liberia.

Taxonomic note. A series of dissections conducted on *Ezishnola* specimens revealed that the configuration of the signum bursae in the female genitalia is a crucial diagnostic feature, prompting the author of this paper to dissect one of the syntypes of *E. cretacea*. The dissection of this type specimen, which is designated as the lectotype of *E. cretacea* in this paper, showed that it possesses no signa bursae, suggesting a close affinity with *E. inopinata* László, 2020. Consequently, the female genitalia figures identified as *E. cretacea* in László (2020) are incorrectly attributed; in fact, they belong to *E. xantholeuca* **comb. n.** As the author at that time considered *E. cretacea* a morphologically variable species confined to West Africa, the examined material listed as *E. cretacea* by László (2020) contains several different taxa, including *E. carcassoni* László, 2020, *E. truncata* **sp. n.**, *E. magnisignata* **sp. n.** and *E. xantholeuca*. The adult figures in László (2020) illustrate *E. xantholeuca* (Figs 4, 5, 6, 7) and *E. carcassoni* (Fig. 8). Regarding the male genitalia illustrations, Fig. 19 depicts *E. carcassoni*, Fig. 20 illustrates *E. xantholeuca*, while the remaining figures are correctly identified.

***Ezishnola inopinata* László, 2020**

(Figs 5–8, 40–41, 61–62)

Ezishnola inopinata László, 2020, *Ecologica Montenegrina* 30: 86. Type locality: Zambia, Lukwakwa, West Lunga National Park. Holotype, female, in coll. ANHRT.

Type material examined.

Holotype. Female. “ZAMBIA 1147m / Lukwakwa, West Lunga NP / (Cryptosepalum forest/Dambo) / 12°39'40"S, 24°26'13"E / 9–15.xi.2018, MV Light Trap / Aristophanous, M., Dérozier, V., / László, G., Oram, D. Leg. / ANHRT:2018.40” // “ANHRTUK / 00056751” // “Gen. slide No. / LGN A 692 ♂ / prep. by Gy.M. Laszlo” (ANHRT).

Paratypes. **Zambia.** See László (2020).

Additional material examined.

Republic of Congo. 1 male, Odzala-Kokoua National Park, Imbalanga Camp, 00°45'47"N, 15°15'39"E, 480m, 05–09.iv.2024, MV light trap, Bashford, M., László, G., Talani, M., Yaba Ngouma, S. leg., gen. slide No.: LGNA 1518; 1 male, Odzala-Kokoua National Park, Kokoua base, 00°28'39"N, 15°16'42"E, 540m, 05–13.ix.2024, MV light trap, Bashford, M., László, G., Talani, M., Volynkin, A. leg., gen. slide No.: LGNA 1989; 1 female, Nouabale-Ndoki National Park, Mondika camp, 02°21'50.63"N, 16°16'25.82"E, 365m, 27.iv–06.v.2023, MV light trap, Dérozier, V., Kirk-Spriggs, A., László, G., Mvouende, S. leg., gen. slide No.: LGNA 1411 (ANHRT). **Zambia.** 1 male, Nkwaji, Mwinilunga, S11°36'22", E24°33'17", 1316m, 3–10.xii.2020, MV light trap, Chizuwa, D., Choongo, W. leg. (ANHRT).

Diagnosis. Forewing length 9.5–11.0 mm in males, 11.0–12.5 mm in females. The distinctive features between *E. inopinata* and its sister species, *E. cretacea*, along with other *Ezishnola* taxa, are detailed in the diagnosis of *E. cretacea*.

Genetic information. *Ezishnola inopinata* belongs to the BIN URI: BOLD AEL5007. The infraspecific divergence calculated from four Zambian specimens is 0.00%. The closest relative of this species is its west African vicariant, *E. cretacea*, diverging by 3.16–3.32%. This species has also close genetic affinities to *E. truncata* with a PWD of 3.46%.

Distribution. *Ezishnola inopinata* has hitherto been known only from northwest Zambia. The discovery of the species from the northern Republic of Congo represents a new country record.

***Ezishnola nitidipicta* sp. n.**

<https://zoobank.org/urn:lsid:zoobank.org:act:A2B0E55B-F91C-4A0D-A038-866E70AEBC92>

(Figs 9–12, 42–43, 63–64)

Holotype. Male, “REPUBLIC OF CONGO 540m / Odzala-Kokoua National Park, / Kokoua base / 01°28'39"N, 15°16'42"E / 05–13.ix.2024 MV light trap / Bashford, M., László, G., / Talani, M., Volynkin, A. leg. / ANHRT:2024.15” // “ANHRTUK / 00413067” // “Gen. slide No. / LGNA 1961 ♂ / prep. by Gy.M. Laszlo” (ANHRT).

Paratypes.

Republic of Congo. 3 males, with the same data as the holotype, gen. slide Nos: LGNA 1453, LGNA 1454; 1 male, Odzala-Kokoua National Park, Imbalanga Camp, 00°45'47"N, 15°15'39"E, 480m, 05–11.iv.2024, actinic light trap, Bashford, M., László, G., Talani, M., Yaba Ngouma, S. leg.; 1 male, same site and collectors, 05–09.iv.2024, MV light trap, gen. slide No.: LGNA 1519; 2 males, 2 females, Nouabale-Ndoki National Park, Mbeli camp, 02°14'23.8"N, 16°23'52.1"E, 372m, 14–20.ii.2023, actinic and MV light trap, Bakala N., M., Dérozier, V., Kirk-Spriggs, A., László, G. leg., gen. slide Nos: ANHRT 02551, ANHRT 02555 (males), ANHRT 02550, LGNA 1503 (females) (ANHRT).

Diagnosis. Forewing length 10.0–11.0 mm in males, 11.0–11.5 mm in females. *Ezishnola nitidipicta* sp. n. is reminiscent of *E. inopinata* but can be distinguished by its paler, whitish-grey forewing ground colour, the more contrasting, narrower and shorter fascia between the outer angle of postmedial line and the termen, and the typically less extensive tornal patch of the forewing.

In terms of male genitalia, *E. nitidipicta* sp. n. is easily distinguishable from all other species in the genus by the shape of the valva, which extends distally into a short and narrow but prominent rounded-quadrangular apical projection. In all other aspects of the male genitalia, *E. nitidipicta* sp. n. shares identical features with its congeners.

In the female genitalia, this new species has a pair of small, elongated, elliptical signa bursae. In contrast, all other species possess considerably larger signa bursae, except for *E. congolana* sp. n., which has even smaller but more rounded signa compared to *E. nitidipicta* sp. n. Another species displaying similarly small signa bursae is *E. pindura* sp. n.; however, this latter new species has a

slightly shorter ductus bursae, a longer tubular distal, and a smaller dilated proximal section of the corpus bursae and broader, less elongate signa compared to *E. nitidipicta* **sp. n.**

Genetic information. This species was not included in the genetic analyses.

Etymology. The specific epithet is a compound word made up of the Latin adjectives “*nitidus*”, meaning “*bright*”, and “*pictus*”, meaning “*painted*”, referring to the bright and contrasting markings of this new species.

Distribution. *Ezishnola nitidipicta* **sp. n.** is known solely from the Northwestern Congolian-lowland forests of the Nouabalé-Ndoki and Odzala-Kokoua National Parks in northern Congo.

***Ezishnola pindura* sp. n.**

<https://zoobank.org/urn:lsid:zoobank.org:act:EF331A7E-EDE6-4A1D-BF80-52908CD98A84>

(Figs 13, 65)

Holotype. Female, [Rwanda] “RUANDA / Parc nat. Nyungwe / PINDURA, 2100m / 29°23'E, 2°48'S / 15.V.2007 / leg. Ignace & Laurent / coll. J.A.W. Lucas” // “Gen. slide No. / LGNA 1626 ♀ / prep. by Gy.M. Laszlo” (RMNH).

Diagnosis. Forewing length 13.5 mm in the female holotype. *Ezishnola pindura* **sp. n.** is an unmistakable species characterised by its brownish grey forewing ground colour, a relatively broad, interrupted postmedial line, an extensive, somewhat triangular longitudinal fascia between the outer angle of the postmedial line and the termen, and the dark, broad, dentate subapical marking being the costal section of the interrupted subterminal line. The only similar species is *E. inopinata*, but it is easily distinguished from *E. pindura* **sp. n.** by its markedly smaller size, paler, more greyish ground colour, narrower and continuous postmedial line and the presence of an amorphous tornal patch.

In the female genitalia, this new species has a very short ductus bursae, noticeably shorter than any other *Ezishnola* species, except for *E. cretacea*, which also has a similarly short ductus bursae. Additionally, *E. pindura* **sp. n.** has the longest tubular distal section of the corpus bursae compared to its allies. The signa bursae are similar in size to those of *E. nitidipicta* **sp. n.**, but they are considerably less elongated and rather ovoid in shape.

Genetic information. The only known specimen of this species could not be successfully sequenced.

Etymology. This new species is named after its type locality, the Pindura region within the Nyungwe Forest National Park in Rwanda.

Distribution. This new species is solely known from the Nyungwe forest in Rwanda.

***Ezishnola truncata* sp. n.**

<https://zoobank.org/urn:lsid:zoobank.org:act:96B508F2-D947-4BE8-AC09-2B51BB488B66>

(Figs 14–17, 44–47)

Holotype. Male, “GABON 430m / Mikongo (Rougier), Monts / de Cristal (Secondary Forest) / 0°29'47"N, 11°10'42"E / 28.vii.–12.viii.2019 MV Light Trap / Albert, J-L., Aristophanous, M., / Bie Mba, J., Dérozier, V., / Moretto, P. Leg. / ANHRT:2019.17” // “ANHRTUK / 00165881” // “SAMPLED FOR / DNA” // “Gen. slide No. / LGN A 1846 ♂ / prep. by Gy.M. Laszlo” (ANHRT).

Paratypes.

Gabon. 1 male, same site and collectors as the holotype, collected at house light, gen. slide No.: LGNA 1849 (ANHRT). **Liberia.** 1 male, Lofa County, Wologizi Mts, base camp forest, 8°07'17"N, 9°57'42"W, 611m, 20.xi–01.xii.2017, MV Light Trap (125W), Aristophanous, M., Sáfián, Sz., Simonics, G. &

Smith, L. leg., gen. slide No.: LGNA 595; 1 male, Lofa county, Wologizi Mts, Rosewood Camp 8°06'14.9"N, 9°58'27.3"W, 585m, 18.xi–1.xii.2018 MV light trap (8W), Sáfián, Sz., Simonics, G. leg., gen. slide No.: LGNA 1987; 1 male, Nimba County, Nimba Mts, ENNR, Grassfield FDA Field Station, 7°29'32.45"N, 8°34'54.05"W, 494m, 22.xi.2018, light trap, blended bulb (250W), Sáfián, Sz., Simonics, G. leg., gen. slide No.: LGNA 1988 (ANHRT). **Republic of Congo.** 1 male, Odzala-Kokoua National Park, Kokoua base, 00°28'39"N, 15°16'42"E, 540m, 05–13.ix.2024, MV light trap, Bashford, M., László, G., Talani, M., Volynkin, A. leg., gen. slide No.: LGNA 1809 (ANHRT).

Diagnosis. Forewing length 9.0–10.5 mm in males. *Ezishnola truncata* **sp. n.** is easily distinguished from the sympatric *E. cretacea* by the configuration of the forewing postmedial line, which consists of a row of tiny dots in the former, while it is sharply defined and continuous in the latter species; in addition, *E. truncata* **sp. n.** lacks a dark longitudinal fascia in the postmedial area of the forewing and features a few small dark patches only. *Ezishnola inscripta* **sp. n.** is highly similar to *E. truncata* **sp. n.**; nevertheless, it can be distinguished by the larger dots of the interrupted postmedial line and the presence of a diffuse postmedial patch being absent in *E. truncata* **sp. n.** *Ezishnola magnisignata* **sp. n.** also occurs sympatrically with *E. truncata* **sp. n.** in West Africa; compared to the latter species, it has a considerably darker, more greyish forewing ground colour and a darker subterminal area with a nearly straight line of small patches, which are present only in the medial section in *E. truncata* **sp. n.** *Ezishnola carcassoni* is easily distinguished from *E. truncata* **sp. n.** by its noticeably larger size, more elongate forewing and the denser dark markings on the forewing. *Ezishnola congolana* **sp. n.** is readily distinguished from *E. truncata* **sp. n.** by its noticeably shorter forewing, darker subterminal area and the presence of a conspicuous, dark postmedial patch, which feature is absent in *E. truncata* **sp. n.** The also sympatric *E. xantholeuca* is externally indistinguishable from *E. truncata* **sp. n.**, and the two species can be reliably identified only through genitalia dissection.

The male genitalia of *E. truncata* **sp. n.** are easily distinguished from all other *Ezishnola* species by its considerably shorter and broader valva produced into a broad, quadrangular apical projection with rounded corners. In this aspect, *E. truncata* **sp. n.** is somewhat similar to *E. nitidipicta* **sp. n.**; however, the latter species has a markedly narrower valva with a much narrower and noticeably longer apical projection. It is worth noting that a specimen from the Republic of Congo (gen. slide No.: LGNA 1809) possesses a robust, straight harpe, reminiscent of that is observed in *E. carcassoni*. However, the conspicuously short, apically truncate valva shape and the short forewing suggest that this specimen belongs to *E. truncata* **sp. n.**

The female is unknown.

Genetic information. *Ezishnola truncata* **sp. n.** has been assigned the BIN URI: BOLD AEK4426. As only one specimen sequenced successfully in this study, infraspecific divergence could not be calculated. The genetically closest taxa are *E. xantholeuca*, *E. inscripta* **sp. n.** and *E. magnisignata* **sp. n.**, diverging by 2.50–2.66%, 2.81–2.99%, and 2.82–2.98%, respectively.

Etymology. The specific epithet refers to the short, apically truncate valva of this new species.

Distribution. *Ezishnola truncata* **sp. n.** has been identified from Liberia, Gabon, and the northern Republic of Congo.

Ezishnola xantholeuca (Hacker, 2012) **comb. n.**

(Figs 18–21, 48–49, 66–67)

Meganola xantholeuca Hacker, 2012, *Esperiana* 17: 498. Type locality: Côte d'Ivoire, Danane. Holotype, male, in coll. ZSM.

Material examined.

Côte d'Ivoire. 1 male, Mt. Tonkoui Peak, 07°27'15.2"N, 07°38'12.5"W, 1171m, 19–27.xi.2019, Actinic Light Trap, Aristophanous, M., Derozier, V., Moretto, P., Ouattara, S. leg. (ANHRT). **Gabon.** 1 male, Mikongo (Rougier), Monts de Cristal (Secondary Forest), 0°29'47"N, 11°10'42"E, 430m, 28.vii–

12.viii.2019, MV light trap, Albert, J-L., Aristophanous, M., Bie Mba, J., Dérozier, V., Moretto, P. leg., gen. slide No.: LGNA 1256 (ANHRT). **Guinea**. 13 males, 619km ESE of Conakry, Nzerekore Region, Prefecture de Lola, Ziela env., 540–600m, x.2017, 7°42'N, 8°21'W, local collectors leg.; 1 female, Nimba Mts, SMFG concession area, (Societe des Mines de Fer de Guinee), Cite 1, 7°42'2.83"N, 8°23'58.60"W, 700m, 16–25.VII.2017, general coll. at light, Sáfián Sz. leg., gen. slide No.: LGNA 998 (ANHRT). **Liberia**. 3 males, Nimba County, Nimba Mts, ENNR, Cellcom road, 7°33'3.78"N, 8°31'46.49"W, 750m, 16–28.xii.2018 Cold Cathode UV Light Trap (8 W), Sáfián, Sz., Simonics, G. leg., gen. slide Nos: LGNA 953, LGNA 954, LGNA 1277; 2 males, Nimba Mts, Mount Gangra western slope, 7°33'29.73"N, 8°38'16.4"W, 701m, 16–17.iii.2017, Light Trap (250W blended bulb) & cold cathode UV light bucket trap (8W), Sáfián, Sz., Simonics, G. leg., gen. slide No.: LGNA 1845; 1 male, ENNR, Nimba Mts, Cellcom Rd., , 7°32'47.5"N, 8°32'1.33"W, 700m, 10–24.iii.2017, light trap (250W blended bulb) & cold cathode UV light bucket trap (8W), Sáfián, Sz., Simonics, G. leg., gen. slide No.: LGNA 1850; 3 males, Lofa County, Wologizi Mts, Ridge Camp 2, 8°07'20.79"N, 9°56'50.75"W, 883m, 22–31.xi.2018, light trap (blended bulb 250W and cold cathode UV 8W), Sáfián, Sz., Simonics, G. leg., gen. slide No.: LGNA 1986 (ANHRT).

Diagnosis. Forewing length 9.0–10.0 mm in males, 10.0–11.0 mm in females. *Ezishnola xantholeuca* is easily distinguished from the sympatric *E. cretacea* by its interrupted postmedial line and the lack of dark postmedial fascia and tornal patch. The species also occurs sympatrically in West Africa with the highly similar *E. inscripta* **sp. n.** and *E. magnisignata* **sp. n.** Both species have noticeably darker ground colour and more contrasting forewing markings than *E. xantholeuca*; however, reliable identification requires comparison of the genital structures. *Ezishnola truncata* **sp. n.**, which is also a sympatric congener, is indistinguishable from *E. xantholeuca* by external features, but the two species can easily be identified through genitalia comparison. *Ezishnola carcassoni* is considerably larger, with a more elongated forewing and more contrasting transverse lines, as well as denser blackish markings, compared to *E. xantholeuca*.

In the male genitalia, the valva shape of *E. xantholeuca* is most similar to that of *E. cretacea* but without a produced apex. However, the former species has a noticeably longer and more robust harpe. Compared to all congeners, *E. xantholeuca* has a markedly narrower and ca. 10–20% longer aedeagus.

The female genitalia configuration of *E. xantholeuca* is most similar to that of *E. inscripta* **sp. n.**, distinguished by the ca. 20% longer ductus bursae and ca. 20% shorter tubular distal section of the corpus bursae, and the slightly larger and noticeably broader signa bursae compared to the latter species. *Ezishnola xantholeuca* has a similar configuration of the ductus and corpus bursae as in *E. nitidipicta* **sp. n.** and *E. congolana* **sp. n.** with markedly larger elliptical signa bursae. Compared to *E. magnisignata* **sp. n.**, *E. xantholeuca* has a ca. three times longer tubular distal section of the corpus bursae and markedly smaller signa bursae.

Genetic information. The holotype specimen of *E. xantholeuca*, along with the specimens from Liberia included in the genetic analysis, belongs to the BIN URI: BOLD ABA7669 (sample id.: BC ZSM Lep 41674). A single specimen from Gabon, which exhibits a rather distinctive habitus, has been assigned the BIN URI: BOLD AEL6060, diverging from the West African samples by 2.71–2.88%. The infraspecific divergence among the West African specimens (BOLD ABA7669) ranges from 0.15% to 0.31%. The genetically closest species to *E. xantholeuca* are *E. truncata* **sp. n.**, *E. inscripta* **sp. n.**, and *E. magnisignata* **sp. n.**, with divergences of 2.50–2.66%, 2.49–3.00%, and 2.83–3.48%, respectively.

Distribution. *Ezishnola xantholeuca* was described from Côte d'Ivoire. This study confirms the presence of the species in Guinea and Liberia. The single, externally markedly distinct specimen from Gabon probably belongs to a separate taxon; see note below.

Taxonomic notes. In the original description of the species, Hacker *et al.* (2012) mistakenly illustrated the male genitalia of a *Meganola* specimen (cf. *M. nyungwe* Hacker, 2012). Furthermore, the three female genitalia depicted under *M. xantholeuca* actually belong to *M. pachygrapha* Hacker, 2012 (László 2025). The author of this paper was unable to locate the original genitalia slide of the holotype of *M. xantholeuca*; however, the DNA barcode of the specimen clearly assigns it to the BIN URI BOLD:ABA7669. During this study, three *Ezishnola* specimens from Liberia were found to fall under

this BIN URI, matching the habitus of the holotype specimen of *M. xantholeuca* illustrated in Hacker *et al.* (2012) perfectly. Thus, it can be concluded that the holotype of *M. xantholeuca* actually belongs to the genus *Ezishnola* (**comb. n.**), and the correct male genitalia of this species are illustrated here (Figs 48–49).

Interestingly, a single male specimen from Gabon with an identical male genitalia configuration to *E. xantholeuca* was found, although it has a notably darker forewing colouration. In the ML analysis, this specimen was recovered as a direct sister to *E. xantholeuca* and belongs to the BIN URI: BOLD AEL6060; therefore, it cannot be ruled out that the Gabonese specimen represents a distinct taxon. However, due to the absence of a female specimen matching this BIN URI, there is currently no conclusive morphological evidence to support the taxonomic distinctness of this single Gabonese specimen, and it is treated here tentatively as *E. xantholeuca*.

Ezishnola congolana sp. n.

<https://zoobank.org/urn:lsid:zoobank.org:act:CD83A407-D413-4EFD-AF5C-4D46A1E67BFA>

(Figs 22–26, 50–51, 68–69)

Holotype. Female, “REPUBLIC OF CONGO 377m / Nouabalé-Ndoki National Park, / Makao camp / 02°35'42.2"N, 17°10'08.3"E / 15–21.v.2023, MV light trap / Dérozier, V., Kirk-Spriggs, A., / László, G., Mvouende, S. leg. / ANHRT:2023.6” // ”ANHRTUK / 00329526” // ”Gen. slide No. / LGN A 1504 ♀ / prep. by Gy.M. Laszlo” (ANHRT).

Paratypes.

Republic of Congo. 2 males, 1 female, with the same data as the holotype, gen. slide No.: LGNA 1457 (female); 3 males, Sangha Prov., Nouabalé-Ndoki National Park, Bomassa (Secondary forest), 02°12'25.7"N, 16°11'39.1"E, 380m, 18–22.vi.2022, actinic light trap, Dérozier, V. leg., gen. slide Nos: LGNA 1847, LGNA 1848; 2 males, Sangha Prov., Nouabale-Ndoki National Park, Bomassa camp (Secondary forest), 02°12'36.9"N, 16°11'30.2"E, 353m, 18.vi–3.vii.2022, MV light trap, Dérozier, V. leg.; 7 males, Nouabale-Ndoki National Park, Mbeli camp, 02°14'23.8"N, 16°23'52.1"E, 372m, 14–20.ii.2023, actinic and MV light trap, Bakala N., M., Dérozier, V., Kirk-Spriggs, A., László, G. leg., gen. slide Nos: ANHRT 02553, ANHRT 02549; 1 male, 1 female, same site, 1–10.x.2022, LepiLED and MV light trap, Dérozier, V., Fouka, B., Kirk-Spriggs, A., Takano, H. leg., gen. slide No.: LGNA 1458 (female); 2 males, Sangha Prov., Nouabale-Ndoki National Park, Bomassa forest, (Secondary forest), 02°11'58.1"N, 16°11'16.9"E, 358m, 17–23.ix.2022, actinic and LepiLED light trap, Dérozier, V., Fouka, B., Kirk-Spriggs, A., Takano, H. leg.; 1 male, Nouabale-Ndoki National Park, Mondika camp, 02°21'50.63"N, 16°16'25.82"E, 365m, 27.iv–06.v.2023, MV light trap, Dérozier, V., Kirk-Spriggs, A., László, G., Mvouende, S. leg.; 8 males, Nouabale-Ndoki National Park, Bomassa camp, 02°12'36.9"N, 16°11'30.2"E, 341m, 06–14.v.2023 LepiLED light trap, Dérozier, V., Kirk-Spriggs, A., László, G., Mvouende, S. leg., gen. slide Nos: LGNA 1501, ANHRT 02477, ANHRT 02479; 8 males, same site, 16–23.ix.2022, MV light trap, Dérozier, V., Fouka, B., Kirk-Spriggs, A., Takano, H. leg.; 1 male, Odzala-Kokoua National Park, Imbalanga bai, 00°46'01.50"N, 15°15'11.88"E, 470m, 14–15&18–19.ix.2024, LepiLED light trap, Bashford, M., László, G., Talani, M., Volynkin, A., Yaba Ngouma, S. leg.; 1 male, Odzala-Kokoua National Park, Imbalanga Camp, 00°45'47"N, 480m, 15°15'39"E, 05–09.iv.2024, MV light trap, Bashford, M., László, G., Talani, M., Yaba Ngouma, S. leg., gen. slide No.: LGNA 1502, LGNA 1505; 1 male, Odzala-Kokoua National Park, Lobo Research Camp, 00°35'04"N, 14°53'12"E, 390m, 20–27.ix.2024, MV light trap, Bashford, M., László, G., Volynkin, A. leg.; 1 male, same site, 23–25.xi.2024, LepiLED light trap, Bashford, M., Elliott, I., Kirk-Spriggs, A. leg. (ANHRT).

Diagnosis. Forewing length 8.0–10.0 mm in males, 10.0–10.5 mm in females. *Ezishnola congolana* sp. n. is readily distinguished from all other *Ezishnola* species by its smallest size and shortest forewing. Additionally, the forewing of this new species has a dark subterminal area with a short and broad, diffuse dark grey blotch between the outer angle of the postmedial line and the termen. Similar postmedial marking is found in *E. cretacea*, *E. inopinata*, *E. nitidipicta* sp. n. and *E. pindura* sp. n.; however, it is considerably darker, larger and more elongated, streak-like in these taxa compared to *E. congolana* sp. n.

In the male genitalia, *E. congolana* **sp. n.** has the narrowest, most elongated valva within the genus, with a barely noticeably distal projection and a relatively broad, rounded apex. The valva shape of *E. congolana* **sp. n.** is very similar to those of *E. inscripta* **sp. n.** and *E. magnisignata* **sp. n.**; however, the latter two species have distally more tapered valva with a more narrowly rounded apex.

In terms of the female genitalia, *E. congolana* **sp. n.** is easily distinguished from all other *Ezishnola* species by the conspicuously small ovoid signa bursae, being the smallest such character in the entire genus.

Genetic information. This new species has been assigned two BIN URIs: BOLD AFG9379 (holotype) and BOLD AEK4427, without any diagnostic morphological feature. The intraspecific divergence calculated from four samples is 0.31–1.72%. The genetically closest relatives of *E. congolana* **sp. n.** are *E. inscripta* **sp. n.** and *E. magnisignata* **sp. n.**, diverging by 1.25–2.04% and 1.57–2.36%, respectively.

Etymology. The specific epithet refers to the Republic of Congo where this new species was discovered.

Distribution. *Ezishnola congolana* **sp. n.** is known exclusively from the northern Republic of Congo, where it was collected in the Nouabalé-Ndoki and Odzala-Kokoua National Parks.

Ezishnola inscripta* **sp. n.*

<https://zoobank.org/urn:lsid:zoobank.org:act:C313C00B-940B-4F01-BDDE-5977784BA7FD>

(Figs 27–28, 52, 70)

Holotype. Female, “GABON 430m / Mikongo (Rougier), Monts / de Cristal (Secondary Forest) / 0°29'47"N, 11°10'42"E / 28.vii–12.viii.2019 MV Light Trap / Albert, J-L., Aristophanous, M., / Bie Mba, J., Dérozier, V., / Moretto, P. Leg. / ANHRT:2019.17” // “ANHRTUK / 00192633” // “SAMPLED FOR: DNA” // “Gen. slide No. / LGNA 1843 ♀ / prep. by Gy.M. Laszlo” (ANHRT).

Paratype. Liberia. Male, Nimba County, Nimba Mts, ENNR, Cellcom road, 7°33'3.78"N, 8°31'46.49"W, 750m, 16–28.xii.2018 Cold Cathode UV Light Trap (8 W), Sáfián, Sz., Simonics, G. leg., gen. slide No.: LGNA 1844 (ANHRT).

Diagnosis. Forewing length 9.5 mm in the male paratype, 12.0 mm in the female holotype. *Ezishnola inscripta* **sp. n.** is reminiscent of *E. congolana* **sp. n.** but can be distinguished by its larger size, more elongated forewing, nearly undetectable antemedial line, lighter subterminal area, and smaller and more diffuse postmedial fascia. It also resembles *E. truncata* **sp. n.**, *E. xantholeuca*, and *E. magnisignata* **sp. n.**; however, these species lack a dark postmedial fascia and have less distinctly defined postmedial lines. *Ezishnola cretacea*, *E. inopinata* and *E. nitidipicta* **sp. n.** are readily distinguished from *E. inscripta* **sp. n.** by their considerably darker and continuous postmedial lines (which is interrupted in *E. inscripta* **sp. n.**) and the more extensive and contrasting postmedial fascia of their forewings. Compared to *E. carcassoni*, *E. inscripta* **sp. n.** is a noticeably smaller species, with a less elongated forewing and less varied and contrasting markings.

In the male genitalia, this new species is nearly identical to *E. magnisignata* **sp. n.** and *E. congolana* **sp. n.**, differing only in a slightly broader valva apex. However, the species within the *E. congolana* **sp. n.** – *magnisignata* **sp. n.** – *inscripta* **sp. n.** complex are primarily distinguished by the configuration of their female genitalia.

In terms of the female genitalia, *E. inscripta* **sp. n.** is most similar to *E. xantholeuca*; however, it can be differentiated by its ca. 20% shorter ductus bursae, the ca. 20% longer tubular distal part of the corpus bursae, and the slightly smaller, and noticeably narrower signa bursae. The size of signa bursae serves as a distinct characteristic that sets *E. inscripta* **sp. n.** apart from its closely related allies, *E. congolana* **sp. n.** and *E. magnisignata* **sp. n.** Specifically, *E. congolana* **sp. n.** has markedly smaller, more ovoid signa bursae, whereas these characters of *E. magnisignata* **sp. n.** are approximately five times larger compared to the medium-sized elliptical signa bursae of *E. inscripta* **sp. n.**

Genetic information. *Ezishnola inscripta* **sp. n.** has been assigned the BIN URI: BOLD AEK4428. The infraspecific divergence based on two samples is 0.93%. The genetically closest relatives are *E. magnisignata* **sp. n.** and *E. congolana* **sp. n.**, diverging by 1.08–1.56%, and 1.25–2.04%, respectively.

Etymology. The specific epithet is derived from the Latin adjective “*inscriptus*”, meaning “*unwritten*”, referring to the somewhat limited forewing markings of this new species.

Distribution. A single female specimen from the Cristal Mountains in Gabon and a single male specimen from the Nimba Mountains in Liberia have been matched through DNA barcode analysis.

Ezishnola magnisignata* **sp. n.*

<https://zoobank.org/urn:lsid:zoobank.org:act:AA15CC8F-8ECC-4972-ABCA-79EAE22A2428>

(Figs 29–32, 53–55, 71–72)

Holotype. Female, “LIBERIA 865m / Lofa County, Wologizi Mts, / Ridge camp / 8°07'10"N, 9°57'11"W / 24–29.xi.2017 Light Trap / (blended bulb 250W) / Aristophanous, M., Sáfián, Sz., / Simonics, G. & Smith, L. leg. / ANHRT:2017.33” // “ANHRTUK / 00145388” // “SAMPLED FOR: / DNA” // “Gen. slide No. / LGNA 1841 ♀ / prep. by Gy.M. Laszlo” (ANHRT).

Paratypes.

Côte d’Ivoire. 2 males, Mt. Tonkoui Peak, 07°27'15.2"N, 07°38'12.5"W, 1171m, 19–27.xi.2019, MV and actinic light trap, Aristophanous, M., Dérozier, V., Moretto, P., Ouattara, S. leg., gen. slide Nos: LGNA 1308, LGNA 1985 (ANHRT). **Guinea.** 1 male, 2 females, 619km ESE of Conakry, Nzerekore Region, Prefecture de Lola, Ziela env., 540–600m, x.2017, 7°42'N, 8°21'W, local collectors leg., gen. slide Nos: LGNA 1311 (male), LGNA 1309, LGNA 1842 (females) (ANHRT).

Diagnosis. Forewing length 9.5–10.0 mm in males, 10.5–11.0 mm in females. *Ezishnola magnisignata* **sp. n.** closely resembles *E. xantholeuca*, *E. truncata* **sp. n.** and *E. inscripta* **sp. n.**; however, it has a noticeably darker forewing ground colour with a brownish sheen and lacks a postmedial-subterminal patch. Nevertheless, the accurate identification of this species requires genitalia dissections, especially in the case of worn specimens. The sympatric *E. cretacea* and *E. carcassoni* are easily distinguished from *E. magnisignata* **sp. n.** by their larger size and considerably darker, more variegated forewing markings.

In terms of the male genitalia, *E. magnisignata* **sp. n.**, *E. inscripta* **sp. n.** and *E. congolana* **sp. n.** are highly similar due to their conspicuously elongated valva shape; however, the valva is distally more tapered with the narrowest rounded apex in *E. magnisignata* **sp. n.**, compared to its close allies. In the female genitalia, *E. magnisignata* **sp. n.** is readily distinguished from all other *Ezishnola* species by its excessively large, elliptical signa bursae and conspicuously short tubular distal section of the corpus bursae.

Genetic information. *Ezishnola magnisignata* **sp. n.** belongs to the BIN URI: BOLD AFG2483. The infraspecific divergence calculated from four samples is in the range of 0.00–0.31%. The genetically closest taxa are *E. inscripta* **sp. n.** and *E. congolana* **sp. n.**, diverging by 1.08–1.56% and 1.57–2.36%, respectively.

Etymology. The specific name refers to the excessive signa bursae in the female genitalia of this new species.

Distribution. *Ezishnola magnisignata* **sp. n.** is known only from West Africa, with confirmed records from Côte d’Ivoire, Guinea and Liberia.

***Ezishnola carcassoni* László, 2020**

(Figs 33–37, 56–58, 73–74)

Ezishnola carcassoni László, 2020, *Ecologica Montenegrina* 30: 90. Type locality: Uganda, Ankole, Kalinzu Forest. Holotype, male, in coll. NHMUK.

Type material examined.

Holotype. Female, “Kalinzu Forest / Ankole Uganda / Nov. 1961 / R. H. Carcasson” // “Coryndon Museum / B.M. 1963-322” // QR code label with unique number: NHMUK 014046240, gen. slide No.: NHMUK 010316559 (prepared by László) (NHMUK).

Paratype. Uganda. 1 male, Katera Sango Bay, Masaka, Oct. 1960, R.H. Carcasson, QR code label with unique number: NHMUK 014046239, slide No.: NHMUK 010316558 (prepared by László) (NHMUK).

Additional material examined.

Côte d’Ivoire. 5 males, 1 female, Mt. Tonkoui Peak, 07°27'15.2"N, 07°38'12.5"W, 1171m, 19–27.xi.2019, actinic, MV and LepiLED light trap, Aristophanous, M., Dérozier, V., Moretto, P., Ouattara, S. leg., gen. slide Nos: LGNA 1839 (male), LGNA 1310 (female); 1 male, same site, 3–7.v.2017, Aristophanous, A., Aristophanous, M., Geiser, M., Moretto, P. leg., gen. slide No.: LGNA 594; 2 males, same site, 9–16.iv.2016, Aristophanous, M., Moretto, P. leg. (ANHRT). **Guinea.** 1 male, Nimba Mts, SMFG concession area (Societe des Mines de Fer de Guinee) 600 Forest, 7°39'49.93"N, 8°22'22.19"W, 1500m, 21–30.viii.2017, Cold Cathode UV light trap (8W), Sáfián, Sz., Simonics, G. leg., gen. slide No.: LGNA 835 (ANHRT). **Liberia.** 1 male, Lofa County, Wologizi Mts, Elephant Ridge, 8°7'1.46"N, 9°55'24.18"W, 1002m, 23–26.xi.2018, LepiLED light trap, Sáfián, Sz., Simonics, G. leg., gen. slide No.: LGNA 1840 (ANHRT). **Republic of Congo.** 5 males, Odzala-Kokoua National Park, Kokoua base, 00°28'39"N, 15°16'42"E, 540m, 05–13.ix.2024, MV light trap, Bashford, M., László, G., Talani, M., Volynkin, A. leg., gen. slide No.: LGNA 1455 (ANHRT).

Diagnosis. Forewing length 11.0–12.0 mm in males, 12.0–13.0 mm in females. *Ezishnola carcassoni* is readily distinguished from all other *Ezishnola* species by its noticeably more elongated forewing and the more varied forewing pattern, consisting of contrasting, relatively large blackish dots that form the antemedial, postmedial, and subterminal transverse lines. This species lacks postmedial-subterminal and tornal patches, which are present in the sympatric *E. cretacea*, *E. inopinata*, *E. nitidipicta* **sp. n.**, *E. inscripta* **sp. n.** and *E. congolana* **sp. n.**

When examining the male genitalia, *E. carcassoni* exhibits the broadest and least tapered valva, along with the thickest harpe within the entire genus. Additionally, the aedeagus of this species is ca. 30–50 % longer than those of all other *Ezishnola* taxa, except for *E. xantholeuca*, the aedeagus of which is similarly long as in *E. carcassoni* but noticeably thinner.

The configuration of the female genitalia of *E. carcassoni* is distinctive within the entire genus, characterised by a relatively long ductus bursae with the longest sclerotised section, the absence of a sack-like cervix bursae and a large spherical corpus bursae, which lacks a tubular distal section and signa.

Genetic information. This species has been assigned the BIN URI: BOLD AEL6061. The infraspecific divergence calculated from five samples is 0.00–0.15%. The genetically closest species are *E. truncata* **sp. n.**, *E. inscripta* **sp. n.**, *E. magnisignata* **sp. n.**, and *E. xantholeuca*, diverging by 3.13–3.30%, 3.13–3.31%, 3.14–3.62%, and 3.19–3.63%, respectively.

Distribution. *Ezishnola carcassoni* was originally described from Uganda. As a result of this current study, the species has been identified from the Côte d’Ivoire, Guinea, Liberia and the northern Republic of Congo.

Discussion

Integrative taxonomic studies have uncovered a remarkable hidden diversity within the genus *Ezishnola*. The holistic approach, through the assessment of external and genital morphology combined with

phylogenetic analyses of the COI 5P' gene region, has led to the recognition that the genus contains far more taxa than the previously recognised three species: *E. cretacea*, *E. inopinata*, and *E. carcassoni*, which were believed to be allopatric (László 2020). As a result of this study, the identity of *E. xantholeuca*, which was incorrectly assigned to the genus *Meganola* due to an incorrect illustration of the male genitalia (Hacker *et al.* 2012), has been clarified, and the species has now been moved to *Ezishnola*. Furthermore, an additional six hitherto undescribed species have been identified, bringing the total number of Afrotropical species of the genus to 10. The updated taxonomic content of the genus *Ezishnola* includes:

Asian taxon:

E. fuscographa László, Ronkay & Witt, 2010 (type species)

African taxa (in alphabetical order):

E. carcassoni László, 2020

E. congolana **sp. n.**

E. cretacea (Hampson, 1914)

E. inopinata László, 2020

E. inscripta **sp. n.**

E. magnisignata **sp. n.**

E. nitidipicta **sp. n.**

E. pindura **sp. n.**

E. truncata **sp. n.**

E. xantholeuca (Hacker, 2012)

Based on the material examined in this study, the Afrotropical taxa can be assigned six different biogeographic distribution patterns. 1. *Ezishnola cretacea*, *E. magnisignata* **sp. n.** and *E. xantholeuca* occur solely in West Africa. 2. *Ezishnola truncata* **sp. n.** and *E. inscripta* **sp. n.** show a western-central African distribution. 3. *Ezishnola nitidipicta* **sp. n.** and *E. congolana* **sp. n.** are central African (Congolian) species, known exclusively from the northern Congo Basin. 4. *Ezishnola inopinata* can be categorised as southern-central African species with records from the northwestern regions of the Zambian Plateau and the northern Congo Basin. 5. *Ezishnola pindura* **sp. n.** is presumably a species endemic to the higher regions of the Albertine Rift. 6. The most widespread species is *E. carcassoni*, showing a wide equatorial distribution with a continuous range from West Africa through the northern Congo Basin to Uganda.

The highest diversity of the genus is found in the northern Congo Basin, where six species occur sympatrically, indicating that the genus is primarily associated with moist rainforest habitats. Given that the moth fauna in these habitats remains poorly understood, it is likely that more species of *Ezishnola* are yet to be discovered, particularly in the Congo Basin and the Afromontane forests of East Africa.

Acknowledgements

The author is grateful to Alberto Zilli and Geoff Martin (NHMUK), Rob de Vos (RMNH) and Dr László Ronkay and Dr Balázs Tóth (HNHM) for facilitating access to the Nolinae type and accession material under their care. Images of the lectotype of *Roeselia cretacea* and the holotype of *Ezishnola carcassoni* used with permission and are copyright of the Trustees of the Natural History Museum, London, made available under Creative Commons License 4.0 (<https://creativecommons.org/licenses/by/4.0/>). Paul D.N. Hebert (CBG, Guelph, Canada), Evgeny Zakharov (CCDB, Guelph, Canada) and their competent teams are thanked for their continuous support in DNA barcoding of Nolidae. The genetic analyses would not have been possible without Sujeevan Ratnasingham (CBG, Guelph, Canada), who developed the BOLD database. Oleg Pekarsky (Budapest, Hungary) prepared several genital slides used in this study. The author extends special thanks to Gabriella László (ANHRT) for her exceptional skill in mounting thousands of Nolinae specimens.

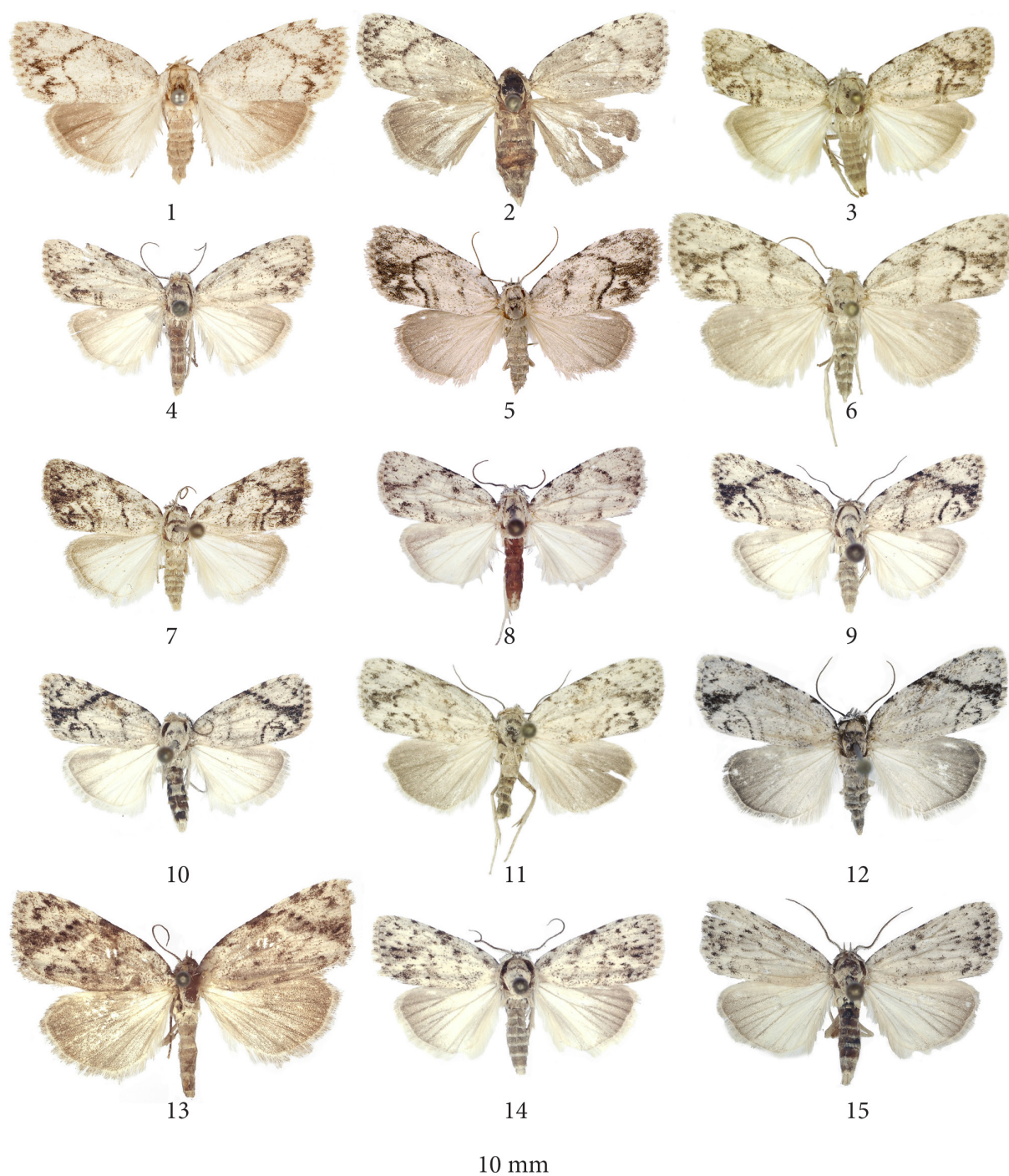
The following collaborative partners are thanked for facilitating ANHRT field work and issuing the necessary research and export permits.

Côte d'Ivoire: the Ministère de l'Enseignement Supérieur et de la Recherche Scientifique; the Office Ivoirien des Parcs et Réserves (OIPR) and the Société de Développement des Forêts (SODEFOR). Gabon. Scientific research was authorised by the Centre National de la Recherche Scientifique (CENAREST) in collaboration with the Université des Sciences et Techniques de Masuku (USTM). Rougier Gabon is thanked for allowing access to concession forest. Guinea: Mamadou Diawara (Guinée Ecologie); Colonel Layaly Camara, Cece Papa Konde (Ministère de l'Environnement et aux Eaux et Forêts); Jamison Suter (Société des Mines de Fer de Guinée). Liberia. Annika Hiller (Wild Chimpanzee Foundation), Jerry Garteh (Society for the Conservation of Nature), Darlington Tuaben, Mike C. Doryen and Kederick F. Johnson (Forestry Department Authority, Liberia). Republic of Congo: Richard Malonga, Morgane Cournarie, Vittoria Estienne, Ben Evans, Onesi Samba and Yako Valentin (WCS, Parc National de Nouabalé-Ndoki); Jonas Erickson, Gwili Gibbon, Sylvain Yaba Ngouma, Adrich Mouamana (African Parks, Parc National d'Odzala-Kokoua); Merlia Talani (Marien Ngouabi University, Brazzaville); the Ministère de l'Enseignement Supérieur de la Recherche Scientifique et de l'Innovation Technologique; Joseph Moumbouilou and Jean Bosco Nganongo (Direction de la Faune et des aires protégées, DEFAP); Joseph Goma-Tchimbakala, Victor Mamonekene (Institut National de Recherche en Sciences Exactes et Naturelles, IRSEN). Zambia: Rhoda Kachali (Department of National Parks and Wildlife – ZAWA, Lusaka); Claire Mateke and Martha Imakando (Livingstone Museum, Livingstone).

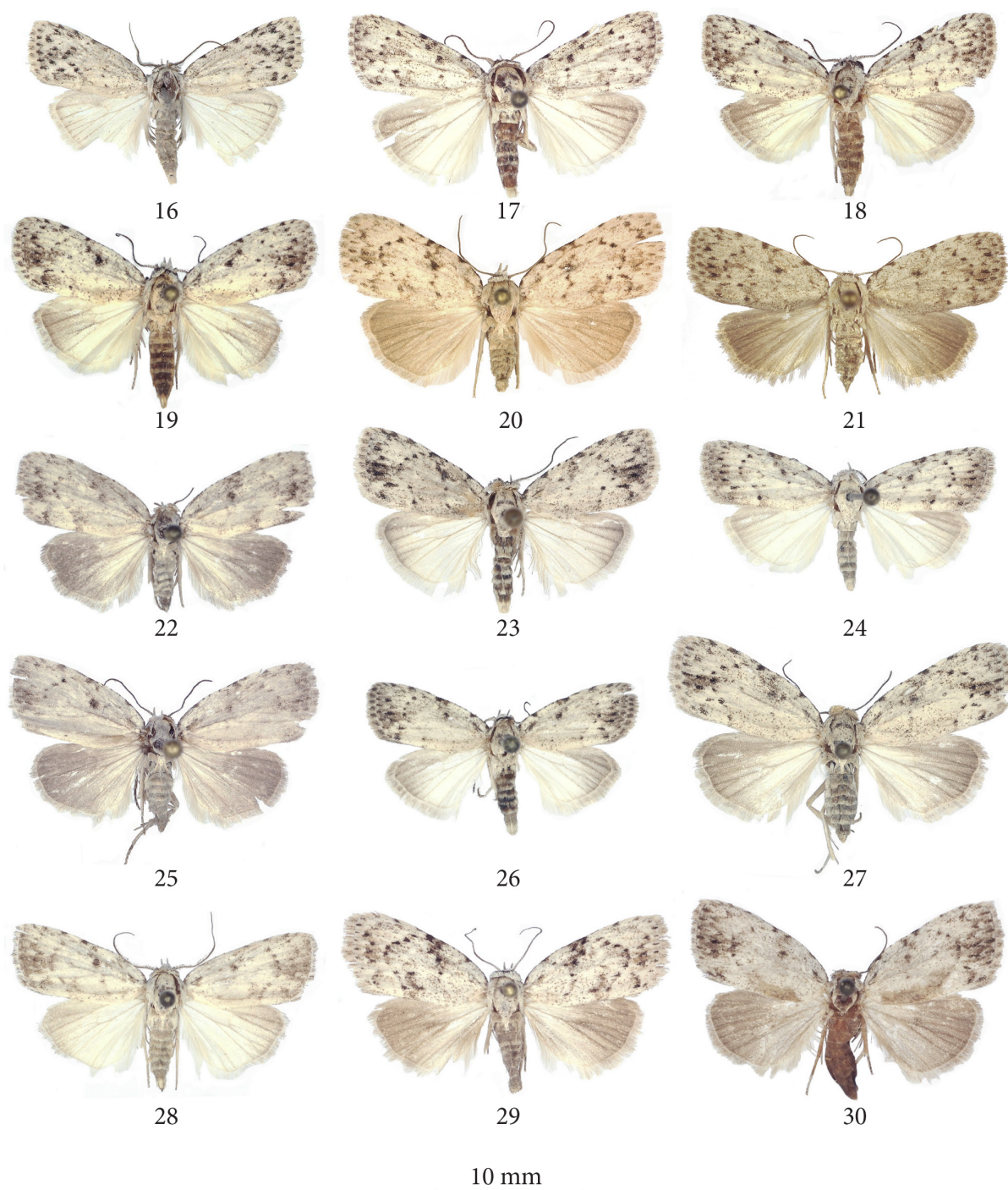
The author declares that, to the best of his knowledge, he conforms to the national regulations and meets with the conditions and requirements of International Conventions concerning collecting/export and handling of the specimens presented in this Article.

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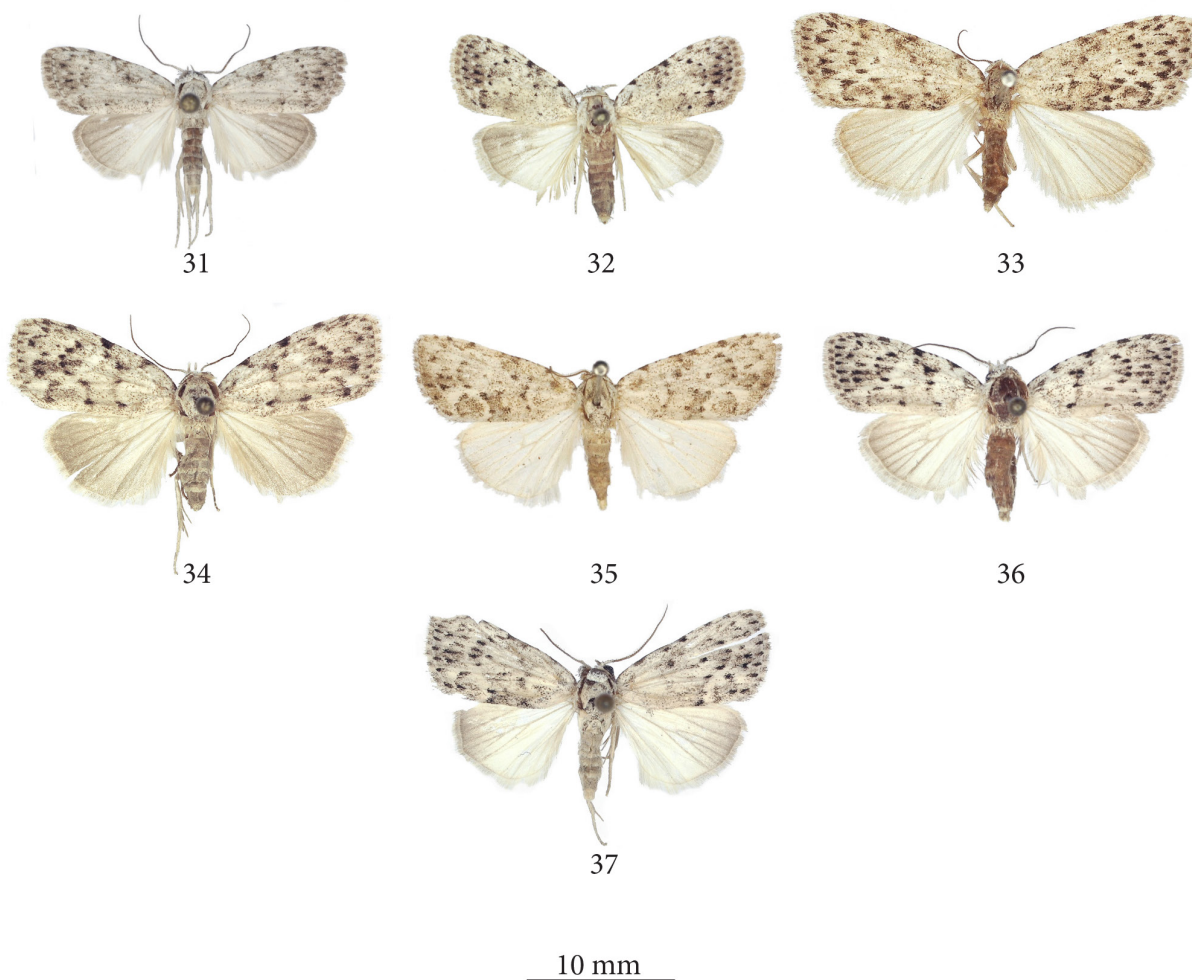
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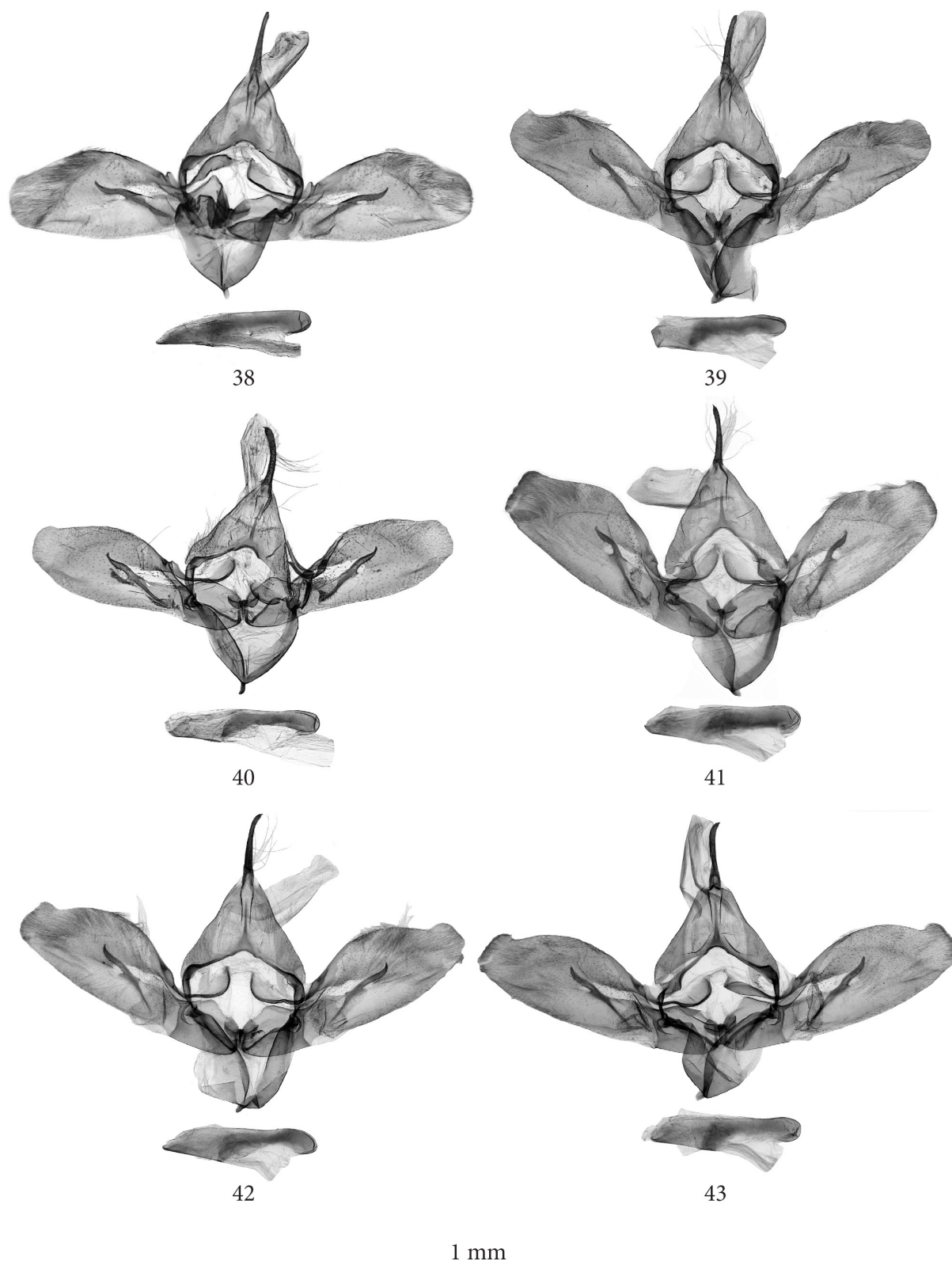
Figures 1–15. Adults (all in coll. ANHRT unless otherwise indicated). 1. *Ezishnola cretacea*, LT of *Roeselia cretacea*, ♀, Ghana, GS: NHMUK010317593 (NHMUK); 2. *Idem*, ♀, Guinea, GS: LGNA 1814; 3. *Idem*, ♂, Guinea, GS: LGNA 1306; 4. *Idem*, ♂, Liberia, GS: LGNA 1838; 5. *E. inopinata*, HT, ♀, Zambia, GS: LGNA 692; 6. *Idem*, ♀, Congo, GS: LGNA 1411; 7. *Idem*, PT, ♂, Zambia; 8. *Idem*, ♂, Congo, GS: LGNA 1818; 9. *E. nitidipicta* sp. n., HT, ♂, Congo, GS: LGNA 1961; 10. *Idem*, PT, ♂, Congo, GS: LGNA 1453; 11. *Idem*, PT, ♀, Congo, GS: LGNA 1503; 12. *Idem*, PT, ♀, Congo, GS: ANHRT 02550; 13. *E. pindura* sp. n., HT, ♀, Rwanda, GS: LGNA 1626 (RMNH); 14. *E. truncata* sp. n., HT, ♂, Gabon, GS: LGNA 1846; 15. *Idem*, PT, ♂, Congo, GS: LGNA 1809.



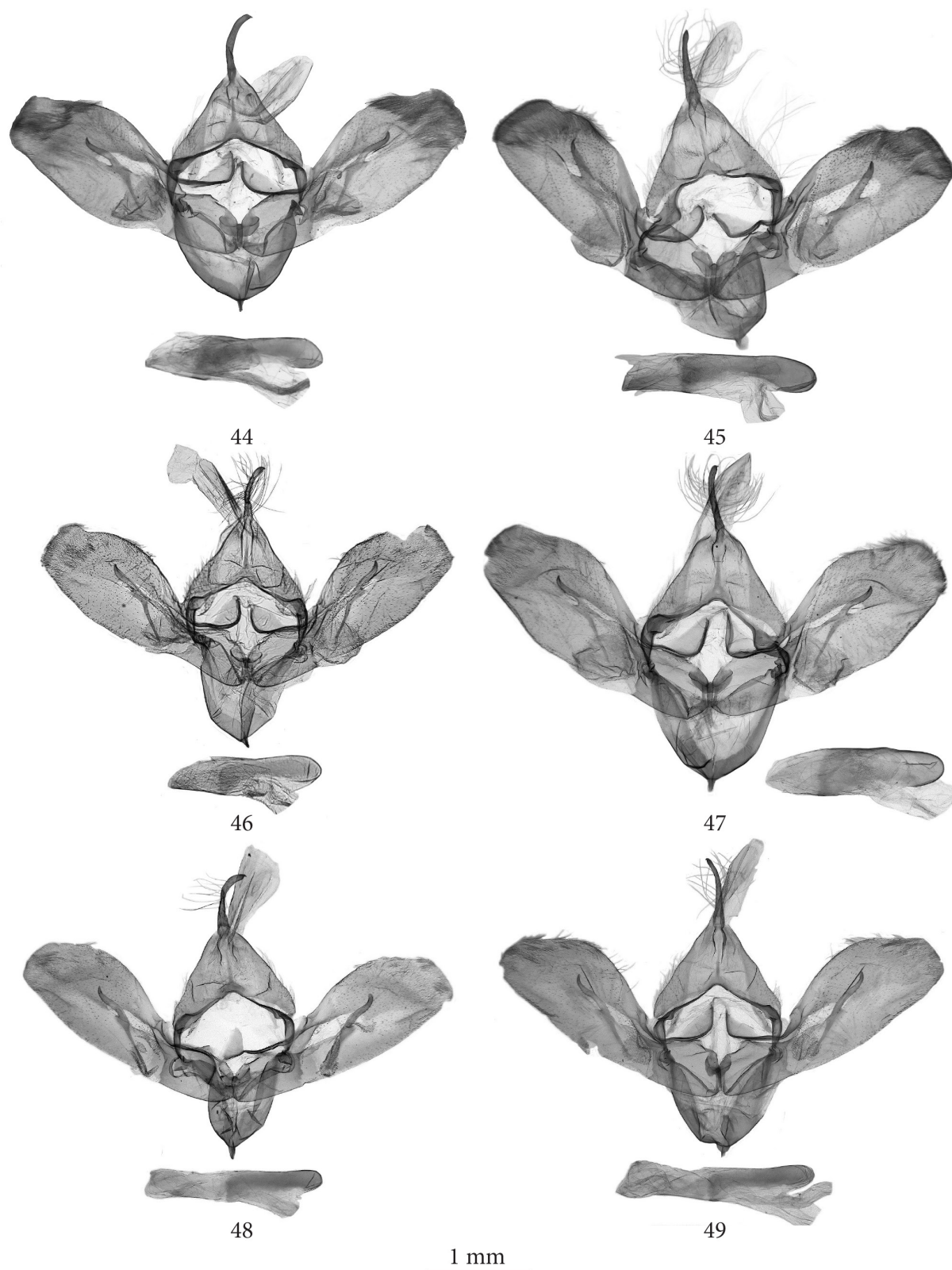
Figures 16–30. Adults (all in coll. ANHRT unless otherwise indicated). 16. *Ezishnola truncata* **sp. n.**, PT, ♂, Liberia, GS: LGNA 595; **17.** *Idem*, PT, ♂, Gabon, GS: LGNA 1849; **18.** *E. xantholeuca*, ♂, Liberia, GS: LGNA 1845; **19.** *Idem*, ♂, Liberia, GS: LGNA 1850; **20.** *Idem*, ♀, Guinea, GS: LGNA 998; **21.** *Idem*, ♀, Ghana, GS: LGNA 990 (HNHM); **22.** *E. congolana* **sp. n.**, HT, ♀, Congo, GS: LGNA 1504; **23.** *Idem*, PT, ♂, Congo, GS: LGNA 1505; **24.** *Idem*, PT, ♂, Congo, GS: LGNA 1847; **25.** *Idem*, PT, ♀, Congo, GS: LGNA 1457; **26.** *Idem*, PT, ♂, Congo, GS: LGNA 1848; **27.** *E. inscripta* **sp. n.**, HT, ♀, Gabon, GS: LGNA 1843; **28.** *Idem*, PT, ♂, Liberia, GS: LGNA 1844; **29.** *E. magnisignata* **sp. n.**, HT, ♀, Liberia, GS: LGNA 1841; **30.** *Idem*, PT, ♀, Liberia, GS: LGNA 1842.



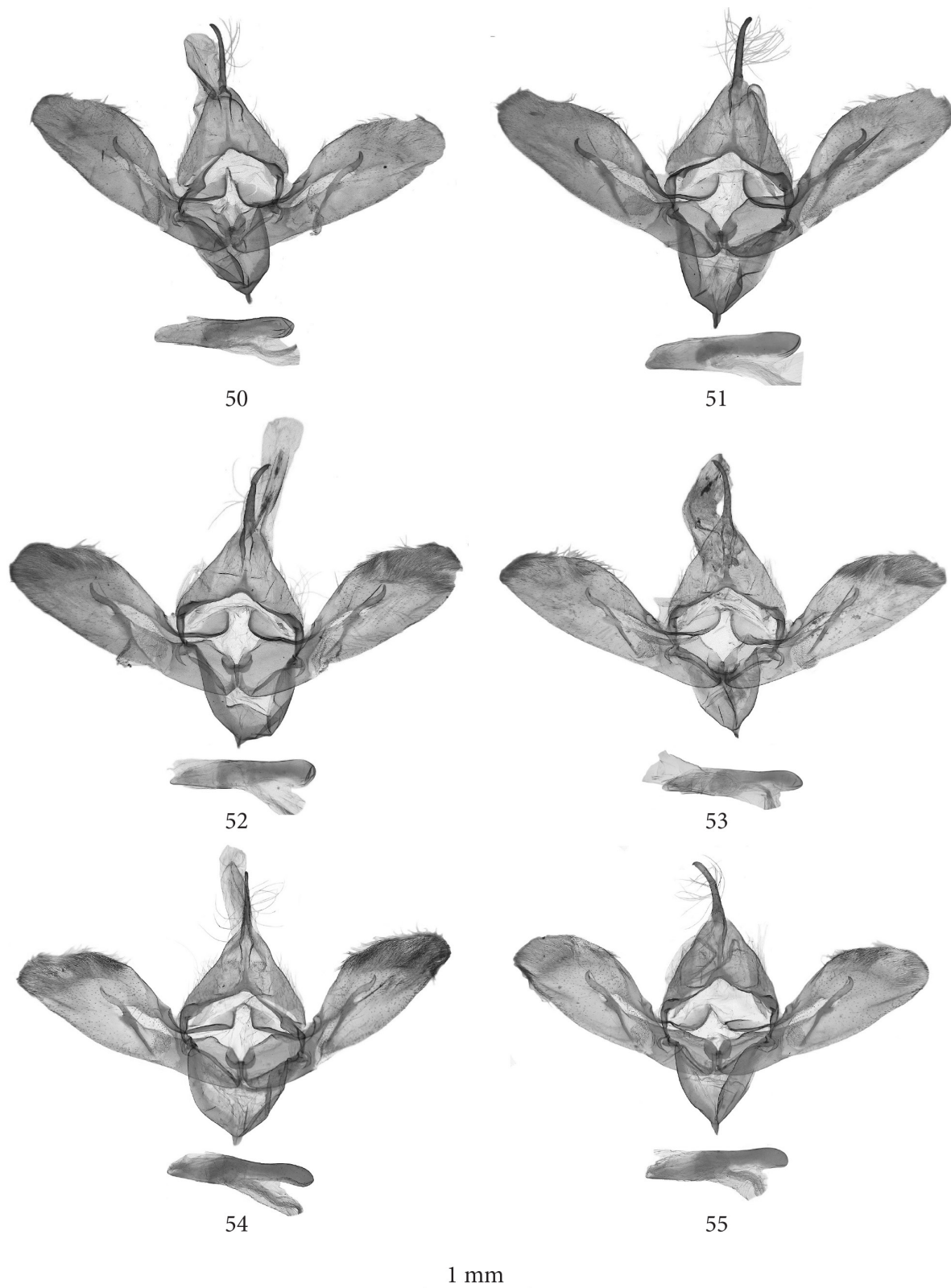
Figures 31–37. Adults (all in coll. ANHRT unless otherwise indicated). **31.** *Ezishnola magnisignata* **sp. n.**, PT, ♂, Côte d'Ivoire, GS: LGNA 1985; **32.** *Idem*, PT, ♂, Guinea, GS: LGNA 1311; **33.** *E. carcassoni*, HT, ♀, Uganda, GS: NHMUK010316559 (NHMUK); **34.** *Idem*, ♀, Côte d'Ivoire, GS: LGNA 1310; **35.** *Idem*, PT, ♂, Uganda, GS: NHMUK010316558 (NHMUK); **36.** *Idem*, ♂, Côte d'Ivoire, GS: LGNA 1839; **37.** *Idem*, ♂, Congo, GS: LGNA 1455.



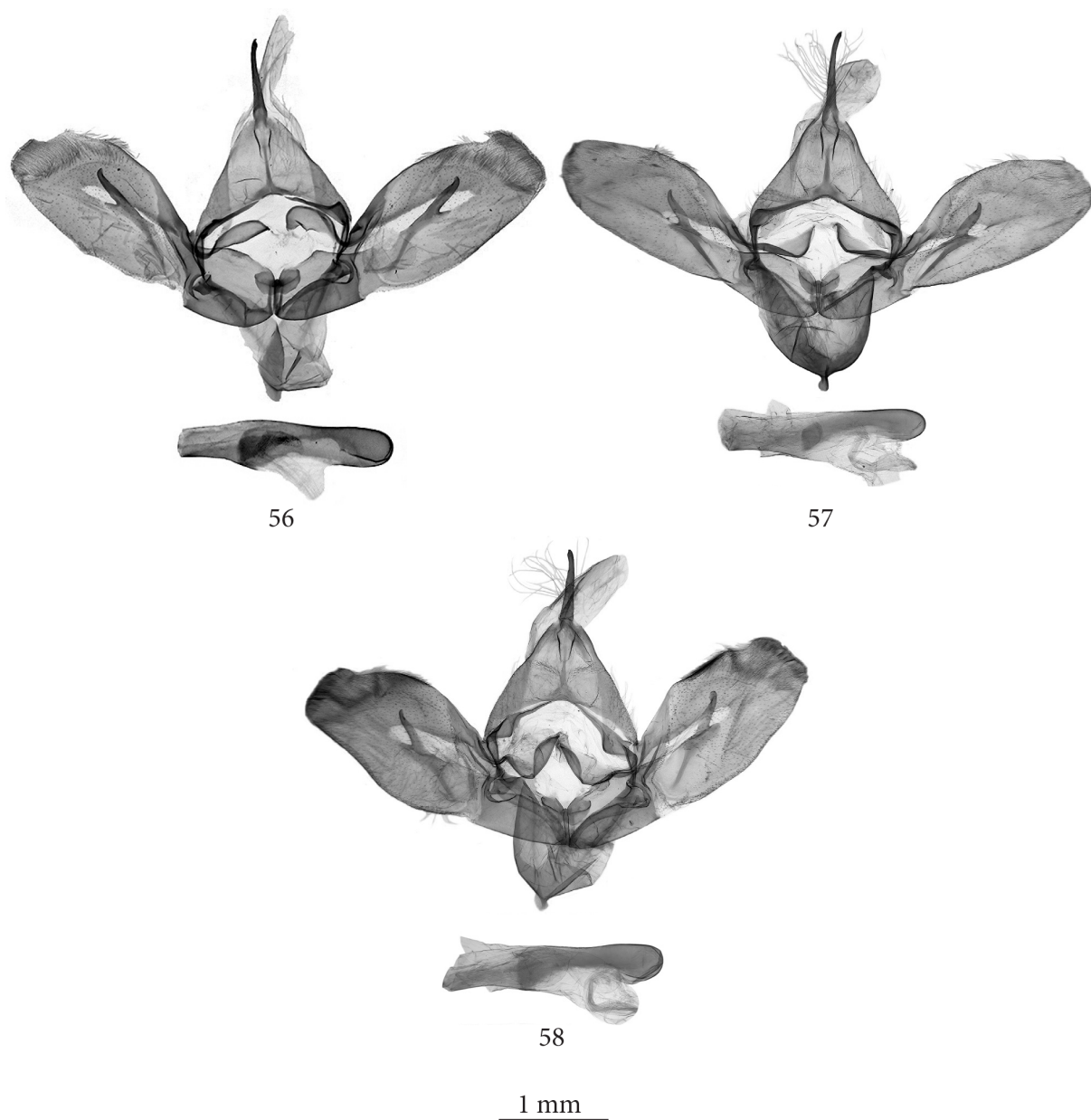
Figures 38–43. Male genitalia, a: clasper apparatus, b: aedeagus (all in coll. ANHRT). 38. *Ezishnola cretacea*, Guinea, GS: LGNA 1306; **39.** *Idem*, Liberia, GS: LGNA 1838; **40.** *E. inopinata*, PT, Zambia, GS: LGNA 60; **41.** *Idem*, Congo, GS: LGNA 1518; **42.** *E. nitidipicta* **sp. n.**, HT, Congo, GS: LGNA 1961; **43.** *Idem*, PT, Congo, GS: LGNA 1453.



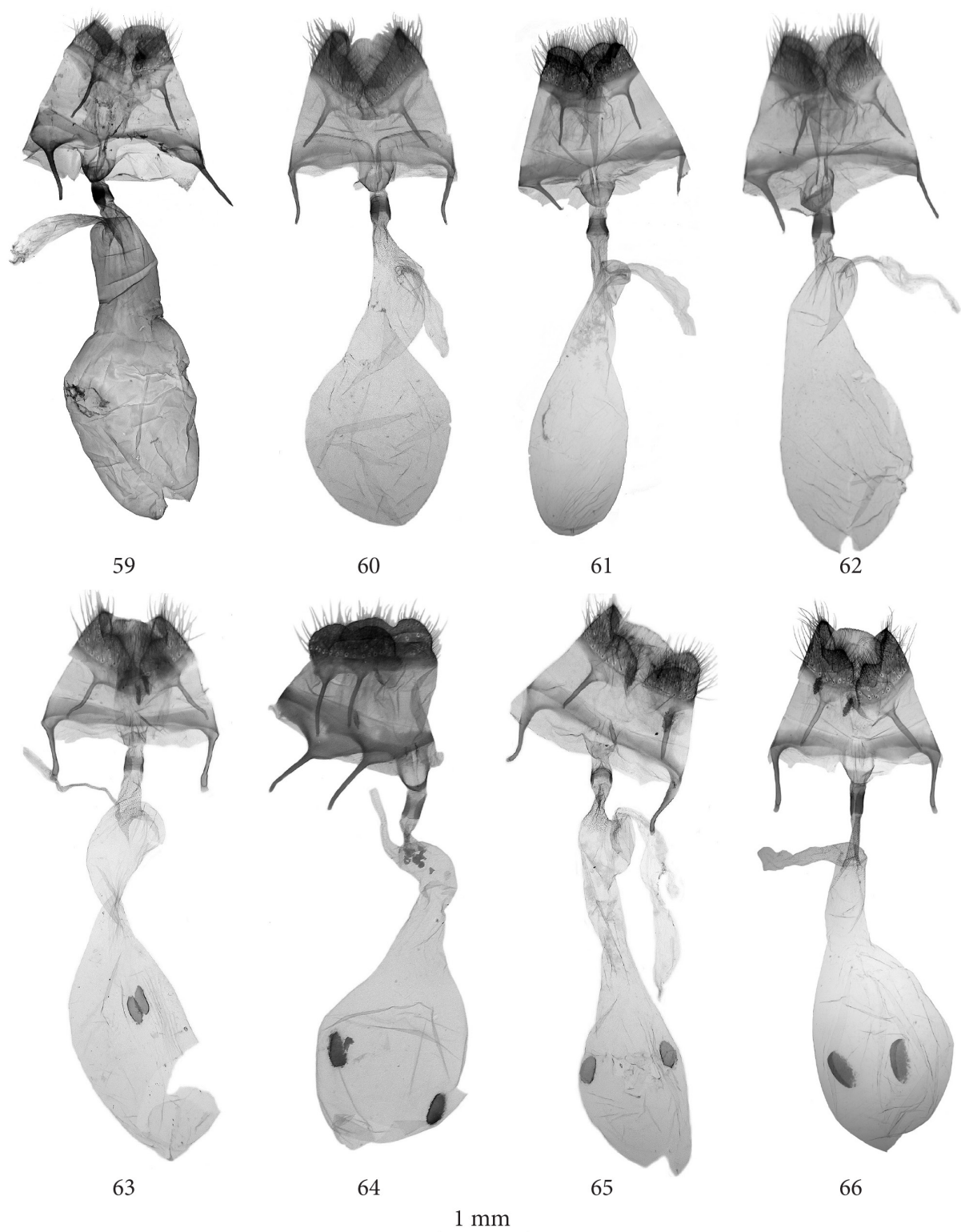
Figures 44–49. Male genitalia, a: clasp apparatus, b: aedeagus (all in coll. ANHRT). 44. *Ezishnola truncata* sp. n., HT, Gabon, GS: LGNA 1846; 45. *Idem*, PT, Congo, GS: LGNA 1809; 46. *Idem*, PT, Liberia, GS: LGNA 595; 47. *Idem*, PT, Gabon, GS: LGNA 1849; 48. *E. xantholeuca*, Liberia, GS: LGNA 1845; 49. *Idem*, Liberia, GS: LGNA 1850.



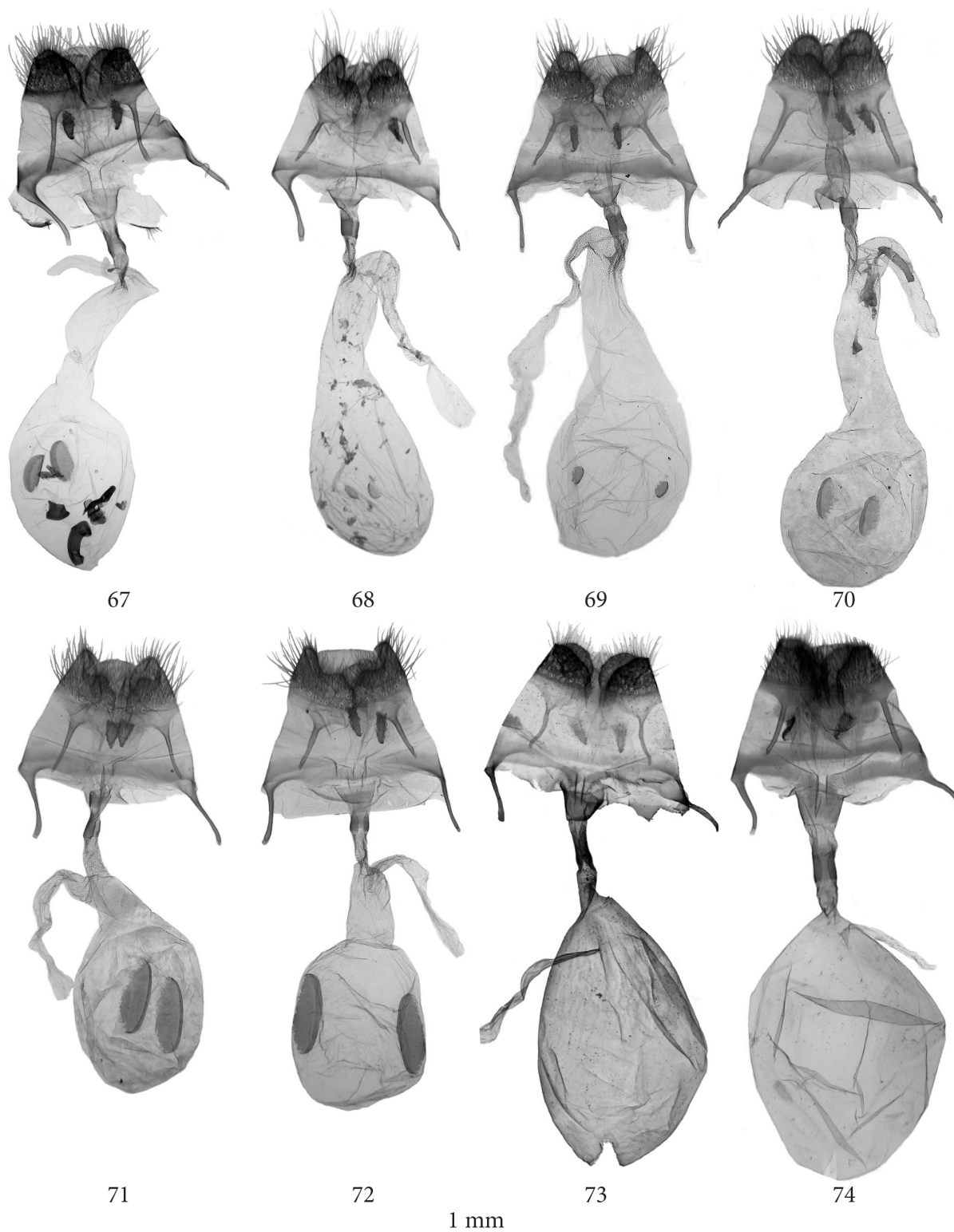
Figures 50–55. Male genitalia, a: clasper apparatus, b: aedeagus (all in coll. ANHRT). 50. *Ezishnola congolana* sp. n., PT, Congo, GS: LGNA 1848; 51. *Idem*, PT, Congo, GS: LGNA 1505; 52. *E. inscripta* sp. n., PT, Liberia, GS: LGNA 1844; 53. *E. magnisignata* sp. n., PT, Cote d'Ivoire, GS: LGNA 1985; 54. *Idem*, Gabon, GS: LGNA 1311; 55. *Idem*, Cote d'Ivoire, GS: LGNA 1308.



Figures 56–58. Male genitalia, a: clasper, b: aedeagus. 56. *Ezishnola carcassoni*, PT, Uganda, GS: NHMUK010316558 (NHMUK); **57.** *Idem*, Cote d'Ivoire, GS: LGNA 1839 (ANHRT); **58.** *Idem*, Congo, GS: LGNA 1455 (ANHRT).



Figures 59–66. Female genitalia (all in coll. ANHRT unless otherwise indicated). 59. *Ezishnola cretacea*, LT, Ghana, GS: NHMUK010317593 (NHMUK); **60.** *Idem*, Guinea, GS: LGNA 1814; **61.** *E. inopinata*, HT, Zambia, GS: LGNA 692; **62.** *Idem*, Congo, GS: LGNA 1411; **63.** *E. nitidipicta* sp. n., PT, Congo, GS: LGNA 1503; **64.** *Idem*, PT, Congo, GS: ANHRT 02550; **65.** *E. pindura* sp. n., HT, Rwanda, GS: LGNA 1626 (RMNH); **66.** *E. xantholeuca*, Guinea, GS: LGNA 998.



Figures 67–74. Female genitalia (all in coll. ANHRT unless otherwise indicated). 67. *Ezishnola xantholeuca*, Ghana, GS: LGNA 990 (HNHM); 68. *E. congolana* sp. n., HT, Congo, GS: LGNA 1504; 69. *Idem*, PT, Congo, GS: LGNA 1457; 70. *E. inscripta* sp. n., HT, Gabon, GS: LGNA 1843; 71. *E. magnisignata* sp. n., HT, Liberia, GS: LGNA 1841; 72. *Idem*, PT, Liberia, GS: LGNA 1842; 73. *E. carcassoni*, HT, Uganda, GS: NHMUK010316559 (NHMUK); 74. *Idem*, Cote d'Ivoire, GS: LGNA 1310.