

Research article

[urn:lsid:zoobank.org:pub:CE2FA6EF-F33B-4542-844D-992169C85D2E](https://zoobank.org/pub:CE2FA6EF-F33B-4542-844D-992169C85D2E)***Kruegerilema*, a new genus for a new species endemic to São Tomé Island
(Lepidoptera: Erebidæ: Arctiinae: Lithosiini)**Anton V. Volynkin^{1,*} & Gyula M. László²^{1,2}*The African Natural History Research Trust (ANHRT), Street Court Leominster-Kingsland, HR6 9QA, UK*¹*Altai State University, Lenina Avenue, 61, RF-656049, Barnaul, Russia**Corresponding author: Email: anton@anhrt.org.uk¹[urn:lsid:zoobank.org:author:25EA1403-9502-42BE-A820-96AC51CE862E](https://zoobank.org/author:25EA1403-9502-42BE-A820-96AC51CE862E)²[urn:lsid:zoobank.org:author:50CAA370-A89A-488E-A635-1B2D6FD71001](https://zoobank.org/author:50CAA370-A89A-488E-A635-1B2D6FD71001)

Abstract. The present paper contains a description of the new genus *Kruegerilema* gen. nov. which is erected for the new species *Kruegerilema smithi* sp. nov. endemic to São Tomé Island. The diagnostic comparison is made with the genus *Brunia* Moore, 1878. Adults together with male and female genitalia of the new and similar genus are illustrated.

Key words. Lithosiina, Sub-Saharan Africa.

INTRODUCTION

The recently published generic classification of the Afrotropical Lithosiina (footman moths) contains 98 genera from mainland Africa (Krüger 2015) with an additional new genus described subsequently from South Africa (Krüger 2016). Although these publications are undoubtedly fundamental in the classification of the subtribe, they inevitably do not provide a perfect overview of the group due to the complexity of the Afrotropical Lithosiina. Unresolved taxonomic problems are especially prevalent in poorly studied regions such as West Africa and the Congo Basin with the generic assignment of several groups of Lithosiina still uncertain.

In the course of identifying the Lithosiini housed in the African Natural History Research Trust, Leominster, large series of a peculiar, dark brown Lithosiina species from São Tomé Island was found. As no reference of the occurrence of any Lithosiina in São Tomé could be traced, the species was in the first instance believed by the authors to be an undescribed *Brunia* Moore, 1878. Having compared the genitalia morphology of the new taxon with the Oriental type species of *Brunia* and its Afrotropical synonym *Ovenna* Birket-Smith, 1965, several remarkable autapomorphies were discovered suggesting that the species 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.

MATERIAL AND METHODS

Abbreviations of the depositoriesANHRT = African Natural History Research Trust,
Leominster, UKNHMUK = Natural History (formerly BMNH)
Museum, London, UK**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 CC 2018 software.

RESULTS

***Kruegerilema* gen. nov.**[urn:lsid:zoobank.org:act:B51F553E-2A78-42A5-8E41-FFE66D56737F](https://zoobank.org/act:B51F553E-2A78-42A5-8E41-FFE66D56737F)**Type species.** *Kruegerilema smithi* sp. nov.

Diagnosis. The new genus (Figs 1–2) is externally similar to the genus *Brunia* Moore, 1878 (= *Ovenna* Birket-Smith, 1965) (Figs 3–4) but distinguished by a

number of diagnostic features. The sexual dimorphism is limited with the female having a wider forewing and a smaller head (in proportion to the body size) than the male whereas in *Brunia*, the sexual dimorphism is substantial: males have an intense dark terminal suffusion of the forewing, while in the female the ground colour is monotonous but with a paler costa which may be bright yellow in certain species.

The male genital capsule of *Kruegerilema* (Figs 5–6) is similar to that of *Brunia* (Fig. 7) (the type species, *Brunia antica* (Walker, 1854) is illustrated by Holloway (2001) and Bucsek (2017)) in the relatively short and thick uncus, the V-shaped vinculum, the relatively narrow dorsal part of the valva curved ventrad and the presence of a short ampulla (processus momenti *sensu* Birket-Smith (1965)). The new genus is distinguished from *Brunia* by certain autapomorphic features such as the highly modified uncus with a subbasal ventral process and the presence of a heavily sclerotized, wide subscaphium, in contrast to *Brunia*'s unmodified uncus and tuba analis lacking a subscaphium. Additionally, the scaphium of *Kruegerilema* is relatively thick and distally extended to a wide, densely dentate area whereas the scaphium is membranous along its full length in *Brunia*. The distal saccular process of the new genus is simple, relatively narrow and elongate with smooth margins while it is considerably shorter (in proportion to the dorsal part of the valva), wider and complex, bearing additional processes or strong dentation in *Brunia*. The aedeagus of *Kruegerilema* is relatively narrow, somewhat tapered distally and having a narrow carinal cluster of short spines whereas the aedeagus of *Brunia* is markedly wider, dilated distally with a longitudinally rugose and expandable scobinated apical section (an autapomorphic feature of the genus). The vesica of *Kruegerilema* is shorter than the aedeagus, bearing finely granulated areas only, whereas in *Brunia* it is markedly wider and longer than the aedeagus and armed with a few large, robust thorn-like or lanceolate flattened cornuti which is a further autapomorphic feature of the genus.

In the female genitalia (Fig. 8), the long and complex postvaginal plate bearing a heavily sclerotized, rounded swollen postero-medial protrusion is an autapomorphic character whereas the postvaginal plate of *Brunia* (Fig. 9) is short (in proportion to the length of the 8th sternite), unmodified and plate-like.

Description

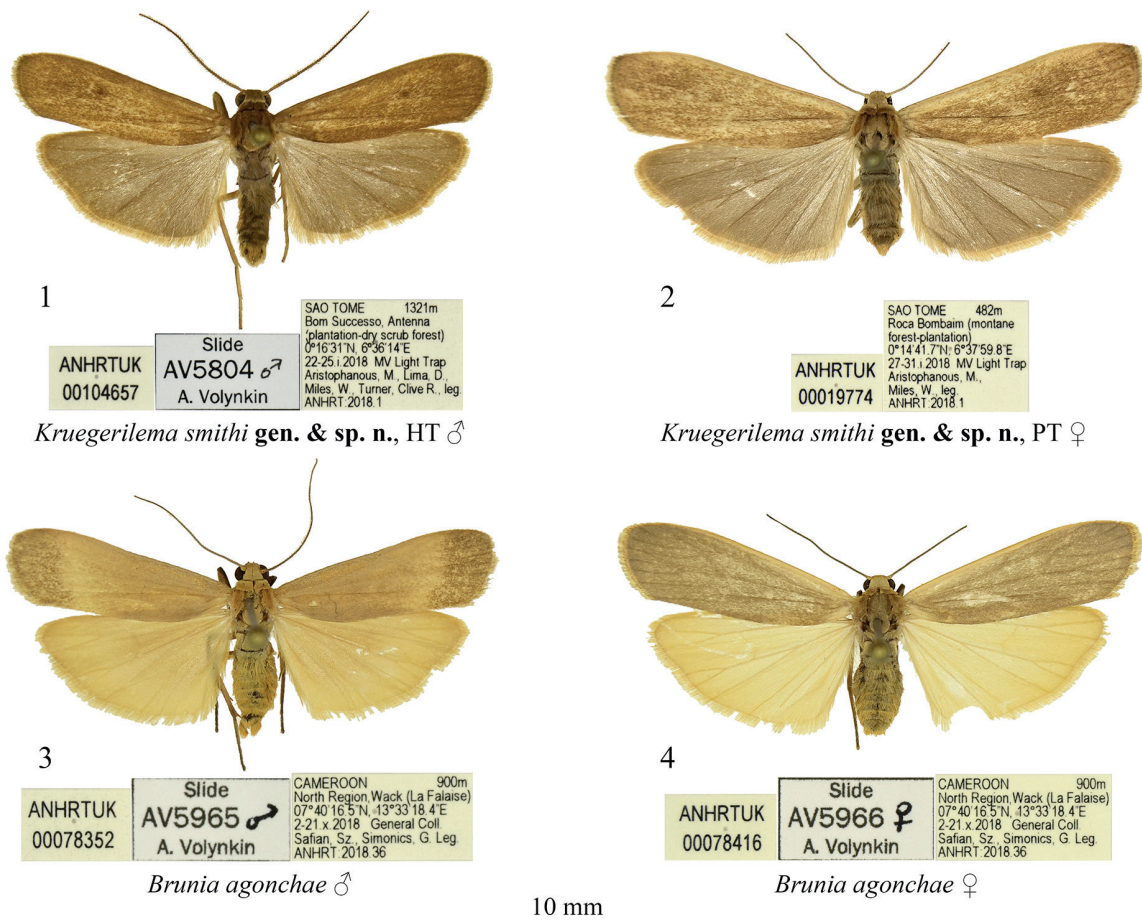
Adult (Figs 1–2). Forewing length 10–13 mm in males and 12–15 mm in females. Sexual dimorphism limited: female somewhat larger with smaller head and wider forewing than in the male. Antenna densely ciliate in the male, weakly ciliate in the female. Body brown. Forewing narrow, elongate with costal margin convex subapically and anal margin convex subbasally. Forewing ground colour and cilia brown. Discal spot small, dark

brown, round. Hindwing monotonous greyish brown. Cilia brown.

Male genitalia (Figs 5–6). Uncus short, thick, distally curved ventrad, apically pointed, subbasally with a short, narrow, apically rounded process projecting ventrad. Tegumen shorter than valva, weakly sclerotized with wide arms fused in distal third. Tuba analis wide (width ca. 2/3 of tegumen length). Scaphium thin, bearing an extensive, densely dentate terminal area. Subscaphium wide, heavily sclerotized, dorso-ventrally flattened, plate-like with deep triangular incision basally. Vinculum somewhat longer than tegumen with narrow, V-shaped saccus. Juxta weakly sclerotized, shield-like with shallow depression distally. Valva elongate and narrow, costal margin slightly concave proximally, convex distally, dorsal section distally tapered, curved ventrad, apically pointed. Ampulla (processus momenti) short, tubercle-like, weakly setose. Sacculus narrow (ca. half of valva width) with weakly setose dorsal surface. Distal saccular process long, heavily sclerotized with a claw-shaped, dorsally curved and apically pointed distal section. Aedeagus tubular, somewhat shorter than length of tegumen-vinculum complex, coecum short and rounded, distal section slightly tapered bearing a narrow lateral cluster of short spines apically. Vesica shorter than aedeagus, its main chamber sack-like, somewhat dilated distally, granulated basally and distally but membranous medially. Ventral subbasal diverticulum broad, semi-globular, granulated. Dorsal subbasal diverticulum elongate, conical and apically rounded, weakly granulated. Smaller medial diverticulum short, conical and apically rounded, scobinated. Larger medial diverticulum globular, membranous. Vesica ejaculatorius located subbasally, directed dorsad.

Female genitalia (Fig. 8). Papilla analis trapezoidal with rounded corners, weakly setose. Apophyses medium long, very thin, equal in length. Postvaginal plate complex, composed of a sclerotized, proximally rounded, quadrangular and swollen anterior plate, a narrow bar-like, very strongly sclerotized posterior plate conjunct with a conspicuous, round medio-distal protrusion, and two wide, quadrangular lateral plates. Ostium bursae equal in width with anterior section of postvaginal plate. Ductus bursae membranous, slightly longer than anterior section of postvaginal plate, somewhat tapered anteriorly. Corpus bursae subdivided into two sections. Posterior section heavily sclerotized with evenly convex lateral margins. Anterior section membranous, ca. 1.7 times longer and ca. two times wider than posterior one, globular, bearing two small round signa, each with short medial thorn-like protrusion. Appendix bursae small, wide but very short, heavily sclerotized, positioned postero-laterally.

Etymology. The generic name is an aggregate of the Latin transcription of the surname Krüger and the generic name *Eilema* Hübner, [1819]. The gender is feminine. The new genus is dedicated to the memory of



Figs 1–4. Lithosiina spp., adults. **1.** *Kruegerilema smithi* sp. nov., holotype, ♂, São Tomé. **2.** Ditto, paratype ♀, São Tomé. **3.** *Brunia agonchae* (Plötz, 1880) (= *Eilema subgriseola* Strand, 1912, the type species of *Ovenna*, a junior synonym of *Brunia*), ♂, Cameroon. **4.** Ditto, ♀, Cameroon. The specimens are deposited in coll. ANHRT.

the late Dr Martin Krüger (1963–2019), a distinguished expert in African Geometridae and Lithosiina taxonomy and author of the generic classification of Afrotropical Lithosiini.

Species composition. The new genus is monotypic.

***Kruegerilema smithi* sp. nov.**

Figs 1–2, 5–6, 8

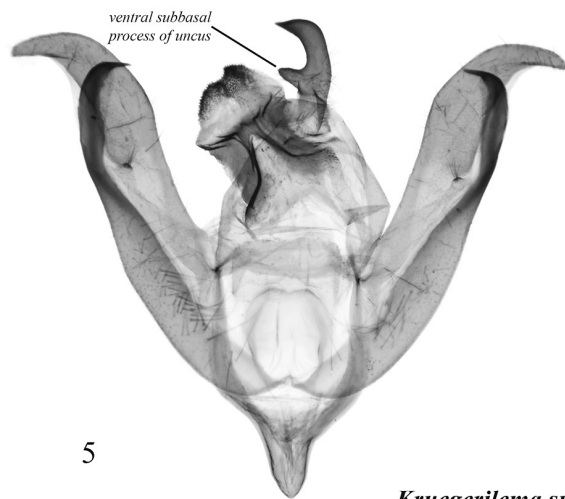
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Type material

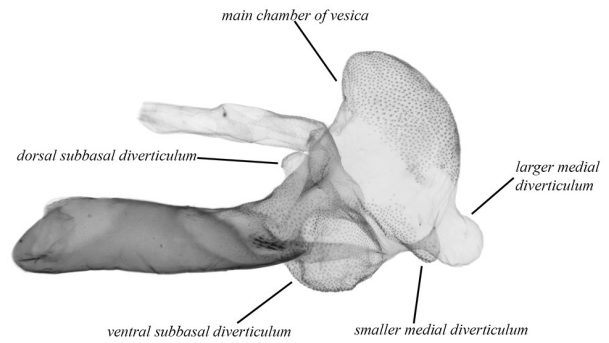
Holotype (Figs 1, 5). ♂, “Sao Tome, 1321m, Bom Successo, Antenna (plantation–dry scrub forest), 0°16'31"N, 6°36'14"E, 22–25.i.2018, MV Light Trap, Aristophanous, M., Lima, D., Miles, W., Turner, Clive R., leg. ANHRT:2018.1”, unique number: ANHRTUK 00104657, gen. prep. No.: AV5804 (ANHRT).

Paratypes (651 specimens in total). **SÃO TOMÉ.** 140 specimens of both sexes, same data as for holotype, gen. prep. No.: AV5805 (♀); 92 specimens of both sexes,

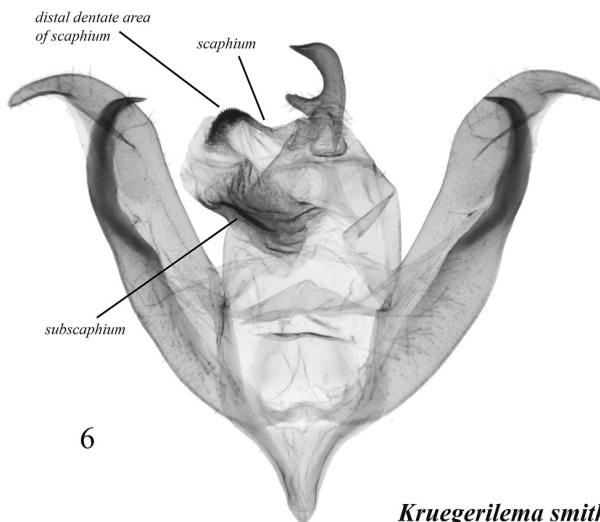
same data but collected by actinic light trap; 1 ♂, Neves, Praia das Furnas, Mucumbli Lodge (plantation-dry scrub forest), 60 m, 0°26'56.1" N, 6°32'22.7" E, 25–27.i.2018, MV Light Trap, Aristophanous, M., Miles, W., Turner, C.R. leg., ANHRT:2018.1; 1 ♂, 1 ♀, Guadalupe, Antenna (dry coastal scrub forest), 254 m, 0°22'49.8" N, 6°38'47.4" E, 31.i–2.ii.2018, Actinic Light Trap, Aristophanous, M., Miles, W., leg., ANHRT:2018.1; 1 ♂, 1 ♀, same data but collected by MV light trap; 284 specimens of both sexes, Roca Bombaim (montane / forest-plantation), 482 m, 0°14'41.7" N, 6°37'59.8" E, 27–31.i.2018, MV Light Trap, Aristophanous, M., Miles, W., leg., ANHRT:2018.1; 7 specimens of both sexes, same data but collected by actinic light trap; 45 specimens of both sexes, Antenna Bom Successo, 1303 m, 00°16'33.7" N, 6°36'19.7" E, 19.x.2016, MV Light Trap, Turner, C.R. & Tasane, T. leg., ANHRT:2017.21, gen. prep. No.: AV5969 (♀); 15 specimens of both sexes, same site and collectors but collected at 20.x.2016; 20 specimens of both sexes, same site and collectors but collected at 28.x.2016; 2 ♂♂, 1 ♀, same site and collectors but collected at



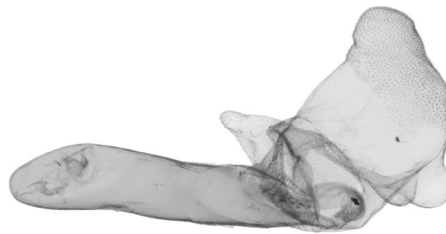
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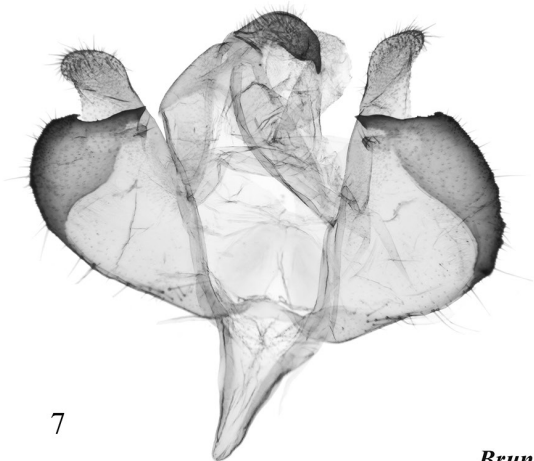
***Kruegerilema smithi* gen. & sp. n., HT**
São Tomé and Príncipe, São Tomé Isl., slide AV5804 Volynkin



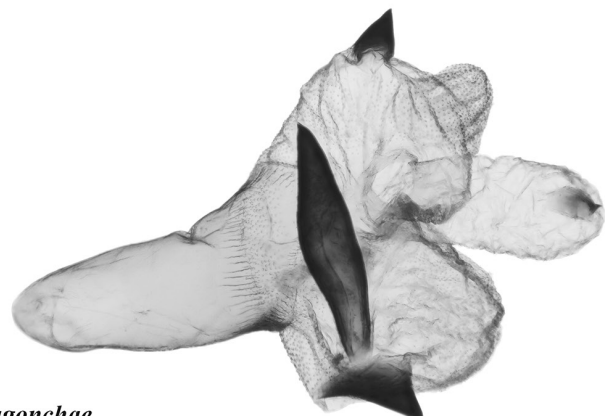
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***Kruegerilema smithi* gen. & sp. n., PT**
São Tomé and Príncipe, São Tomé Isl., slide AV5958 Volynkin



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Brunia agonchae
Cameroon, North Region, slide AV5965 Volynkin

Figs 5–7. Lithosiina spp., male genitalia. **5.** *Kruegerilema smithi* sp. nov., holotype, São Tomé. **6.** Ditto, paratype, São Tomé. **7.** *Brunia agonchae* (= *Eilema subgriseola* Strand, 1912), Cameroon. The specimens dissected are deposited in coll. ANHRT.

29.x.2016; 8 specimens of both sexes, Ponta Furada, 186 m, 0°14'01.8" N, 6°28'15.5" E, 24.x.2016, MV Light Trap, Turner, C.R. & Tasane, T. leg.; 2 ♂♂, 1 ♀, Mucumbli Lodge, Praia das Furnas, Neves, 60 m, 00°26'56.1" N, 6°32'22.7" E, 16–17.x.2016, MV, plantation with remnant native dry scrub forest, C.R. Turner & T. Tasane leg., ANHRT:2017.21, gen. prep. No.: AV5958 (♂); 1 ♀, same site and collectors but collected at 30.x.2016; 9 specimens of both sexes, Ponta Figo, 635 m, 00°17'12.7" N, 6°34'14.5" E, 27.x.2016, primary and secondary forest edge along steep mountain track slope, MV, C.R. Turner & T. Tasane, leg., ANHRT:2017.21 (ANHRT). 1 ♀, St. Thome, X.–XI.[18]99 (Mocquerys), Rothschild Bequest B.M. 1939-1; 1 ♂, St. Thome, XII.[18]99 – I.[19]00, (Mocquerys), Rothschild Bequest B.M. 1939-1, gen. prep. No.: Arctiidae 5638; 3 ♂♂, 9 ♀♀, Sao Thome I[sland], 18.xi.1932, W.H.T. Tams, B.M. 1933-39; 2 ♂♂, 1 ♀, Sao Thome I[sland], 19.xi.1932, W.H.T. Tams, B.M. 1933-39, 2 ♂♂, 18. 26., Sao Thome, 10.I.–24.I.[19]26, Edge of virgin forest, T.A. Barns (NHMUK).

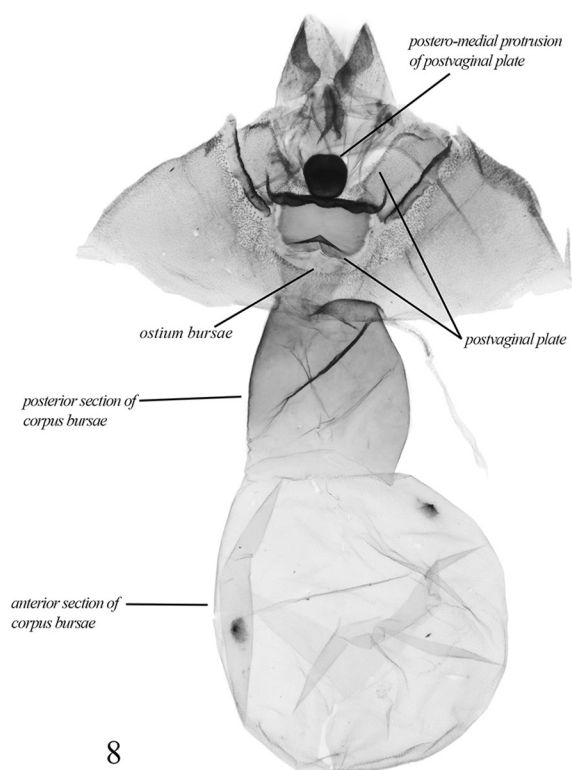
Diagnosis and description. The characterisation of the new species is provided under the description of the genus *Kruegerilema*.

Distribution. The new species is endemic to São Tomé Island (the Democratic Republic of São Tomé and Príncipe).

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 the discovery of numerous new species to science.

Acknowledgements. We express our sincere thanks to Dr Alberto Zilli and Mr Geoff Martin (NHMUK) for their kind assistance during the visits to their institution. Mr Arlindo de Carvalho (General Directorate for the Environment) is thanked for granting necessary permits to the ANHRT team for sampling insects in São Tomé and Príncipe.

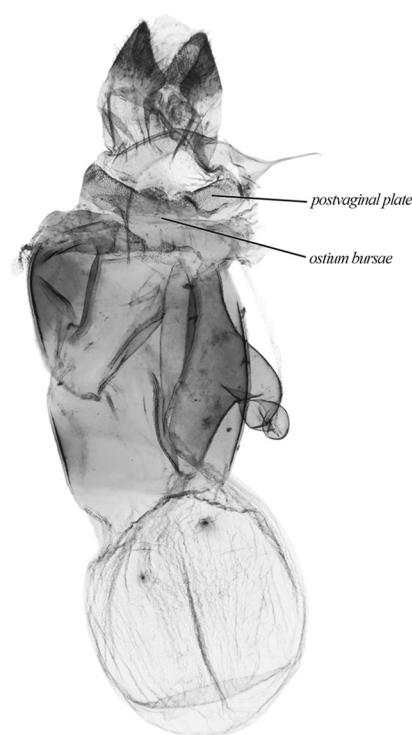
The Authors declare that to the best of their knowledge they conform to the national regulations and meet with the conditions and requirements of International Conventions concerning collecting/export and handling of the specimens presented in this article.



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***Kruegerilema smithi* gen. & sp. n., PT**

São Tomé and Príncipe, São Tomé Isl., slide AV5805 Volynkin



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Brunia agonchae

Cameroon, North Region, slide AV5966 Volynkin

Figs 8–9. Lithosiina spp., female genitalia. **8.** *Kruegerilema smithi* sp. nov., paratype, São Tomé. **9.** *Brunia agonchae* (= *Eilema subgriseola* Strand, 1912), Cameroon. The specimens dissected are deposited in coll. ANHRT.

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