

Research article

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Juxtilema, a new genus for a new species from Zambia (Lepidoptera: Erebidæ: Arctiinae: Lithosiini)

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Abstract. The present paper contains a description of the new genus *Juxtilema* **gen. nov.** which is erected for the new species *Juxtilema smithi* **gen. et sp. nov.** from Zambia. The diagnostic comparison is made with the genera *Lophilema* Aurivillius, 1910 and *Oedipygilema* Krüger, 2015. The new genus is characterised by an autapomorphic feature in the male genitalia, i.e., the structure of the juxta which is heavily sclerotised, extremely elongate, cylindrical and evenly curved, bearing a densely setose area apically and medially, and strongly connected to the bases of the sacculi. Adults together with male and female genitalia of the new and similar genera are illustrated.

Key words. Lithosiina, Sub-Saharan Africa.

INTRODUCTION

Despite recent publications devoted to the generic classification of the Afrotropical Lithosiina, or footman moths (Krüger 2015, 2016; Volynkin & László 2021), the generic assignment of a number of groups remains uncertain. In the course of identifying the Lithosiini housed in the African Natural History Research Trust, Leominster, a series of an unknown Lithosiina species from Zambia was found. Although it displays a typical ‘eilemoid’ pattern common not only for Afrotropical but also Asiatic and European members of the subtribe Lithosiina, the genital structures of both sexes of the species are considerably different from those of all other Afrotropical genera suggesting that it belongs to a distinct monophyletic lineage that not only represents a hitherto undescribed species but also a new genus, the descriptions of which are provided herein.

Abbreviations of the depositories

ANHRT = African Natural History Research Trust,
Leominster, UK
NHMUK = Natural History Museum, London, UK
(formerly BMNH)

Other abbreviations

AV = genitalia slide prepared by A.V. Volynkin
HT = holotype
PT = paratype

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

RESULTS

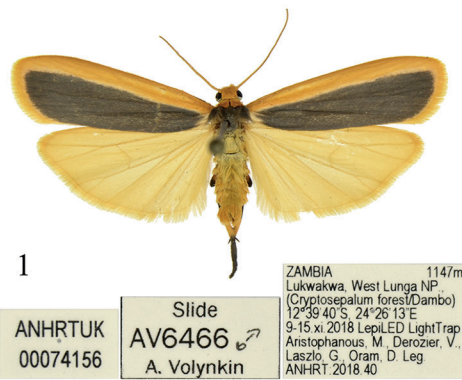
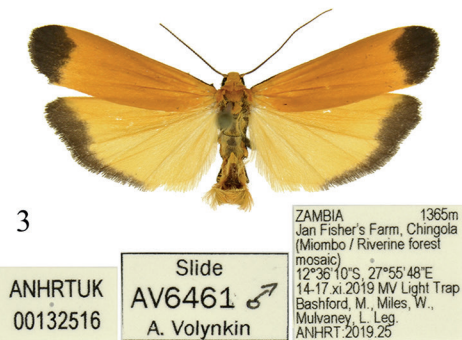
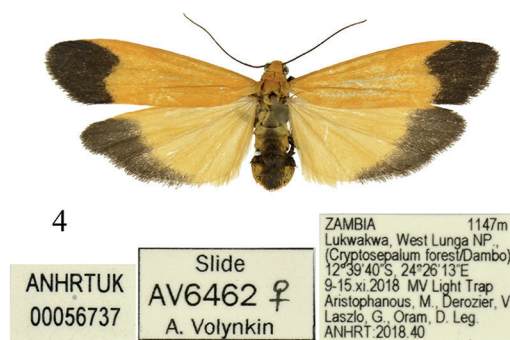
Juxtilema gen. nov.

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Type species: *Juxtilema smithi* gen. et sp. nov.

Diagnosis

The type species of the new genus (Figs 1–2) displays a characteristic ‘eilemoid’ pattern and is externally similar to members of genera such as *Manulea* Wallengren (illustrated by Dubatolov & Zolotuhin (2011) and Witt *et al.* (2011)), *Mimelilema* Krüger, *Gracililema* Krüger and *Pseudotigrioides* Krüger (illustrated by Krüger (2015)). Nevertheless, the male genitalia ground plan of *Juxtilema* **gen. nov.** is most similar to that of the genus *Lophilema*, members of which (Figs 5–8) considerably differ externally from the new genus in the limited sexual dimorphism (strongly expressed in *Lophilema*) and the absence of a medial androconial area on the upper side of the male forewing. The male genital capsule structure of *Juxtilema* **gen. nov.** (Fig. 9) is similar to that of *Lophilema*

*Juxtilema smithi* gen. & sp. n., HT ♂*Juxtilema smithi* gen. & sp. n., PT ♀*Oedipygilema aposema* ♂*Oedipygilema aposema* ♀*Lophilema mbulu*, HT ♂*Lophilema mbulu*, PT ♀*Lophilema polioplaga*, HT ♂*Lophilema polioplaga* ♀

10 mm

Figs 1–8. Lithosiina spp., adults, depositories of the specimens. 1–6., 8. ANHRT. 7. NHMUK (©The Trustees of NHMUK).

(Figs 11–12) in the elongated saccus with thin margins, a strongly elongated intravicular corema and the distally protruding medial section of the sacculus (similar to only certain species of the genus, e.g., *L. mbulu* Volynkin, 2019). However, the male genital capsule of the new genus is distinguished from that of *Lophilema* by the heavily sclerotised, extremely elongate, cylindrical and evenly curved juxta which is strongly connected to the bases of the sacculi and bearing a densely setose area apically and medially (an autapomorphic feature), whereas the juxta of *Lophilema* is weakly sclerotised, short, dorso-ventrally flattened and bears basal and distal concavities. Additionally, compared to *Lophilema*, the uncus of *Juxtilema* gen. nov. is setose, thick and triangular in cross-section (it is smooth, slender and laterally flattened in *Lophilema*), the processus distalis plicae is present, the distal saccular process is smooth (densely setose in *Lophilema*), and the anellus bears triangular sclerotised protrusions which are absent in *Lophilema*. Among Afrotropical Lithosiina genera, an extremely elongated and apically setose juxta is also known in the genus *Oedipygilema* (Figs 3–4), but in the latter it is dorso-ventrally flattened, straight and has two longitudinal latero-ventral ribs connected proximally by a membrane (Fig. 10). In addition, the genital capsule of *Oedipygilema* differs from that of *Juxtilema* gen. nov. in the presence of a strongly elongated and thin basal costal process, the lack of a processus distalis plicae, the short and apically well-sclerotised saccus lacking a corema, and the longer, thinner and laterally flattened uncus (it is relatively short, thick and triangular in cross-section in *Juxtilema* gen. nov.). The phallus of *Juxtilema* gen. nov. is longer and thicker (in proportion to the genital capsule size) compared to *Lophilema* and *Oedipygilema*. In the vesica, the presence of a sclerotised dentate distal patch is characteristic for the new genus. The female genitalia of *Juxtilema* gen. nov. (Figs 13–14) are characterised by the ventro-laterally positioned ostium bursae, a character considered here as autapomorphic, whereas in other Afrotropical Lithosiina genera including *Lophilema* (Figs 16, 17) and *Oedipygilema* (Fig. 15) the ostium bursae is positioned medio-ventrally.

Description

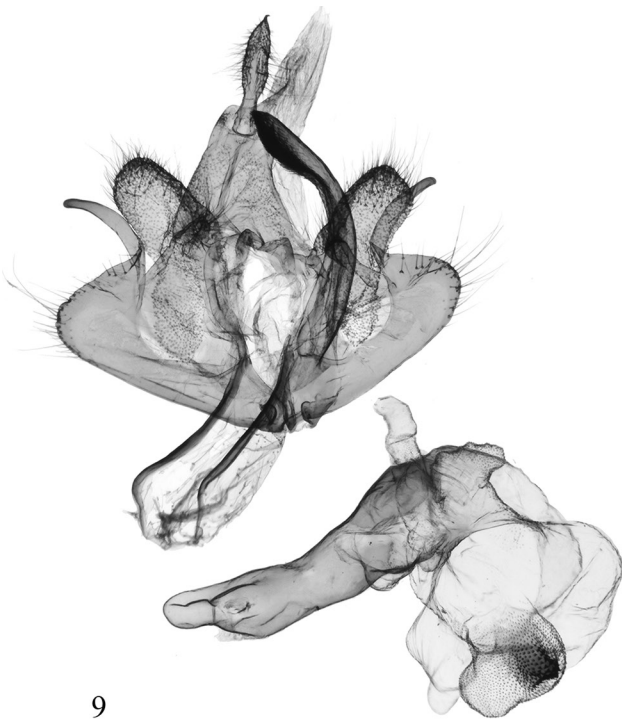
External morphology of adults (Figs 1–2). Forewing length 13–15 mm in males and 14–16 mm in females. Sexual dimorphism limited: female slightly larger than male and having somewhat more convex forewing costal margin with slightly narrower costal stripe. Antennae of both sexes sparsely ciliate with somewhat shorter ciliae in females. Head deep yellow. Thorax plumbeous-grey, patagia deep yellow. Forewing ground colour plumbeous-grey with wide deep yellow costal stripe, thin deep yellow terminal line and cilia. Hindwing monotonous pale ochreous-yellow. Abdomen pale yellow proximally and ochreous-yellow distally.

Male genitalia (Fig. 9). Uncus weakly setose, thick, triangular in cross-section, tapered distally with short claw-shaped tip. Tuba analis with thin and weakly sclerotised scaphium. Arms of tegumen wide and fused in posterior two-thirds. Vinculum ca. twice longer than tegumen, with well-sclerotised but thin arms connected by thin and weakly sclerotised commissure distally. Intravicular area wide, membranous and with long expandable medial corema bearing numerous long androconial scales. Dorsal section of valva short, apically rounded and setose, processus distalis plicae represented as transverse sclerotised crest, setose dorsally. Sacculus heavily sclerotised and flattened with strongly ventro-distally protruding, rounded and sparsely setose distal section. Distal saccular process originating from the dorsal side of distal section of sacculus, slender, smoothly down-curved, distally tapered and apically rounded. Juxta extremely long, reaching the base of uncus, heavily sclerotised, tubular, smoothly up-curved, with ventrally heavily setose distal half, basally fused with basal section of sacculus. Anellus with two short, triangular, swollen protrusions dorsally. Phallus somewhat down-curved medially, dilated distally, with elongate and apically rounded coecum ca. twice narrower than main tube. Vesica sack-like with short membranous basal diverticulum, short scobinated subbasal diverticulum, two short but broad membranous lateral diverticula and short granulated distal diverticulum bearing sclerotised dentate patch. Vesica ejaculatorius originates subbasally and directed laterally.

Female genitalia (Figs 13–14). Papilla analis trapezoid with rounded corners, weakly setose. Apophyses thin, apophysis anterioris ca. twice shorter and somewhat thinner than apophysis posterioris. Ostium bursae positioned ventro-laterally, surrounded by asymmetrical sclerotised fold ventrally and laterally. Ductus bursae short, dorso-ventrally flattened and weakly sclerotised. Corpus bursae sack-like with weakly gelatinous posterior section and membranous anterior section bearing elongate and narrow serrulate signum laterally. Appendix bursae short but broad, conical, apically rounded, membranous, positioned postero-laterally on right side.

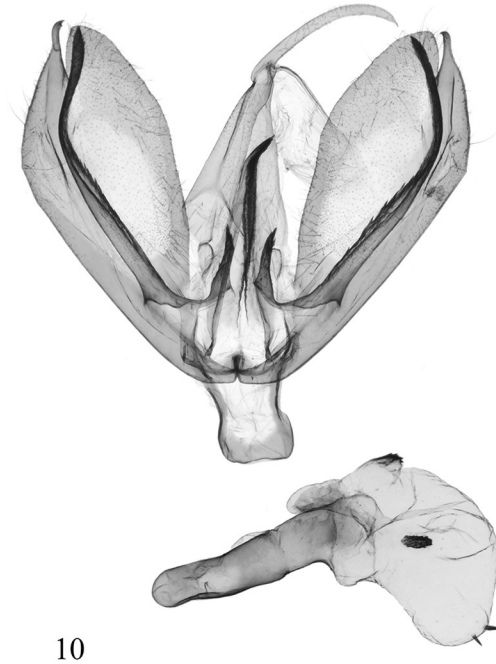
Etymology

The genus name is an aggregation of the word ‘juxta’ and the generic group name *Eilema*, referring to the extremely elongated juxta of the type species.



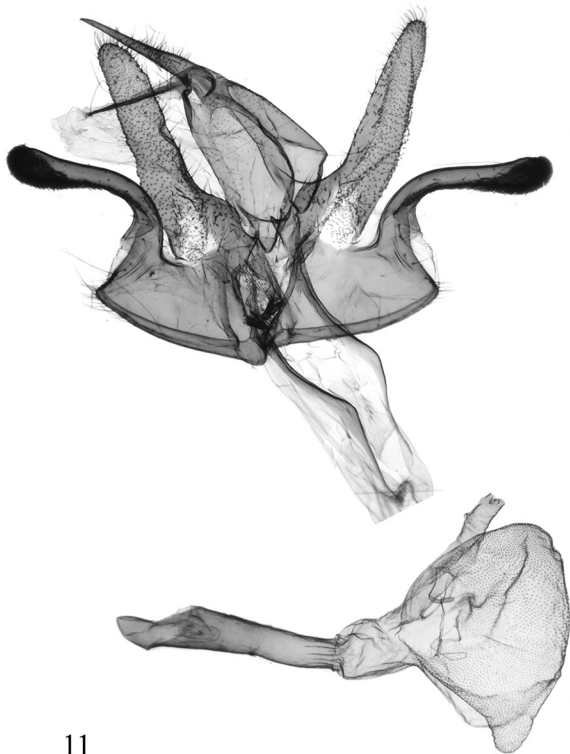
9

***Juxtilema smithi* gen. & sp. n., HT**
NW Zambia, West Lunga NP, Lukwakwa, slide AV6466



10

Oedipygilema aposema
S Zambia, Chingola, slide AV6461



11

***Lophilema mbulu*, HT**
Tanzania, Mbulu Mts., slide AV3189



12

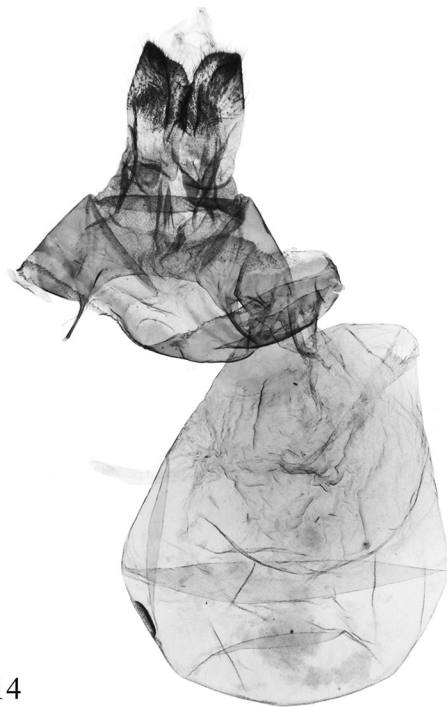
***Lophilema polioplaga*, HT**
Kenya, slide BMNH Arctiidae 756

Figs 9–12. Lithosiina spp, male genitalia, depositories of the specimens. 9–11. ANHRT. 12. NHMUK (©The Trustees of NHMUK).



13

***Juxtilema smithi* gen. & sp. n., PT**
NW Zambia, West Lunga NP, Lukwakwa, slide AV6458



14

***Juxtilema smithi* gen. & sp. n., PT**
C Zambia, Mutinondo Wilderness Area, slide AV6456



15

Oedipygilema aposema
NW Zambia, West Lunga NP, slide AV6462



16

***Lophilema mbulu*, PT**
Tanzania, Mbulu Mts, slide AV4585



17

Lophilema polioplaga
Tanzania, slide AV3373

Figs 13–17. Lithosiina spp., female genitalia, specimens are deposited in ANHRT.

***Juxtilema smithi* gen. et sp. nov.**

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(Figs 1–2, 9, 13–14)

Type material

Holotype (Figs 1, 9). ♂, “Zambia, 1147m, Lukwakwa, West Lunga NP. (Cryptosepalum forest/Dambo) 12°39'40”S, 24°26'13”E, 9–15.xi.2018 LepiLED Light Trap, Aristophanous, M., Derozier, V., Laszlo, G., Oram, D. Leg. ANHRT:2018.40” / “ANHRTUK 00074156” / “Slide AV6466♂ A. Volynkin” (ANHRT).

Paratypes. ZAMBIA: 23 ♂♂, 3 ♀♀, the same data as in the holotype, MV, LepiLED & Actinic light traps, unique numbers: ANHRTUK 00056731, 00057112, 00057113, 00057130, 00057131, 00058739, 00058740, 00058744, 00059195, 00059382, 00061633–00061637, 00061639, 00073763, 00073783, 00074155, 00074157–00074159, 00074189–00074192, gen. prep. Nos.: AV6421, AV6467 (♂♂), AV6458 (♀); 1 ♂, 3 ♀♀, the same locality but 4–8.xi.2013, Light Trap, Smith, Takano & Oram leg., unique numbers: ANHRTUK 00201092–00201095; 5 ♂♂, 9 ♀♀, 1400 m, Hillwood, Ikelenge (Miombo / Riverine forest mosaic), 11°16'02” S, 24°18'59” E, 23–30.xi.2019, LepiLED & Actinic light traps, Bashford, M., Miles, W., Mulvaney, L., Smith, R. leg., unique numbers: ANHRTUK 00107617–00107620, 00132358, 00202054–00202057, 00202059, 00202061, 00202119, 00202120, 00204138, gen. prep. No.: AV6459 (♀); 1 ♂, the same locality but 7–10.xii.2019, Bashford, M., Miles, W., Mulvaney, L. leg., unique number: 00132465, gen. prep. No.: AV6468; 3 ♂♂, 3 ♀♀, 1340 m, Jiwundu Swamp, 11°51'54” S, 25°33'20” E, 21–24.xi.2014, Light Trap, Smith, R. & Takano, H. leg., unique numbers: ANHRTUK 00010320, 00010341, 00010379, 00057210, 00201096, 00201097; 1 ♀, 1346 m, Kambishi School, 11°54'42” S, 25°28'50” E, 10–13.xi.2017, MV light trap, Carter, M., Lloyd, A., Miles, W., Oram, D., Smith, R. leg., unique number: ANHRTUK 00118606; 1 ♀, 1179 m, Greystone, Kitwe, Copperbelt Province, 12°55'50” S, 28°14'29” E, 19–20.x.2013, Light Trap, Smith, R. & Takano, H. leg., unique number: ANHRTUK 00201080, gen. prep. No.: AV6473; 18 ♂♂, 1 ♀, 1460m, Mutinondo Wilderness Area, Mpika, Northern Prov., 12°27'06” S, 31°17'30” E, 14–17.ii.2019, MV Light Trap, Dérozier, V., Mulvaney, L., Takano, H. leg., unique numbers: ANHRTUK 00139538, 00139539, 00139628, 00139629, 00139671, 00191201, 00192182–00192188, 00192190–00192192, 00219813, 00219814, 00219828, gen. prep. Nos.: AV6427, AV6469, AV6470 (♂♂), AV6456 (♀) (all in ANHRT).

Diagnosis

See the diagnosis for the genus.

Description

See the description for the genus.

Distribution

The new species is known from Zambia.

Etymology

The new species is dedicated to Mr Richard Smith, founder and director of the African Natural History Research Trust, who, through organising and undertaking numerous entomological expeditions to Sub-Saharan Africa has enabled much of the recent advances in our taxonomic understanding of the Afrotropical Lithosiina.

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