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Apameini: Sesamiina): updated classification and
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Revisiting the taxonomy and molecular systematics of *Sesamia* stemborers (Lepidoptera: Noctuidae: Apameini: Sesamiina): updated classification and comparative evaluation of species delimitation methods

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Abstract

In this study, we reassess the phylogenetic relationships of the genus *Sesamia* Guenée, 1852 and examine in more detail the members of the *nonagrioides* species group, for which three distinct species complexes are identified. The *calamistis* subgroup comprises eight species, of which four new species are described: *Sesamia kabirara* Le Ru **sp. nov.**, *Sesamia kalale* Le Ru **sp. nov.**, *Sesamia mapalense* Le Ru **sp. nov.** and *Sesamia teke* Le Ru **sp. nov.** The *incerta* subgroup consists of 11 species, of which four new species are described: *Sesamia kamba* Le Ru **sp. nov.**, *Sesamia lalaci* Le Ru **sp. nov.**, *Sesamia lusese* Le Ru **sp. nov.** and *Sesamia msowero* Le Ru **sp. nov.** The *nonagrioides* subgroup comprises ten species of which two new species are described: *Sesamia libode* Le Ru **sp. nov.** and *Sesamia satauensis* Le Ru **sp. nov.** Phylogenetic and molecular species delimitation analyses of a multi-marker molecular dataset allow us to investigate and clarify the status of *Sesamia* species and species complexes. Our results yield a well-supported phylogenetic hypothesis for the genus, which supports the monophyletic nature of all but one species subgroup. The results of 16 distinct molecular species delimitation analyses show some levels of incongruence and, overall, a tendency towards over-splitting. We also present an updated list of species for the genus *Sesamia* and provide morphological keys based on male and female genitalia to determine the species group of any *Sesamia* species and to identify all species belonging to the *nonagrioides* species group.

Key Words

integrative taxonomy, molecular phylogenetics, molecular species delimitation, pest species, species complex, systematics

1. Introduction

The genus *Sesamia* is the second most diverse genus – after *Acrapex* Hampson, 1854 – of Sesamiina stemborers (Lepidoptera: Noctuidae: Noctuinae: Apameini), a subtribe of ca. 300 species mainly distributed in the Afrotropics. *Sesamia* currently consist of more than 60 valid species which are mainly distributed in the Afrotropical region (Moyal 2006; Moyal et al. 2011; Kergoat et al. 2015, 2018; Le Ru et al. 2020, 2022). Like other sesamiine stemborers, *Sesamia* species tend to prefer open habitats and humid environments (Kergoat et al. 2018); they are highly specialised phytophagous insects, whose larvae develop mainly in the stems of C₄ grasses and sedges (Poales). Several species of *Sesamia* are infamous for being major pests of various cereal crops (e.g., maize, rice, sorghum, and sugarcane), in particular *S. calamistis* Hampson, 1910, *S. cretica* Lederer, 1857, *S. grisescens* Warren, 1911, *S. inferens* (Walker, 1856) and *S. nonagrioides* (Lefèbvre, 1827) (Tams and Bowden 1953; Young and Kuniata 1992; Kuniata 1994, 1998; Kuniata and Sweet 1994; Kfir et al. 2002; Singh and Kular 2015; Gofitshu et al. 2016; Dey et al. 2021; Roopika et al. 2022). Until the 1950s, the great superficial resemblance of most species of the genus resulted in many misidentifications and confusions. It was only through the study of the male genitalia by Janse (1937–1939) and of both male and female genitalia by Tams and Bowden (1953) that informative morphological characters were identified, allowing improved species identifications and a better circumscription of sesamiine genera. Tams and Bowden (1953) also showed that *Sesamia* species may be assigned to at least three distinct morphological groups on the basis of the male genitalia: (i) the *coniota* species group (not named at the time), characterised by the partially fused sacculus and cucullus and a weakly spinose lamina ventralis of phallus, (ii) the *cretica* species group, characterised by

the fused sacculus and cucullus, a medial or dorsal process to the juxta and the strongly spinose lamina ventralis, and (iii) the *nonagrioides* species group, characterised by the separated cucullus and sacculus, simple juxta and membranous lamina ventralis.

The three *Sesamia* species groups have only begun to be revised in depth in recent years, thanks to the combined use of morphological and molecular data within an ‘integrative taxonomy’ framework (sensu Dayrat 2005; Will et al. 2005). Initially, two species complexes belonging to the *nonagrioides* species group were studied, leading to the description of nine new species (Moyal et al. 2011; Kergoat et al. 2015). In another study, Le Ru et al. (2020) formally defined the *coniota* species group and described three new species. More recently, the *cretica* species group was revised by Le Ru et al. (2022), resulting in the description of 23 new species. Molecular phylogenetic studies on the *cretica* species group also highlighted its polyphyletic nature, as several distinct lineages could be evidenced (Le Ru et al. 2022). In the process of revising *Sesamia* species groups, molecular species delimitation (SD) analyses were carried out in two studies (Kergoat et al. 2015; Le Ru et al. 2022). However, in doing so, both studies essentially focused on the species groups or subgroups of interest; in addition, only a single SD method was used in Kergoat et al. (2015), whereas up to 17 distinct approaches were used in Le Ru et al. (2022). Given that molecular SD analyses are known to be sensitive to breadth of the samples (see Ahrens et al. 2016), it is of interest to investigate *Sesamia* species boundaries with a more extensive sampling. This would also disclose whether there are significant discrepancies between the results of analyses carried out on a broad sample of specimens and those focusing only on a single species group (Le Ru et al. 2022) or subgroup (Kergoat et al. 2015).

In this study, we present a morphological revision of the *nonagrioides* species group, with formal descriptions of new species and supplemental descriptions of previously described taxa. We also provide morphological keys based on male and female genitalia that distinguish the three major *Sesamia* species groups and facilitate the identification of all species belonging to the *nonagrioides* species group. A review of all the species currently assigned to *Sesamia* is also performed. This morphological revision is carried out in conjunction with a molecular study, where the largest molecular dataset ever assembled for this genus (more than 600 specimens sequenced for up to four mitochondrial and two nuclear gene fragments) is analysed. Molecular phylogenetic analyses are used to investigate the phylogenetic placement of *Sesamia* species. In addition to the morphological study, several molecular SD analyses are used to investigate and clarify the status of *Sesamia* species after an integrative taxonomy approach. The results of molecular SD analyses are also discussed and compared with the results of previous molecular works on the genus.

2. Methods

2.1. Sampling and morphological study

Several thousand specimens belonging to the *nonagrioides* species group were obtained from the sampling of larvae from grasses and sedges (Poales) visually determined to have herbivore damage in sub-Saharan Africa (see Table S1), and in the western Palearctic (France, Italy, Iran and Turkey; see Kergoat et al. 2015 for details). Larvae were reared on artificial diets (following Onyango and Ochieng’Odero 1994) until pupation and emergence of adults (e.g., Le Ru et al. 2006a, 2006b). For non-crop Afrotropical species, plant specimens were identified by Simon Mathenge (Botany Department, University of Nairobi, Kenya). Additional adult specimens were collected with light traps set up in Cameroon, Democratic Republic of Congo, Ethiopia, Kenya, Republic of Congo, Republic of South Africa and Zambia. All sampling was carried out in accordance with local insect collection permits or local regulations. Lastly, hundreds of adult specimens (including holotypes and paratypes) were studied in the repository institutions listed below (see section 2.5). Specimens of other *Sesamia* species (already analysed in previous studies on the genus) were also taken into account when constructing the general key to distinguish the three species groups; this was also the case for specimens originally assigned to *Sesamia* but which do not belong to this genus (see the corresponding section in the discussion). Genitalia were dissected after immersion of the last abdominal segments in a boiling 10% potassium hydroxide (KOH) bath for a few minutes, then cleaned, immersed in absolute alcohol for a few minutes and mounted on slides in Euparal (after separating the phallus from the

rest of the male apparatus). The types of the species new to science were deposited as indicated in the individual descriptions given in the taxonomic section.

2.2. Molecular dataset

For this study, a comprehensive molecular dataset was assembled comprising 603 *Sesamia* specimens (57 from the *coniota* species group, 131 from the *cretica* species group and 415 from the *nonagrioides* species group) and 12 outgroups (one *Apameina* and 11 *Sesamiina*; including two species currently attributed to the genus *Sesamia* but which belong to a yet undescribed genus, see Table S2). This dataset consists of six gene fragments. We used the following four mitochondrial gene fragments: 658 bp region of the cytochrome *c* oxidase subunit 1 (*COI*), 992 bp of the cytochrome *b* (*cytb*), 370 bp of the small ribosomal RNA (*rrnS*), and 533 bp of the large ribosomal RNA (*rrnL*). Two nuclear gene fragments were also targeted: 1,240 bp of the elongation factor-1a (*EF1a*), and 860 bp of the 28S ribosomal DNA (*28S*). Most specimens (580 specimens) were sampled and previously sequenced by our research group (Toussaint et al. 2012; Kergoat et al. 2015, 2018; Le Ru et al. 2020, 2022). For the purpose of this study additional specimens were also processed, including a first batch of eight very old specimens (collected between 1921 and 1964) and a second batch of 38 specimens collected between 2008 and 2014. From these 46 specimens, we were able to generate sequences for 39 specimens (including 30 *COI*, 22 *cytb*, 24 *rrnS*, 30 *rrnL*, 21 *EF1a*, and 23 *28S* gene fragments; see Table S2 for details), including two of the oldest (please see below for details). Lastly, GenBank data was also used to include 24 *S. inferens* specimens (24 *COI* and one *cytb* gene fragments) from China, India, Indonesia and Thailand and one *S. griseescens* specimen (*rrnS* gene fragment) from Papua New Guinea (see Table S2).

For the 46 additional specimens processed in this study, DNA was extracted from hind legs using DNAeasy tissue kits (Qiagen, Hilden, Germany). Initially, we attempted standard PCRs (see Kergoat et al. 2012 for details), which proved successful for most of the recently collected specimens (37 out of 38), but failed for all older specimens. In an attempt to get data for the oldest specimens, we used high-throughput sequencing (amplicon sequencing) to target *COI*, *rrnL* and *rrnS* gene fragments. Amplicon libraries were constructed for these three genes following Galan et al. (2017), with slight modifications as described in Hévin et al. (2023); for the *COI*, two overlapping fragments were targeted following Shokralla et al. (2015). The final library was paired-end sequenced on an Illumina MiSeq flowcell using a MiSeq Reagent Kit v2 (500 cycles) at the AGAP laboratory (Montpellier, France). Using this approach, we were able to obtain *COI* Illumina reads for a specimen of *S. kamba* sp. nov. collected in 1955 and for a specimen of *S. madagascariensis* Saalmüller, 1891 collected in 1954. The corresponding reads were processed using the FROGS pipeline (<http://frogs.toulouse.inra.fr>; Escudié et al. 2018) on the GenoToul Galaxy server using

demultiplexing, pre-processing, clustering and chimera removal tools. Remaining contaminants were further detected using the BLAST tool (available at: <https://blast.ncbi.nlm.nih.gov/Blast.cgi>) and removed manually. Newly generated sequences were deposited on GenBank (see Table S2 for all GenBank accession numbers).

All mitochondrial and nuclear sequences were aligned using MAFFT v7 (Kato and Standley 2013) with default option settings and a gap opening penalty of 5.0, and further visually checked using Mesquite. For all protein-coding genes (*cytb*, *COI* and *EF1a*), coding frames and stop codons were also checked with Mesquite to detect potential pseudogenes. The final concatenated dataset consisted of a matrix of 615 specimens and 4,653 bp.

2.3. Phylogenetic analyses

Phylogenetic analyses were carried out under maximum likelihood (ML) with IQ-TREE v.2.1.3 (Minh et al. 2020). The concatenated dataset was divided into 12 partitions, with three partitions (one per codon position) for each coding gene fragment (*cytb*, *COI* and *EF1a*) and one partition for each non-coding gene fragment (*rrnL*, *rrnS* and *28S*). To infer individual gene trees, additional analyses were also conducted on each gene fragment, with three partitions implemented for the coding genes. Best-fit substitution models and partition schemes were selected with ModelFinder (part of the IQ-TREE software, Kalyaanamoorthy et al. 2017) using the Bayesian Information Criterion (Table S3). Maximum likelihood trees were obtained using heuristic searches implementing 500 random-addition replicates with the following settings: random-starting tree, hill-climbing nearest neighbour interchange (NNI) search (*-allnni* option), a default perturbation strength of 0.5 (*-pers 0.5* option), partition-resampling strategy (*-sampling GENE* option), best partition scheme allowing the merging of partitions (*-m MFP+MERGE* option). Clade support for all analyses was assessed using 1,000 replicates for both SH-like approximate likelihood ratio tests (SH-aLRT; Guindon et al. 2010) and ultrafast bootstraps (uBV; Minh et al. 2013). Highly supported nodes were identified by SH-aLRT values $\geq 80\%$ and uBV $\geq 95\%$ as recommended by the authors of IQTREE (<http://www.iqtree.org/doc/Frequently-Asked-Questions>). All tree files were visualized using FigTree v1.4.4 (<http://tree.bio.ed.ac.uk/software/figtree>).

2.4. Molecular species delimitation analyses

Sixteen distinct molecular species delimitation (SD) analyses were used in this study to better assess the consistency and repeatability of the inferred species delineations.

First, we relied on two tree-based methods: the Poisson-tree-process (PTP) approach of Zhang et al. (2013) and the General Mixed Yule Coalescent (GMYC) model of Pons et al. (2006). These methods were applied on the best-scoring ML tree resulting from the analyses of the

concatenated dataset, and also on the *cytb* and *COI* gene trees. Analyses were performed on a dedicated web server (<https://species.h-its.org>) with default parameters. For the GMYC model, we relied on the default single threshold approach (results referred to as ‘GMYCs’) of Pons et al. (2006) as well as the more parameter-rich approach (results referred to as ‘GMYCm’) of Monaghan et al. (2009), which implements multiple thresholds to account for potential heterogeneity of evolutionary rates among lineages. The ultrametric trees required for the GMYC methods were created with treePL (Smith and O’Meara 2012) using default settings.

Second, two distance-based methods were used: the Automatic Barcode Gap Discovery (ABGD) model of Puillandre et al. (2012) and the Assemble Species by Automatic Partitioning (ASAP) model of Puillandre et al. (2021). As these methods are known to be sensitive to missing data, they were only used for the *cytb* and *COI* gene fragments for which we had better coverage. ABGD analyses were performed using default settings, a standard Kimura 2-parameter model (K80) and recursive partitioning strategies on a dedicated webserver (<https://bioinfo.mnhn.fr/abi/public/abgd/abgdweb.html>). ASAP analyses, which differ from ABGD by including a specific scoring system to identify the best-fitting set of putative species, were carried out on a dedicated web server (<https://bioinfo.mnhn.fr/abi/public/asap/#>) using default settings and a K80 model.

Third, a multi-locus coalescent-based SD approach implemented in the program tr2 (Fujisawa et al. 2016) was used. This method uses both gene trees and a guide tree as inputs, and relies on a Bayesian model comparison framework with rooted triplets. All six gene trees were used and the topology resulting from the analyses of the concatenated dataset was used as a guide tree.

Finally, LIMES (Ducasse et al. 2020) was used to compare the partitions of all SD analyses using a SPART file (Miralles et al. 2022) as input. All the results of the SD analyses and the morphospecies previously defined were ranked according to the mean congruence (*mCtax*) obtained. Following Ducasse et al. (2020), specimens with missing gene fragments were excluded, resulting in the removal of five species (*S. djenoensis* Le Ru, 2022, *S. grisescens*, *S. lusese* **sp. nov.**, *S. madagascariensis* and *S. viettei* Rungs, 1954) for this specific analysis.

Results of the morphological and molecular studies were considered altogether, with molecular analyses being used to either test species status or determine monophyly of species groups and subgroups. To refine our hypotheses, we proceeded in an ‘iterative’ manner (sensu Yeates et al. 2011), carrying out additional analyses over time, which enabled us to identify with greater precision the species complexes requiring in-depth morphological studies.

2.5. Abbreviations

MCSN – Museo Civico di Storia Naturale, Milan, Italy;
MNHN – Muséum national d’Histoire naturelle, Paris,

France; **NHM** – Natural History Museum, London, United Kingdom; **NMK** – National Museum of Kenya, Nairobi, Kenya; **SMLF** – the Senckenberg Museum, Frankfurt am Main, Germany; **TMSA** – Ditsong Museum (formerly Transvaal Museum of South Africa), Pretoria, Republic of South Africa.

3. Results

Reappreciation of the already known species of the *nonagrioides* species group and study of new material allowed us to arrange this assemblage into three subgroups, namely the *calamistis*, *incerta* and *nonagrioides* subgroups, as detailed herein in sections 3.3, 3.4 and 3.5.

3.1. Phylogenetic analyses

The best-scoring tree from the ML analyses of the concatenated dataset is shown in Figure 1. Overall, 40% and 50% of the nodes are supported (SH-aLRT \geq 80% and uBV \geq 95%, respectively), with 67% and 78% of the interspecific nodes supported (SH-aLRT \geq 80% and uBV \geq 95%, respectively), and 35% and 45% of the intraspecific nodes (SH-aLRT \geq 80% and uBV \geq 95%, respectively) (Fig. 1; see also Figshare files for details). The *cretica* species group is recovered as paraphyletic (with five distinct lineages), while the *coniota* species group and the *nonagrioides* species group are recovered as monophyletic with high support (SH-aLRT \geq 97% and uBV of 100%). Except for the *fuscifrontia* subgroup, which is found to be paraphyletic, all *cretica* subgroups (*albivena*, *cretica*, *salama* and *wiltshirei*) and *nonagrioides* subgroups (*calamistis*, *incerta* and *nonagrioides*) are recovered as monophyletic with high supports (SH-aLRT values comprised between 85.1 and 100% and uBV \geq 98%). Within these subgroups, all species are also recovered as monophyletic with high support (SH-aLRT \geq 80% and uBV \geq 95%, except *S. inferens*, for which SH-aLRT = 79.9%). The results of the separate gene tree analyses further used by several SD approaches are available online on Figshare.

3.2. Species delimitation analyses

Depending on the methods and loci analysed, between 57 and 125 putative species are inferred by the SD analyses (Fig. 1; see Table S7 for details). Of the 59 sampled *Sesamia* “species”, 32 are recovered by at least 75% of the SD analyses, while 15 are recovered by less than 50% of the SD analyses. Five SD analyses have *mCtax* values that are close to the one inferred for the morphospecies (in *mCtax* order: GMYCs.concatenated, PTP.concatenated, GMYCs.COI, GMYCs.cytb, and ASAP.cytb). Eleven species (*S. calamistis*, *S. coniota* Hampson,

1902, *S. epunctifera* Hampson, 1902, *S. incerta* (Walker, 1856), *S. inferens*, *S. kafulo* Le Ru, 2022, *S. kamba* sp. nov., *S. nonagrioides*, *S. poephaga* Tams and Bowden, 1953, and *S. salama* Le Ru 2022) are often split by the SD analyses. Of the 16 SD analyses (only ten for *S. inferens* from India and Indonesia), *S. inferens* is found only once as a distinct species; *S. inferens* from China is recovered as a putative species by 81% of the analyses, *S. inferens* from Thailand by 81%, *S. inferens* from Indonesia by 70%, and *S. inferens* from India by 90% (with seven of the ten SD analyses finding different putative species). *Sesamia jansei* Tams and Bowden, 1953 and *S. schoenoplectus* Le Ru, 2020 are often split and sometimes some of the specimens are lumped together. Two sister species are sometimes lumped together by the SD analyses: *S. libode* sp. nov. with *S. typhae* Le Ru, 2015, and *S. capensis* Le Ru, 2015 with *S. natalensis* Le Ru, 2015. Finally, *S. msowero* sp. nov. is sometimes lumped with *S. lalaci* sp. nov. or *S. pennipuncta* Moyal, 2011 by the SD analyses.

3.3. *calamistis* subgroup

3.3.1. Morphology and taxonomy of *calamistis* species subgroup

The *calamistis* subgroup consists of *S. calamistis*, *S. kabirara* sp. nov., *S. kalale* sp. nov., *S. mapalense* sp. nov., *S. madagascariensis*, *S. monodi* Rungs, 1963, *S. oriaula* Tams and Bowden, 1953 and *S. teke* sp. nov.. This subgroup is characterised by the following combination of characters: (i) tegumen with large peniculi, vinculum with a large saccus; (ii) valve triangular with sacculus and cucullus separated; costa short, heavily sclerotised ending with a long curved costal spine; sacculus well sclerotized, ovoid at base, ending with a narrow, more or less elongated apical extension, its inner margin extended almost to costal margin, bearing outwardly several rows of short and stout spines; cucullus weakly sclerotized, elongated, clavate at apex with scattered and papillated hairs; (iii) juxta trapezoidal, except for *S. madagascariensis*; (iv) uncus angled at base, stout tapered to a fine point, tufted with long hairs dorsally; (v) phallus short; lamina ventralis with an elongate carinal crest produced into paired lateral lobes; vesica with a semi-circular or narrow flat cornutus or without cornutus; (vi) ventrolateral plates of female segment A8 elongated, sclerotized, at least twice as long as wide; (vii) ostium bursae small, transverse, strongly sclerotized; (viii) ductus bursae short and broad, generally strongly sclerotized posteriorly. The descriptions of the four new species belonging to the *calamistis* subgroup are presented below: *S. kabirara* sp. nov. from Kenya and Uganda, *S. kalale* sp. nov. from Zambia, *S. mapalense* sp. nov. from Kenya and *S. teke* sp. nov. from the Republic of Congo. A supplemental redescription is also provided, where appropriate, for species previously described in this subgroup.

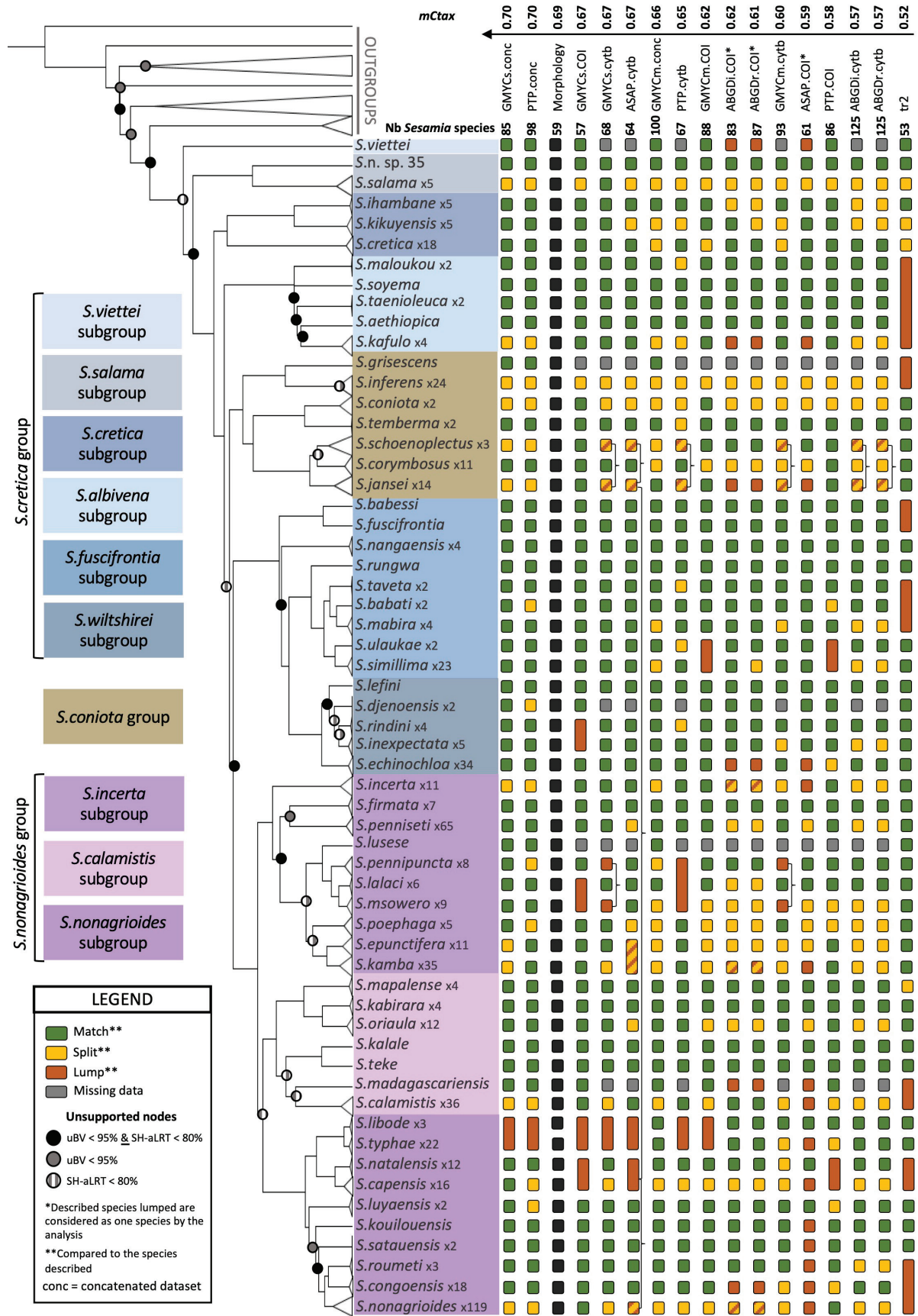


Figure 1. Maximum likelihood topology resulting from the analysis of the concatenated dataset, supplemented by the results of the SD analyses. The tree is shown on the left along with information on clade support for major nodes (S = supported, NS = not supported). The results of molecular analyses are displayed on the right, sorted by *mCtax* values. The bars are coloured in green, yellow or red, depending on whether a given analysis matches, splits or merges the number of described species, respectively. Analysis type, *mCtax*, *Ctax* (between morphology and a given analysis) and the number of species found (Nb species) are summarised in the panel at bottom left.

***Sesamia calamistis* Hampson, 1910**

Figures 2A–D; 3A, H; 4A; 5A; 6

= *Sesamia mediastriga* Bethune-Baker, 1911

Sesamia calamistis – Hampson (1910: 325, Plate CXLIV, fig. 18), Gaede (1934–1935: 97, Tafel 10, Reihe i), Tams and Bowden (1953: 664, figs 18–21, 47–48), Viette (1967: 703, figs 545–546), Poole (1989: 907 [catalogue]). *Sesamia mediastriga* – Bethune-Baker (1911: 518). *Sesamia vuteria* sensu Hampson (1910: 324, text figure 142, ♂) nec Stoll, 1790 (pro parte, misidentification).

Type material. Holotype ♂, [REPUBLIC OF SOUTH AFRICA], Cape Colony, Grahamstown, De. 20.03, 98–167, 1924/247, 1905.316, Agrotidae genitalia slide No. 1259, ♀ abdomen stuck on ♂ type, (NHM).

Other material. ANGOLA: one ♂, North Angola, N'dalla Tando, 2700 Ft, X 1908, W. Ansozei, Type *Sesamia mediastriga* Bethune-Baker, 1911, (NHM); BOTSWANA: four ♂, Chobe District, Kasane, 17°47'38"S, 25°09'10"E, 929m a.s.l., iii.2016, ex larvae in stems of *Pennisetum macrourum* Trin., (B. Le Ru leg.) (MNHN); CAMEROON: two ♀, Northwest Region, Babessi, 06°01'55"N, 10°33'07"E, 1203m a.s.l., xi.2013, ex light trap, (B. Le Ru leg.) (MNHN); four ♀, Northwest Region, Ndop, 05°58'40"N, 10°24'25"E, 1182m a.s.l., xii.2013, ex light trap, (B. Le Ru leg.) (MNHN); DEMOCRATIC REPUBLIC OF CONGO: three ♂, four ♀, Province Orientale, Yangambi, Yangole, 00°41'16"N, 24°18'10"E, 375m a.s.l., v.2010, ex larvae in stems of *Paspalum virgatum* L. (B. Le Ru leg.) (MNHN); ETHIOPIA: three ♂, five ♀, Jimma, Waro Kolobo, 07°36'49"N, 36°49'59"E, 1726m a.s.l., ix.2005, ex larvae in stems of *Cenchrus unisetus* (Nees) Morrone, (B. Le Ru leg.) (MNHN); KENYA: three ♂, two ♀, Eastern Province, Mtito Andei, 02°40'37"S, 38°11'43"E, 739m a.s.l., iv.2004/x 2003, ex larvae in stems of *Sorghum arundinaceum* (Desv.) Stapf, (B. Le Ru leg.) (MNHN); one ♀, Eastern Province, Mtito Andei, 02°40'37"S, 38°11'43"E, 739m a.s.l., xii.2003, ex larvae in stems of *Cyperus articulatus* L., (B. Le Ru leg.) (MNHN); one ♀, Eastern Province, Mtito Andei, 02°40'37"S, 38°11'43"E, 739m a.s.l., iv.2004, ex larvae in stems of *Eriochloa meyeriana* (Nees) Pilg., (B. Le Ru leg.) (MNHN); one ♂, Eastern Province, Mtito Andei, 02°40'37"S, 38°11'43"E, 739m a.s.l., xii.2003, ex larvae in stems of *Schoenoplectus corymbosus* (Roth ex Roem. & Schult.) J. Raynal, (B. Le Ru leg.) (MNHN); two ♂, one ♀, Eastern Province, Mtito Andei, 02°40'37"S, 38°11'43"E, 739m a.s.l., iv.2004, ex larvae in stems of *Cyperus rotundus* L., (B. Le Ru leg.) (MNHN); three ♂, two ♀, Central Province, Mai-Mahiu, 01°02'04"S, 36°26'25"E, 2042m a.s.l., xii.2009, ex larvae in stems of *Panicum deustum* Brickell & Enslin ex Muhl., (B. Le Ru leg.) (MNHN); MADAGASCAR: one ♀, Tananarive, Anombalahivato, 18°59'24"S, 47°28'03"E, 1395m a.s.l., i.2004, ex larvae in stems of *Pennisetum polystachion* (L.) Schult., (B. Le Ru leg.) (MNHN); REPUBLIC OF CONGO: four ♂, Kouilou, Kimbakala, 04°21'04"S, 12°08'50"E, 46m a.s.l., Iv.2013, ex larvae in stems of *Pennisetum polystachion* (L.) Schult., (B. Le Ru leg.) (MNHN); two ♂, Kouilou, Bas Kouilou, 04°28'19"S, 11°42'58"E, 11m a.s.l., iv.2013, ex larvae in stems of *Jardinea gabonensis* Steud., (B. Le Ru leg.) (MNHN); one ♂, four ♀, Kouilou, Lac Nanga, 04°53'48"S, 11°56'37"E, 14m a.s.l., iv.2013, ex larvae in stems of *Echinochloa pyramidalis* (Lam.) Hitchc. & Chase, (B. Le Ru leg.) (MNHN); one ♀, Bouenza, Nkaye, 04°10'17"S, 13°19'18"E, 189m a.s.l., iii.2013, ex larvae in stems of *Imperata cylindrica* (L.) P. Beauv., (B. Le Ru leg.) (MNHN); REPUBLIC OF SOUTH AFRICA: four ♀, KwaZulu Na-

tal, Duku Duku, 28°26'46"S, 32°17'26"E, 27m a.s.l., iii.2016, ex light trap, (B. Le Ru leg.) (MNHN); TANZANIA: one ♀, Iringa province, Sao Hill, 08°23'03"S, 35°10'45"E, 1938m a.s.l., ii.2013, ex larvae in stems of *Hyparrhenia dregeana* (Nees) Stapf ex Stent, (B. Le Ru leg.) (MNHN); one ♀, Zanzibar, Mtwango, 08°23'03"S, 35°10'45"E, 1938m a.s.l., ii.2013, ex larvae in stems of *Hyparrhenia dregeana* (Nees) Stapf ex Stent, (B. Le Ru leg.) (MNHN); one ♂, two ♀, Zanzibar, Kikobwa, 05°57'48"S, 39°19'30"E, 85m a.s.l., iii.2012, ex larvae in stems of *Andropogon schliebenii* Pilg., (B. Le Ru leg.) (MNHN); ZAMBIA: one ♂, two ♀, North-Western Province, Rwanko Azhi, 12°13'13"S, 25°39'04"E, 1413m a.s.l., iii.2012, ex light trap, (B. Le Ru leg.) (MNHN); two ♂, five ♀, Luapula Province, Ngwenya, 12°58'32"S, 28°27'19"E, 1243m a.s.l., iii.2012, ex light trap, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *calamistis* species subgroup, section 3.3.2.). This species can be distinguished from the other known members of the *calamistis* subgroup by the combination of the following characters of the male and female genitalia: vinculum u-shaped at the outer margin, slightly w-shaped at the inner margin without indentation, with a large saccus; apical extension of the sacculus shorter than the cucullus; juxta large and trapezoidal, the inferior plate produced into a blunt point, the sides pointed, the superior plate short and wide; phallus short and thick, vesica with a semi-circular large cornutus; ventrolateral plates of female segment A8 almost twice as long as wide; ostium bursae small, transverse, strongly sclerotized, with short and bifid tip on each side; ductus bursae short and broad, strongly albeit asymmetrically sclerotized posteriorly.

Supplemental description. (Fig. 2A–D). The external morphology of adults of both sexes has been described in great detail by Tams and Bowden (1953) and Viette (1967). — **Forewing length:** male 27–33 mm (\bar{x} = 29.2 mm, N = 20); female 32–38 mm (\bar{x} = 34.0 mm, N = 20). — **Male genitalia** (Fig. 3A, H). Tegumen with large peniculi; vinculum u-shaped at the outer margin, slightly w-shaped at the inner margin, with a large saccus. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a short and thin straight spine, with an apical tooth, sometimes bifid; sacculus heavily sclerotized rounded at base, a thick apical extension, slightly curved inwards, shorter than the cucullus, with a crest of several rows of short stout spines, blunt at apex; cucullus long, weakly sclerotized, clavate at apex, with scattered and papillated hairs. Juxta large and trapezoidal, the inferior plate produced into a blunt point, the sides pointed, the superior plate short and wide, with pointed terminations; uncus small and stout, angled at base, tapered near apex to a fine curved point; phallus short and thick, dilated at base; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a semi-circular large cornutus. — **Female genitalia** (Fig. 4A). Apophyses anteriores with spatulate tips; ventrolateral plates of segment A8 weakly sclerotized, elongated, almost twice as long as wide; ostium bursae small, transverse, strongly sclerotized, the posterior side slightly flared with short and bifid tip on each side; ductus bursae short and broad, strongly albeit asym-

metrically sclerotized posteriorly; corpus bursae long, without signa; ovipositor lobes at least 2.5 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved and tooth-shaped; apophyses posteriores more slender than apophyses anteriores. — **L5 instar larva** (Fig. 5A). Length, 35–40 mm, breadth, 4.0 mm; head smooth, light brown, prothoracic shield pale salmon beige; body with ground colour salmon pink, pinacula and caudal plate pale yellow-brown. Young larvae are very similar in appearance to mature ones.

Distribution. All sub-Saharan Africa (including Madagascar and Mascarene Islands), recorded from all vegetation mosaics (White 1983) (Fig. 6) belonging to the corresponding bioregions (sensu Linder et al. 2012).

Ecology. Larvae were collected on young stems and shoots of 57 host plant species either belonging to Cyperaceae (12 species from three genera) or Poaceae (45 species from 23 genera) (Table S4).

Remarks. This important pest species of cultivated grasses (maize, pearl millet, rice, sorghum, sugarcane and wheat; Gahukar 1984; Leslie 1994; Haile and Hofsvang 2001; Kfir et al. 2002) is very common and widespread in sub-Saharan Africa. As reported by Tams and Bowden (1953), the species is variable in size, wing patterns and colours, depending on its geographical origin. In addition to the specimens recorded above, respectively seven, 13 and 33 *S. calamistis* specimens were found in the MCSN, NHM and TMSA. Unlike *S. nonagrioides* that is frequently associated with *Typha domingensis* Pers. in sub-Saharan Africa, *S. calamistis* larvae have never been reared from this plant.

***Sesamia kabirara* Le Ru sp. nov.**

<https://zoobank.org/B08A476B-6240-42A3-963A-F9687B9E2623>

Figures 2E–H; 3B, I; 4B, 6

Type material. Holotype ♂, UGANDA, Western Province, Rushenyi, Kabirara, 01°00'36"S, 30°07'01"E, 1522m a.s.l., V.2009, ex larvae in stems of *Typha domingensis* Pers., male gen. Prep. LE RU Bruno/264, (B. Le Ru leg.) (MNHN); Paratypes: KENYA: two ♂, two ♀, Nyanza Province, Homa Bay, Ndhiwa, 00°40'24"S, 34°32'07"E, 1448m a.s.l., IV.2004–II.2005, ex larvae in stems of *E. pyramidalis*, (B. Le Ru leg.) (MNHN); four ♂, two ♀, Nyanza Province, Kisumu, Aram, 00°17'38"S, 34°25'37"E, 1146m a.s.l., II.2005, ex larvae in stems of *E. pyramidalis*, (B. Le Ru leg.) (MNHN); RWANDA: two ♂, Kigali, Kitikinyoni, 01°57'45"S, 29°59'59"E, 1358m a.s.l., III.2006, ex larvae in stems of *E. pyramidalis*, (B. Le Ru leg.) (MNHN); six ♂, five ♀, Kigali, Kitikinyoni, 01°57'45"S, 29°59'59"E, 1358m a.s.l., III.2006, ex larvae in stems of *Brachiaria radicans* Napper, male gen.

Prep. LE RU Bruno/24, females gen. Prep. LE RU Bruno/1014–1015, (B. Le Ru leg.) (MNHN); UGANDA: two ♂, two ♀, same locality and date as holotype, ex larvae in stems of *Typha domingensis* Pers., (B. Le Ru leg.) (MNHN); one ♂, Eastern Province, Mbale, Mailotano, 01°04'30"N, 34°07'32"E, 1071m a.s.l., III.2005, ex larvae in stems of *Echinochloa pyramidalis* (Lam.) Hitchc. & Chase, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *calamistis* species subgroup, section 3.3.2.). This species can be distinguished from the other known members of the *calamistis* subgroup by the combination of the following characters of the male and female genitalia: vinculum u-shaped at the outer margin, w-shaped at the inner margin without indentation, with a medium sized saccus; the apical extension of the sacculus as long as the cucullus, tapered and pointed at apex; juxta large and trapezoidal, the inferior plate produced into a sharp point, the sides pointed, the superior plate elongated without narrowing; phallus short and thick; vesica with a weak skinny cornutus; ventrolateral plates of female segment A8 elongated, almost three times longer than wide; ostium small, transverse, strongly sclerotized, funnel-shaped with short and pointed tip on each side and a hemispherical cup in the middle; ductus bursae short, very broad, almost ovoid and strongly sclerotized posteriorly.

Description. (Fig. 2E–H). Wing patterns similar in both sexes, but males are darker. Antenna ochraceous, bipectinate at base and serrate at apex in the male, filiform in the female, flagellum adorned dorsally with ochraceous scales in males and light ochraceous scales in females; palpus ochraceous; eyes brown. Head and thorax covered with long ochraceous hairs. Abdomen light buff suffused with fuscous scales. Forelegs of male light brown, otherwise ochraceous suffused with fuscous scales. Forewing ochraceous suffused with brown and fuscous scales, much more in males; three more or less distinct dark brown spots, one ante-medial, one at apex of cell and one postmedial; a longitudinal fuscous fascia along lower margin of cell, partly within, partly without cell from base of cell to the sub-terminal line; one more or less visible subterminal transverse markings, frequently reduced to a series of brown markings on the veins; outer margin adorned with brown spots between the veins, fringe light buff. Hindwing white extensively suffused with fuscous scales on the costal, apical and terminal areas, a series of fuscous markings more or less visible on the veins, fringe concolor, basal line of fringe buff. Underside of forewing ochraceous, heavily suffused with brown and fuscous scales in costa, apex and termen areas, fringe buff suffused with fuscous scales; underside of hindwing white extensively suffused with brown scales, particularly in costal and apical areas, fringe buff suffused with fuscous scales. — **Forewing length:** male 22–24 mm (\bar{x} = 23.4 mm, N = 12); female 26–28 mm (\bar{x} = 27.1 mm, N = 11). — **Male genitalia** (Fig. 3B, I). Tegumen with large peniculi; vinculum u-shaped at the outer margin, w-shaped at the inner margin without indentation, with a medium sized saccus. Valve with

sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a long straight spine, with an apical tooth; sacculus heavily sclerotized rounded at base with an indentation, a narrow and elongated apical extension as long as the cucullus, slightly curved inwards, adorned outwards with rows of short stout spines, pointed at apex; cucullus long, weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large and trapezoidal, the inferior plate produced into a sharp point, the sides pointed, the superior plate elongated without narrowing, with pointed ends; uncus angled and stout at base, narrowed in distal part, truncate at apex, tufted with long hairs on upper side; phallus short and thick, dilated at base; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a weak skinny cornutus. — **Female genitalia** (Fig. 4B). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 lightly sclerotized, elongated, almost three times longer than wide; ostium bursae small, transverse, strongly sclerotized, funnel-shaped with short and pointed tip on each side and a hemispherical cup in the middle; ductus bursae short, almost ovoid and very strongly sclerotized posteriorly; corpus bursae long, without signa; ovipositor lobes at least twice as long than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved and tooth-shaped; apophyses posteriores more slender than apophyses anteriores.

Etymology. Named after Kabirara, a village near Rushenyi in the Western Region of Uganda; treated as a noun in apposition.

Distribution. Kenya, Uganda and Rwanda. Known from several localities belonging to two vegetation mosaics ('lowland rain forest and secondary grassland' (Mosaic #11a) and 'East African evergreen bushland and secondary acacia wooded grassland' (Mosaic #45)) (White 1983) (Fig. 6) belonging to the Congolian bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected from young stems and shoots of Poaceae (*Brachiaria arrecta* (T. Durand & Schinz) Stent., *Echinochloa pyramidalis* (Lam.) Hitchc. & Chase) and Typhaceae (*Typha domingensis*) growing in wetlands inhabited by other Poales belonging to the following genera: *Digitaria* Haller, *Miscanthus* Andersson, *Panicum* L. and *Sporobolus* R. Br.

***Sesamia kalale* Le Ru sp. nov.**

<https://zoobank.org/51A818E3-820E-4F43-B0DB-D775EC81D802>

Figures 2I–J; 3C,J; 6

Type material. Holotype ♂, ZAMBIA, Occidental Province, Kaoma, Kalale, 14°47'55"S, 25°19'16"E, 1154m a.s.l., III.2012, ex light trap., gen. prep. LE RU Bruno/114, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *calamistis* species subgroup, section 3.32). This species can be distinguished from the other known members of the *calamistis* subgroup by the combination of the following characters of the male genitalia: vinculum v-shaped at the outer margin, w-shaped at the inner margin without indentation, with a medium large saccus; apical extension of the sacculus as long as the cucullus, tapered and pointed at apex; juxta large and trapezoidal, the inferior plate v-shaped, the sides pointed, the superior plate wide and short, with blunted ends; phallus short and thick; vesica with a small flat triangular cornutus.

Description. (Fig. 2I, J). Antenna ochraceous, shortly bipectinate at base and serrate at apex, flagellum adorned dorsally with ochraceous scales; palpus ochraceous; eyes brown. Head and thorax covered with light buff hairs. Forelegs of male ochraceous, otherwise light buff suffused with fuscous scales. Forewing light ochraceous heavily suffused with dark ochraceous and fuscous scales; three dark brown spots, one antemedial and one postmedial below the cell, one at apex of cell; a longitudinal fuscous fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; outer margin adorned with brown spots between the veins, fringe light buff. Hindwing white, fringe concolor (white), basal line of fringe buff. Underside of forewing light buff, heavily suffused with ochraceous and fuscous scales, fringe buff suffused with fuscous scales; underside of hindwing white suffused with ochraceous and fuscous scales in costal area, fringe concolor (white). — **Forewing length:** male 22 mm (N = 1). — **Male genitalia** (Fig. 3C, J). Tegumen with large peniculi; vinculum v-shaped at the outer margin, w-shaped at the inner margin without indentation, with a medium large saccus. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a long curved spine, with an apical tooth; sacculus heavily sclerotized rounded at base, a narrow and elongated apical extension as long as the cucullus, slightly curved inwards, adorned outwards with rows of short stout spines, pointed at apex; cucullus long, weakly sclerotized, very clavate at apex, with scattered and papillated hairs; juxta large and trapezoidal, the inferior plate v-shaped, the sides pointed, the superior plate wide and short, with blunted ends; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thick, dilated at base; lamina ventralis with an elongate carinal crest; vesica with a small flat triangular cornutus.

Etymology. Named after Kalale a small village in the Occidental Province of Zambia; treated as a noun in apposition.

Distribution. Zambia. Known from one locality only in 'wetter Zambezian miombo woodland (dominated by *Brachystegia* Benth., *Julbernardia* Pellegr. and *Isoberlinia* Craib & Stapf)' (Mosaic #25) vegetation mosaic (White 1983) (Fig. 6) belonging to the Zambezian bioregion (sensu Linder et al. 2012).

Ecology. Unknown; the only known specimen was caught with a light trap along the banks of a small river.

Sesamia madagascariensis Saalmüller, 1891

Figures 2K–N; 3D, K; 4C; 6

Sesamia madagascariensis – Saalmüller (1891: 262), Hampson (1910: 325), Warren (1911: 240), Tams and Bowden (1953: 663, figs 15–17), Rungs (1954: 159, 161, 162, fig. 4, Planche VIII, figs 3, 6, 8), Viette (1967: 700, figs 543–544).

Type material. Lectotype ♀, [MADAGASCAR], [Madagascar Nord], Nosy Be, [A.] Stumpff, [18]85, P. Viette gen. n°2552 [no. 19 in box], Paratypoid, SMF-L. 559, selected by Rungs (l.c., 1954: 161), Fotografiert 2014 H. Thöny, Senckenberg Museum, (Frankfurt a[m]. Main); Paralectotype ♀, [MADAGASCAR], Nossi-Bé, [A.] Stumpff, [18]85, Lep. 559 a, Senckenberg Museum, (Frankfurt a[m]. Main); Paralectotype ♀, Madag[ascar], Loucoubé, [A.] Stumpff, [18]80, Typus, 20, Lep. 559 x, [Senckenberg Museum, Frankfurt am. Main].

Other material. MADAGASCAR: six ♂, five ♀, Tananarivo, Nanihana, XII.1931, Madame d'Olsoufieff, ♂ Agrotidae genitalia slide No. 1263, ♀ Agrotidae genitalia slide No 1229, (NHM); two ♀, Madagascar, Nossi-Bé, 1932, coll. C. Dumont, (MNHN); one ♂, Madagascar nord, Nossi-Bé, forêt de Lokobe, alt. 150m a.s.l., 3 au 9.XI.1958, coll. P. Viette, (MNHN); one ♀, Madagascar, Tananarive, 1913, Waterlot, Ch. Rungs gen. 40 MP. 40, (MNHN); two ♀, Madagascar Centr., Tananarive, Plateaux de l'Imerina, Parc de Tsimbazaza, Alt. 1200m a.s.l., Chasse n° 57 du 23/24.XI.1951, Mission P.Viette sept. 1951–Mars 1952, Ch. Rungs gen. MP. 28, genitalia P. Viette prép. N° 4382, (MNHN); two ♀, [Madagascar] Tananarive, Tsimbazaza, 10.XII.1954, P. Viette, (MNHN); one ♂, Madagascar S., env. de Betroka, 19.vi.1954, (Dr. E. Diehl), [MNHN]; one ♀, Madagascar Centre, La Mandraka, 1200m a.s.l., 10/13.III.1964, P. Viette, (MNHN); one ♂, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 44 du 31.X.1951, Mission P. Viette sept. 1951–Mars 1952, *Sesamia madagascariensis* Saalm. Form *cannella* Rungs Holotype, (MNHN); one ♀, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 101 du 18.I.1951, Mission P. Viette sept. 1951–Mars 1952, *Sesamia madagascariensis* Saalm. Form *cannella* Rungs Allotype, (MNHN); one ♀, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 59 du 25.XI.1951, Mission P. Viette sept. 1951–Mars 1952, (MNHN); one ♀, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 66 du 3.XII.1951, Mission P. Viette sept. 1951–Mars 1952, (MNHN); one ♀, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 67 du 4.XII.1951, Mission P.Viette sept. 1951–Mars 1952, (MNHN); one ♂, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 84 du 24/26.XII.1951, Mission P.Viette sept. 1951–Mars 1952, Ch. Rungs gen. MP. 2, (MNHN); one ♂, one ♀, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 93 du 6.I.1952, Mission P.Viette sept. 1951–Mars 1952, (MNHN); one ♂, Madagascar Centr., Plateaux de l'Imerina, Tanana-

rive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 94 du 9.I.1952, Mission P.Viette sept. 1951–Mars 1952, (MNHN); one ♀, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 96 du 10.I.1952, Mission P.Viette sept. 1951–Mars 1952, (MNHN); one ♀, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 103 du 19.I.1952, Mission P.Viette sept. 1951–Mars 1952, (MNHN); one ♀, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 109 du 28.I.1952, Mission P.Viette sept. 1951–Mars 1952, (MNHN); one ♀, Madagascar Sud, env. d'Ifofaka, forêt d'Alluadia, Alt. 150m a.s.l., P. Viette n-91, Jour. 1.I.1952, (MNHN); one ♂, Madagascar Centr., Massif de l'Ankaratra, Manjakatampo, Forêt d'Ambahona, Alt. 1850m a.s.l., P. Viette, Chasse n° 41 du 26.X.1951, Mission P.Viette sept. 1951–Mars 1952, Ch. Rungs gen. MP. 27, (MNHN); three ♀, Madagascar Est, pourtour 3^{ème} Réserve national[e], route de Manakambahiny, env. de Nosivola, Alt. 1000m a.s.l., P. Viette, le 17/18/19.XI.[19]54, (MNHN); one ♀, Madagascar Est, env. Périnet, forêt d'Analamazotra, Alt. 910m a.s.l., P. Viette le 17.III.1955, (MNHN); three ♂, six ♀, [Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de] Tsimbazaza, [Alt. 1200m a.s.l.], P. Viette, 1/2/3/7/10/13XII.1954, [MNHN]; three ♀, Madagascar, Tananarive, 1914, Waterlot, (MNHN); one ♀, Madagascar, Tananarive, 12.XII.[19]27, Coll. R. Decary, (MNHN).

Diagnosis. (See also the identification key of *calamistis* species subgroup, section 3.3.2.). This species can be distinguished from the other known members of the *calamistis* subgroup by the combination of the following characters of the male and female genitalia: vinculum u-shaped at the outer margin, w-shaped at the inner margin with an indentation, with a large saccus; apical extension of the sacculus almost as long as the cucullus; juxta large and conical, pointed at apex, the sides rounded, the superior plate wide and long; phallus short; vesica with a small, slightly ridged, mid-ventral cornutus; ventrolateral plates of female segment A8 twice as long as wide; ostium bursae small, transverse, in the shape of a semicircle, strongly sclerotized, with small pointed tips on each side; ductus bursae short, asymmetrically sclerotized posteriorly; ovipositor lobes at least three times longer than wide.

Description. (Fig. 2K–N). The external morphology of adults of both sexes has been described in great detail by Tams and Bowden (1953), Rungs (1954) and Viette (1967). The ground colour of the forewing can vary from cartridge-buff to dark ochraceous, but most of the examined specimens are rather ochraceous. — **Forewing length:** male 28–34 mm (\bar{x} = 31.7 mm, N = 7); female 29–40 mm (\bar{x} = 35.9 mm, N = 16). — **Male genitalia** (Fig. 3D, K). Tegumen with moderate peniculi; vinculum u-shaped at the outer margin, w-shaped at the inner margin with an indentation, with a large saccus. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a long curved spine, slightly bending outward, with an apical tooth; sacculus heavily sclerotized rounded at base with an indentation, a thick and elongated apical extension almost as long as the cucullus, adorned outwards with rows of short stout spines, pointed at apex; cucullus long, weakly sclerotized, slightly clavate at apex, with scattered and papillat-

ed hairs; juxta large and conical, pointed at apex, the sides rounded, the superior plate wide and long; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short, dilated at base; lamina ventralis with an elongate carinal crest; vesica with a small, slightly ridged, mid-ventral cornutus. — **Female genitalia** (Fig. 4C). Apophyses anteriores with large spatulate tips; ventrolateral plates of segment A8 twice as long as wide; ostium bursae small, transverse, in the shape of a semicircle, strongly sclerotized, with small pointed tips on each side; ductus bursae short, asymmetrically sclerotized posteriorly; corpus bursae long, without signa; ovipositor lobes at least three times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe almost straight, tooth-shaped; apophyses posteriors more slender than apophyses anteriores.

Distribution. Madagascar. Known from localities belonging to different vegetation mosaics ('lowland rain forest wetter types' (Mosaic #1b), 'cultivation and secondary grassland, replacing upland and montane forest' (Mosaic #18) and 'dry deciduous forest and secondary grassland' (Mosaic #22b)) (White 1983) (Fig. 6).

Ecology. Unknown.

Remarks. In his revision of the genus *Sesamia* from Madagascar, Rungs (1954) noted that specimens collected in the highlands are much darker (and slightly reddish) than the lectotype and other specimens collected in the coastal area of Nossi-Be; he named them the *cannella* form.

Sesamia mapalense Le Ru sp. nov.

<https://zoobank.org/6D587F66-49D6-4049-935F-C775985EB2D5>

Figures 2O–R; 3E, L; 4D; 5B; 6

Type material. Holotype ♂, **KENYA**, Nyanza Province, Kijauri, 00°46'20"S, 35°04'51"E, 1858m a.s.l., V.2006, ex larvae in stems of *Panicum mapalense* Pilg., gen. Prep. LE RU Bruno/G42, (B. Le Ru leg.) (MNHN); Paratypes: **KENYA**: eight ♂, 10 ♀, same locality as holotype, I.2005–V.2006–X.2015, ex larvae in stems of *P. mapalense*, males gen. Prep. LE RU Bruno/G248–250–509, female gen. Prep. LE RU Bruno/G249, (B. Le Ru leg.) (MNHN); one ♀, Nyanza Province, Kissii2/Sare, 00°54'47"S, 34°31'44"E, 1583m a.s.l., VII.2004, ex larvae in stems of *P. mapalense*, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *calamistis* species subgroup, section 3.3.2.). This species can be distinguished from the other known members of the *calamistis* subgroup by the combination of the following characters of the male and female genitalia: vinculum with a small saccus, u-shaped at the outer margin, w-shaped at the inner margin without indentation; apical extension of

the sacculus slightly shorter than the cucullus; juxta large and trapezoidal, the inferior plate v-shaped, the sides pointed, the superior plate narrow and short; phallus short and thick, vesica without cornutus; ventrolateral plates of female segment A8 at least three times longer than wide; ostium bursae very small, transverse, with two lobes bean shaped, sclerotized; ductus bursae short and broad, entirely membranous.

Description. (Fig. 2O–R). Antenna ochraceous suffused with brown scales, shortly bipectinate in the male, filiform in the female, flagellum adorned dorsally with brown scales in males and light ochraceous scales in females; palpus from light to dark ochraceous; eyes brown. Wing patterns similar in both sexes, thorax brown in males, buff in females; head and thorax covered with long hairs. Legs of males brown, forelegs fuscous otherwise light buff suffused with fuscous scales in females. Forewing dark ochraceous heavily suffused with brown scales in males, light buff suffused with ochraceous and brown scales in females; no transverse markings, a line of dark brown markings below the cell, another one along the upper margin of the cell; orbicular spot indistinct, reniform spot visible; a more or less visible longitudinal fascia, brown in males, ochraceous in females, between lower and upper margins of cell, from base of cell to the termen; a curved subterminal series of brown markings on the veins; outer margin adorned with brown spots between the veins; fringe concolor (dark ochraceous) with a basal buff line. Hindwing light buff heavily suffused with brown scales, fringe concolor (light buff) with a basal buff line in males; light buff suffused with fuscous scales, fringe concolor (light buff) with a basal buff line, in females. Underside of forewing uniformly brown, suffused with ochraceous scales in costa, fringe concolor (brown), in males; light buff heavily and uniformly suffused with brown scales, suffused with ochraceous scales in costa, fringe concolor (light buff), in females. Underside of hindwing uniformly brown, suffused with ochraceous scales in costa, fringe concolor (brown) in males; light buff heavily suffused with brown scales, fringe concolor (light buff) in females; abdomen buff suffused with fuscous scales in both sexes. — **Forewing length:** male 17–19 mm (\bar{x} = 18.0 mm, N = 8); female 19–22 mm (\bar{x} = 20.5 mm, N = 11). — **Male genitalia** (Fig. 3E, L). Tegumen with large peniculi; vinculum with a small saccus, u-shaped at the outer margin, w-shaped at the inner margin without indentation. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a long straight spine, with an apical tooth; sacculus heavily sclerotized rounded at base, a narrow and elongated apical extension slightly shorter than the cucullus, apical extension adorned with rows of short stout spines, thick and blunt at apex; cucullus long, weakly sclerotized, clavate at apex, with scattered and papillated hairs. Juxta large and trapezoidal, the inferior plate v-shaped, the sides pointed, the superior plate narrow and short, bifid; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thick, dilated at base; lamina ventralis with an elongate carinal

crest, produced into paired lateral lobes; vesica without cornutus. — **Female genitalia** (Fig. 4D). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 slightly sclerotized, elongated, at least three times longer than wide; ostium bursae very small, transverse, with two lobes bean-shaped, sclerotized; ductus bursae short and broad, entirely membranous; ductus seminalis from the basal part of the corpus bursae; corpus bursae as long as ductus bursae, without signa; ovipositor lobes at least twice as long than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe almost straight, tooth-shaped; apophyses posteriores more slender than apophyses anteriores. — **L5 instar larva** (Fig. 5B). Length, 35–40 mm, breadth, 4.0 mm; head smooth, red brown, prothoracic shield salmon beige; body with ground colour salmon pink, pinacula and caudal plate salmon beige. Young larvae are very similar in appearance to mature ones.

Etymology. Named after *mapalense* the host plant specific name, treated as a noun in apposition.

Distribution. Kenya. Only known from two localities belonging to the ‘lowland rain forest and secondary grassland’ (Mosaic #11a) vegetation mosaic (White 1983) (Fig. 6) belonging to the Congolian bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected from young stems and shoots of *Panicum mapalense* Pilg. growing in wetlands inhabited by various species of Poaceae belonging to the following genera: *Cymbopogon* Spreng., *Hyparrhenia* Andersson ex Four., *Digitaria*, *Panicum* and *Sporobolus*.

***Sesamia monodi* Rungs, 1963**

Figures 2S–U; 3F, M; 6

Sesamia monodi – Rungs (1963: 69, figs 2, 3), Poole (1989: 908 [catalogue]).

Type material. Type ♂, [SENEGAL], Dakar, IFAN 1952, 31.VII.1952, A. Villiers, preparation N° IFAN 2 CH. Rungs P. (MNHN).

Diagnosis. (See also the identification key of *calamistis* species subgroup, section 3.3.2.). This species can be distinguished from the other known members of the *calamistis* subgroup by the combination of the following characters of the male genitalia: vinculum u-shaped at the outer margin, w-shaped at the inner margin with an indentation, with a large saccus; apical extension of the sacculus very short compared to the cucullus; juxta pointed inferiorly, the sides rounded, the superior plate bifid; vesica with a semi-circular large cornutus.

Description. (Fig. 3S–U). The species has been accurately described in great detail by Rungs (1963). — **Forewing length:** male 24.0 mm (N = 1). — **Male genitalia**

(Fig. 3F, M). Although already partly described by Rungs (1963), we provide here a complete description. Tegumen with large peniculi; vinculum u-shaped at the outer margin, w-shaped at the inner margin with an indentation, with a large saccus. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a thick and long straight spine, with an apical tooth; sacculus heavily sclerotized rounded at base with a thick and short apical extension nipple-shaped, very short compared to the cucullus, adorned with some stout spines; cucullus long, weakly sclerotized, very clavate at apex, with scattered and papillated hairs; juxta pointed inferiorly, the sides rounded, the superior plate bifid; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus shown in Fig. 2M poorly prepared, damaged; lamina ventralis not visible; vesica with a semi-circular large cornutus.

Distribution. Senegal. Known from a single locality belonging to the ‘lowland rain forest and secondary grassland’ (Mosaic #11a) vegetation mosaic (White 1983) (Fig. 6) belonging to the Sudanian bioregion (sensu Linder et al. 2012).

Ecology. Unknown.

***Sesamia oriaula* Tams & Bowden, 1953**

Figures 2V–Y; 3G, N; 4E, 5C, 6

Sesamia oriaula – Tams & Bowden (1953: 677), Poole (1989: 908 [catalogue]).

Type material. Holotype ♂, UGANDA, Ruwenzori Range, Bwamba Pass (West side), 5,500–7,500 ft., XIII.1934–I.1935, B.M.E. Afr. Exp. B.M. 1935–203, 1951/79, Agrotidae genitalia slide No. 1250, (F.W. Edwards Leg.) (NHM).

Other material. KENYA: four ♂, 11 ♀, Western Province, Kakamega Town, 00°15'18"N, 34°45'01"E, 1630m a.s.l., IX.2006, ex larvae in stems of *Cenchrus caudatus* (Schrad.) Kuntze, males gen. Prep. LE RU Bruno/20-1016-1017, female gen. Prep. LE RU Bruno/21, (B. Le Ru leg.) [MNHN]; two ♀, Nyanza Province, Homa Bay, Lwanda, 00°48'19"S, 34°29'44"E, 1148m a.s.l., II.2005, ex larvae in stems of *Miscanthus violaceus* (K. Schum.) Pilg., (B. Le Ru leg.) (MNHN); one ♀, Nyanza Province, Kisumu, Kasagamu, 00°06'39"S, 34°46'32"E, 1156m a.s.l., II.2005, ex larvae in stems of *Echinochloa pyramidalis* (Lam.) Hitchc. & Chase, (B. Le Ru leg.) (MNHN); UGANDA: seven ♂, one ♀, Ruwenzori Range, Ibanda, 4,700ft, 20–21.VIII.1952, males Agrotidae genitalia slides No. 2253–No.2265–No.2422, females Agrotidae genitalia slide No.1450–No.1449–No.2496, (D.S. Fletcher Leg.) (NHM); 14 ♂, 14 ♀, South Buganda Province, Masaka, Sembabule, Kasalu, 00°07'21"S, 31°32'57"E, 1198m a.s.l., V.2014, ex larvae in stems of *Echinochloa pyramidalis*, (Lam.) Hitchc. & Chase, male gen. Prep. LE RU Bruno/742, (B. Le Ru leg.) (MNHN); one ♀, Western Province, Kyenjojo, Kabungo, 00°39'21"N, 30°38'53"E, 1363m a.s.l., VI.2014, ex larvae in stems of *E. pyramidalis*, (B. Le Ru leg.) (MNHN); one ♂, North Buganda Province, Jinja, Mabira Forest, 00°44'05"N,

33°17'14"E, 1194m a.s.l., VII.2003, ex larvae in stems of *C. purpureus*, (B. Le Ru leg.) (MNHN); four ♂, three ♀, North Buganda Province, Kirongo, Mpologoma, 00°58'12"N, 33°44'20"E, 1063m a.s.l., II.2005, ex larvae in stems of *E. pyramidalis*, (B. Le Ru leg.) (MNHN); one ♂, seven ♀, North Buganda Province, Soroti, Awoja, 01°40'00"N, 33°43'59"E, 1051m a.s.l., V.2009, ex larvae in stems of *M. violaceus*, male gen. Prep. LE RU Bruno/23, female gen. Prep. LE RU Bruno/22, (B. Le Ru leg.) (MNHN); one ♂, seven ♀, Western Province, Bukoba, Kakungube, 01°26'46"N, 31°50'56"E, 1285m a.s.l., IV.2004, ex larvae in stems of *E. pyramidalis*, (B. Le Ru leg.) (MNHN); nine ♂, five ♀, Central Province, Kampala, Makerere, 00°28'00"N, 32°36'21"E, 1279m a.s.l., IV.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♂, one ♀, Western Province, Fort Portal, 00°39'19"N, 30°17'06"E, 1501m a.s.l., IV.2006, ex larvae in stems of *C. purpureus*, (B. Le Ru leg.) (MNHN); one ♂, Western Province, Fort Portal, Kibale Forest, 00°25'50"N, 30°23'48"E, 1267m a.s.l., IV.2004, ex larvae in stems of *C. purpureus*, (B. Le Ru leg.) (MNHN); three ♂, Central Province, Kampala, Namulonge, 00°31'17"N, 32°37'35"E, 1242m a.s.l., IV.2004, ex larvae in stems of *E. pyramidalis*, (B. Le Ru leg.) (MNHN); two ♂, Western Province, Kampala, Kakabara, 00°31'20"N, 30°57'36"E, 1409m a.s.l., IV.2004, ex larvae in stems of *C. purpureus*, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *calamistis* species subgroup, section 3.3.2.). This species can be distinguished from the other known members of the *calamistis* subgroup by the combination of the following characters of the male and female genitalia: vinculum u-shaped at the outer and inner margins, with a large sized saccus (larger than those of the other members of the subgroup), almost rectangular; apical extension of the sacculus as long as the cucullus, tapered and pointed at apex; juxta large and trapezoidal, the inferior plate produced into a sharp point, the sides blunted, the superior plate narrow and elongated, gradually narrowed; phallus long and thin; vesica with a small ventral cornutus; ventrolateral plates of female segment A8 almost three times longer than wide; ostium bursae small, transverse, strongly sclerotized, with long and pointed tip on each side and a hemispherical cup in the middle; ductus bursae very broad, almost ovoid and strongly sclerotized posteriorly.

Description (Fig. 2V–Y). The description made by Tams and Bowden (1953) was very brief, based on males only; here we provide a complete description of both sexes. Antenna light buff, bipectinate in the male, ochraceous and filiform in the female, flagellum adorned dorsally with fuscous scales in both sexes; palpus light buff with fuscous scales; eyes brown. Wing patterns similar in both sexes, but females are darker. Head and thorax covered with long light ochraceous hairs in both sexes. Abdomen light buff suffused with fuscous scales. Legs light buff in the male, ochraceous in the female. Forewing light buff uniformly and heavily suffused with brown and fuscous scales over the entire wing and with ochraceous scales from base of the cell to the termen in the male; ochraceous lightly suffused with brown and fuscous scales in the female; three distinct dark brown spots, one antemedial, one at apex of cell and one postmedial; a longitudi-

nal light buff fascia suffused with fuscous scales along lower margin of cell, partly within, partly without cell from base of cell to the termen; a distinct curved subterminal series of black markings on the veins; outer margin adorned with black spots between the veins, fringe light buff suffused with ochraceous and fuscous scales. Hindwing lightly pink ochre suffused with fuscous scales on the costal, apical and terminal areas; four black elongated markings on the veins in the male, fringe concolor (light pink ochre), veins and basal line of fringe buff. Underside of forewing light buff in the male, ochraceous in the female, heavily suffused with brown and fuscous scales from apex of the cell to the termen, fringe concolor (light buff in males and ochraceous in females), with fuscous scales; underside of hindwing lightly pink ochre extensively suffused with brown scales in the male and ochraceous and brown scales in the female in costal and apical areas, fringe concolor (light pink ochre in males and ochraceous in females). — **Forewing length:** male 26–31 mm (\bar{x} = 28.4 mm, N = 13); female 27–39 mm (\bar{x} = 33.7 mm, N = 12). — **Male genitalia** (Fig. 3G, N). Tegumen with large peniculi; vinculum u-shaped at the outer and inner margins, with a large saccus, almost rectangular. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a long straight spine, with an apical tooth; sacculus heavily sclerotized rounded at base with an indentation, a narrow and elongated apical extension as long as the cucullus, pointed at apex, slightly curved inwards, adorned outwards with rows of short stout spines; cucullus long, weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large and trapezoidal, the inferior plate produced into a sharp point, the sides blunted, the superior plate narrow and elongated, gradually narrowed, with pointed ends; uncus angled and stout at base, narrowed in distal part, truncate at apex, tufted with long hairs on upper side; phallus short, but longer and thinner than those of other members of the subgroup, dilated at base; lamina ventralis with an elongate carinal crest; vesica with a small ventral cornutus. — **Female genitalia** (Fig. 4E). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 lightly sclerotized, elongated, almost three times longer than wide; ostium bursae small, transverse, strongly sclerotized with long and pointed tip on each side and a hemispherical cup in the middle; ductus bursae short, very broad and strongly sclerotized posteriorly, almost ovoid; corpus bursae long, without signa; ovipositor lobes at least 2.5 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe almost straight; apophyses posteriores more slender than apophyses anteriores. — **L5 instar larva** (Fig. 5C). Length, 35–40 mm, breadth, 4.0 mm; head smooth, red brown, prothoracic shield salmon beige; body with ground colour salmon pink, pinacula and caudal plate salmon beige. Young larvae are very similar in appearance to mature ones.

Distribution. Kenya, Uganda, Rwanda. Known from several localities in 'lowland rain forest and secondary

grassland' (Mosaic #11a) and 'East African evergreen bushland and secondary acacia wooded grassland' (Mosaic #45) vegetation mosaics (White 1983) (Fig. 6) belonging to the Congolian bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected from young stems and shoots of *Cenchrus caudatus* (Schrad.) Kuntze, *Cenchrus purpureus* (formerly *Pennisetum purpureum* Schumach.), *Echinochloa pyramidalis* and *Miscanthus violaceus* (K. Schum.) Pilg., growing in wetlands inhabited by various Poales belonging to the genera *Cyperus*, *Sporobolus* and *Typha*.

Sesamia teke Le Ru sp. nov.

<https://zoobank.org/35FAB472-5188-4D32-B15A-CE07B-DAA6D4F>

Figures 2Z–AA; 4F, 6

Type material. Holotype ♀, **REPUBLIC OF CONGO**, Plateau Province, Lefini River, 02°54'30"S, 15°37'46"E, 320m a.s.l., X.2013, ex light trap., gen. Prep. LE RU Bruno/582, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *calamistis* species subgroup, section 3.3.2.). This species is only known by the female holotype. It can be distinguished from the other known members of the *calamistis* subgroup by the combination of the following characters of the female genitalia: ventrolateral plates of female segment A8 at least three times longer than wide; ostium bursae small, transverse, strongly sclerotized, funnel-shaped with elongated and pointed tip on each side and a posterior thick convex bead; ductus bursae short, almost ovoid and strongly sclerotized posteriorly.

Description. (Fig. 2Z–AA). Antenna pale ochraceous, filiform, flagellum adorned dorsally with light ochra-

ceous scales; palpus light ochraceous; eyes brown; palpus ochraceous; eyes brown. Head and thorax covered with ochraceous hairs. Legs ochraceous. Forewing light ochraceous lightly suffused with fuscous scales; a longitudinal ochraceous fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; outer margin adorned with brown spots between the veins, fringe light buff. Hindwing white lightly pink ochre in the apex and termen areas, fringe concolor (white), basal line of fringe pinkish ochre. Underside of forewing light buff, heavily suffused with fuscous scales in apex and termen areas, fringe buff suffused with fuscous scales; underside of hindwing white, slightly pinkish ochre suffused with fuscous scales in costal and apical areas, fringe concolor (white). — **Forewing length:** female 24 mm (N = 1). — **Female genitalia** (Fig. 3F). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 lightly sclerotized, elongated, at least three times longer than wide; ostium bursae small, transverse, strongly sclerotized, funnel-shaped with elongated and pointed tip on each side and a posterior thick convex bead; ductus bursae short and broad, almost ovoid and strongly sclerotized posteriorly; corpus bursae long, without signa; ovipositor lobes at least three times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved and tooth-shaped; apophyses posteriores more slender than apophyses anteriores.

Etymology. Named after the Plateau Teke in the Republic of Congo where the species was found; treated as a noun in apposition.

Distribution. Republic of Congo. Only known from a single locality belonging to the 'lowland rain forest and secondary grassland' (Mosaic #11a) vegetation mosaic (White 1983) (Fig. 6) belonging to the Congolian bioregion (sensu Linder et al. 2012).

Ecology. Unknown.

3.3.2. Identification key of *calamistis* subgroup

Keys to the *calamistis* subgroup based on the morphology of male (A) and female (B) genitalia.

A

- | | | |
|----|--|-------------------------|
| 1 | apical extension of the sacculus very short (Fig. 3F)..... | <i>monodi</i> |
| 1' | apical extension of the sacculus long (Fig. 3A, B)..... | 2 |
| 2 | apex of the apical extension blunt (Fig. 3A, D, E)..... | 3 |
| 2' | apex of the apical extension pointed (Fig. 3B, C, G)..... | 5 |
| 3 | juxta with long superior plate (Fig. 3D)..... | <i>madagascariensis</i> |
| 3' | juxta with short superior plate (Fig. 3A, E)..... | 4 |
| 4 | juxta with wide superior plate (Fig. 3A)..... | <i>calamistis</i> |
| 4' | juxta with narrow superior plate (Fig. 3E)..... | <i>mapalense</i> |
| 5 | juxta with wide superior plate (Fig. 3C)..... | <i>kalale</i> |
| 5' | sides of juxta convex (Fig. 3G)..... | <i>oriaula</i> |
| 6 | sides of juxta concave (Fig. 3B)..... | <i>kabirara</i> |

B

1	ostium bursae with two bean-shaped lobes (Fig. 4D).....	<i>mapalense</i>
1'	ostium bursae without bean-shaped lobes (Fig. 4A–C).....	2
2	ductus bursae strongly sclerotized and almost ovoid posteriorly (Fig. 4B, E, F).....	3
3	ductus bursae strongly and asymmetrically sclerotized posteriorly (Fig. 4A, C).....	5
3'	ostium bursae funnel-shaped (Fig. 4B, F).....	4
4	ostium bursae not funnel-shaped (Fig. 4E).....	<i>oriaula</i>
4'	posterior section of ductus bursae strongly sclerotized, twice as long as wide (Fig. 4B).....	<i>kabirara</i>
5	posterior section of ductus bursae strongly sclerotized, as long as wide (Fig. 4F).....	<i>teke</i>
5'	ostium bursae shaped as a semicircle (Fig. 4C).....	<i>madagascariensis</i>
6	ostium bursae not shaped as a semicircle (Fig. 4A).....	<i>calamistis</i>

3.3.3. Ecology and distribution of the *calamistis* subgroup

Regarding the ecology of the *calamistis* subgroup, the four taxa with known hosts (*S. calamistis*, *S. kabirara*, *S. mapalense* and *S. oriaula*) were reared from a total of 63 host plant species belonging to families Poaceae, Cyperaceae and Typhaceae. Two species are polyphagous as they were found associated with several host plant families, with *S. calamistis* recorded on 57 host plant species belonging to three families and *S. kabirara* recorded from three host plant species belonging to Poaceae and Typhaceae. *Sesamia oriaula* was found on eight host plants of Poaceae and *S. mapalense* was found monophagous on *Panicum mapalense* (Poaceae). While *S. calamistis* is characterised by its wide range of habitat, all the taxa whose biology is known (*S. kabirara*, *S. mapalense*, *S. oriaula*) or those that we only collected using light traps (*S. kalale*, *S. teke*) show marked ecological preferences for hygrophilous habitats, inhabiting wetlands, riversides and marshes. It should be noted that *S. kabirara* and *S. oriaula* larvae were frequently collected on *Echinochloa pyramidalis* floating on the surface of ponds; however, pupae were rarely found in those stems.

Regarding the distribution of the *calamistis* subgroup, one species (*S. calamistis*) has been recorded over a very large range and is found in all vegetation mosaics (White 1983) and all sub-Saharan bio-regions (sensu Linder et al. 2012). In contrast, all the other taxa have been recorded in a much more restricted range, limited to a single bioregion (*S. kabirara*, *S. mapalense*, *S. oriaula* and *S. teke* recorded in the Congolian bioregion; *S. kalale* in the North of the Zambezi bioregion; *S. monodi* in the Sudanian bioregion; *S. madagascariensis* in forested areas of Madagascar). It is surprising that no species belonging to the *calamistis* subgroup was found in the Southern African and Ethiopian bioregions, which are known for their high diversity of Sesamiina.

3.4. *incerta* subgroup

3.4.1. Morphology and taxonomy of the *incerta* subgroup

The *incerta* subgroup consists of *S. epunctifera*, *S. firmata* Moyal, 2011, *S. incerta*, *S. kamba* sp. nov., *S. lala-*

ci sp. nov., *S. lusese* sp. nov., *S. msowero* sp. nov., *S. pennipuncta* Moyal, *S. penniseti* Tams & Bowden, 1953, *S. poephaga*, and *S. simplaria* Rungs, 1954. This group was recorded as the *epunctifera* subgroup by Tams and Bowden (1953) and Moyal et al. (2011), and erroneously as the *poephaga* subgroup by Le Ru et al. (2020). It is characterised by the following combination of characters: (i) male antennae serrate or shortly pectinate (ii) tegumen with peniculi of variable size, vinculum with a large saccus; (iii) valve triangular, with sacculus and cucullus separated; costa short, heavily sclerotised, ending with a stout costal spine; sacculus well sclerotized, ovoid at base, ending either with a short apical extension, strongly club-shaped bearing numerous short and stout spines, or with an elongated, very sharp apical extension, its inner margin slightly toothed but without short and stout spines; cucullus weakly sclerotized, elongated, clavate or triangular at apex with scattered and papillated hairs; (iv) inferior plate of the juxta triangular more or less elongated with a base more or less pointed or rounded, the superior plate with a bifid termination; (v) uncus angled at base, slender, tapered to a fine point, tufted with long hair on upper side; (vi) phallus short; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a semi-circular cornutus or without cornutus; (vii) ventrolateral plates of female segment A8, large and broad, sclerotized; (viii) ostium bursae funnel-shaped with the exception of *S. firmata*; (ix) ductus bursae very slightly sclerotized all over, with slightly more sclerotized elongated areas with the exception of *S. firmata*.

The description of the four new species belonging to the *incerta* subgroup is presented below: *S. kamba* sp. nov., *S. lalaci* sp. nov., *S. lusese* sp. nov. and *S. msowero* sp. nov., all from Eastern Africa. A supplemental description is also provided, where appropriate, for species previously described in this subgroup.

Sesamia epunctifera Hampson, 1902

Figures. 4D; 6A–D; 7A, L; 8A; 9

Sesamia epunctifera – Hampson (1902: 298; 1910: 329), Gaede (1934–1935: 98), Janse (1939: 371), Tams and Bowden (1953: 667), Poole (1989: 907 [catalogue]).

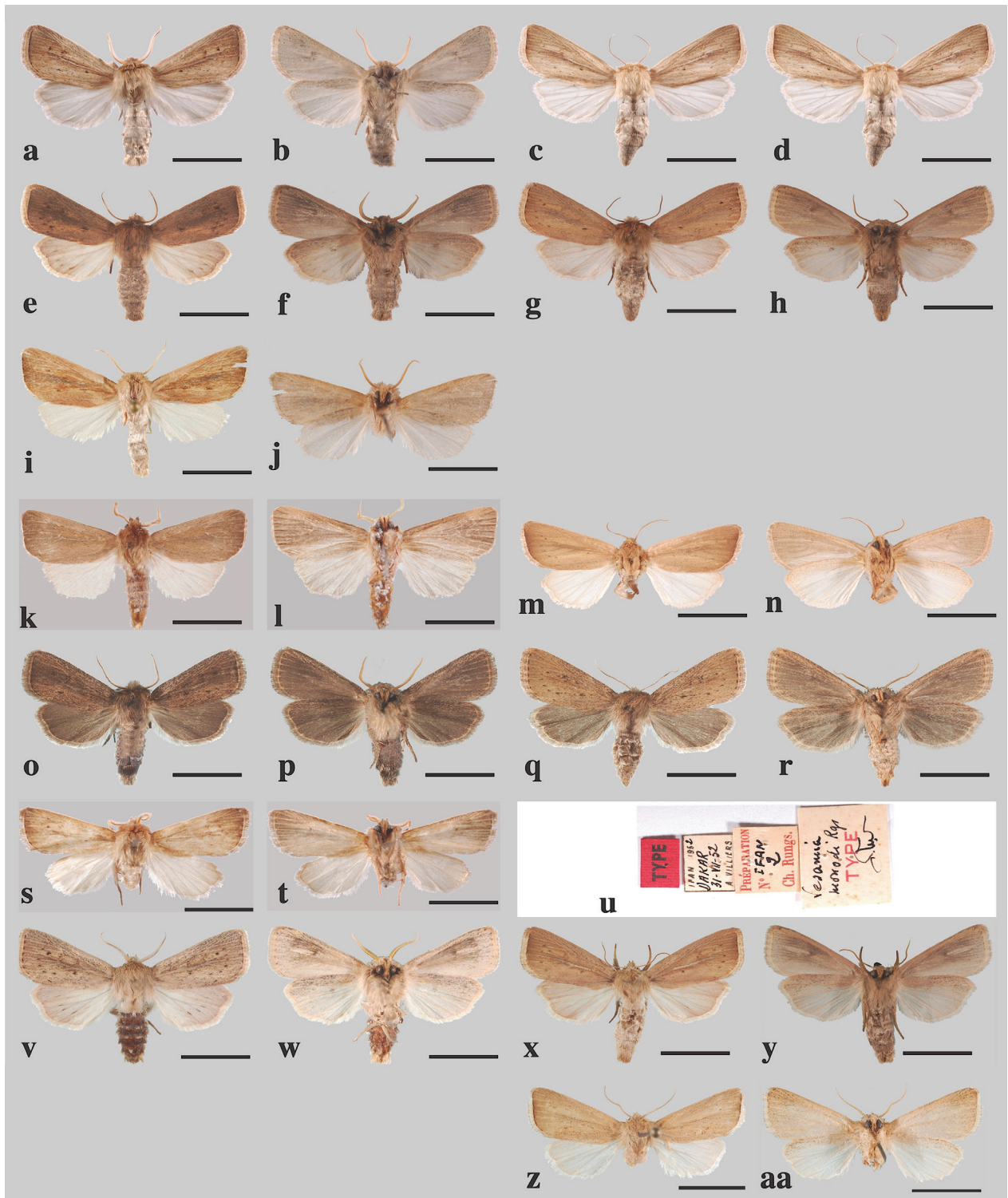


Figure 2. Adults of the *calamistis* subgroup (*S. calamistis*, *S. kabirara* sp. nov., *S. kalale* sp. nov., *S. madagascariensis*, *S. mapalense* sp. nov., *S. monodi*, *S. oriaula* and *S. teke* sp. nov.). *S. calamistis*: A male upper side; B male underside; C female upper side; D female underside; *S. kabirara* sp. nov.: E male upper side; F male underside; G female upper side; H female underside; *S. kalale* sp. nov.: I male upper side; J male underside; *S. madagascariensis*: K male upper side; L male underside, M female upper side; N female underside; *S. mapalense* sp. nov.: O male upper side; P male underside; Q female upper side; R female underside; *S. monodi*: S male upper side; T male underside; U original label type from MNHN; *S. oriaula*: V male upper side; W male underside; X female upper side; Y female underside; *S. teke* sp. nov.: Z female upper side; AA female underside. Scale bar = 10 mm.

Type material. Lectotype ♂, [REPUBLIC OF SOUTH AFRICA], [Eastern Cape Province], C[ape] Colony, Annshaw, [18]98–167, 1947/321, (Miss F. Barrett Leg.) (NHM), by present designation.

Other material. MOZAMBIQUE: one ♀, Manica Province, Chimio, Ripango, 19°26'16"S, 33°17'41"E, 640m a.s.l., III.2005, ex larvae in stems of *Megathyrsus maximus*, (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); REPUBLIC OF SOUTH AFRICA:

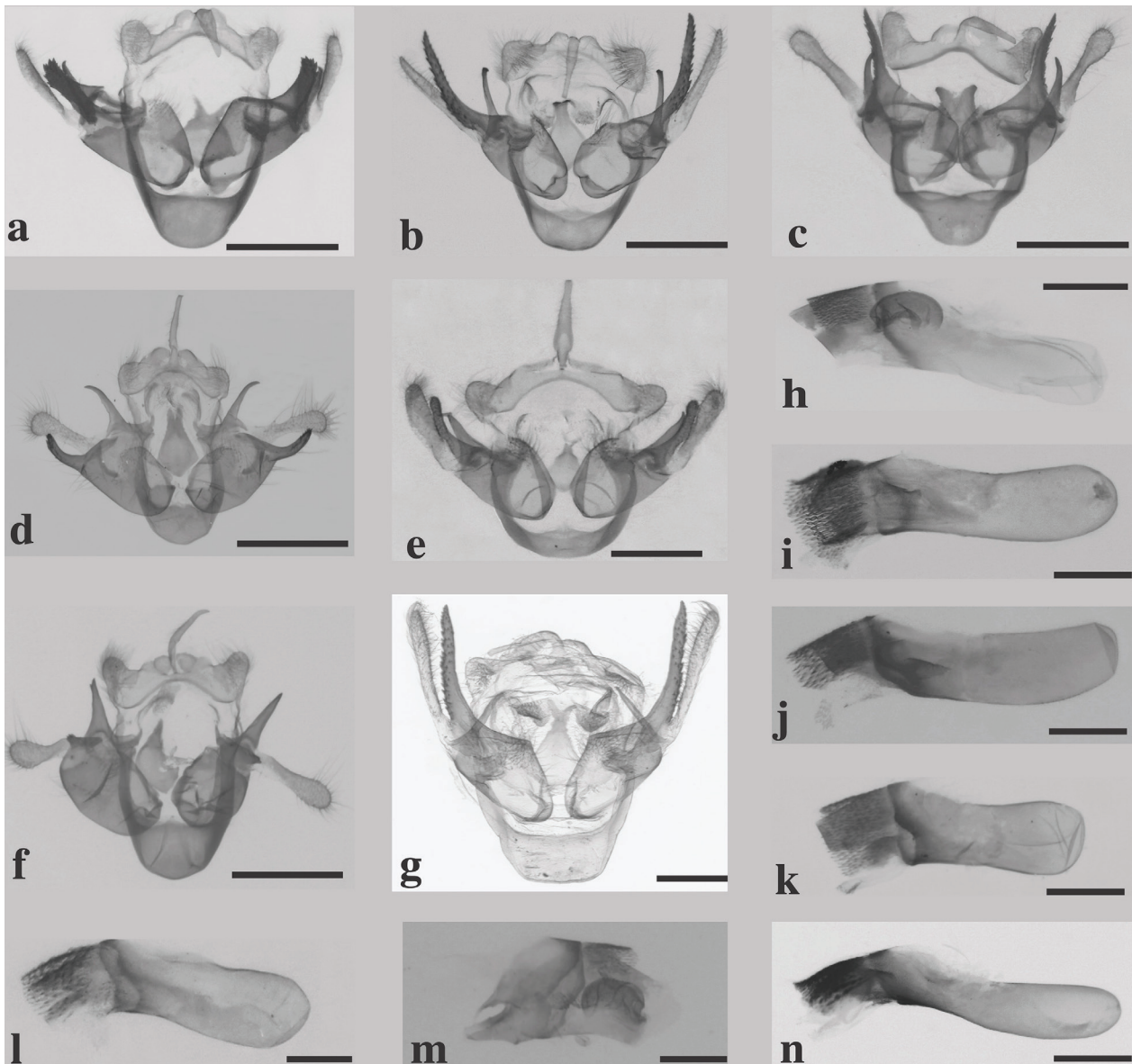


Figure 3. Male genitalia of members of the *calamistis* subgroup, with the vesica inside the phallus. *S. calamistis*: **A** apparatus; **H** phallus; *S. kabirara* sp. nov.: **B** apparatus; **I** phallus; *S. kalale* sp. nov.: **C** apparatus; **J** phallus; *S. madagascariensis*: **D** apparatus; **K** phallus; *S. mapalense*: **E** apparatus; **L** phallus; *S. monodi*: **F** apparatus; **M** phallus (poorly prepared, damaged); *S. oriaula*: **G** apparatus; **N** phallus. Scale bar = 1 mm for apparatus and 0.5 mm for phalli.

one ♂, C[ape] Colony, Annshaw, 98–9, Agrotidae genitalia slide No. 1237, (Miss F. Barrett Leg.) (NHM); one ♂, C[ape] Colony, Annshaw, 97–185, Agrotidae genitalia slide No. 1402, (Miss F. Barrett Leg.) (NHM); one ♂, C[ape] Colony, Annshaw, 97–186, Agrotidae genitalia slide No. 1401, (Miss F. Barrett Leg.) (NHM); one ♂, [Eastern Cape], Umkomaas, 22.I.[19]14, Joicey Bequest. Brit. Mus. 1934–120, Agrotidae genitalia slide No. 1234, (A.J.T. Janse Leg.) [NHM]; one ♂, [Kwazulu-Natal, Durban, 1907–236, 1947/323, Agrotidae genitalia slide No. 1236, (G.F. Leigh Leg.) (NHM); one ♂, [Kwazulu-Natal, 1902–74, 1952/27, Agrotidae genitalia slide No. 1403, (NHM); one ♂, Transvaal, Zoutpansberg District, Khalavha District, 3,700ft., 23.IV.1954, at light, (very open bush and grassveld), Stn Ru. 140, , B.M. 1954–797, (J. Bal-four-Browne) (NHM); one ♂, six ♀, Free state, Theunissen, Oss River, 28°25'14"S, 26°45'48"E, 1386m a.s.l., II.2009, ex larvae in stems of *Sorghum arundinaceum*, (B. Le Ru leg.) (MNHN); five ♂, three ♀, Kwazulu-Natal, Old Point, 31°03'43"S, 30°10'59"E, 76m a.s.l., II.2007, ex larvae in stems of *Megathyrus maximus*, (Jacq.) B.K. Simon &

S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); six ♂, four ♀, Kwazulu-Natal, Oribi Gorge, 31°41'04"S, 30°15'57"E, 400m a.s.l., II.2006, ex larvae in stems of *Megathyrus maximus*, (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); eight ♂, six ♀, Eastern Cape, Addo, Happy Land, 33°28'38"S, 25°35'50"E, 63m a.s.l., XII.2013, ex larvae in stems of *Megathyrus maximus*, (Jacq.) B.K. Simon & S.W.L. Jacobs, males gen. Prep. LE RU Bruno/610–631, female gen. Prep. LE RU Bruno/632, (B. Le Ru leg.) (MNHN); one ♂, two ♀, Kwazulu-Natal, Clanstal, 30°14'58"S, 30°46.47"E, 29m a.s.l., XI.2014, ex larvae in stems of *Megathyrus maximus*, (Jacq.) B.K. Simon & S.W.L. Jacobs, female gen. Prep. LE RU Bruno/765, (B. Le Ru leg.) (MNHN); one ♂, four ♀, Kwazulu-Natal, Eston Beaufort, 29°55'06"S, 30°37'13"E, 673m a.s.l., XI.2014, ex larvae in stems of *Megathyrus maximus*, (Jacq.) B.K. Simon & S.W.L. Jacobs, female gen. Prep. LE RU Bruno/769, (B. Le Ru leg.) (MNHN); one ♂, two ♀, Kwazulu-Natal, Dukuduku 3, 28°28'03"S, 32°12'10"E, 14m a.s.l., XI.2014, ex larvae in stems of *Megathyrus maximus*, (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one

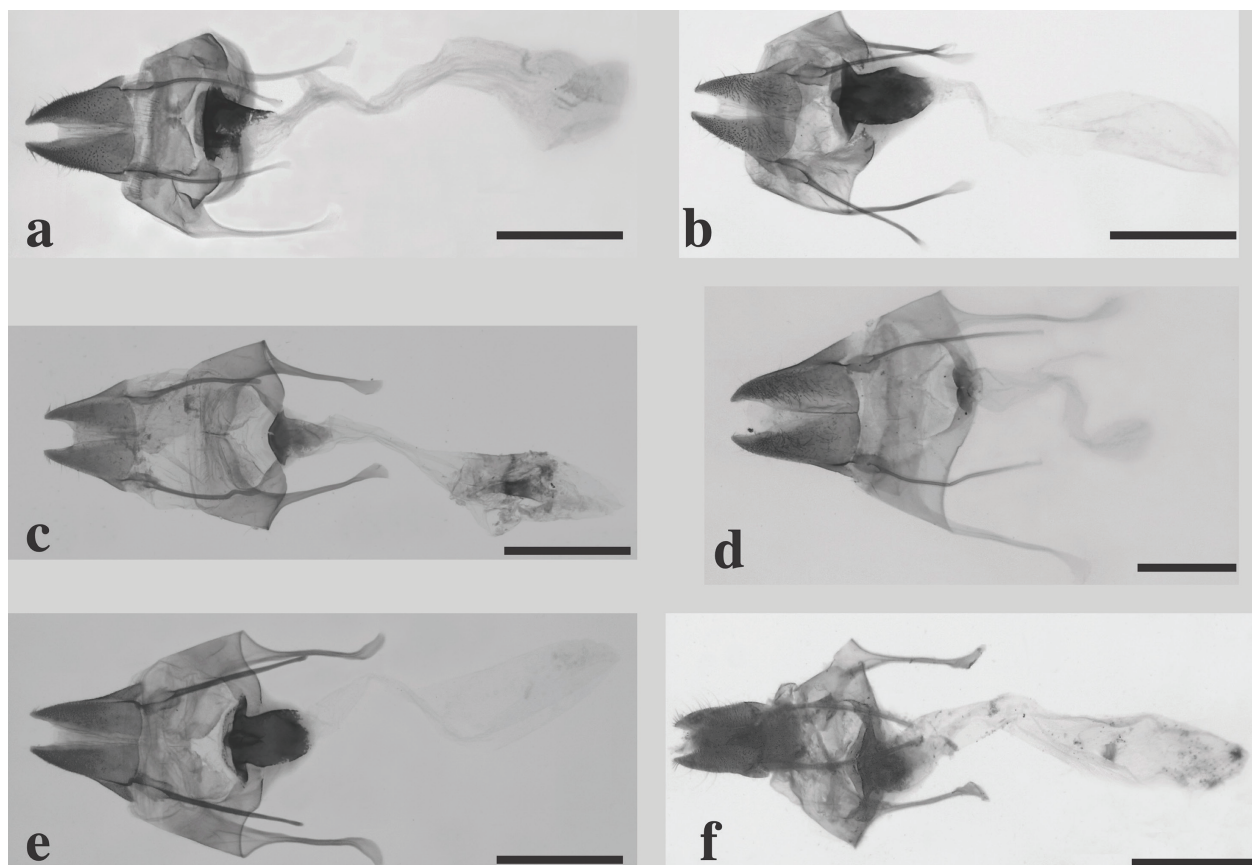


Figure 4. Female genitalia of members of the *calamistis* subgroup. **A** *S. calamistis*; **B** *S. kabirara* sp. nov.; **C** *S. madagascariensis*; **D** *S. mapalense* sp. nov.; **E** *S. oriaula*; **F** *S. teke* sp. nov. Scale bar = 1 mm.

♂, Kwazulu-Natal, Dukuduku 2, 28°26'46"S, 32°17'26"E, 27m a.s.l., XI.2014, ex light trap, (B. Le Ru leg.) (MNHN); one ♀, Limpopo, Louis Trichardt, Nooitgedacht, 23°04'35"S, 30°00'33"E, 836m a.s.l., I.2007, ex larvae in stems of *M. maximus*, (B. Le Ru leg.) (MNHN); **ZAMBIA**: one ♂, Kasese District, Northern Province, Mbala, Chalwe, 10°26'24"S, 29°30'02"E, 1295m a.s.l., III.2012, ex light trap, gen. Prep. LE RU Bruno/119, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *incerta* subgroup, section 3.4.2.). This species can be distinguished from the other known members of the *incerta* subgroup by the combination of the following characters of the male and female genitalia: tegumen with large squat peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large sized saccus, almost trapezoidal; juxta large, the inferior plate shaped like a rounded triangle produced into a sharp point, the sides pointed, the superior plate broad and short, shortly bifid terminally; phallus short and thick; vesica with a large almost ovoid flat cornutus; ventrolateral plates of female segment A8 very large, broad, sclerotized, trapezoidal, the anterior side straight outward swollen inwards, at least 1.2 times longer than wide; ostium bursae funnel-shaped with pointed tip on each side; ductus bursae with two narrow slightly more sclerotized areas posteriorly, at least 12 times longer than wide.

Description. (Fig. 6A–D). The male of this species has been previously described in great detail by Janse

(1937–1939) and Tams and Bowden (1953). The female is described here for the first time. It is characterised by its more elongated wings than the male and its filiform antennae; otherwise both sexes are very similar. — **Forewing length:** male 23–27 mm (\bar{x} = 24.5 mm, N = 11); female 28–31 mm (\bar{x} = 29.9 mm, N = 11). — **Male genitalia** (Fig. 8A, L). Tegumen with large squat peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large sized saccus, almost trapezoidal. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and short straight spine, with an apical tooth; sacculus heavily sclerotized rounded at base, a broad and short apical extension, curved inwards, strongly club-shaped, bearing numerous short and stout spines; cucullus longer than sacculus, weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large, the inferior plate shaped like a rounded triangle produced into a sharp point, the sides pointed, the superior plate broad and short, shortly bifid terminally; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thick, a bit curved in the middle; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a large almost ovoid flat cornutus. — **Female genitalia** (Fig. 9A). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 very large, broad, sclerotized, trapezoidal, the anterior side straight outward

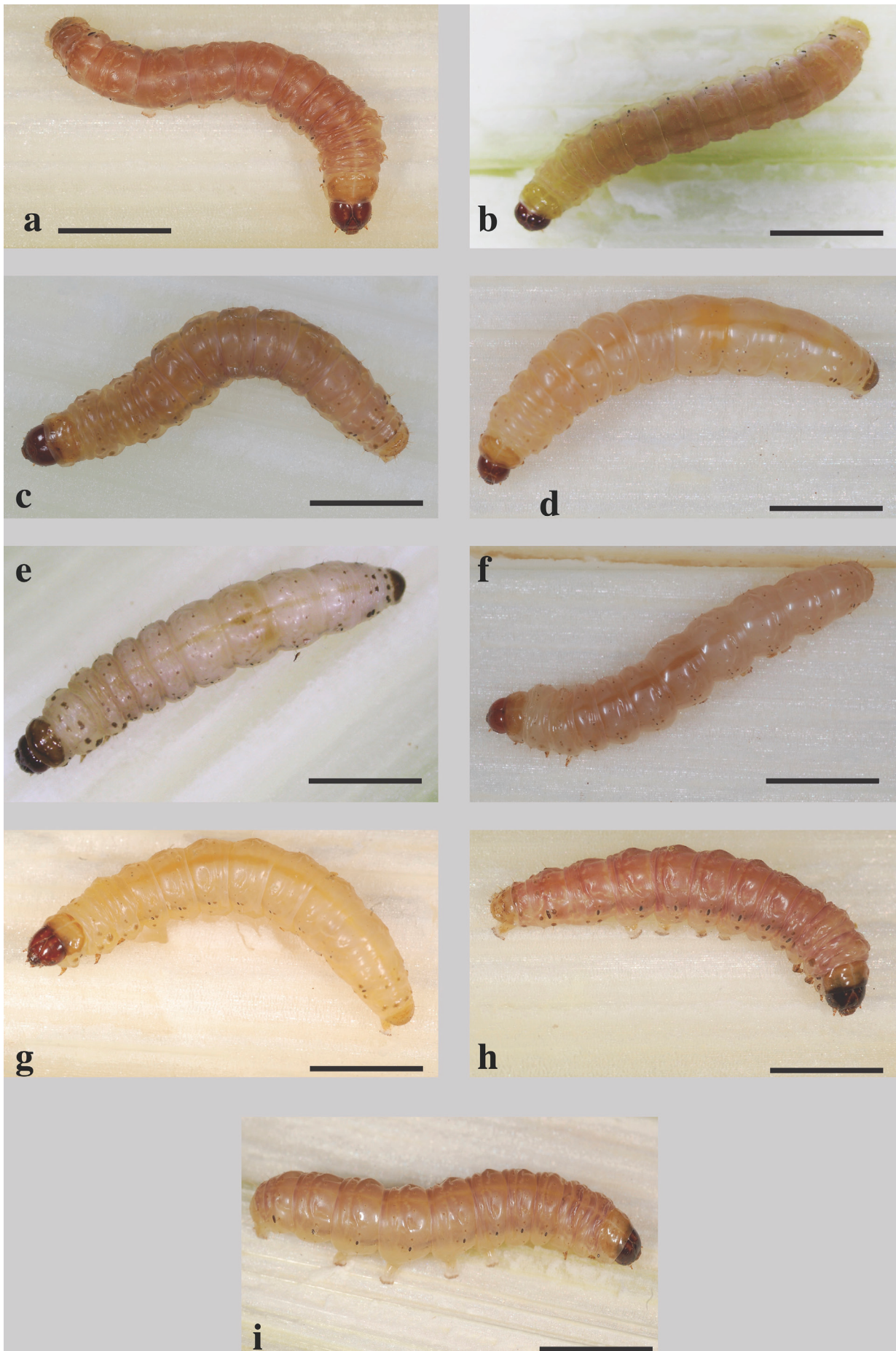


Figure 5. Last instar larvae of members of the *calamistis*, *incerta* and *nonagrioides* subgroups. **A** *S. calamistis*; **B** *S. mapalense* sp. nov.; **C** *S. oriaula*; **D** *S. epunctifera*; **E** *S. firmata*; **F** *S. incerta*; **G** *S. kamba* sp. nov.; **H** *S. penniseti*; **I** *S. roumeti*. Scale bar = 10 mm.

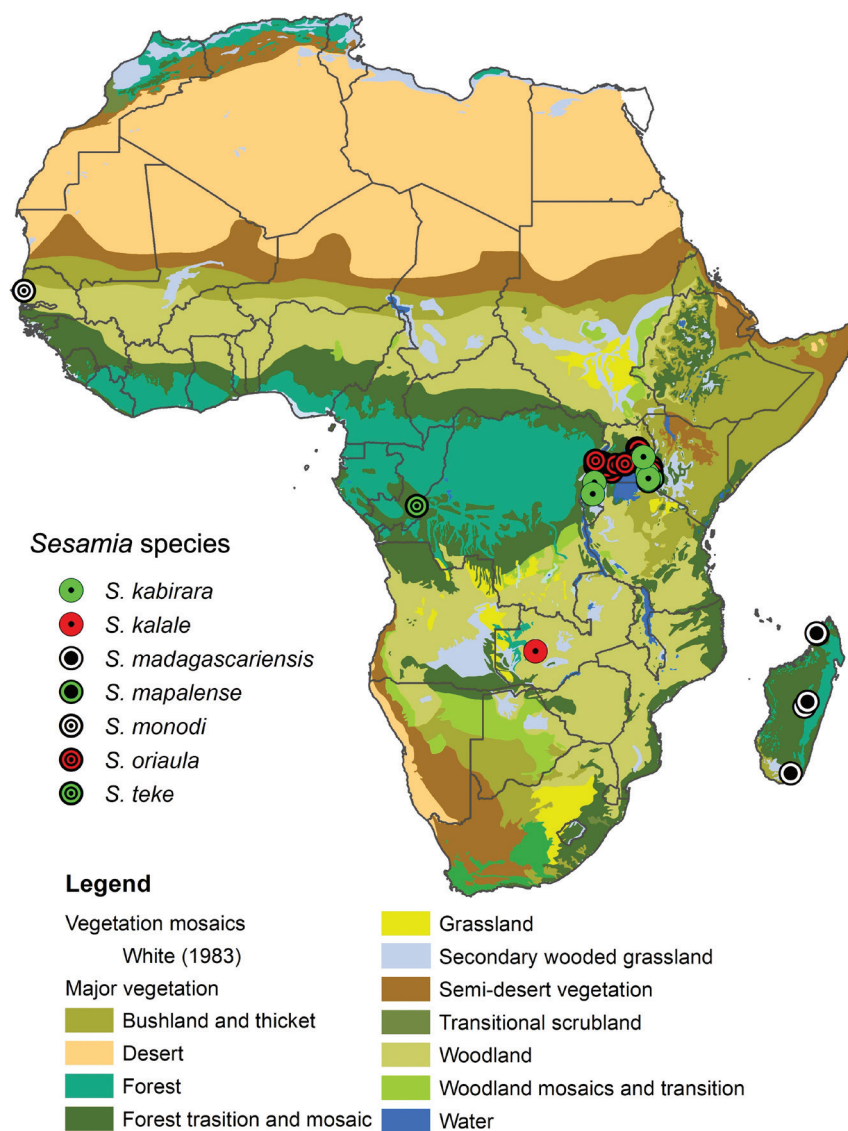


Figure 6. Distribution map of sampled specimens of the *calamistis* subgroup, with the exception of *S. calamistis* specimens.

swollen inwards, at least 1.2 times longer than wide; ostium bursae funnel-shaped with pointed tip on each side; ductus bursae long and narrow, slightly sclerotized posteriorly, and with two narrow posterior slightly more sclerotized areas, at least 12 times longer than wide; corpus bursae long, without signa; ovipositor lobes at least 2.7 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved; apophyses posteriores more slender than apophyses anteriores. — **L5 instar larva** (Fig. 5D). Length 30–35 mm, width 4.0 mm; head smooth, red brown, prothoracic shield pale yellow brown, body with ground colour salmon pink with pearly reflections, pinacula and caudal plate dark brown. Young larvae are similar in appearance to mature ones.

Distribution. Mozambique, Republic of South Africa and Zambia. Known from many localities from Eastern Cape and Kwazulu Natal Provinces, from one locality in South Mozambique and one locality in North-Western Province in Zambia belonging to the ‘East African Coastal (Tongaland-Pondoland)’ (Mosaic #16c), ‘drier Zambezian miombo woodland dominated by *Brachys-*

tegia and *Julbernardia*’ (Mosaic #26), ‘undifferentiated woodland, North Zambezian’ (Mosaic #29c), ‘undifferentiated woodland, South Zambezian’ (Mosaic #29d) and ‘semi-evergreen bushland and thicket’ (Mosaic #39) vegetation mosaics (White 1983) (Fig. 10) belonging to the Southern African bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected on young stems and shoots of *Digitaria natalensis* Stent, *Megathyrus maximus* B.K. Simon & S.W.L. Jacobs and *Sorghum arundinaceum* (Desv.) Stapf, growing in grassland inhabited with various Poales belonging to the following genera: *Cymbopogon*, *Digitaria*, *Hyparrhenia*, *Megathyrus* (Pilg.) B.K. Simon & S.W.L. Jacobs and *Panicum*. It should be noted that 83% of the larvae were collected on *Megathyrus maximus* (101 larvae reared from this host plant and found in 10 of the 13 collection sites for this species), which suggests that *S. epunctifera* shows a preference for this host plant.

Remarks. This species was described succinctly on the basis of two syntypes by Hampson (1902), one from Kenya and the other from the Republic of South Africa,

without description of the genitalia. Later, Janse (1937–1939) and Tams and Bowden (1953) provided detailed descriptions of the species based on male specimens from the Republic of South Africa only. This study clearly indicates that the syntype from Kenya belongs to a different species that has never been recorded in the Republic of South Africa; therefore the syntype from the Republic of South Africa is selected here as the lectotype of *S. epunctifera*.

Sesamia firmata Moyal, 2011

Figures 5E; 7E–H; 8B, M; 9B; 11

Sesamia firmata – Moyal (2011: 424).

Type material. Holotype ♂, **KENYA**, Eastern, Kitui 1, 01°24'07"S, 37°48'03"E, 1160m a.s.l., II. 2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, gen. prep. MP27, (B. Le Ru leg.) (MNHN); Paratypes: **KENYA**: one ♀, same locality, date and host plants as holotype, gen. prep. MP28, (B. Le Ru leg.) (MNHN); one ♀, same locality, date and host plants as holotype, gen. prep. MP28, (B. Le Ru leg.) (NMK); two ♂, one ♀, Central, Makutano, Tana River Bridge, 00°47'21"S, 37°15'55"E, 1080m a.s.l., V.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♂, Coast, Ukunda, Muhaka, 04°19'12"S, 39°32'28"E, 43m a.s.l., X.2002, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); **TANZANIA**: one ♂, Pwani, Mkuranga, Kisele, 07°11'22"S, 39°10'13"E, 66m a.s.l., III.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♂, Zanzibar, Mahonda, 05°59'17"S, 39°14'24"E, 42m a.s.l., V.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN).

Other material. **KENYA**: 18 ♂, five ♀, Central, Makutano, Tana River Bridge, 00°47'21"S, 37°15'55"E, 1080m a.s.l., V.2007/III.2012, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); six ♂, five ♀, Coast, Muhaka, 04°19'12"S, 39°32'28"E, 43m a.s.l., X.2002, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); two ♀, Eastern, Kitui 1, 01°24'07"S, 37°48'03"E, 1160m a.s.l., III.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); **TANZANIA**: one ♂, one ♀, Zanzibar, Mwera, 06°09'11"S, 39°16'23"E, 20m a.s.l., V.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); four ♂, Zanzibar, Kizimbani, 06°05'10"S, 39°15'26"E, 28m a.s.l., V.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); four ♂, one ♀, Zanzibar, Mahonda, 05°59'17"S, 39°14'24"E, 42m a.s.l., V.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♂, two ♀, Morogoro, Mzombe, 07°29'24"S, 37°01'53"E, 371m a.s.l., III.2008, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); eight ♂, three ♀, Morogoro, Uluguru Mountains, Mbangazina, 06°55'36"S, 37°46'13"E, 479m a.s.l., VI.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN);

five ♂, two ♀, Morogoro, Uluguru Mountains, Kalundwa, 06°55'39"S, 37°46'39"E, 496m a.s.l., VI.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); 21 ♂, seven ♀, Morogoro, Kibwaya, 06°55'49"S, 37°48'31"E, 400m a.s.l., II.2010, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) [MNHN]; one ♂, two ♀, Morogoro, Kisele, 07°11'22"S, 39°10'13"E, 66m a.s.l., III.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *incerta* subgroup, section 3.4.2.). This species can be distinguished from the other known members of the *incerta* subgroup by the combination of the following characters of the male and female genitalia: tegumen with large, ear-shaped peniculi; vinculum v-shaped at the outer margin with a large sized saccus; sacculus with an elongated very sharp apical extension, its inner margin slightly toothed but without short and stout spines; cucullus as long as the sacculus, widened in a triangle towards the apex; juxta large, the inferior plate part as a triangle with a large conical base, the superior plate broad and long, with long bifid termination; phallus short and thick; vesica without cornutus; ventrolateral plates of female segment A8 large, almost trapezoidal, sclerotized, widened inwards, the anterior side straight; ostium bursae large, sclerotized, the posterior side slightly convex with blunt tip on each side; posterior section of ductus bursae very large and ovoid, strongly sclerotized.

Redescription. (Fig. 7E–H). The species was described from nine specimens in Moyal et al. (2011). We redescribe the species with additional material (90 males and females) collected in Kenya and Tanzania. The general forewing shape of the female is more elongated than that of the male; wing patterns similar in both sexes, but males are generally darker. Antenna ochraceous, serrate in the male, filiform in the female, flagellum adorned dorsally with ochraceous scales in both sexes; palpus brown; eyes dark brown. Head and thorax covered with long ochraceous hairs. Abdomen light buff suffused with fuscous scales. Forelegs light brown, otherwise ochraceous suffused with fuscous scales. Forewing dark ochraceous suffused with brown and fuscous scales, much more in males; three more or less distinct dark brown spots, one antemedial, one at apex of cell and one postmedial; a more or less distinct longitudinal fuscous fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; one subterminal transverse zigzagging line, more visible in males, with brown markings on the veins and between the veins; outer margin adorned with brown spots between the veins, fringe concolor (dark ochraceous). Hindwing light buff extensively suffused with brown scales over its entire area, particularly in males, veins suffused with brown scales, four brown elongated markings on the veins, fringe concolor (light buff), basal line of fringe buff. Underside of forewing buff, heavily suffused with brown scales particularly in the medial area, fringe buff suffused with fuscous scales, in males; underside of forewing pale ochre slightly suffused with fuscous scales, in costa and

termen, fringe concolor (pale ochre), in females. Under-side of hindwing buff extensively suffused with fuscous scales, particularly in costa, apex and termen, veins suffused with brown scales, fringe buff suffused with brown scales, in males; underside of hindwing pale ochre slightly suffused with fuscous scales, in costa, fringe concolor (pale ochre), in females. — **Forewing length:** male 26–35 mm (\bar{x} = 30.6 mm, N = 13); female 32–40 mm (\bar{x} = 36.3 mm, N = 10). — **Male genitalia** (Fig. 8B, M). Tegumen with large, ear-shaped peniculi; vinculum v-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large saccus. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and straight spine, with two apical teeth; sacculus heavily sclerotized with an elongated very sharp apical extension, its inner margin slightly toothed but without short and stout spines; cucullus as long as the sacculus, weakly sclerotized, widened in a triangle towards the apex, with scattered and papillated hairs; juxta large, the inferior plate part as a triangle with a large conical base, the superior plate broad and long, with long bifid termination; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thick, a bit curved in the middle; lamina ventralis with an elongate carinal crest; vesica without cornutus. — **Female genitalia** (Fig. 9B). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 large, almost trapezoidal, sclerotized, widened inwards, the anterior side straight, at least 1.2 times longer than wide; ostium bursae large, sclerotized, the posterior side slightly convex with blunt tip on each side; ductus bursae long and narrow, its posterior section large and ovoid, strongly sclerotized; corpus bursae medium sized, without signa; ovipositor lobes at least 2.7 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved; apophyses posteriores more slender than apophyses anteriores. — **L5 instar larva** (Fig. 5E). Length 35–40 mm, width 4.0 mm; head smooth, dark brown, almost black, prothoracic shield brown, body with ground colour ebony with brown spots on each segment, pinacula and caudal plate dark brown. Young larvae are similar in appearance to mature ones.

Distribution. Kenya and Tanzania. Known from many localities in different vegetation mosaics ('East African coastal Zanzibar-Ihambane' (Mosaic #16a), 'Somalia-Masai acacia-*Commiphora* Jacq. deciduous bushland and thicket' (Mosaic #42) and mosaic of 'East African evergreen bushland and secondary acacia wooded grassland' (Mosaic #45)) (White 1983) (Fig. 11) belonging to the Zambezian bioregion (sensu Linder et al. 2012).

Ecology. Larvae were only collected from young stems and shoots of *Cenchrus purpureus* (Schumach.) Morrone, growing along rivers or in wetlands inhabited by various Poales belonging to the following genera: *Echinochloa* P. Beauv., *Megathyrsus*, *Panicum* and *Setaria* (L.) P. Beauv.

Remarks. The record from *Pennisetum trachyphyllum* Pilg. (synonym of *Cenchrus trachyphyllus* (Pilg.) Morrone) by Moyal et al. (2011) is a mistake due to a mislabelling in the icipe Mbita Point grass collection.

Sesamia incerta (Walker, 1856)

Figures 5F; 7I–L; 8C, N; 9C, 10

= *Sesamia veronica* Moyal, 2011 **syn. nov.**

Leucania incerta – Walker (1856: 103). *Sesamia incerta* – Tams and Bowden (1953: 676), Poole (1989: 907 [catalogue]). *Sesamia veronica* – (Moyal (2011: 424).

Type material. Holotype ♀, [REPUBLIC OF SOUTH AFRICA], S.[outh] Africa, Sir A. Smith. 44–6, Agrotidae genitalia slide No. 1233, (NHM).

Other material. REPUBLIC OF SOUTH AFRICA: three ♂, two ♀, NorthWest Province, Potchefstroom, Boskop Dam, 26°30'54"S, 27°07'25"E, 1403m a.s.l., II.2006–II.2007, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., male gen. prep. MP29, female gen. prep. MP30, these two specimens were used to describe the holotype and the paratype of *S. veronica* Moyal, 2011, however with wrong data for the GPS coordinates and dates of collection, (B. Le Ru leg.) (MNHN); four ♂, four ♀, Western Cape Province, Olifants River, 33°37'32"S, 22°13'15"E, 302m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); two ♂, one ♀, Western Cape Province, Swartberg, R401-15km, 34°09'02"S, 19°28'40"E, 283m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); two ♂, Free State Province, Kroonstad, 27°27'33"S, 27°06'35"E, 1329m a.s.l., II.2007, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♂, two ♀, Western Cape Province, Heidelberg, 34°05'49"S, 20°57'54"E, 80m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); two ♂, five ♀, Western Cape Province, Melkbosstrand, 33°42'16"S, 18°27'22"E, 29m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); two ♀, Mpumalanga Province, Dullstroom, 25°25'18"S, 30°06'06"E, 2013m a.s.l., II.2006, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♀, Western Cape Province, Darling, 33°22'31"S, 18°22'47"E, 110m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); two ♀, Free State Province, Winburg, 28°31'01"S, 27°00'44"E, 1420m a.s.l., I.2007, ex larvae in stems of *P. australis*, (B. Le Ru leg.) (MNHN); one ♂, Western Cape Province, Velddrif, 32°47'24"S, 18°11'24"E, 10m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); five ♂, three ♀, Free State Province, Riet-Vlei, 33°50'13"S, 18°31'11"E, 14m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., male gen. Prep. LE RU Bruno/226, (B. Le Ru leg.) (MNHN); two ♂, Northern Cape Province, Kimberley, 28°42'17"S, 24°46'22"E, 1180m a.s.l., II.2011, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); three ♂, four ♀, Western Cape Province, George, N12x N9, 33°47'02"S, 22°20'04"E, 493m a.s.l., II.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., male gen. Prep. LE RU Bruno/225, (B. Le Ru leg.) (MNHN); five ♂, eight ♀, Eastern Cape Province, Queenstown, 31°55'24"S, 26°49'46"E, 1041m a.s.l., XI.2009, ex larvae in stems of

Phragmites australis Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♀, Free State Province, Parys 2, 26°53'45"S, 27°27'15"E, 1369m a.s.l., II.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., female gen. Prep. LE RU Bruno/316, (B. Le Ru leg.) (MNHN); one ♀, Free State Province, Stilfontein, 26°54'15"S, 26°48'37"E, 1395m a.s.l., III.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♂, Free State Province, Bloemhof Dam, 29°39'36"S, 25°40'06"E, 1237m a.s.l., II.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♀, Free State Province, Oudedorp, 26°35'03"S, 27°04'18"E, 1373m a.s.l., II.2007, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♂, one ♀, Mpumalanga Province, Middelburg-N4, 25°40'20"S, 29°43'10"E, 1610m a.s.l., XII.2010, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♀, North West Province, Baberspan, 26°34'02"S, 25°35'39"E, 1357m a.s.l., X.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); three ♂, four ♀, Western Cape Province, Wellington, Hauptfleisch, 33°37'25"S, 18°58'18"E, 100m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); two ♂, Western Cape Province, Heuningnes River, 34°41'24"S, 20°01'57"E, 15m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♀, Western Cape Province, Makassa, 34°03'45"S, 18°45'20"E, 12m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♀, Western Cape Province, Soes-Rivier, 34°20'38"S, 20°09'11"E, 95m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♂, Western Cape Province, Hartenbos, 34°07'02"S, 22°06'07"E, 23m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♀, Northwest Province, Bar Baraka, 26°49'43"S, 27°22'01"E, 1365m a.s.l., II.2014, ex light trap, (B. Le Ru leg.) (MNHN); five ♂, three ♀, Western Cape Province, Waboomskraal, 33°50'36"S, 22°20'47"E, 570m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); two ♀, Northwest Province, Harpington, 26°52'03"S, 27°01'30"E, 1318m a.s.l., II.2006, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♂, one ♀, Western Cape Province, Karsrivier, 34°29'09"S, 20°05'28"E, 40m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); one ♂, Western Cape Province, Hankey, 33°50'18"S, 24°52'34"E, 135m a.s.l., XII.2009, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN); four ♂, five ♀, Northern Cape Province, Upington, 28°27'11"S, 21°15'54"E, 802m a.s.l., II.2016, ex larvae in stems of *Phragmites australis* Trin. Ex Steud., (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *incerta* subgroup, section 3.4.2.). This species can be distinguished from the other known members of the *incerta* subgroup by the combination of the following characters of the male and female genitalia: tegumen with medium-sized, ovoid peniculi; vinculum u-shaped at the outer margin with a large sized saccus, quadrangular; juxta large and conical, the inferior plate shaped like a rounded triangle produced into a sharp point, the sides blunted, the superior plate broad and short, shortly bifid terminally; phallus short and thick, strongly curved in the middle; vesica with a small mushroom-shaped cornutus; ventrolateral plates of female segment A8 large, sclerotized, lozenge-shaped, the anterior side rounded, at least 1.6 times longer than

wide; ostium bursae large, funnel-shaped, weakly sclerotized, with pointed tip on each side, the posterior side shaped like a narrow wavy band; ductus bursae with barely visible slightly more sclerotized elongated areas, at least 10 times longer than wide.

Redescription. (Fig. 7I–L). The species that was described as *S. veronica* Moyal et al. from the holotype female by Walker (1856) and from a male and a female collected in 2005 (see Moyal et al. 2011) is clearly a synonym of *S. incerta*. Since 2005, we have collected many *S. incerta* specimens in the Republic of South Africa and we are redescribing this species with additional material since the male described in Moyal et al. (2011) is atypical. The general shape of the female forewing is more elongated than that of the male; wing patterns similar in both sexes, but males are generally darker. Antenna ochraceous, serrate in the male, filiform in the female, flagellum adorned dorsally with ochraceous scales in both sexes; palpus light brown; eyes brown. Head and thorax covered with long light ochraceous hairs. Abdomen light buff suffused with fuscous scales. Legs ochraceous suffused with fuscous scales. Forewing ochraceous suffused with brown scales, much more in males; three more or less distinct dark brown spots, one antemedial, one at apex of cell and one postmedial; a more or less distinct longitudinal fuscous fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; one subterminal line with brown elongated markings on the veins; outer margin adorned with more or less visible brown spots between the veins, fringe ochraceous heavily suffused with brown and fuscous scales, basal line of fringe light ochraceous. Hindwing white extensively suffused with fuscous scales over its entire area, particularly in males, veins suffused with brown scales, four brown elongated markings on the veins, fringe concolor (white), basal line of fringe buff. Underside of forewing ochraceous, heavily suffused with brown scales over its entire area but more heavily in the medial area, one elongated brown marking at apex of the cell, another one below the cell, fringe ochraceous heavily suffused with brown and fuscous scales, in males; underside of forewing pale ochraceous slightly suffused with brown scales, fringe ochraceous suffused with fuscous scales, in females. Underside of hindwing white heavily suffused with brown scales, particularly in costa, apex and termen, outer margin adorned with more or less visible brown spots between the veins, fringe concolor (white), in males; underside of hindwing white slightly suffused with fuscous scales in costal and apical areas, outer margin adorned with more or less visible brown spots between the veins, fringe concolor (white), in females. — **Forewing length:** male 31–36 mm (\bar{x} = 33.5 mm, N = 13); female 38–42 mm (\bar{x} = 40.1 mm, N = 13). — **Male genitalia** (Fig. 8C, N). Tegumen with medium-sized, ovoid peniculi; vinculum u-shaped at the outer margin and v-shaped at the inner margin without indentation, with a large sized saccus, quadrangular. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and short straight

spine, sometimes with two small apical teeth; sacculus heavily sclerotized rounded at base, a broad and short apical extension, curved inwards, strongly club-shaped, bearing numerous short and stout spines; cucullus longer than sacculus, weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large and conical, the inferior plate shaped like a rounded triangle produced into a sharp point, the sides blunted, the superior plate broad and short, shortly bifid terminally; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thick, strongly curved in the middle; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a small mushroom-shaped cornutus. — **Female genitalia** (Fig. 9C). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 large, sclerotized, lozenge-shaped, the anterior side rounded, at least 1.6 times longer than wide; ostium bursae large, funnel-shaped, weakly sclerotized, with pointed tip on each side, the posterior side shaped like a narrow wavy band; ductus bursae long and narrow, very slightly sclerotized posteriorly, with barely visible slightly more sclerotized elongated areas, at least 10 times longer than wide; corpus bursae elongate, without signa; ovipositor lobes at least 2.1 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved; apophyses posteriores more slender than apophyses anteriores. — **L5 instar larva** (Fig. 5F). Length 35–40 mm, width 4.0 mm; head smooth, orange brown, prothoracic shield light brown, body with ground colour dark salmon, pinacula and caudal plate light brown. Young larvae are similar in appearance to mature ones.

Distribution. Republic of South Africa. Known from many localities in different vegetation mosaics ('Cape shrubland (Fynbos)' (Mosaic #50), 'bushy Karoo-Namib shrubland' (Mosaic #51), 'grassy shrubland transition from Karoo shrubland to Highveld' (Mosaic #57b), 'Highveld grassland' (Mosaic #58)) (White 1983) (Fig. 10) belonging to the Southern African bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected from young stems and shoots of *Phragmites australis* Trin. Ex Steud. growing along rivers or in wetlands inhabited by various Poales belonging to the following genera: *Cyperus* L., *Echinochloa*, *Miscanthus*, *Sporobolus* and *Typha* L.

***Sesamia kamba* Le Ru sp. nov.**

<https://zoobank.org/C052C775-8CAA-4CE7-BCA2-1D10DF65A029>

Figures 5G; 7M–P; 8D, O; 9D; 10

Type material. HOLOTYPE ♂, KENYA, Eastern Province, Mtito Andei, 02°40'37"S, 38°11'43"E, 739m a.s.l., V.2004, ex larvae in stems of *Megathyrus maximus*

(Jacq.) B.K. Simon & S.W.L Jacobs, gen. Prep. LE RU Bruno/417, (B. Le Ru leg.) (MNHN). — PARATYPES: KENYA: nine ♂, six ♀, same locality as holotype, V.2004–V.2005, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L Jacobs, female gen. Prep. LE RU Bruno/415, (B. Le Ru leg.) (MNHN); five ♂, seven ♀, Coast Province, Ukunda, Muhaka, 04°19'12"S, 39°32'28"E, 43m a.s.l., V.2004–V.2005, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L Jacobs, (B. Le Ru leg.) (MNHN); one ♂, Coast Province, Ukunda, Muhaka, 04°19'12"S, 39°32'28"E, 43m a.s.l., VI.2013, ex light trap, gen. Prep. LE RU Bruno/572, (B. Le Ru leg.) (MNHN); one ♀, Coast Province, Ukunda, Muhaka, 04°19'12"S, 39°32'28"E, 43m a.s.l., V.2004, ex larvae in stems of *Hyparrhenia diplandra* (Hack.) Stapf, (B. Le Ru leg.) (MNHN); one ♂, one ♀, Coast Province, Malindi, Sokoke Forest, 03°15'03"S, 39°52'06"E, 55m a.s.l., VII.2003, ex larvae in stems of *Digitaria milanji-ana* Stapf., (B. Le Ru leg.) (MNHN).

Other material. COMORO ISLANDS: two ♂, Comores, Mohéli, XII.1955, (A. Robinson leg.) (MNHN); ETHIOPIA: one ♂, Southern Region, Sodo, Abalama Baraka, 06°34'17"S, 37°49'07"E, 1275m a.s.l., XI.2004, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L Jacobs, (B. Le Ru leg.) (MNHN); five ♂, one ♀, Oromia Region, Saja, Gibe river, 09°20'56"S, 37°34'13"E, 1442m a.s.l., IX.2015, ex larvae in stems of *Andropogon* sp., males gen. Prep. LE RU Bruno/914, females gen. Prep. LE RU Bruno/923–925, (B. Le Ru leg.) (MNHN); KENYA: six ♂, seven ♀, Eastern Province, Salama, Kimakui, 01°46'57"S, 37°12'47"E, 1724m a.s.l., IV.2011, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L Jacobs, (B. Le Ru leg.) (MNHN); three ♂, Nyanza Province, Ruma Park Main gate, 00°38'17"S, 34°20'13"E, 1254m a.s.l., XI.2012, ex light trap, (B. Le Ru leg.) (MNHN); one ♂, two ♀, Coast Province, Kwale, Shimba Hills, 04°08'51"S, 39°26'58"E, 417m a.s.l., V.2004, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L Jacobs, (B. Le Ru leg.) (MNHN); three ♂, three ♀, Nyanza Province, Kisumu, Kajulu Kadero, 00°01'47"S, 34°47'43"E, 1205m a.s.l., V.2011, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L Jacobs, (B. Le Ru leg.) (MNHN); one ♂, Eastern Province, Mwingi, 00°55'40"S, 38°05'40"E, 994m a.s.l., I.2005, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L Jacobs, (B. Le Ru leg.) (MNHN); two ♀, Eastern Province, Salama, Kima Ranch, 01°53'15"S, 37°14'36"E, 1423m a.s.l., XII.2010, ex light trap, (B. Le Ru leg.) (MNHN); one ♂, seven ♀, Eastern Province, Machakos, Kapiti Ranch, 01°38'15"S, 37°08'46"E, 1795m a.s.l., VI.2012, ex light trap, (B. Le Ru leg.) (MNHN); one ♀, Eastern Province, Machakos, Kapiti Plains, 01°38'12"S, 37°10'57"E, 1647m a.s.l., I.2012, ex larvae in stems of *Hyparrhenia filipendula* (Krauss) Stapf, (B. Le Ru leg.) (MNHN); one ♂, one ♀, Eastern Province, Machakos, Kapiti Plains, 01°38'12"S, 37°10'57"E, 1647m a.s.l., I.2016, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L Jacobs, (B. Le Ru leg.) (MNHN); one ♂, Brit. E. Africa, Sabaki Valley, 94–94, (Gregory Coll.) (NHM); one ♂, B. E. Africa, [Eastern Province], Athi ya Mawe, 16.IV.[18]99, 1900–10, (C.S. Betton leg.) (NHM); one ♂, B. E. Africa, [Eastern Province], Athi ya Mawe, 16.iv.[18]99, 1900–10, (C.S. Betton leg.), [previously designed as a syntype of *Sesamia epunctifera* by Hampson (1902)], (NHM); one ♂, [Nyanza Province], S. Kavirondo, Suna, IV.1932, Rothschild Bequest B.M. 1939-1, Agrotidae genitalia slide No.1278, (W. Feather leg.) (NHM); MOZAMBIQUE: one ♀, Nampula

Province, Milela, 15°44'45"S, 37°38'11"E, 480m a.s.l., III.2010, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, Cabo Delgado Province, Pemba, Megaruma, 13°12'51"S, 39°51'57"E, 244m a.s.l., III.2010, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♀, Nampula Province, Mekuasse River, 14°46'47"S, 38°22'32"E, 452m a.s.l., III.2010, ex larvae in stems of *Sorghum arundinaceum* (Desv.) Stapf, (B. Le Ru leg.) (MNHN); two ♂, Nampula Province, Nivole, 15°00'45"S, 39°05'27"E, 479m a.s.l., III.2010, ex larvae in stems of *Snowdenia polystachya* (Fresen.) Pilg., (B. Le Ru leg.) (MNHN); two ♂, seven ♀, Nampula Province, Nivole, 15°00'45"S, 39°05'27"E, 479m a.s.l., III.2010, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); five ♂, Cabo Delgado Province, Nenenda, 11°34'43"S, 39°47'00"E, 413m a.s.l., III.2010, ex larvae in stems of *Hyparrhenia dregeana* Stapf ex Stent, gen. Prep. LE RU Bruno/18–19, (B. Le Ru leg.) (MNHN); one ♂, Nampula Province, Pharani, 14°56'34"S, 37°53'22"E, 584m a.s.l., III.2010, ex larvae in stems of *Hyparrhenia dregeana* (Nees) Stent, (B. Le Ru leg.) (MNHN); four ♂, Nampula Province, Nakakani, 14°56'15"S, 38°32'09"E, 545m a.s.l., III.2010, ex larvae in stems of *Setaria parviflora* (Poir.) Kerguélen, (B. Le Ru leg.) (MNHN); **TANZANIA**: three ♂, one ♀, Mtwara Region, Ndanda, 10°30'07"S, 39°01'02"E, 306m a.s.l., III.2007, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♀, Morogoro Region, Magole, Wami, 06°26'49"S, 37°31'53"E, 364m a.s.l., II.2008, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♀, Morogoro Region, Nane Nane, 06°48'13"S, 37°41'38"E, 517m a.s.l., III.2009, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); two ♂, three ♀, Pembe Island, Fidel Castro, 05°14'09"S, 39°48'37"E, 44m a.s.l., V.2008, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♀, Pembe Island, Weshi, 05°14'09"S, 39°48'37"E, 44m a.s.l., V.2008, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♂, Pembe Island, Mtwango, 06°10'36"S, 39°16'51"E, 15m a.s.l., V.2008, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♂, Morogoro Region, Mikese, 06°45'45"S, 37°51'50"E, 434m a.s.l., III.2009, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); two ♂, two ♀, Pembe Island, Kinyakuzi, 04°57'30"S, 39°45'49"E, 29m a.s.l., V.2008, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♂, one ♀, Pembe Island, Chake Chake, 05°14'44"S, 39°45'49"E, 13m a.s.l., V.2008, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♂, one ♀, Morogoro Region, Mdokwa, 06°20'40"S, 38°33'09"E, 270m a.s.l., v.2008, ex larvae in stems of *C. gayana*, (B. Le Ru leg.) (MNHN); one ♂, Mtwara Region, Mtumaronga, 10°12'54"S, 39°29'49"E, 75m a.s.l., iii.2007, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♂, one ♀, Mtwara Region, Masasi, Mkan-gaula, 10°51'02"S, 38°37'27"E, 331m a.s.l., III.2007, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♀, Iringa Province, Ilula, Kitonga Slope, 07°39'58"S, 36°09'52"E, 1097m a.s.l., XI.2004, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♀, Morogoro Province, Sumbukulu, 07°45'28"S, 36°55'17"E, 320m a.s.l., II.2010, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); two ♂, four ♀, Pwani Province, Bigwa, 07°13'55"S, 39°09'37"E, 120m

a.s.l., III.2010, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); two ♂, Morogoro Province, Mavinga Bridge, 08°19'14"S, 36°40'40"E, 300m a.s.l., II.2010, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♂, one ♀, Morogoro Province, Kivukoni, 08°12'51"S, 36°41'30"E, 280m a.s.l., II.2010, ex larvae in stems of *Hyparrhenia schimperi* Andersson, (B. Le Ru leg.) (MNHN); five ♂, two ♀, Morogoro Province, Kivukoni, 08°12'51"S, 36°41'30"E, 280m a.s.l., II.2010, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♀, Manyara Province, Kikawilo, 04°13'28"S, 36°43'52"E, 280m a.s.l., II.2010, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♂, Morogoro Province, Nyamawala, 08°08'54"S, 36°25'02"E, 278m a.s.l., II.2010, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); **UGANDA**: one ♂, Kasese District, Mihunga, 00°21'20"S, 30°01'32"E, 1756m a.s.l., V.2009, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); three ♂, one ♀, Eastern Region, Ngora District, Kapir, Obur, 01°39'45"S, 33°45'57"E, 1051m a.s.l., V.2009, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♀, Eastern Region, Ngora District, Kapir, Obur, 01°39'45"S, 33°45'57"E, 1051m a.s.l., V.2009, ex larvae in stems of *Setaria parviflora* (Poir.) Kerguélen, (B. Le Ru leg.) (MNHN); one ♂, Eastern Region, Ngora District, Kapir, Obur, 01°39'45"S, 33°45'57"E, 1051m a.s.l., V.2009, ex larvae in stems of *Chloris gayana* Kunth, (B. Le Ru leg.) (MNHN); four ♂, six ♀, Central Province, Kampala, Nduundu, Quarry, 00°29'33"N, 32°41'55"E, 1167m a.s.l., V.2009, ex larvae in stems of *Setaria parviflora* (Poir.) Kerguélen, (B. Le Ru leg.) (MNHN); five ♂, two ♀, Central Province, Kampala, Nduundu, Odokomit, 01°44'53"N, 33°34'29"E, 1087m a.s.l., V.2009, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♀, Central Province, Kampala, Nduundu, Mpanga Forest, 00°12'12"N, 32°18'21"E, 1285m a.s.l., IV.2004, ex larvae in stems of *Megathyrus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, (B. Le Ru leg.) (MNHN); one ♂, Western Province, Fort Portal, Itojo, 00°50'33"N, 33°13'08"E, 1070m a.s.l., V.2014, ex light trap, (B. Le Ru leg.) (MNHN); two ♂, one ♀, Western Province, Kichwamba, Kanga Bukama, 00°12'54"S, 30°05'38"E, 1277m a.s.l., V.2014, ex light trap, male gen. Prep. LE RU Bruno/708, female gen. Prep. LE RU Bruno/709, (B. Le Ru leg.) (MNHN); one ♂, [Eastern Region], Busora, Mwiri, 20.XII.[19]37, SES/167, Agrotidae genitalia slide No.1235, (NHM).

Diagnosis. (See also the identification key of *incerta* subgroup, section 3.4.2.). This species can be distinguished from the other known members of the *incerta* subgroup by the combination of the following characters of the male and female genitalia: tegumen with small peniculi; vinculum u-shaped at the outer margin with a large sized saccus, rectangular; sacculus with a narrow and short apical extension, curved inwards, strongly club-shaped; juxta large, the inferior plate shaped like a rounded triangle produced into a sharp point, the sides rounded, the superior plate broad and short, shortly bifid terminally; phallus short and thick; vesica with a small semi-circular flat cornutus; ventrolateral plates of female segment A8 very large, trapezoidal, the anterior side triangle-shaped, as long as wide; ostium bursae large, funnel-shaped, sclerotized, with pointed tip on each side, ductus bursae with

two narrow posterior sclerotized areas, at least 10 times longer than wide.

Description. (Fig. 7M–P). The general shape of the female forewing is more elongated than that of the male; wing patterns similar in both sexes, but males are generally darker. Also, the ground colour of the forewing is variable from cartridge-buff to dark ochraceous according to the specimens, however most available specimens are rather ochraceous. Antenna ochraceous, serrate in the male, filiform in the female, flagellum adorned dorsally with buff scales in both sexes; palpus brown; eyes dark brown. Head and thorax covered with long light ochraceous hairs. Abdomen buff heavily suffused with fuscous scales. Forelegs light brown, otherwise ochraceous suffused with fuscous scales. Forewing ochraceous suffused with brown and fuscous scales; three more or less distinct dark brown spots, one antemedial, one at apex of cell and one postmedial; a more or less distinct longitudinal fuscous fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; one subterminal line with brown elongated markings on the veins; outer margin adorned with brown spots between the veins, fringe ochraceous heavily suffused with brown and fuscous scales, basal line of fringe light ochraceous. Hindwing white extensively suffused with fuscous scales over its entire area, veins suffused with brown scales, four more or less visible brown elongated markings on the veins, fringe concolor (white), basal line of fringe buff. Underside of forewing ochraceous, heavily suffused with brown and fuscous scales over its entire area but more heavily in the medial area, fringe ochraceous heavily suffused with fuscous scales, in males; underside of forewing pale ochraceous slightly suffused with brown and fuscous scales, lore heavily in the costa, fringe ochraceous suffused with fuscous scales, in females. Underside of hindwing white suffused with brown scales, particularly in costal and apical areas, outer margin adorned with more or less visible brown spots between the veins, fringe concolor (white). — **Forewing length:** male 26–33 mm (\bar{x} = 29.1 mm, N = 13); female 27–35 mm (\bar{x} = 32.5 mm, N = 13). — **Male genitalia** (Fig. 8D, O). Tegumen with small peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large saccus, rectangular. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and short straight spine, with two apical teeth; sacculus heavily sclerotized rounded at base, a narrow and short apical extension, curved inwards, strongly club-shaped, bearing numerous short and stout spines; cucullus longer than sacculus, weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large and conical, the inferior plate shaped like a rounded triangle produced into a sharp point, the sides rounded, the superior plate broad and short, shortly bifid terminally; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thick, a bit curved in the middle; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica

with a small semi-circular flat cornutus. — **Female genitalia** (Fig. 9D). Apophyses anteriores with spatulate tips; ventrolateral plates of segment A8 very large, sclerotized, trapezoidal, the anterior side triangle-shaped, as long as wide; ostium bursae large, funnel-shaped, sclerotized, with pointed tip on each side; ductus bursae long and narrow, with two posterior sclerotized areas at least 10 times longer than wide; corpus bursae pyriform, without signa; ovipositor lobes at least 2.2 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved; apophyses posteriores more slender than apophyses anteriores. — **L5 instar larva** (Fig. 5G). Length 30–35 mm, width 4.0 mm; head smooth, orange brown, prothoracic shield light brown, body with ground colour pearl yellow, pinacula and caudal plate light brown. Young larvae are similar in appearance to mature ones.

Etymology. Named after Kamba, the name of the tribe who live in the southern part of the Eastern Province in Kenya; treated as a noun in apposition.

Distribution. Ethiopia, Kenya, Mozambique, Tanzania and Uganda. Known from many localities in different vegetation mosaics ('East African coastal Zanzibar-Ihambane' (Mosaic #16a), 'Somalia-Masai acacia-*Commiphora* deciduous bushland and thicket' (Mosaic #42), 'East African evergreen bushland and secondary acacia wooded grassland' (Mosaic #45)) (White 1983) (Fig. 10) belonging to the Congolian, Ethiopian and Zambebian bioregions (sensu Linder et al. 2012).

Ecology. Larvae were collected from young stems and shoots of 17 host plants (Table S4) belonging to the following genera: *Andropogon* L., *Cenchrus*, *Chloris* Sw., *Digitaria*, *Hypparrhenia*, *Hyperthelia* Clayton, *Megathyrsus*, *Panicum*, *Setaria*, *Snowdenia* C.E.Hubb., *Sorghum* Moench and *Sporobolus* growing in grasslands. It should be noted that 70% of the larvae were collected on *Megathyrsus maximus* (1414 larvae reared from this host plant and found in 80 of the 131 collection sites for this species), which suggests that *S. kamba* shows a preference for this host plant.

***Sesamia lalaci* Le Ru sp. nov.**

<https://zoobank.org/0078A468-8B30-4B43-B505-C05B-2313C2F1>

Figures 8E, P; 11; 12A–B

Type material. HOLOTYPE ♂, MOZAMBIQUE, Nampula district, Lalaci, 14°57'40"S, 37°16'02"E, 656m a.s.l., III.2010, ex larvae in stems of *Cenchrus purpureus*, gen. prep. LE RU Bruno/5, (B. Le Ru leg.) (MNHN). — PARATYPES: MOZAMBIQUE: two ♂, Nampula district, Pharani, 14°56'34"S, 37°53'22"E, 584m a.s.l., IV.2010, ex larvae in stems of *Hypparrhenia schimperi* (A. Rich.) Stapf, gen. prep. LE RU Bruno/6, (B. Le Ru

leg.) (MNHN); one ♂, Nampula district, Muacala River, 14°10'12"S, 39°54'24"E, 180m a.s.l., III.2010, ex larvae in stems of *Megathyrsus maximus*, (B. Le Ru leg.) (MNHN); **TANZANIA**: one ♂, Mtwara Region, Ntanda, 10°30'07"S, 39°01'02"E, 306m a.s.l., iii.2007, ex larvae in stems of *Cenchrus purpureus*, (B. Le Ru leg.) [MNHN].

Diagnosis. (See also the identification key of *incerta* subgroup, section 3.4.2.). This species can be distinguished from the other known members of the *incerta* subgroup by the combination of the following characters of the male genitalia: tegumen with large flat peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large sized saccus, rounded; juxta large, the inferior plate shaped like an elongated triangle, almost isosceles, with a slight bulge at the bottom, the two sides straight, ending with a long and narrow, shortly bifid superior plate at least three times shorter than the inferior plate; phallus strongly curved in the middle.

Description. (Fig. 12A, B). Antenna ochraceous, shortly pectinate, flagellum adorned dorsally with ochraceous scales; palpus ochraceous; eyes brown. Head and thorax covered with long ochraceous hairs. Forelegs brown, otherwise dark ochraceous suffused with fuscous scales. Forewing ochraceous, slightly suffused with brown and fuscous scales; a longitudinal grey fuscous fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; three dark brown spots, one antemedial, one at apex of cell and one postmedial; one subterminal line with brown elongated markings on the veins; outer margin adorned with more or less visible brown spots between the veins, fringe light ochraceous suffused with brown and fuscous scales, basal line of fringe light ochraceous. Hindwing white, fringe concolor (white), suffused with fuscous scales. Underside of forewing light ochraceous, heavily suffused with fuscous and brown scales in costal and apical areas and below the cell, fringe light ochraceous suffused with fuscous scales, basal line light ochraceous. Underside of hindwing white suffused with brown and fuscous scales in costal and apical areas, fringe concolor (white), suffused with fuscous scales. — **Forewing length:** male 28–33 mm (\bar{x} = 30.7 mm, N = 4). — **Male genitalia** (Fig. 8E, P). Tegumen with large flat peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large saccus, rounded. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and long straight spine, with two apical teeth; sacculus heavily sclerotized rounded at base, a broad and short apical extension, curved inwards, strongly club-shaped, bearing numerous short and stout spines; cucullus weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large, the inferior plate shaped like an elongated triangle, almost isosceles, with a slight bulge at the bottom, the two lateral sides straight, ending with a long and narrow, shortly bifid superior plate at least three

times shorter than the inferior one; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thin, strongly curved in the middle; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a small semi-circular flat cornutus.

Etymology. Named after Lalaci, a small village in Nampula district in Mozambique; treated as a noun in apposition.

Distribution. Mozambique. Known from localities in the 'East African coastal Zanzibar-Ihambane' (Mosaic #16a) vegetation mosaic (White 1983) (Fig. 11) belonging to the Zambezian bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected from young stems and shoots of *Cenchrus purpureus*, *Hyparrhenia schimperi* (Hochst. ex A.Rich.) Andersson ex Stapf and *Megathyrsus maximus* growing along rivers or in wetlands inhabited by various Poales belonging to the following genera *Echinochloa*, *Megathyrsus*, *Panicum* and *Setaria*.

Remarks. This species is morphologically very close to *S. lusese* sp. nov., *S. msowero* sp. nov. and *S. pennipuncta*, and its identification is impossible without a thorough examination of the genitalia.

Sesamia lusese Le Ru sp. nov.

<https://zoobank.org/A1B861B4-E608-4EAA-A663-30D90457CA2F>

Figures 8F, Q; 10; 12C–D

Type material. Holotype ♂, **TANZANIA**, Mbeya Region, Lusese, 08°51'34"S, 33°51'10"E, 1307m a.s.l., III.2014, light trap, gen. prep. LE RU Bruno/858, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *incerta* subgroup, section 3.4.2.). This species can be distinguished from the other known members of the *incerta* subgroup by the combination of the following characters of the male genitalia: tegumen with large ovoid peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large sized saccus, almost square; juxta large, the inferior plate triangle-shaped, almost isosceles, slightly curved at the bottom, the two lateral sides straight, ending with a long and wide, shortly bifid superior plate at least 1.7 times shorter than the inferior one; phallus almost straight.

Description. (Fig. 12C, D). Antenna ochraceous, shortly pectinate, flagellum adorned dorsally with ochraceous scales; palpus ochraceous; eyes brown. Head and thorax covered with long ochraceous hairs. Legs ochraceous slightly suffused with fuscous scales. Forewing ochraceous, slightly suffused with brown and fuscous scales,

much more in the termen area; a longitudinal grey ochraceous fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; one antemedial dark brown spot; outer margin adorned with more or less visible brown spots between the veins, fringe light ochraceous suffused with brown and fuscous scales, basal line of fringe light ochraceous. Hindwing white, very slightly suffused with brown scales in costal and apical areas, fringe concolor (white), suffused with fuscous scales in apex. Underside of forewing light ochraceous, slightly suffused with fuscous scales in costa, apex and termen areas, fringe light ochraceous suffused with fuscous scales, basal line light ochraceous. Underside of hindwing white suffused with brown and fuscous scales in costal and apical areas, fringe concolor (white), suffused with fuscous scales in apex. — **Forewing length:** male 26.0 mm (N = 1). — **Male genitalia** (Fig. 8F, Q). Tegumen with large ovoid peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large saccus, almost square. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and long straight spine, with one apical teeth; sacculus heavily sclerotized rounded at base, a broad and short apical extension, curved inwards, strongly club-shaped, bearing numerous short and stout spines; cucullus weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large, the inferior plate triangle-shaped, almost isosceles, slightly curved at the bottom, the two lateral sides straight, ending with a long and wide, shortly bifid superior plate at least 1.7 times shorter than the inferior one; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thin, almost straight; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a large almost circular flat cornutus.

Etymology. Named after Lusese, a small village in Mbeya region in Tanzania; treated as a noun in apposition.

Distribution. Tanzania. Known from a single locality in a transition area between ‘wetter Zambezi miombo woodland (dominated by *Brachystegia*, *Julbernardia* and *Isoberlinia*)’ (Mosaic #25) and ‘undifferentiated montane vegetation’ (Mosaic #19a) vegetation mosaics (White 1983) (Fig. 10) belonging to the Zambezi bioregion (sensu Linder et al. 2012).

Ecology. Ecology unknown, but likely on Paniceae (Poaceae), like the three related species, *S. lalaci* sp. nov., *S. msowero* sp. nov. and *S. pennipuncta*. The only known individual was caught using a light trap in a bushland on a hill inhabited by various Poales belonging to the following genera: *Cenchrus*, *Megathyrsus* and *Panicum*.

Remarks. This species is morphologically very close to *S. lalaci* sp. nov., *S. msowero* sp. nov. and *S. pennipuncta*, and its identification is impossible without a thorough examination of the genitalia.

Sesamia msowero Le Ru sp. nov.

<https://zoobank.org/F2177619-BC14-447A-9AB2-4CFC054B-7CB2>

Figures 8G, R; 9E; 10; 12E–H

Type material. HOLOTYPE ♂, TANZANIA, Coast, Msowero, 07°33'21"S, 37°01'25"E, 340m a.s.l., II.2010, ex larvae in stems of *Cenchrus unisetus* (Nees) Morone, male gen. prep. LE RU Bruno/3, (B. Le Ru leg.) (MNHN). — PARATYPES: TANZANIA: two ♂, one ♀, same locality, date and host plant as the holotype, (B. Le Ru leg.) (MNHN); two ♀, Morogoro, Chilombola, 08°56'01"S, 36°46'37"E, 370m a.s.l., II.2010, ex larvae in stems of *Cenchrus purpureus*, gen. prep. LE RU Bruno/4, (B. Le Ru leg.) (MNHN); one ♂, one ♀, Coast, Mwaya, 08°55'01"S, 36°49'01"E, 360m a.s.l., I.2010, ex larvae in stems of *Cenchrus purpureus*, male gen. prep. JB728, female gen. prep. JB727, (B. Le Ru leg.) (MNHN); two ♀, Morogoro, Mahenge forest, 08°55'30"S, 36°43'12"E, 410m a.s.l., V.2010, ex larvae in stems of *Cenchrus purpureus*, (B. Le Ru leg.) (MNHN); one ♂, Morogoro, Sumbukulu, 07°45'28"S, 36°55'17"E, 320m a.s.l., II.2010, ex larvae in stems of *Cenchrus purpureus*, (B. Le Ru leg.) (MNHN); two ♀, Coast, Ilima, 09°27'28"S, 33°41'31"E, 895m a.s.l., III.2007, ex larvae in stems of *Cenchrus purpureus*, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *incerta* subgroup, section 3.4.2.). This species can be distinguished from the other known members of the *incerta* subgroup by the combination of the following characters of the male and female genitalia: tegumen with large erect peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin with an indentation, with a large sized saccus, rounded; juxta large, the inferior plate triangle-shaped, almost isosceles, with a marked bulge at the bottom, the two lateral sides slightly rounded, ending with a long and narrow, shortly bifid superior plate at least twice as short than the inferior one; phallus strongly curved in the middle; ventrolateral plates of female segment A8 large, sclerotized, slightly trapezoidal, the posterior side swollen inwards, at least twice as long than wide; ostium bursae large, funnel-shaped, sclerotized, with rounded tip on each side; ductus bursae with two posterior sclerotized areas at least seven times longer than wide; ovipositor lobes at least 2.5 times longer than wide.

Description. (Fig. 12E–H). Wing patterns and colours similar in both sexes. Antenna ochraceous, shortly pectinate in the male, filiform in the female, flagellum adorned dorsally with ochraceous scales in both sexes; palpus ochraceous; eyes brown. Head and thorax covered with long ochraceous hairs. Abdomen light buff suffused with fuscous and brown scales. Legs dark ochraceous suffused with fuscous scales. Forewing ochraceous, slightly suffused with fuscous scales; a more or less distinct dark brown spot at base of the cell; a longitudinal dark ochra-

ceous fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; outer margin adorned with more or less visible brown spots between the veins, fringe light ochraceous suffused with brown and fuscous scales, basal line of fringe light ochraceous. Hindwing white, very slightly suffused with brown scales in costal and apical areas, fringe concolor (white), suffused with fuscous scales in apex. Underside of forewing light ochraceous, heavily suffused with fuscous scales in costal and apical areas and below the cell, fringe light ochraceous suffused with fuscous scales, basal line light ochraceous. Underside of hindwing white suffused with brown and fuscous scales in costal and apical areas, fringe concolor (white), suffused with fuscous scales in apex. — **Forewing length:** male 30–33 mm (\bar{x} = 31.2 mm, N = 5); female 31–37 mm (\bar{x} = 34.3 mm, N = 8). — **Male genitalia** (Fig. 8G, R). Tegumen with large erected peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin with an indentation, with a large saccus, rounded. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and long straight spine, with two apical teeth; sacculus heavily sclerotized rounded at base, a broad and short apical extension, curved inwards, strongly club-shaped, bearing numerous short and stout spines; cucullus weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large, the inferior plate triangle-shaped, almost isosceles, with a marked bulge at the bottom, the two lateral sides slightly rounded, ending with a long and narrow, shortly bifid superior plate at least twice as short than the inferior one; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thin, slightly curved in the middle; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a small flat semi-circular flat cornutus. — **Female genitalia** (Fig. 9E). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 large, sclerotized, slightly trapezoidal, the posterior side with a strong cup-shaped bulge, at least twice as long than wide; ostium bursae large, funnel-shaped, sclerotized, with rounded tip on each side; ductus bursae long and narrow, very slightly sclerotized posteriorly, with two posterior sclerotized areas at least seven times longer than wide; corpus bursae pyriform, without signa; ovipositor lobes at least 2.5 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved; apophyses posteriores more slender than apophyses anteriores.

Etymology. Named after Msowero, a small village in Coastal region in Republic of Tanzania; treated as a noun in apposition.

Distribution. Tanzania. Known from localities in ‘drier Zambesian miombo woodland (dominated by *Brachystegia* and *Julbernardia*)’ (Mosaic #26) vegetation mosaic (White 1983) (Fig. 10) belonging to the Zambesian bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected from young stems and shoots of *Cenchrus purpureus* and *Cenchrus unisetus* (Nees) Morrone growing along rivers or in wetlands inhabited by various Poaceae species belonging to the following genera: *Echinochloa*, *Megathyrsus*, *Panicum* and *Setaria*.

Remarks. This species is morphologically very close to *S. lalaci* sp. nov., *S. lusese* sp. nov. and *S. pennipuncta*, and its identification is impossible without a thorough examination of the genitalia.

Sesamia pennipuncta Moyal, 2011

Figures 8H, S; 9F; 11; 12I–L

Sesamia pennipuncta – Moyal (2011: 430).

Type material. HOLOTYPE ♀, MOZAMBIQUE, Manica district, Rio Chiteo, 18°58′11″S, 32°49′12″E, 767m a.s.l., IV.2005, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, gen. prep. MP31, (B. Le Ru leg.) (MNHN). — PARATYPE: MOZAMBIQUE: one ♂, Manica district, Vandula, 19°00′54″S, 33°07′23″E, 661m a.s.l., IV.2005, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, gen. prep. MP32, (B. Le Ru leg.) (MNHN).

Other materials. MOZAMBIQUE: one ♂, one ♀, Nampula district, Metuce, 15°33′03″S, 38°06′28″E, 409m a.s.l., III.2010, ex larvae in stems of *C. purpureus*, male gen. prep. LE RU Bruno/1, female gen. prep. JB726, (B. Le Ru leg.) (MNHN); one ♂, one ♀, Nampula district, Milela River, 15°44′45″S, 37°38′11″E, 480m a.s.l., III.2010, ex larvae in stems of *C. purpureus*, female gen. prep. LE RU Bruno/2, male gen. prep. LE RU Bruno/265, (B. Le Ru leg.) (MNHN); one ♀, Manica district, Nyamwerera, 17°46′34″S, 33°13′43″E, 635m a.s.l., IV.2005, ex larvae in stems of *C. purpureus*, (B. Le Ru leg.) (MNHN); TANZANIA: three ♂, three ♀, Morogoro, Mahenge forest, 08°55′30″S, 36°43′12″E, 410m a.s.l., V.2010, ex larvae in stems of *C. purpureus*, male gen. prep. LE RU Bruno/239, female gen. prep. LE RU Bruno/240, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *incerta* subgroup, section 3.4.2.). This species can be distinguished from the other known members of the *incerta* subgroup by the combination of the following characters of the male and female genitalia: tegumen with large flat peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large sized saccus, rounded; juxta large, the inferior plate triangle-shaped almost equilateral, with a slight bulge at the bottom, ending with a long and narrow, shortly bifid superior plate as long as the inferior one; phallus short and thin, almost straight in the middle; ventrolateral plates of female segment A8 large, sclerotized, slightly trapezoidal, the posterior side swollen inwards, at least 1.4 times longer than wide; ostium bursae large, funnel-shaped, sclerotized, with rounded tip on each side; ductus bursae with two posterior sclerotized areas at least nine times longer than wide; ovipositor lobes at least 2.5 times longer than wide.

Redescription. (Fig. 12I, L). The species was described from two specimens in Moyal et al. (2011). We redescribe the species with additional material (five males, six females) collected in Mozambique and Tanzania. Wing patterns and colours similar in both sexes. Antenna ochraceous, shortly pectinate in the male, filiform in the female, flagellum adorned dorsally with ochraceous scales in both sexes; palpus ochraceous; eyes brown. Head and thorax covered with long ochraceous hairs. Abdomen light buff suffused with fuscous and brown scales. Legs dark ochraceous suffused with fuscous scales. Forewing ochraceous, slightly suffused with brown and fuscous scales; a longitudinal dark ochraceous fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; outer margin adorned with more or less visible brown spots between the veins, fringe light ochraceous suffused with brown and fuscous scales, basal line of fringe light ochraceous. Hindwing white, very slightly suffused with brown scales in costal and apical areas, fringe concolor (white), suffused with fuscous scales in apex. Underside of forewing light ochraceous, heavily suffused with fuscous scales in costal and apical areas and below the cell, fringe light ochraceous suffused with fuscous scales, basal line light ochraceous. Underside of hindwing white suffused with brown and fuscous scales in costal and apical areas, fringe concolor (white), suffused with fuscous scales in apex. — **Forewing length:** male 28–30 mm (\bar{x} = 29.3 mm, N = 6); female 29–35 mm (\bar{x} = 32.0 mm, N = 6). — **Male genitalia** (Fig. 8H, S). Tegumen with large flat peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large saccus, rounded. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and long straight spine, with two apical teeth; sacculus heavily sclerotized rounded at base, a broad and short apical extension, curved inwards, strongly club-shaped, bearing numerous short and stout spines; cucullus weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large, the inferior plate triangle-shaped almost equilateral, with a slight bulge at the bottom, ending with a long and narrow, shortly bifid superior plate as long as the inferior one; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thin, almost straight in the middle; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a small semi-circular flat cornutus. — **Female genitalia** (Fig. 9F). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 large, sclerotized, slightly trapezoidal, the posterior side with a slight cup-shaped bulge, at least 1.4 times longer than wide; ostium bursae large, funnel-shaped, sclerotized, with rounded tip on each side; ductus bursae long and narrow, posteriorly very slightly sclerotized and with two sclerotized areas at least nine times longer than wide; corpus bursae pyriform, without signa; ovipositor lobes at least 2.5 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved; apophyses posteriores more slender than apophyses anteriores.

Distribution. Mozambique and Tanzania. Known from localities in ‘East African coastal Zanzibar-Ihambane’ (Mosaic #16a) and ‘drier Zambezian miombo woodland (dominated by *Brachystegia* and *Julbernardia*)’ (Mosaic #26) vegetation mosaics (White 1983) (Fig. 12) belonging to the Zambezian bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected from young stems and shoots of *C. purpureus* growing along rivers or in wetlands inhabited by various Poales belonging to the following genera: *Echinochloa*, *Megathyrus*, *Panicum* and *Setaria*.

Remarks. This species is morphologically very close to *S. lalaci* sp. nov., *S. lusese* sp. nov. and *S. msowero* sp. nov., and its identification is impossible without a thorough examination of the genitalia.

Sesamia penniseti Tams & Bowden, 1953

Figures 5H; 8I, T; 9G; 11; 12M–P

= *Sesamia poebora* Tams & Bowden, 1953

Sesamia penniseti – Tams and Bowden (1953: 669), Poole (1989: 908 [catalogue]). *Sesamia poebora* – Tams and Bowden (1953: 670).

Type material. Holotype ♂, [GHANA], Gold Coast, [Ashanti], Owabi, 29.II.1950, 1950/261, ex [*Cenchrus purpureus*] *Pennisetum purpureum*, Agrotidae genitalia slide No. 1241, J. Bowden [Leg.] (NHM). Allotype ♀, [GHANA], Gold Coast, Ashanti, Kumasi, 11.IV.1950, ex *Pennisetum purpureum* [*Cenchrus purpureus* (Schumach.) Morrone], Agrotidae genitalia slide No. 1252, (NHM); Paratypes: GHANA: one ♀, Gold Coast, Ashanti, Kumasi, 18.II.1950, ex *Pennisetum purpureum* [*Cenchrus purpureus* (Schumach.) Morrone], J. Bowden [Leg.], (NHM); one ♂, Gold Coast, Ashanti, Kumasi, 30.VI.1950, ex *Pennisetum purpureum* [*Cenchrus purpureus* (Schumach.) Morrone], Agrotidae genitalia slide No. 1253, J. Bowden [Leg.], (NHM); one ♂, Gold Coast, Ashanti, Kumasi, 4.VII.1950, ex *Pennisetum purpureum* [*Cenchrus purpureus* (Schumach.) Morrone], J. Bowden [Leg.], (NHM); one ♀, Gold Coast, Ashanti, Owabi, 22.III.1950, ex *Pennisetum purpureum* [*Cenchrus purpureus* (Schumach.) Morrone], J. Bowden [Leg.], (NHM); two ♀, Gold Coast, Ashanti, Owabi, 13.III.1950, ex *Pennisetum purpureum* [*Cenchrus purpureus* (Schumach.) Morrone], J. Bowden [Leg.], (NHM).

Other material. CAMEROON: four ♀, Central region, Sanaga River, 04°22'23"N, 11°15'10"E, 388m a.s.l., XII.2013, light trap, (B. Le Ru leg.) (MNHN); two ♀, four ♂, North West region, Babungo, 06°01'49"N, 10°26'24"E, 1214m a.s.l., XI.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); four ♀, four ♂, North West region, Din, 06°17'36"N, 10°30'31"E, 1283m a.s.l., XI.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, gen. prep. LE RU Bruno/228 (B. Le Ru leg.) (MNHN); nine ♀, five ♂, Northwest, Sarkong, 06°02'55"N, 10°36'11"E, 1365m a.s.l., XI.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Mor-

rone, (B. Le Ru leg.) (MNHN); three ♂, South, Nkondom, 03°58'01"N, 11°27'18"E, 735m a.s.l., XI.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, one ♂, Northwest, Tolon-Jikijem, 06°14'25"N, 10°28'15"E, 1660m a.s.l., XI.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); two ♀, three ♂, Northwest, Widikom, 05°51'05"N, 09°44'45"E, 585m a.s.l., XII.2008, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); two ♀, Northwest, Ndop Bamunka, 06°00'26"N, 10°28'41"E, 1170m a.s.l., XII.2013, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, male gen. prep. LE RU Bruno/614, (B. Le Ru leg.) (MNHN); one ♀, one ♂, Northwest, Banyo, 06°44'42"N, 11°51'49"E, 1044m a.s.l., XI.2008, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); two ♂, South, Mbamkomo, 03°47'22"N, 11°24'26"E, 752m a.s.l., XII.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); three ♀, one ♂, Southwest, Buea, 04°10'12"N, 09°14'54"E, 1010m a.s.l., XI.2008, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, one ♂, Northwest, Bamessi, 06°00'22"N, 10°21'54"E, 1187m a.s.l., XI.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); two ♂, West, Santchou, 05°15'37"N, 09°58'40"E, 720m a.s.l., XI.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, West, Tiben, 05°56'54"N, 09°49'17"E, 940m a.s.l., XII.2008, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); two ♂, Northwest, Somie, 06°26'06"N, 11°24'46"E, 780m a.s.l., XI.2008, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♂, Northwest, Koini Njinikom, 06°14'33"N, 10°18'57"E, 1123m a.s.l., XII.2008, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, Northwest, Djah, 06°28'54"N, 10°44'26"E, 1874m a.s.l., XII.2013, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, Southwest, Bafut Ngemba, 05°51'14"N, 10°10'03"E, 1900m a.s.l., XI.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, Southwest, Mouangel, 05°05'29"N, 09°51'41"E, 1250m a.s.l., XI.2007, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); **DEMOCRATIC REPUBLIC OF CONGO**: four ♀, two ♂, Oriental province, Yankau, 02°02'38"N, 22°51'36"E, 365m a.s.l., V.2010, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, male gen. prep. LE RU Bruno/236, female gen. prep. LE RU Bruno/237 (B. Le Ru leg.) (MNHN); **KENYA**: six ♀, two ♂, Western, Kissii 2/Sare, 00°54'47"S, 34°31'44"E, 1583m a.s.l., II.2003–2005, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, one ♂, Western, Kisumu 4, 00°35'47"N, 34°27'10"E, 1283m a.s.l., III.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, Western, Kakamega 11, 00°12'05"N, 34°55'58"E, 1603m a.s.l., V.2008, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); **REPUBLIC OF CONGO**: six ♀, five ♂, Niari, Ditiadi, 04°11'40"S, 12°58'03"E, 178m a.s.l., IV.2013, ex larvae in stems of *Andropogon gabonensis* Stapf, (B. Le Ru leg.) (MNHN); three ♂, Niari, Ditiadi, 04°11'40"S, 12°58'03"E, 178m a.s.l., IV.2013, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, male gen. prep. LE RU Bruno/540, (B. Le Ru leg.) (MNHN); one ♀, one ♂, Bouenza, Madingou, 04°09'37"S, 13°34'10"E, 159m a.s.l., IV.2013, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, male gen. prep. LE RU Bruno/543, female gen. prep. LE RU Bruno/569, (B. Le Ru leg.) (MNHN); one ♀, Bouenza, Tadi, Mfouati River, 04°19'04"S,

13°53'02"E, 181m a.s.l., IV.2013, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♂, Kouilou, Djeno, 04°53'28"S, 11°55'26"E, 6m a.s.l., IV.2013, ex larvae in stems of *Andropogon schirensis* Hochst. Ex A.Rich., male gen. prep. LE RU Bruno/555, (B. Le Ru leg.) (MNHN); one ♂, Kouilou, Tchiamba-Nzassi, 04°58'34"S, 12°00'50"E, 3m a.s.l., IV.2013, ex larvae in stems of *Andropogon schirensis* Hochst. Ex A.Rich., male gen. prep. LE RU Bruno/568, (B. Le Ru leg.) (MNHN); one ♀, one ♂, Pool, Misafou, 04°21'59"S, 13°51'12"E, 224m a.s.l., IV.2013, ex larvae in stems of *Andropogon gabonensis* Stapf, (B. Le Ru leg.) (MNHN); two ♀, one ♂, Pool, Kikembo, 04°16'02"S, 14°10'26"E, 284m a.s.l., IV.2013, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, male gen. prep. LE RU Bruno/568, (B. Le Ru leg.) (MNHN); **UGANDA**: one ♂, [Central Uganda, Wakiso District], Kawanda, 8.X.1940, ex *Pennisetum purpureum* [*Cenchrus purpureus* (Schumach.) Morrone], 1948/296, Agrotidae genitalia slide No. 1242, T.H.C. Taylor [Leg.], *Sesamia poebora* holotype det. W.H.T. Tams, (NHM); six ♀, five ♂, Western, Kashenyi, 00°45'21"S, 30°19'25"E, 1461m a.s.l., III.2005, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); three ♀, Western, Kayanga, Kalinzu Forest, 00°22'02"S, 30°06'43"E, 1447m a.s.l., IV.2006, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♂, Western, Nyambega, 00°50'08"N, 30°12'36"E, 1234m a.s.l., IV.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, Western, Bumaga, 00°49'41"N, 30°09'50"E, 699m a.s.l., IV.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, Central, Koba Forest, 00°20'32"N, 32°21'43"E, 1277m a.s.l., IV.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♂, Western, Bwindi town, 00°57'03"S, 29°37'05"E, 1375m a.s.l., IV.2006, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, two ♂, Central, Namuganga, 00°27'20"S, 31°47'10"E, 1348m a.s.l., IV.2004, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♂, Western, Kasese, 00°11'40"N, 30°06'19"E, 974m a.s.l., IV.2006, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN); one ♀, Oriental province, Ntuntu, Nyehara forest, 00°41'52"N, 30°32'51"E, 1568m a.s.l., V.2009, ex larvae in stems of *Cenchrus purpureus* (Schumach.) Morrone, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *incerta* subgroup, section 3.4.2.). This species can be distinguished from the other known members of the *incerta* subgroup by the combination of the following characters of the male and female genitalia: tegumen with medium-sized peniculi; vinculum u-shaped at the outer margin with a large sized saccus, rounded; juxta large, the inferior plate shaped as a slightly flattened triangle, the superior plate narrow and long, as long as the inferior one, shortly bifid terminally; phallus short and thick; vesica with a small semi-circular flat cornutus; ventrolateral plates of female segment A8 very large, sclerotized, rounded; ostium bursae flattened funnel-shaped, sclerotized, with blunt tip on each side; ductus bursae with two narrow posterior sclerotized areas, one of them twice as long as the other.

Redescription. (Fig. 12M–P). The species has been previously described in great detail by Tams and Bowden (1953). However, Tams and Bowden did not mention the fact that the wings are more elongated in females than

in males. Also, the ground colour of the forewing varies from cartridge-buff to dark ochraceous depending on the specimen, with most studied specimens being rather light ochraceous. — **Forewing length:** male 27–33 mm (\bar{x} = 29.7 mm, N = 12); female 30–40 mm (\bar{x} = 34.6 mm, N = 12). — **Male genitalia** (Fig. 8I, T). Tegumen with medium-sized peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large saccus, rounded. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and short straight spine, with two apical teeth; sacculus heavily sclerotized rounded at base, a broad and short apical extension, curved inwards, strongly club-shaped, bearing numerous short and stout spines; cucullus longer than sacculus, weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large, the inferior plate shaped as a slightly flattened triangle, the superior plate narrow and long, as long as the inferior one, shortly bifid terminally; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thick, a bit curved in the middle; lamina ventralis with an elongate carinal crest produced into paired lateral lobes; vesica with a small semi-circular flat cornutus. — **Female genitalia** (Fig. 9G). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 very large, sclerotized, rounded; ostium bursae large, flattened funnel-shaped, sclerotized, with blunt tip on each side; ductus bursae long and narrow, with two narrow posterior sclerotized areas, one of them twice as long as the other; corpus bursae pyriform, without signa; ovipositor lobes at least 2.2 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved; apophyses posteriores more slender than apophyses anteriores. — **L5 instar larva** (Fig. 5H). Length 35–40 mm, width 4.0 mm; head smooth, black, prothoracic shield light brown, body with ground colour dark pink, pinacula and caudal plate light brown. Young larvae are similar in appearance to mature ones.

Distribution. Benin, Cameroon, Ghana, Kenya, Republic of Congo, Republic of Côte d'Ivoire, Rwanda and Uganda. Known from many localities in 'Guineo-Congolian rainforest drier types' (Mosaic #2), 'lowland rain forest and secondary grassland' (Guineo-Congolian) (Mosaic #11a) and 'undifferentiated Afromontane' (Mosaic #19a) vegetation mosaics (White 1983) (Fig. 11) belonging to the Congolian bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected from young stems and shoots of nine host plants of the Poaceae family, belonging to the Andropogoneae, Cynodonteae and Paniceae tribes (see Table S4 for details). Almost 88% of the larvae were collected on *Cenchrus purpureus* and were found in frequent association with larvae of another Sesamiina species, *Poconoma serrata* (Hampson, 1910). Most larvae were found along forest roads, forest edges and riversides in forested areas, also inhabited by various Poaceae species mostly belonging to the following genera:

Cenchrus, *Cymbopogon*, *Megathyrsus*, *Panicum*, *Setaria*, *Sorghum* and *Sporobolus*.

Remarks. *Sesamia poebora* Tams & Bowden (known from a single specimen from Uganda) was synonymized with *S. penniseti* by Moyal et al. (2011). Tams and Bowden (1953) stated that it is a "very distinct species of the *epunctifera* group, separable from all the other species by the characteristic wing markings, consisting of three median fuscous patches and a strongly dentate post-medial fascia". In general, the wing markings of *Sesamia* species can be more or less visible depending on the localities and populations; when studying the genitalia of the *S. poebora* male holotype (Agrotidae genitalia slide No. 1242) no difference was found with the male holotype of *S. penniseti* (Agrotidae genitalia slide No. 1241). In addition, *S. penniseti* and *S. poebora* were collected on the same host plant (*Cenchrus purpureus*), and dozens of *S. penniseti* specimens were collected in Uganda and Western Kenya as well as in Cameroon and the Republic of Congo in Central Africa where it is a common species; among the *S. penniseti* specimens preserved in the MNHN some of them also show markings similar to those of the *S. poebora* holotype. All these elements indicate that *S. poebora* is a synonym of *S. penniseti* as concluded by Moyal et al. (2011). This species is an occasional minor pest of maize, sorghum and sugarcane (Scheibelreiter 1980; Sampson and Kumar 1986; Ratnadass et al. 1992; Ndemah et al. 2007).

Sesamia poephaga Tams & Bowden, 1953

Figures 8J, U; 9H; 11; 12Q–T

Sesamia poephaga – Tams and Bowden (1953: 668), Poole (1989: 908 [catalogue]).

Type material. Holotype ♂, [GHANA], Gold Coast, N.[orth] Territories, Kete-Krachi, SES/31, B.M. 1925-126, Agrotidae genitalia slide No. 1238, A.W. Cardinal Leg., (NHM); Paratypes: **GHANA:** one ♀, Gold Coast, North Ashanti, Wenchi, 7.xii.1947, ex maize, (NHM); **NIGERIA:** one ♀, Niger, Anambara Creek, Rothschild Bequest B.M. 1939-1, Ses. 100, *Sesamia poephaga* Tams Paratype ♀ det., W. H. T. Tams Agrotidae genitalia slide No. 1408, (NHM); one ♂, Anambara Creek, Rothschild Bequest B.M. 1939-1., Agrotidae genitalia slide No. 1282, (NHM); one ♀, Nigeria, Ogruga, R. Niger, (NHM); **REPUBLIC OF CÔTE D'IVOIRE:** one ♀, Bingerville, 1–5.VIII.1918, (NHM); **TOGO:** five ♀, British Mandated Togoland, Kpeve, X.1949, ex maize, (NHM).

Other material. **ZAMBIA:** two ♂, Western Province, Kantongo, 09°29'03"S, 32°37'54"E, 1378m a.s.l., III.2012, light trap, gen. Prep. LE RU Bruno/111-153, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *incerta* subgroup, section 3.4.2.). This species can be distinguished from the other known members of the *incerta* subgroup

by the combination of the following characters of the male and female genitalia: tegumen with large erected peniculi; vinculum u-shaped at the outer margin with a large sized saccus, rectangular; sacculus with a broad and short apical extension, curved inwards, strongly club-shaped; juxta large, the inferior plate almost triangular, produced into a sharp point, the superior plate broad and of medium length, shortly bifid terminally; phallus short and thick; vesica with a small semi-circular flat cornutus; ventrolateral plates of female segment A8 very large, trapezoidal, the anterior side rounded, as long as wide; ostium bursae large, funnel-shaped sclerotized, with slightly pointed tip on each side; ductus bursae with two posterior very narrow and long sclerotized areas.

Description. (Fig. 12Q–T). The species has been described in great detail by Tams and Bowden (1953). However, Tams and Bowden did not mention the fact that the wings are more elongated in females than in males. — **Forewing length:** male 32–35 mm (\bar{x} = 33.5 mm, N = 4); female 34–40 mm (\bar{x} = 37.2 mm, N = 6). — **Male genitalia** (Fig. 8J, U). Tegumen with large erected peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large saccus, rectangular. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and short straight spine, with two apical teeth; sacculus heavily sclerotized rounded at base, a broad and short apical extension, curved inwards, strongly club-shaped, bearing numerous short and stout spines; cucullus longer than sacculus, weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large, the inferior plate almost triangular, produced into a sharp point, the superior plate broad and of medium length, shortly bifid terminally; uncus angled and stout at base, narrowed in distal part, pointed at apex, tufted with long hairs on upper side; phallus short and thick, a bit curved in the middle; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a small semi-circular flat cornutus. — **Female genitalia** (Fig. 9H). Apophyses anteriores with spatulate tips; ventrolateral plates of segment A8 very large, trapezoidal, sclerotized, the anterior side rounded, as long as wide; ostium bursae large, funnel-shaped, sclerotized, with slightly pointed tip on each side; ductus bursae long and narrow, with two posterior very narrow and long sclerotized areas; corpus bursae pyriform, without signa; ovipositor lobes at least 2.8 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved; apophyses posteriores more slender than apophyses anteriores.

Distribution. Benin, Cameroon, Ghana, Mali, Republic of Côte d’Ivoire, Zambia. Known from localities in different vegetation mosaics (‘wetter Zambebian miombo woodland (dominated by *Brachystegia*, *Julbernardia* and *Isoberlinia*’ (Mosaic #25), ‘Sudanian woodland with abundant *Isoberlinia*’ (Mosaic #27), ‘undifferentiated woodland (Sudanian and North Zambebian)’ (Mosaic

#29a, c)) (White 1983) (Fig. 10) belonging to the Congolian, Sudanian and Zambebian bioregions (sensu Linder et al. 2012). We never found this species in Eastern Africa despite the collection of hundreds of *Sesamia* specimens belonging to the *S. epunctifera* species complex (made of *S. epunctifera*, *S. kamba* **sp. nov.** and *S. poephaga*).

Ecology. This species is an occasional minor pest of maize and sorghum and sugarcane (Tams and Bowden 1953; Ratnadass and Djimadounngar 2002; Mathieu et al. 2006). According to Ratnadass and Djimadounngar (2002) and Mathieu et al. (2006), this species inhabits the savannahs of West and Central Africa. On one occasion, two specimens were light-trapped by us in a dry Nyombo forested area in Zambia, which confirms that this is a species that inhabits relatively dry habitats.

Remarks. Morphological and molecular results indicate that *S. poephaga* is closely related to *S. epunctifera* and *S. kamba* **sp. nov.** When Tams and Bowden (1953) described *S. poephaga*, they designated a female allotype from Tanzania and 17 paratypes (all females except one male from Kenya). Tams and Bowden considered that *S. poephaga* was a widespread species, as the paratypes come from Eastern Africa (Kenya and Uganda), Southern Africa (Malawi and Zimbabwe), Western Africa (Ghana, Ivory Coast, Nigeria and Togo) and the Comoro Islands. The genitalia of the female allotype ([Tanzania], Tanganyika, Chunya District, Chunya, 2650 ft., 1926, Agrotidae genitalia slide No. 1239, G. Swynnerton [Leg.], [NHM]), designated by Tams and Bowden (1953) clearly does not belong to a female of *S. poephaga* but to an unknown species of the *cretica* species group, morphologically close to *S. albivena* Hampson. On the other hand, the female paratype from Nigeria, Anambara Creek, Agrotidae genitalia slide No. 1408, [NHM] clearly belongs to the species *S. poephaga*. Without the possibility of dissecting the genitalia and taking into account the results of our extensive collections in Central, Eastern, Southern and Western Africa (several hundred specimens collected from more than 15 countries), specimens from Eastern Africa should belong to *S. kamba* **sp. nov.**, and those from Southern Africa should belong either to the *S. pennipuncta* species complex (made of *S. lalaci* **sp. nov.**, *S. lusesse* **sp. nov.**, *S. msowero* **sp. nov.** and *S. pennipuncta*) or to the *S. epunctifera* species complex. The single specimen from the Comoro Islands seems to belong to a distinct species. In Western Africa the species is obtained from maize and sorghum on which it is an occasional pest in the southern part of the savannah zone; there are no records from wild host plants.

Sesamia simplaria Rungs 1954

Figures 8K, V; 9I; 11; 12U–X

Sesamia simplaria – Rungs (1954: 164, fig. 2; Planche VIII, figs 2, 5), Viette (1967: 707, figs 548, 549), Poole (1989: 908 [catalogue]).

Type material. Type ♂, [MADAGASCAR], Sn. 18, P. Viette gen ♂ n° 2549, L 556, TYPE, TYPUS *Sesamia simplaria* (Saalm) Rungs, P.E.L. Viette det. 1961, TYPE ♂ *Sesamia simplaria* (Saalm) Rgs Cg. Rungs det 1953, Fotografiert 2014 H. Thöny, Senckenberg Museum, (Francfort-sur-le-Main).

Other material. MADAGASCAR: one ♂, Nossi-Bé, [A.] Stumpff, [18]89, Lep. 556 x *simplaria*, this specimen is not the typus of *Leucania simplaria* Saalm, it's a specimen of *Sesamia simplaria* Rungs, 1954. P.E.L. Viette det 1961, [Senckenberg Museum, Francfort-sur-le-Main]; one ♂, [Madagascar], Agrotidae genitalia slide No. 1432, (NHM); one ♀, Nossi-Bé, 1924, Coll. C. Dumont, (MNHN); one ♂, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 18 du 7.X.[19]51, Mission P.Viette sept. 1951–Mars 1952, Ch. Rungs gen. MP. 26, (MNHN); one ♂, Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de Tsimbazaza, Alt. 1200m a.s.l., P. Viette, Chasse n° 97 du 13.I.1952, Mission P.Viette sept. 1951–Mars 1952, Ch. Rungs gen. MP. 1, (MNHN); seven ♂, three ♀, env. de Tananarive, 1921, R. Decary, Ch. Rungs male gen. MP. 42, Genitalia P. Viette female prep. n° 4380, (MNHN); three ♂, two ♀, [Madagascar Centr., Plateaux de l'Imerina, Tananarive, Parc de] Tsimbazaza, [Alt. 1200m a.s.l.], 8/9.XI.1954/4.XII.1954/13.II.1955, P. Viette, (MNHN); one ♂, Madagascar Est, env. de Périnet, forêt d'Analamazoatra, Alt. 910m a.s.l., P. Viette le 14.I.1955, (MNHN); one ♂, Madagascar Sud, District de Sakaraha, Lambomakandro, route de Tuléar km 808, 6–9.IV.1956, P. Grivaud, Institut Scientifique de Madagascar, 3071R, (MNHN).

Diagnosis. (See also the identification key of *incerta* subgroup, section 3.4.2.). This species can be distinguished from the other known members of the *incerta* subgroup by the combination of the following characters of the male and female genitalia: vinculum v-shaped at the outer margin, u-shaped at the inner margin without indentation, with a medium sized saccus; sacculus with a broad and short apical extension, curved inwards, strongly club-shaped; juxta large, the inferior plate triangular produced into a blunt point, the sides rounded, the superior plate long and wide, bifid terminally; phallus short and thick, curved; vesica with a large semi-circular cornutus; ventrolateral plates of female segment A8 very large, as wide as long, the anterior side slightly convex, the posterior side triangular, separated by a deep longitudinal ditch backward the ostium; ostium bursae funnel-shaped; ductus bursae without posterior elongated sclerotized areas; ovipositor lobes at least twice as long than wide.

Taxonomic notes. Rungs (1954), without providing rationale regarding his interpretation of the notoriously difficult descriptions by Saalmüller (1891), considered that the text part of that author's description of *Leucania simplaria* (cf. Saalmüller 1891: 252–253) did indeed relate to a species corresponding to the current concept of *Leucania Ochsenheimer*, 1816, although the illustration associated with the description was that of a *Sesamia* (cf. Saalmüller 1891: Tafel X, fig. 160). Rungs further stated that the depicted specimen must have been a female by its filiform antennae, so that of the two syntypes listed by Saalmüller, one in the Lübeck museum (whose collection is destroyed) and the other in SMLF, the latter, actually a

male *Sesamia*, was the only surviving (syn)type, and he proceeded with a redescription of the species based on this and other supplementary specimens. Viette (1962) brought forward Rungs' argumentation and challenged also his interpretation of Saalmüller's illustration and the labelling of the SMLF specimen of *Sesamia* examined by Rungs as one (syn)type of *Leucania simplaria*, considering that the whole description by Saalmüller (1891) was not mixed and fully related to the species nowadays known as *Leucania (Boursinania) simplaria* Saalmüller, 1891. The *Sesamia* species with which the latter has been confused may therefore be attributed and dated as from Rungs (1954).

Description. (Fig. 12U–X). Both males and females have been described in great detail by Rungs in 1954 and completed by Viette in 1967. — **Forewing length:** male 29–33 mm (\bar{x} = 30.9 mm, N = 9); female 30–36 mm (\bar{x} = 33.0 mm, N = 5). — **Male genitalia** (Fig. 8K, V). Although already partly described by Rungs (1954) and Viette (1967) we provide here a complete description. Tegumen with large peniculi, slightly erected; vinculum u-shaped at the outer margin, u-shaped at the inner margin without indentation, with a medium sized saccus. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a thick and long straight spine, with two apical teeth; sacculus heavily sclerotized rounded at base, a broad and short apical extension, slightly curved inwards, strongly club-shaped, bearing numerous short and stout spines; cucullus long, weakly sclerotized, clavate at apex, with scattered and papillated hairs. Juxta large, the inferior plate triangular produced into a blunt point, the sides rounded, the superior plate long and neck, bifid terminally; uncus small and stout, angled at base, tapered near apex to a fine curved point; phallus short and thick, slightly curved; lamina ventralis with an elongate carinal crest; vesica with a large semi-circular cornutus. — **Female genitalia** (Fig. 9I). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 very large, as wide as long, the anterior side slightly convex, the posterior side triangular, separated by a deep longitudinal ditch backward the ostium; ostium bursae funnel-shaped, weakly sclerotized; ductus bursae very short, without elongated sclerotized areas; ductus seminalis from the basal part of the corpus bursae; corpus bursae long, without signa; ovipositor lobes at least twice as long than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved and tooth-shaped; apophyses posteriores more slender than apophyses anteriores.

Distribution. Madagascar. Known from several localities in different vegetation mosaics ('lowland rain forest wetter types' (Mosaic #1b), 'cultivation and secondary grassland, replacing upland and montane forest' (Mosaic #18), 'dry deciduous forest and secondary grassland' (Mosaic #22b)) (White 1983) (Fig. 11).

Ecology. Unknown.

Remarks. This species was named in Saalmüller and von Heyden (1891) but the description provided by Saalmüller

corresponds to that of a *Leucania* Ochsenheimer (Noctuidae: Leucaniini), and not at all to the figure illustrating the species (fig. 160), which is a *Sesamia*. Saalmüller therefore did not describe *S. simplaria*, and Rungs (1954) decided to describe the species on the basis of the ♂ type from the Senckenberg Museum, [Francfort-sur-le-Main] which was the specimen in the fig. 160 of Saalmüller and

von Heyden (1891). According to Rungs (1954) and Viette (1967), *S. simplaria* would belong to the *calamistis* subgroup. However, the short pectination of the male antennae, the apical extension of the sacculus strongly club-shaped and the lateral plates of the ostial segment very large, as wide as long, suggest that *S. simplaria* rather belongs to the *incerta* subgroup.

3.4.2. Identification key of *incerta* subgroup

Keys to the *incerta* subgroup based on the morphology of male (A) and female (B) genitalia. All male of known species of the *incerta* subgroup have serrate or very shortly bipectinate antennae.

A

1	sacculus with an elongated very sharp apical extension (Fig. 8B)	<i>firmata</i>
1'	sacculus with a short apical extension club-shaped (Fig. 8A, C, E)	2
2	juxta with superior plate two to three times longer than wide (Fig. 8E, G–I)	3
2'	juxta with superior plate less than 1.5 longer than wide (Fig. 8A, C, D, J)	7
3	juxta with long bifid superior termination (Fig. 8K)	<i>simplaria</i>
3'	juxta shortly bifid superiorly (Fig. 8E, G–I)	4
4	superior plate of juxta as long as the inferior one (Fig. 8H, I)	5
4'	superior plate of juxta shorter than the inferior one (Fig. 8E, G)	6
5	basal plate of juxta triangle-shaped almost equilateral (Fig. 8H)	<i>pennipuncta</i>
5'	basal plate of juxta shaped as a slightly flattened triangle (Fig. 8I)	<i>penniseti</i>
6	superior plate of juxta twice as short than inferior one (Fig. 8G)	<i>msowero</i>
6'	superior plate of juxta three times shorter than inferior one (Fig. 8E)	<i>lalaci</i>
7	large peniculi (Fig. 8A, F, J)	8
7'	small peniculi (Fig. 8D)	<i>kamba</i>
8	medium-sized ovoid peniculi (Fig. 8C)	<i>incerta</i>
8'	superior plate of juxta as long as wide (Fig. 8A)	<i>epunctifera</i>
9	superior plate of juxta longer than wide (Fig. 8F, J)	9
9'	large ovoid peniculi (Fig. 8F)	<i>lusese</i>
10	large erect peniculi (Fig. 8J)	<i>poephaga</i>

B

1	ductus bursae strongly sclerotized posteriorly (Fig. 9B)	<i>firmata</i>
1'	ductus bursae slightly sclerotized posteriorly (Fig. 9A, C, G)	2
2	ventrolateral plates of segment A8 almost oval in shape (Fig. 9C)	<i>incerta</i>
2'	ventrolateral plates of segment A8 not oval in shape (Fig. 9A, D–G)	3
3	anterior side of the ventrolateral plates of segment A8 almost straight (Fig. 9G)	4
3'	anterior side of the ventrolateral plates of segment A8 not straight (Fig. 9A, C, D, G, H)	6
4	ventrolateral plates of segment A8 at least twice as long than wide (Fig. 9E)	<i>msowero</i>
4'	ventrolateral plates of segment A8 less than 1.5 times longer than wide (Fig. 9F, I)	5
5	ductus bursae with posterior sclerotized areas (Fig. 9F)	<i>pennipuncta</i>
5'	ductus bursae without posterior sclerotized areas (Fig. 9I)	<i>simplaria</i>
6	anterior side of ventrolateral plates of segment A8 angled (Fig. 9A, D)	
6'	anterior side of ventrolateral plates of segment A8 not angled (Fig. 9C, H, I)	8
7	anterior side of the ventrolateral plates of segment A8 swollen inwards to the body axis (Fig. 9A)	<i>epunctifera</i>
7'	anterior side of the ventrolateral plates of segment A8 triangle-shaped (Fig. 9D)	<i>kamba</i>
8	ventrolateral plates of segment A8 globular in shape (Fig. 9G)	<i>penniseti</i>
8'	ventrolateral plates of segment A8 almost square shaped (Fig. 9H)	<i>poephaga</i>

3.4.3. Ecology and distribution of the *incerta* subgroup

Regarding the ecology of the *incerta* subgroup, the species with known hosts reported in this study were found

on a total of 24 plant species belonging solely to family Poaceae. Because they are not developing on plants belonging to distinct plant families, none of them is considered as polyphagous. Three species were found to be monophagous (*S. firmata* and *S. pennipuncta* on *Cenchrus purpureus* and *S. incerta* on *Phragmites aus-*

tralis), four oligophagous species (*S. epunctifera*, *S. lalaci*, *S. msowero*, *S. poephaga*) were found on less than four host plants, and two oligophagous species, *S. kamba* and *S. penniseti* were found on 17 and nine host plants, respectively. All oligophagous species show a marked preference for one host plant; *S. epunctifera* and *S. kamba* were mainly found on *Megathyrsus maximus* while *S. lalaci*, *S. msowero*, *S. pennipuncta* and *S. penniseti* were mostly found on *Cenchrus purpureus*. With the exception of *S. incerta*, which is found exclusively in wetlands, and *S. penniseti*, which is found mainly in forested areas, all the other species show a marked ecological preference for open habitats, inhabiting more or less dry woodlands and secondary grasslands, which are much drier than the habitats of most species in the *calamistis* and *nonagrioides* subgroups.

Regarding the distribution of the *incerta* subgroup, four species have been recorded over a fairly large range: *S. epunctifera* has been found to be common in the Republic of South Africa, mainly in the Eastern Cape and the Kwazulu Natal provinces with however one record in the Manica Province in Central Mozambique and another one in Northern Province in Zambia, inhabiting the Southern and Zambebian bioregions; *S. penniseti* has been found to be very common over a wide area extending from Western Africa to Eastern Africa, inhabiting the Congolian bioregion; *S. poephaga* was found sporadically from Western Africa to Central Africa, inhabiting the Sudanian and Zambebian bioregions; *S. kamba* was found from northern Mozambique to southern Ethiopia and eastern Uganda, inhabiting the Somalian and Zambebian bioregions. The other seven species have been recorded in much more restricted ranges, limited to a single bioregion (*S. incerta* only recorded in the Southern Africa bioregion, *S. simplaria* only in Madagascar, and *S. firmata*, *S. lalaci*, *S. lusese*, *S. msowero* and *S. pennipuncta* only in the eastern part of the Zambebian bioregion along the Indian Ocean Sea). The *incerta* subgroup colonised all sub-Saharan bioregions, but Eastern Africa is by far the region with the greatest diversity of the subgroup, as it hosts eight of the eleven known species.

3.5. *nonagrioides* subgroup

3.5.1. Morphology and taxonomy of *nonagrioides* subgroup

The *nonagrioides* subgroup consists of *S. capensis*, *S. congoensis* Le Ru, 2015, *S. kouilouensis* Le Ru, 2015, *S. libode* **sp. nov.**, *S. luyaensis* Le Ru, 2015, *S. natalensis*, *S. nonagrioides*, *S. roumeti* Laporte, 1991, *S. satauensis* **sp. nov.** and *S. typhae*. The subgroup is characterised by the following combination of characters: (i) male antennae bipectinate; (ii) tegumen with large peniculi, vinculum with a large saccus; (iii) valve elongated, with sacculus and cucullus separated; costa short, heavily sclerotised ending with a stout costal spine; sacculus well sclerotized, ovoid at base ending with a short apical extension, slightly club-shaped bearing numerous short and stout

spines; cucullus weakly sclerotized, elongated, clavate at apex with scattered and papillated hairs; (iv) juxta conical inferiorly, the superior plate with bifid termination; (v) uncus angled at base, stout, apex truncated or blunted, tufted with long hair on upper side; (vi) phallus short; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a semi-circular lateral cornutus; (vii) ventrolateral plates of female segment A8, ovoid or triangular, sclerotized; (viii) ostium bursae funnel-shaped; (ix) ductus bursae slightly sclerotized with posterior elongated sclerotized areas.

The description of the two new species is presented below, *S. libode* **sp. nov.** from the Republic of South Africa, and *S. satauensis* **sp. nov.** from Botswana, as well as the redescription of the male of *S. roumeti* from Ethiopia and description of the female.

Sesamia libode Le Ru **sp. nov.**

<https://zoobank.org/E58342F2-AF12-4D4D-97D4-4BA6458998BE>

Figures 13A–D; 14A, D, G; 15

Type material. HOLOTYPE ♂, **REPUBLIC OF SOUTH AFRICA**, Eastern Cape Province, Libode, 30°48'58"S, 29°16'27"E, 1053m a.s.l., III.2015, ex larvae in stems of *Miscanthus capensis* Andersson, gen. Prep. LE RU Bruno/803, (B. Le Ru leg.) (MNHN). — PARATYPES: **REPUBLIC OF SOUTH AFRICA**: eight ♂, three ♀, Eastern Cape Province, Rustfontein, 30°26'27"S, 29°10'37"E, 1505m a.s.l., XI.2009, ex larvae in stems of *Typha latifolia* L., male gen. Prep. LE RU Bruno/13, female gen. Prep. LE RU Bruno/14, (B. Le Ru leg.) (MNHN); eighteen ♂, nine ♀, Kwazulu-Natal Province, Glen Ive Sawhill, 30°31'25"S, 29°43'39"E, 1157m a.s.l., XI.2009, ex larvae in stems of *Typha latifolia* L., (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *nonagrioides* subgroup, section 3.5.2.). This species can be distinguished from the other known members of the *nonagrioides* subgroup by the combination of the following characters of the male and female genitalia: tegumen with large drooping peniculi; vinculum u-shaped at the outer margin with a large rounded saccus; juxta large and conical, the inferior plate produced into a blunted point, the sides pointed, the superior plate broad and short, gradually narrowed, bifid terminally; uncus with an apex large and truncated; phallus short and thick; vesica with a small semi-circular flat cornutus; ventrolateral plates of female segment A8 large, weakly sclerotized, ovoid, the anterior side convex, at least twice as long than wide; ostium bursae large, flattened funnel-shaped, sclerotized, with blunt tip on each side; ductus bursae long and narrow, with a large posterior sclerotized area at least 3.6 times longer than wide.

Description. (Fig. 13A–D). The general shape of the female forewing is more elongated than that of the male;

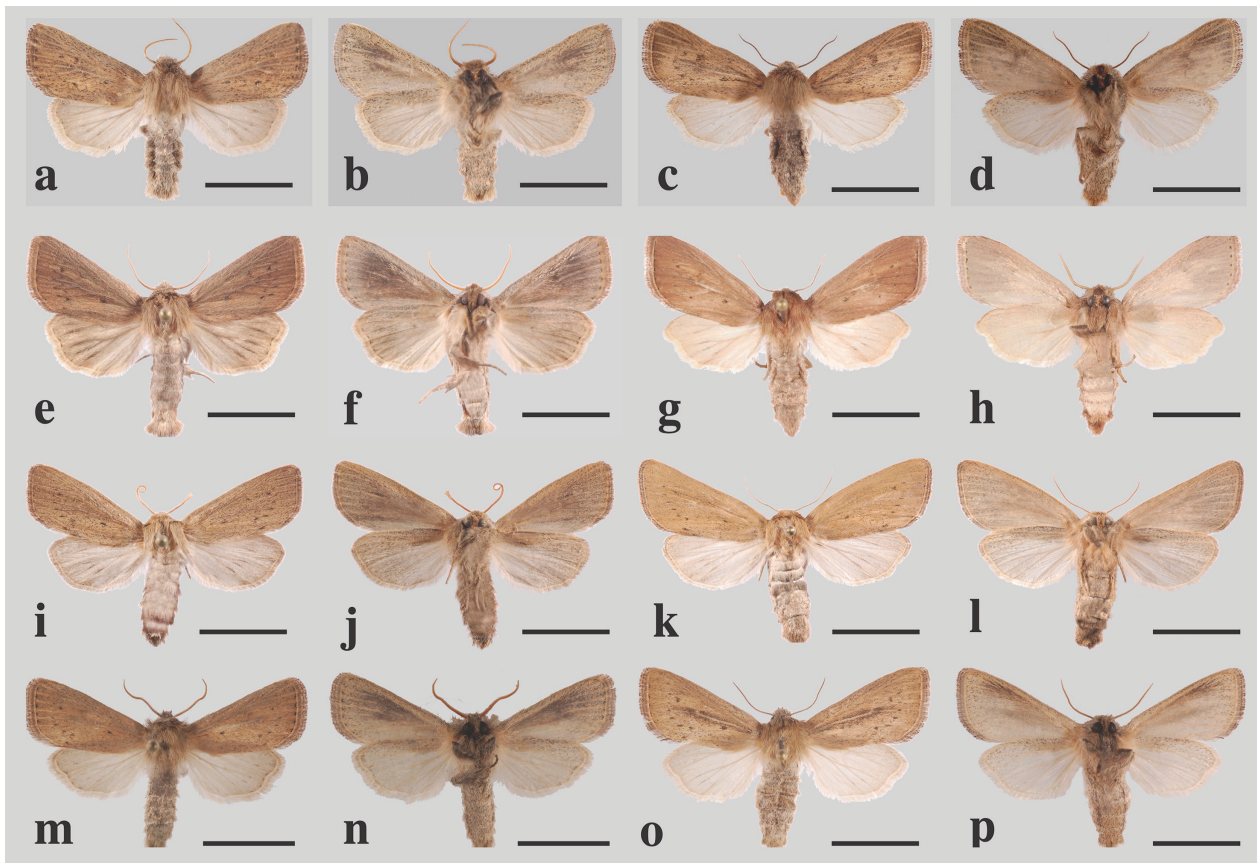


Figure 7. Adults of the *incerta* subgroup (*S. epunctifera*, *S. firmata*, *S. incerta* and *S. kamba* sp. nov.). *S. epunctifera*: **A** male upper side; **B** male underside; **C** female upper side; **D** female underside; *S. firmata*: **E** male upper side; **F** male underside; **G** female upper side; **H** female underside; *S. incerta*: **I** male upper side; **J** male underside; **K** female upper side; **L** female underside; *S. kamba* sp. nov.: **M** male upper side; **N** male underside; **O** female upper side; **P** female underside. Scale bar = 10 mm.

wing patterns in both sexes. Antenna ochraceous, bipectinate in the male, filiform in the female, flagellum adorned dorsally with ochraceous scales in both sexes; palpus ochraceous; eyes dark brown. Head and thorax covered with long ochraceous hairs. Abdomen buff suffused with brown fuscous scales. Forelegs dark brown in males, otherwise ochraceous suffused with fuscous scales. Forewing ochraceous suffused with brown and fuscous scales; three more or less distinct dark brown spots, one antemedial, one at apex of cell and one postmedial; a more or less visible longitudinal ochraceous or brown fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; one subterminal line with brown elongated markings on the veins; outer margin adorned with brown spots between the veins, fringe ochraceous more or less suffused with brown and fuscous scales, basal line of fringe buff. Hindwing white suffused with fuscous scales in costal and apical areas, four more or less visible brown elongated markings on the veins, fringe concolor (white), basal line of fringe buff. Underside of forewing light ochraceous, suffused with brown and fuscous scales in costa, apex and termen, much more in the postmedial area, fringe ochraceous suffused with fuscous scales, in males; underside of forewing light ochraceous slightly suffused with brown and fuscous scales in costa, apex and termen, fringe light ochraceous suffused with fuscous

scales, in females. Underside of hindwing white suffused with brown scales in costal and apical areas, outer margin adorned with more or less visible brown spots between the veins, fringe concolor (white). — **Forewing length**: male 28–32 mm (\bar{x} = 29.7 mm, N = 11); female 31–35 mm (\bar{x} = 33.4 mm, N = 11). — **Male genitalia** (Fig. 14A, D). Tegumen with large drooping peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large sized rounded saccus. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and short straight spine, with two apical teeth; sacculus heavily sclerotized rounded at base, a broad and short apical extension, curved inwards, club-shaped, bearing numerous short and stout spines; cucullus longer than sacculus, weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large and conical, the inferior plate produced into a blunted point, the sides pointed, the superior plate broad and short, gradually narrowed, bifid terminally; uncus angled, very stout, narrowed slightly towards the apex, apex large and truncated, tufted with long hairs on upper side; phallus short and thick, a bit curved in the middle; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a small semi-circular flat cornutus. — **Female genitalia** (Fig. 14G). Apophyses anteriores with spatulate tips; ventrolateral plates of female

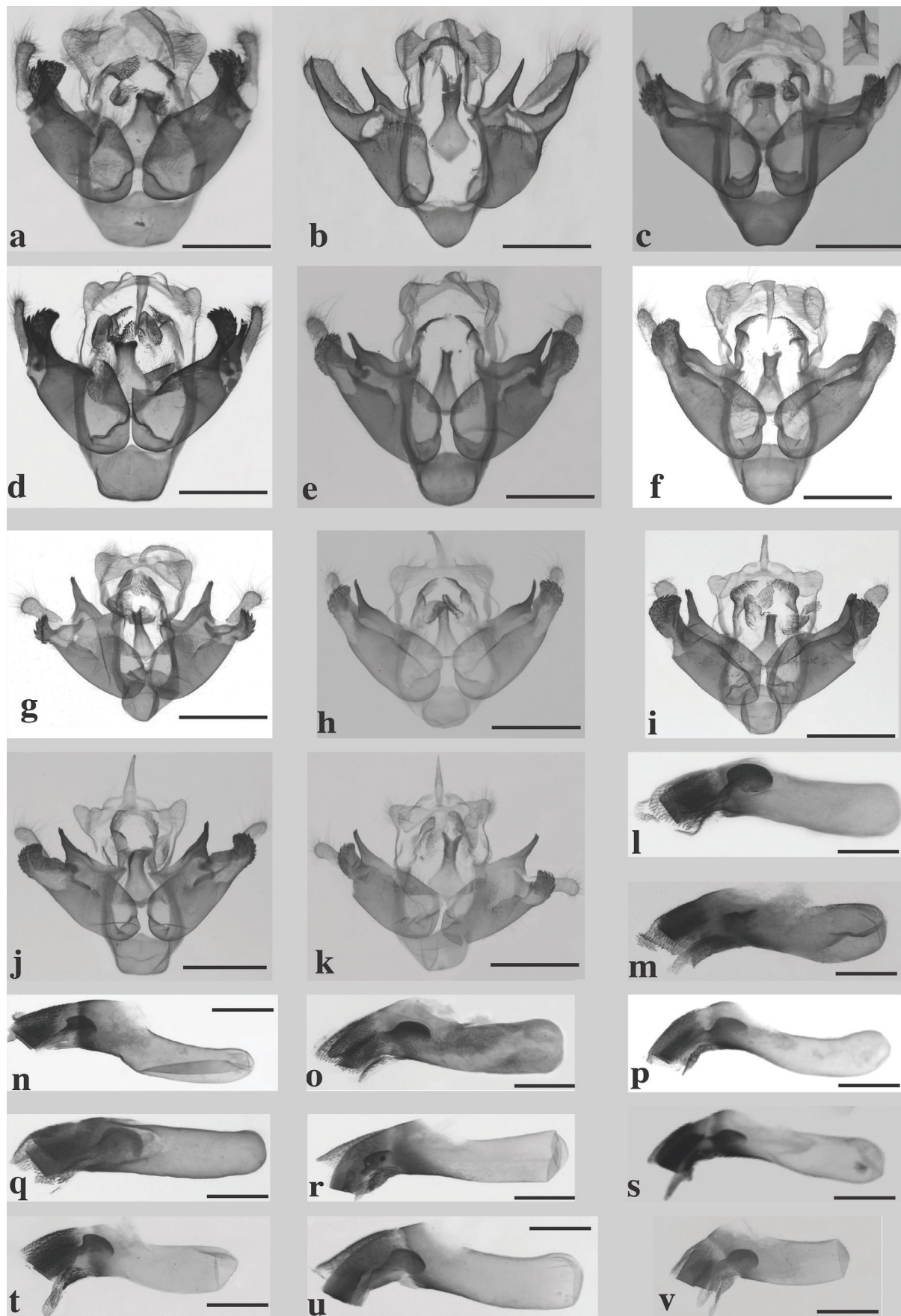


Figure 8. Male genitalia of members of the *incerta* subgroup (dorsal view for apparatus and lateral view for phalli). *S. epunctifera*: A apparatus; L phallus; *S. firmata*: B apparatus; M phallus; *S. incerta*: C apparatus; N phallus; *S. kamba* sp. nov.: D apparatus; O phallus; *S. lalaci* sp. nov.: E apparatus; P phallus; *S. lusese* sp. nov.: F apparatus; Q phallus; *S. msowero* sp. nov.: G apparatus; R phallus; *S. pennipuncta*: H apparatus; S phallus; *S. penniseti*: I apparatus; T phallus; *S. poephaga*: J apparatus; U phallus; *S. simplaria*: K apparatus; V phallus. Scale bar = 1 mm for apparatus and 0.5 for phalli.

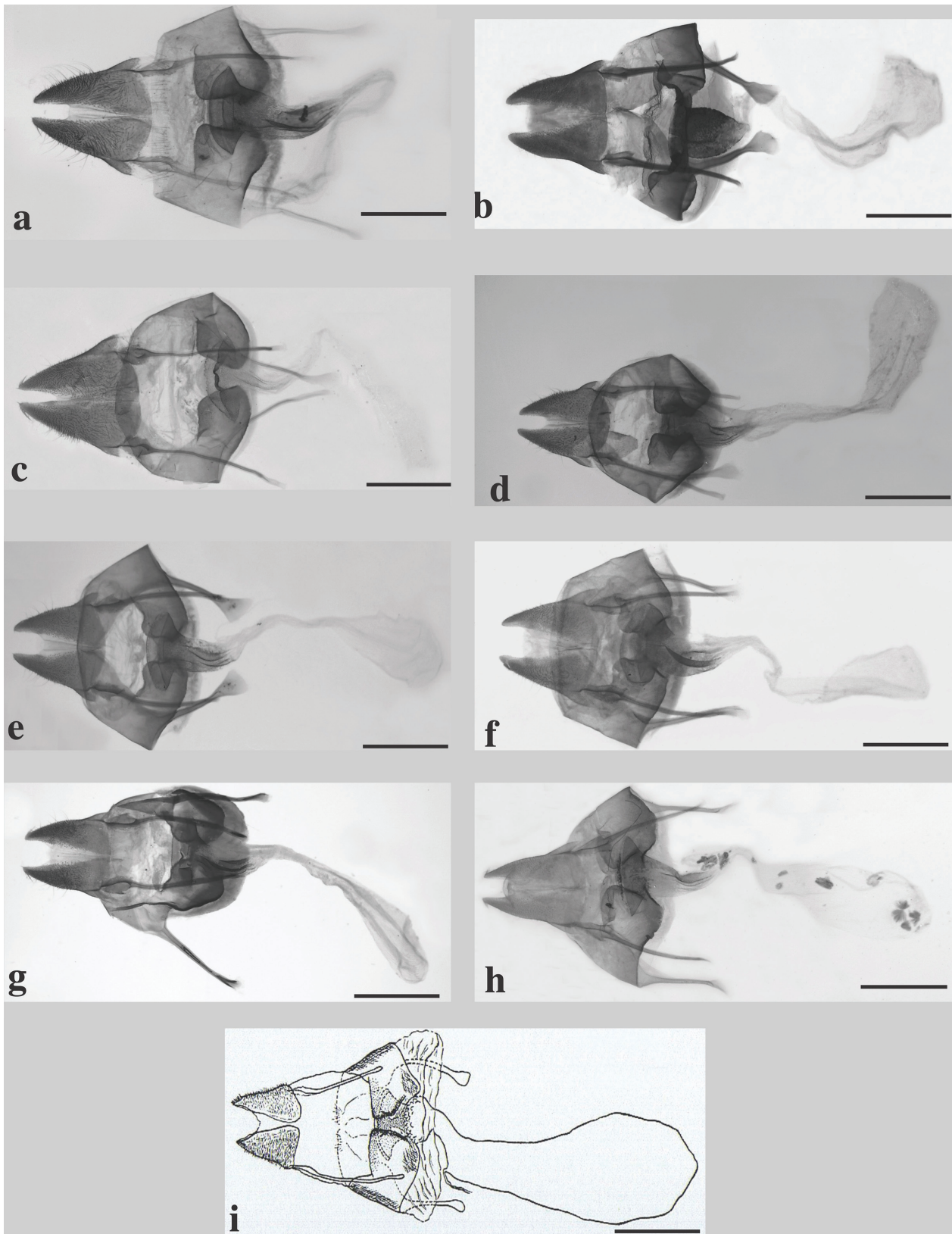


Figure 9. Female genitalia from members of the *incerta* subgroup (ventral view). **A** *S. epunctifera*; **B** *S. firmata*; **C** *S. incerta*; **D** *S. kamba* sp. nov.; **E** *S. msowero* sp. nov.; **F** *S. pennipuncta*; **G** *S. penniseti*; **H** *S. poephaga*; **I** *S. simplaria*. Scale bar = 1 mm.

segment A8 large, weakly sclerotized, ovoid, the anterior side convex, at least twice as long than wide; ostium bursae flattened funnel-shaped, sclerotized, with blunt tip on each side; ductus bursae long and narrow with a large posterior sclerotized area at least 3.6 times longer than

wide; corpus bursae pyriform, without signa; ovipositor lobes at least 2.6 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved; apophyses posteriores more slender than apophyses anteriores.

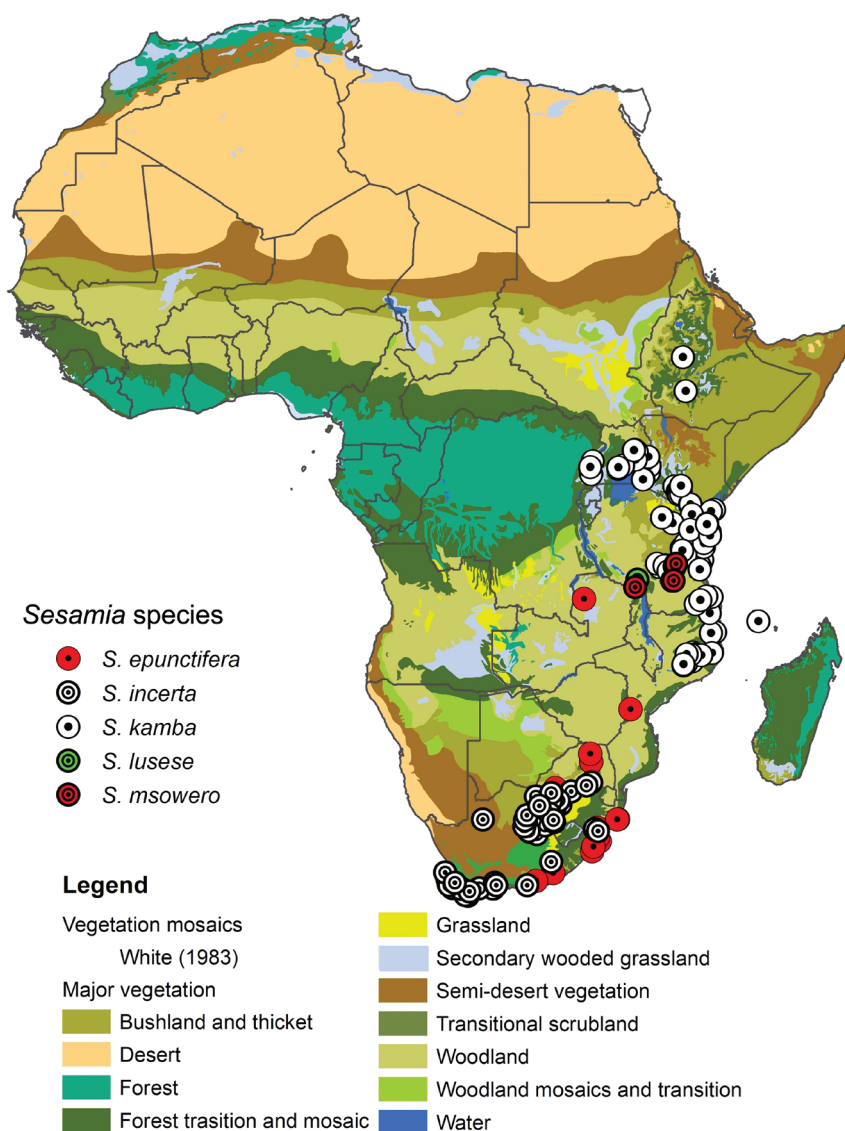


Figure 10. Distribution map of sampled specimens of the *incerta* subgroup: *S. epunctifera*, *S. incerta*, *S. kamba* sp. nov., *S. lusese* sp. nov., *S. msowero* sp. nov.

Etymology. Named after Libode, a small village in Eastern Cape Province in Republic of South Africa; treated as a noun in apposition.

Distribution. Republic of South Africa. Known from three localities in Eastern Cape and Kwazulu-Natal Provinces only in ‘East African coastal mosaic Tongaland-Pondoland’ (Mosaic #16c) and ‘undifferentiated montane vegetation Afromontane’ (Mosaic #19a) vegetation mosaics (White 1983) (Fig. 14) belonging to the Southern African bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected from young stems and shoots of *Miscanthus capensis* Andersson (Poaceae) and *Typha latifolia* L. (Typhaceae) growing in wetlands inhabited by various Poales belonging to the following genera: *Cyperus*, *Echinochloa*, *Phragmites* Adans., *Setaria* and *Sporobolus*.

Remarks. Male gen. Prep. LE RU Bruno/13 and female gen. Prep. LE RU Bruno/14 were wrongly attributed to *S. typhae*.

Sesamia roumeti Laporte, 1991

Figures 5I; 13E–H, 14B, E, H; 15

Sesamia roumeti – Laporte 1991: 419.

Type material. Holotype ♂, ETHIOPIA, Amhara Region, Bah[i]r-Dar (Gojam), 18.xi.1981, genitalia prep. B. Laporte n°1421, (P.-C. Rougeot) (MNHN).

Other materials. ETHIOPIA: 35 ♂, 21 ♀, Oromia Province, Ziwai, Lake Ziwai, 07°56'12"N, 38°43'32"E, 1644m a.s.l., ix.2015, ex larvae in stems of *Phragmites australis* Trin. ex Steud., males gen. Prep. LE RU Bruno/895-918, females gen. Prep. LE RU Bruno/896-919, (B. Le Ru leg.) [MNHN]; one ♀, Oromia Province, Ziwai, Lake Ziwai, 07°56'12"N, 38°43'32"E, 1644m a.s.l., ix.2015, ex larvae in stems of *T. domingensis*, (B. Le Ru leg.) [MNHN]; one ♂, Oromia Province, Ziwai, Lake Ziwai, 07°56'12"N, 38°43'32"E, 1644m a.s.l., ix.2015, ex larvae in stems of *P. mapalense*, (B. Le Ru leg.) [MNHN].

Diagnosis. (See also the identification key of *nonagrioides* subgroup, section 3.5.2.). This species can be distinguished from the other known members of the

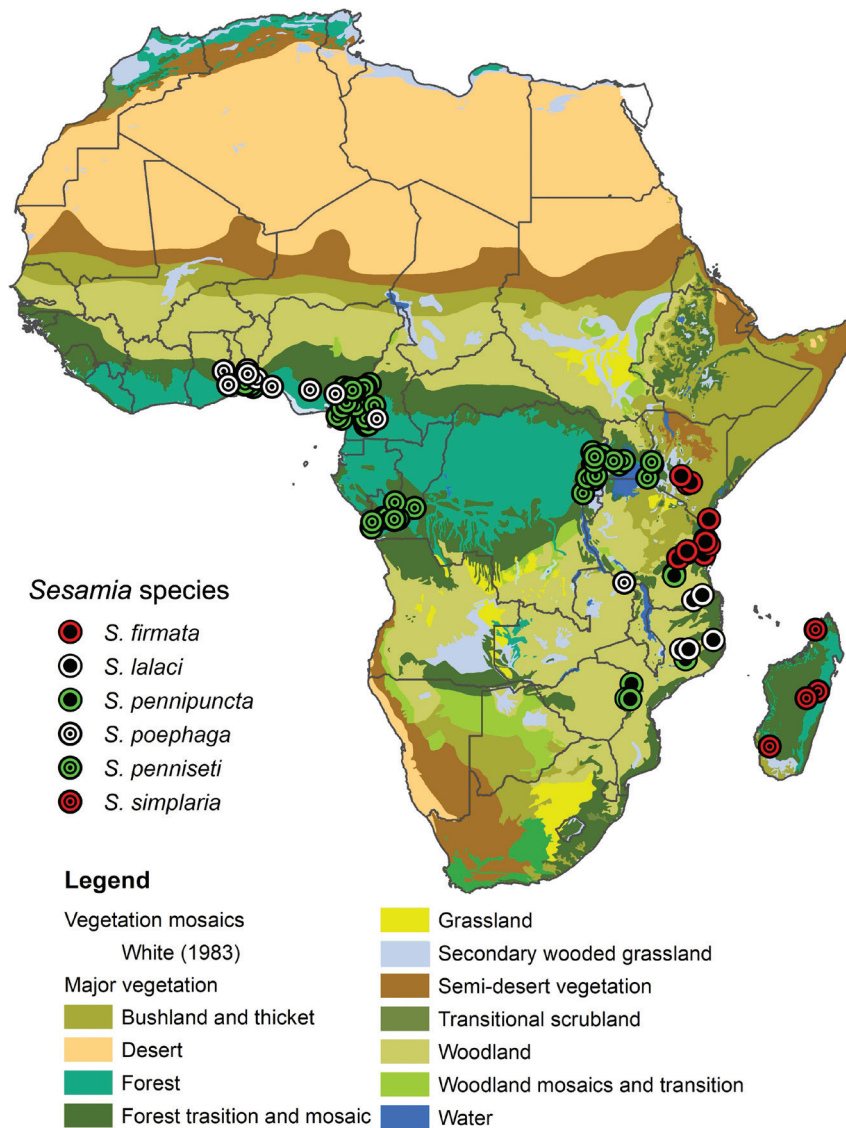


Figure 11. Distribution map of sampled specimens of the *incerta* subgroup: *S. firmata*, *S. lalaci* **sp. nov.**, *S. pennipuncta*, *S. poephaga*, *S. penniseti*, *S. simplaria*.

nonagrioides subgroup by the combination of the following characters of the male and female genitalia: tegumen with large flat peniculi; vinculum u-shaped at the outer margin with a large sized rectangular saccus; juxta large and conical, the inferior plate produced into a blunted point, the sides rounded, the superior plate narrow and short, very shortly bifid terminally; uncus stout, narrowed towards the apex, apex blunted; phallus short and thin; vesica with a small semi-circular flat cornutus; ventrolateral plates of female segment A8 small, weakly sclerotized, triangular, the anterior side concave, at least 2.5 times longer than wide; ostium bursae large, funnel-shaped, sclerotized, with tip slightly pointed on each side; ductus bursae long and narrow with two narrow posterior sclerotized areas, the smallest like a thin line, the biggest at least 3.5 times longer than wide.

Redescription. (Fig. 13E–H). The description of this species in Rougeot et al. (1991) was very brief, based on males only; thus a complete description of both sexes is provided here. The general shape of the female forewing is more elongated than that of the male; wing patterns

similar in both sexes, but males are darker. Antenna ochraceous, bipectinate in the male, filiform in the female, flagellum adorned dorsally with ochraceous scales in both sexes; palpus ochraceous; eyes dark brown. Head and thorax covered with long ochraceous hairs. Abdomen buff suffused with brown fuscous scales. Forelegs brown ochraceous, otherwise ochraceous suffused with fuscous scales. Forewing ochraceous suffused with brown and fuscous scales, much more in males; two more or less distinct dark brown spots, one antemedial, one at apex of cell; a more or less visible longitudinal ochraceous or fuscous brown fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; one subterminal line with brown markings on the veins; outer margin adorned with brown spots between the veins, fringe ochraceous more or less suffused with brown and fuscous scales, basal line of fringe buff. Hindwing white slightly suffused with fuscous scales in costa, apex and termen, fringe concolor (white), basal line of fringe buff. Underside of forewing light ochraceous, suffused with brown and fuscous scales in costa, apex and termen, much more in the postmedial area, fringe ochraceous suffused with

fuscous scales, in males; underside of forewing light ochraceous slightly suffused with brown and fuscous in costa, apex and termen, fringe light ochraceous suffused with fuscous scales, in females. Underside of hindwing white suffused with brown and fuscous scales in costa, apex and termen, fringe concolor (white), with fuscous scales in males. — **Forewing length:** male 25–31 mm (\bar{x} = 28.0 mm, N = 12); female 31–38 mm (\bar{x} = 34.2 mm, N = 11). — **Male genitalia** (Fig. 14B, E). Tegumen with large flat peniculi; vinculum u-shaped at the outer margin and v-shaped at the inner margin without indentation, with a large rectangular saccus. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and short straight spine, with two apical teeth; sacculus heavily sclerotized rounded at base, a broad and short apical extension, curved inwards, club-shaped, bearing numerous short and stout spines; cucullus longer than sacculus, weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large and conical, the inferior plate produced into a blunted point, the sides rounded, the superior plate narrow and short, very shortly bifid terminally; uncus angled, stout, narrowed towards the apex, apex blunted, tufted with long hairs on upper side; phallus short and thin, a bit curved in the middle; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a small semi-circular flat cornutus. — **Female genitalia** (Fig. 14H). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 small, weakly sclerotized, triangular, the anterior side concave, at least 2.5 times longer than wide; ostium bursae large, funnel-shaped, sclerotized, with tip slightly pointed on each side; ductus bursae long and narrow with two narrow posterior sclerotized areas, the smallest like a thin line, the biggest at least 3.5 times longer than wide; corpus bursae pyriform, without signa; ovipositor lobes at least 2.7 times longer than wide with dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved; apophyses posteriores more slender than apophyses anteriores. — **L5 instar larva** (Fig. 5F). Length 35–40 mm, width 4.0 mm; head smooth, dark brown, prothoracic shield light brown, body with ground colour dark salmon, pinacula and caudal plate light brown. Young larvae are similar in appearance to mature ones.

Distribution. Ethiopia. Known from two localities only in ‘Somalia-Masai acacia-*Commiphora* deciduous bushland and thicket’ (Mosaic #42) and ‘undifferentiated Ethiopia woodland’ (Mosaic #29b) vegetation mosaics (White 1983) (Fig. 15) belonging to the Ethiopian bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected on young stems and shoots of *Phragmites australis*, *Eriochloa* sp., *Panicum mapalense* (Poaceae) and *Typha domingensis* (Typhaceae) growing in wetlands with various Poales belonging to the following genera: *Cyperus*, *Echinochloa*, *Eriochloa*, *Phragmites*, *Sporobolus* and *Typha*.

Sesamia satauensis Le Ru sp. nov.

<https://zoobank.org/CF811267-BEA2-45F6-A7E2-446EC5B-F9E50>

Figures 13I–L; 14C, F, I; 15

Type material. Holotype ♂, **BOTSWANA**, Chobe Province, Satau, 18°17'00"S, 26°41'00"E, 943m a.s.l., III.2015, ex larvae in stems of *Vossia cuspidata* Griff., gen. Prep. LE RU Bruno/809, (B. Le Ru leg.) (MNHN); Paratype. **BOTSWANA:** one ♀, same locality and date as holotype, ex larvae in stems of *Vossia cuspidata* Griff., gen. Prep. LE RU Bruno/812, (B. Le Ru leg.) (MNHN).

Diagnosis. (See also the identification key of *nonagrioides* subgroup, section 3.5.2.). This species can be distinguished from the other known members of the *nonagrioides* subgroup by the combination of the following characters of the male and female genitalia: tegumen with large flat peniculi; vinculum u-shaped at the outer margin with a large sized rounded saccus; juxta large and conical, the inferior plate and sides rounded, the superior plate narrow and short, bifid terminally; uncus stout and short, the same width over the entire length, apex blunted; phallus short and thin; vesica with a small semi-circular flat cornutus; ventrolateral plates of female segment A8 large, weakly sclerotized, almost subspherical, the anterior side concave, at least twice as long than wide; ostium bursae large, funnel-shaped, sclerotized, with blunt tip on each side; ductus bursae sclerotized with a small very narrow posterior sclerotized area, at least 10 times longer than wide.

Description. (Fig. 13I–L). Wing patterns similar in both sexes but the males are darker. Antenna ochraceous, bipectinate in the male, filiform in the female, flagellum adorned dorsally with ochraceous scales in both sexes; palpus dark ochraceous in males, ochraceous in females; eyes dark brown. Head and thorax covered with long ochraceous hairs. Abdomen buff. Forelegs brown in males, otherwise ochraceous suffused with fuscous scales. Forewing ochraceous slightly suffused with brown and fuscous scales particularly in termen; three dark brown spots, on antemedial, one medial and one postmedial; a more or less visible longitudinal fuscous brown fascia along lower margin of cell, partly within, partly without cell from base of cell to the subterminal line; one subterminal line of more or less distinct brown spots on the veins; outer margin adorned with brown elongated spots between the veins, fringe ochraceous suffused with fuscous scales, basal line of fringe buff. Hindwing white, fringe concolor (white). Underside of forewing light ochraceous, suffused with brown and fuscous scales in costa, apex and termen, much more in the postmedial area, fringe ochraceous suffused with fuscous scales, in males; underside of forewing light ochraceous slightly suffused with brown and fuscous scales in costa, apex and termen, fringe light ochraceous suffused with fuscous scales, in females. Underside of hindwing white, fringe concolor (white). — **Forewing length:** male 28.0 mm

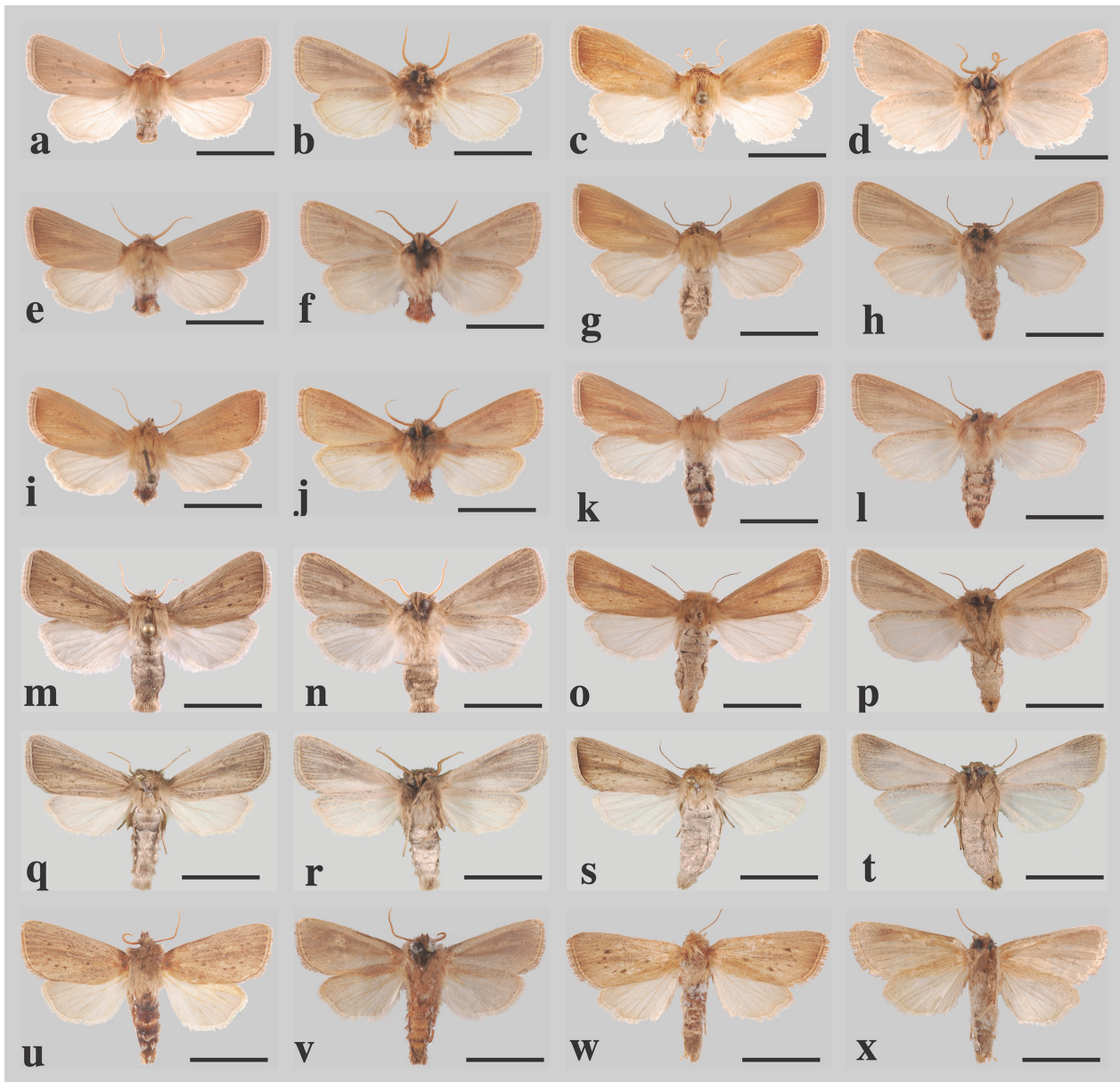


Figure 12. Adults of the *incerta* subgroup (*S. lalaci* sp. nov., *S. lusese* sp. nov., *S. msowero* sp. nov., *S. pennipuncta*, *S. penniseti*, *S. poephaga* and *S. simplaria*). *S. lalaci* sp. nov.: **A** male upper side; **B** male underside; *S. lusese* sp. nov.: **C** male upper side; **D** male underside; *S. msowero* sp. nov.: **E** male upper side; **F** male underside; **G** female upper side; **H** female underside; *S. pennipuncta*: **I** male upper side; **J** male underside; **K** female upper side; **L** female underside; *S. penniseti*: **M** male upper side; **N** male underside; **O** female upper side; **P** female underside; *S. poephaga*: **Q** male upper side; **R** male underside; **S** female upper side; **T** female underside; *S. simplaria*: **U** male upper side; **V** male underside; **W** female upper side; **X** female underside. Scale bar = 10 mm.

($N = 1$); female 31.0 mm ($N = 1$). — **Male genitalia** (Fig. 14C, F). Tegumen with large flat peniculi; vinculum u-shaped at the outer margin and w-shaped at the inner margin without indentation, with a large sized rounded saccus. Valve with sacculus and cucullus separate; costa short and narrow, heavily sclerotized, ending with a stout and short straight spine; sacculus heavily sclerotized rounded at base, a broad and short apical extension, curved inwards, club-shaped, bearing numerous short and stout spines; cucullus longer than sacculus, weakly sclerotized, slightly clavate at apex, with scattered and papillated hairs; juxta large and conical, the inferior plate and sides rounded, the superior plate narrow and short, bifid terminally; uncus angled, stout and short, the same

width over the entire length, tapering to a fine point, apex blunted, tufted with long hairs on upper side; phallus short and thin, a bit curved in the middle; lamina ventralis with an elongate carinal crest, produced into paired lateral lobes; vesica with a small semi-circular flat cornutus. — **Female genitalia** (Fig. 14I). Apophyses anteriores with spatulate tips; ventrolateral plates of female segment A8 large, sclerotized, almost spherical, the anterior side convex, at least 1.2 times longer than wide; ostium bursae large, funnel-shaped, sclerotized, with blunt tip on each side; ductus bursae long and narrow, with a small narrow, slightly sclerotized posterior area, at least 10 times longer than wide; corpus bursae pyriform, without signa; ovipositor lobes at least 2.6 times longer than wide with

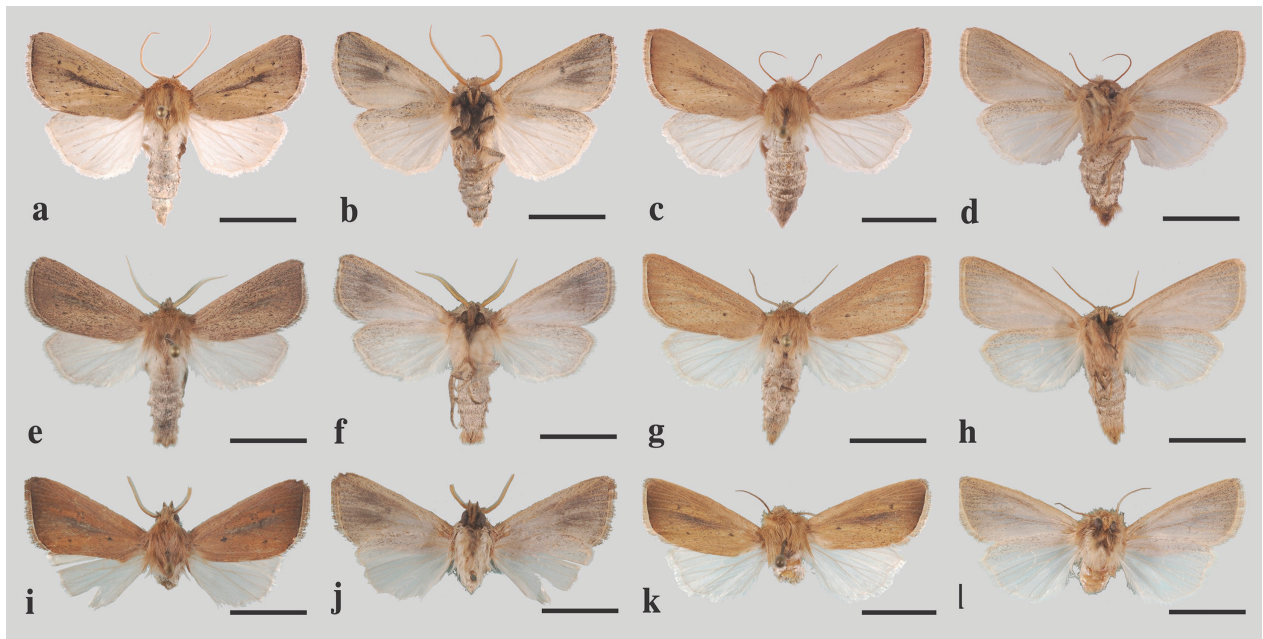


Figure 13. Adults of the *nonagrioides* subgroup (*S. libode* sp. nov., *S. roumeti*, *S. satauensis* sp. nov.). *S. libode* sp. nov.: **A** male upper side; **B** male underside; **C** female upper side; **D** female underside; *S. roumeti*: **E** male upper side; **F** male underside; **G** female upper side; **H** female underside; *S. satauensis* sp. nov.: **I** male upper side; **J** male underside; **K** female upper side; **L** female underside. Scale bar = 9 mm.

dorsal surface bearing numerous short and stout setae, the ventral side of each lobe slightly curved; apophyses posteriores more slender than apophyses anteriores.

Etymology. Named after Satau, a small village in Chobe Province in Botswana; treated as a noun in apposition.

Distribution. Republic of Botswana. Known from one locality only in '*Colophospermum mopane* (Benth.)

Leonard woodland and scrub woodland' (Mosaic #28) vegetation mosaic (White 1983) (Fig. 15) belonging to the Zambezian bioregion (sensu Linder et al. 2012).

Ecology. Larvae were collected from young stems and shoots of *Vossia cuspidata* (Roxb.) Griff (Poaceae) (Table S5) growing in wetlands with various Poales belonging to the following genera: *Cyperus*, *Echinochloa*, *Phragmites*, *Setaria*, *Sporobolus* and *Typha*.

3.3.2 Identification key of *nonagrioides* subgroup

Keys to the *nonagrioides* subgroup based on male (A) and female (B) genitalia. The characters listed are directly observable on figures from the study by Kergoat et al. (2015). All male of known species of the *nonagrioides* subgroup have long bipectinate antennae.

A

1	drooping peniculi	2
1'	peniculi flat or erected.....	3
2	uncus with apex widened and truncate	<i>libode</i>
2'	uncus with apex not widened and truncate	<i>typhae</i>
3	peniculi flat.....	4
3'	peniculi erected	7
4	juxta with short superior plate.....	5
4'	juxta with long superior plate.....	6
5	juxta with short and wide superior plate	<i>congoensis</i>
5'	juxta with short and narrow superior plate.....	<i>satauensis</i>
6	juxta with long, shortly bifid superior plate.....	<i>nonagrioides</i>
6'	juxta with long and very shortly bifid superior plate	<i>roumeti</i>
7	juxta with long superior plate.....	<i>natalensis</i>
7'	juxta with short superior plate.....	8
8	juxta with wide superior plate.....	<i>capensis</i>
8'	juxta with narrow superior plate	<i>luyaensis</i>

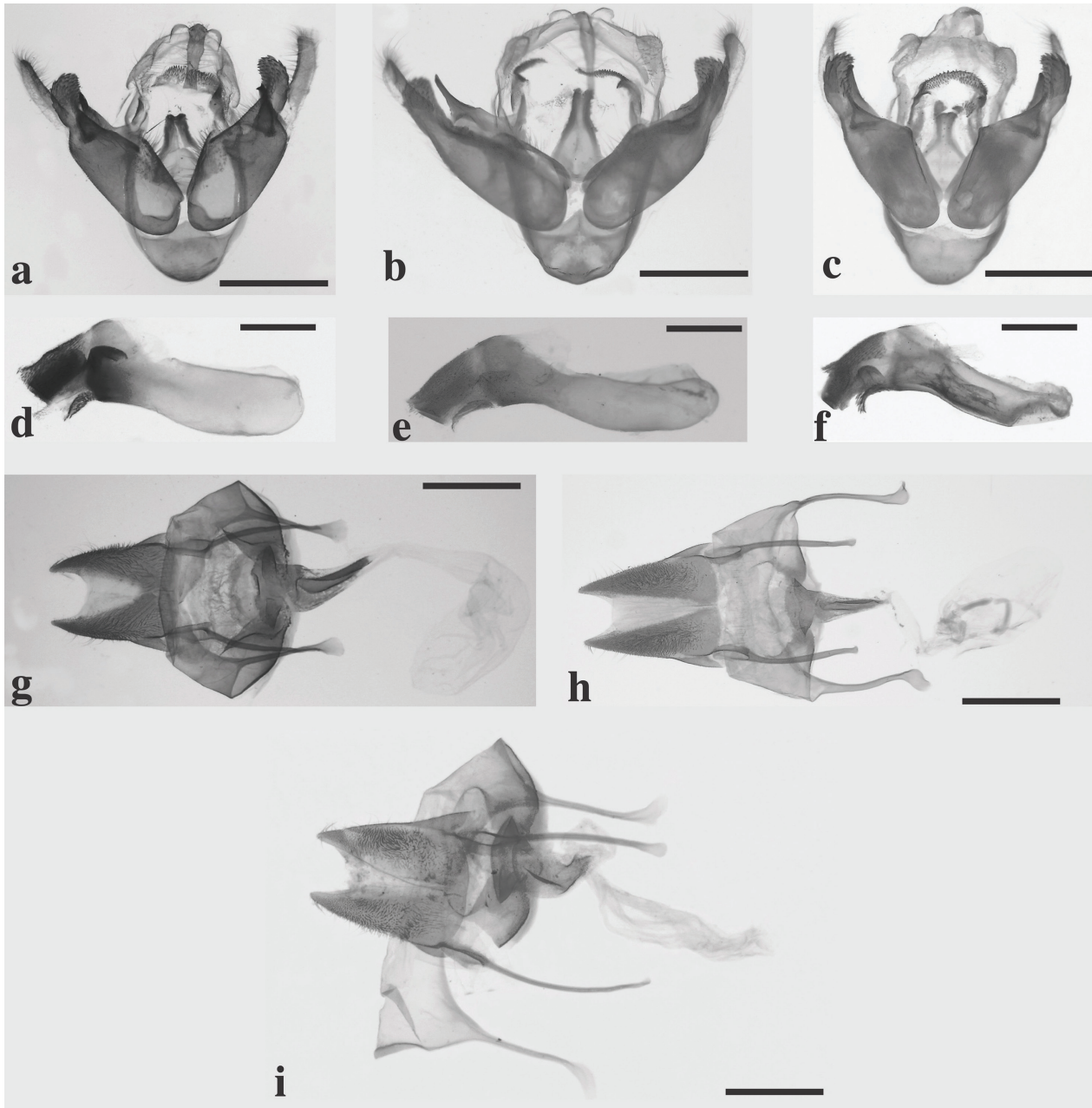


Figure 14. Male and female genitalia of members of the *nonagrioides* subgroup; *S. libode* sp. nov.: **A** male apparatus; **D** phallus; **G** female apparatus; *S. roumeti*: **B** male apparatus; **E** phallus; **H** female apparatus; *S. satauensis* sp. nov.: **C** male apparatus; **F** phallus; **I** female apparatus. Scale bar = 1 mm for male apparatusi and 0.5 mm for phalli; 9 mm for female apparatusi.

B

1	ovipositor lobes at least three times longer than wide	2
1'	ovipositor lobes less than three times longer than wide.....	3
2	ovipositor lobes at least four times longer than wide; lateral plates medium sized, rounded.....	<i>kouilouensis</i>
2'	ovipositor lobes less than four times longer than wide, lateral plates medium sized, not rounded.....	<i>luyaensis</i>
3	ventrolateral plates of segment A8 large ovoid or subspherical	4
3'	ventrolateral plates of segment A8 small and triangular.....	<i>roumeti</i>
4	ductus bursae with a small and narrow posterior sclerotized area.....	<i>satauensis</i>
4'	ductus bursae with a large and wide posterior sclerotized area	5
5	ductus bursae with posterior sclerotized section at least four times longer than wide	6
5'	ductus bursae with posterior sclerotized section less than three times longer than wide	8
6	corpus bursae funnel-shaped flattened with a long tip on each side	7
6'	corpus bursae funnel-shaped not flattened with a very short tip on each side.....	<i>natalensis</i>
7	anterior side of the ventrolateral plates of segment A8 almost straight.....	<i>typhae</i>
7'	anterior side of the ventrolateral plates of segment A8 convex	<i>libode</i>

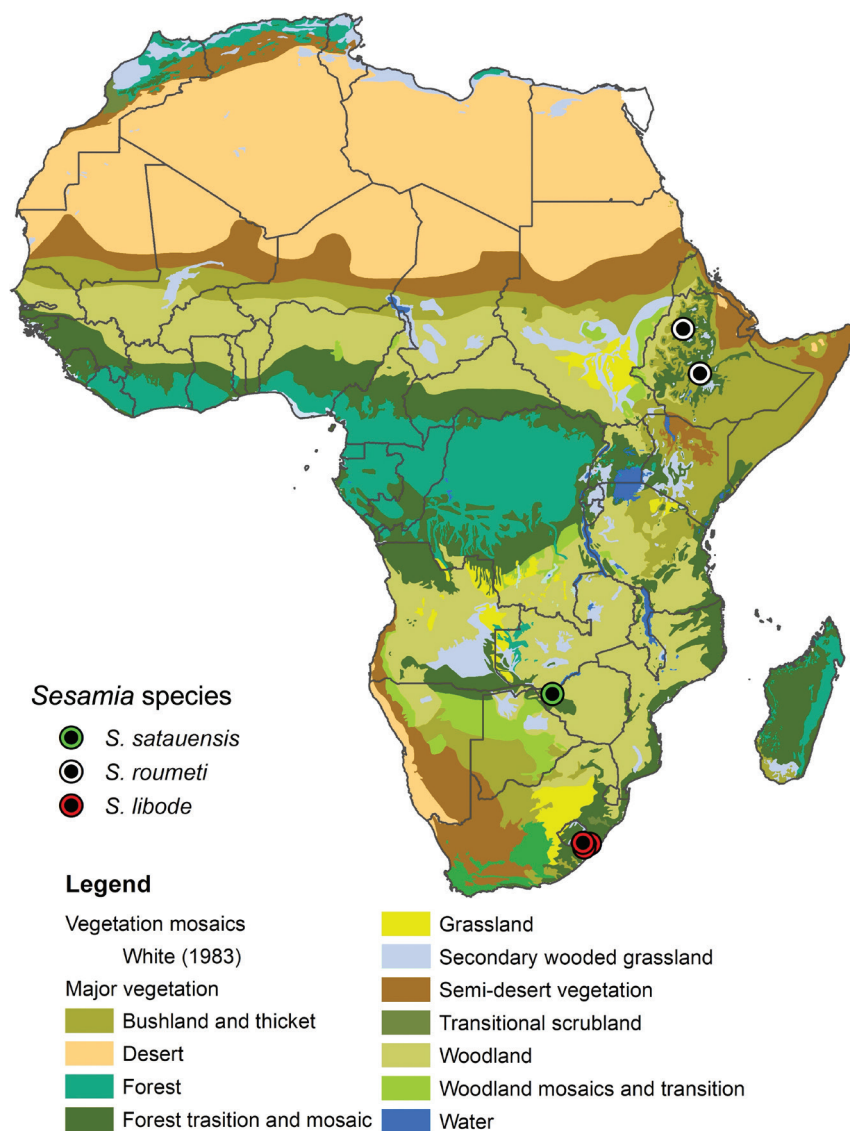


Figure 15. Distribution map of sampled specimens of the *nonagrioides* subgroup.

- 8 corpus bursae with blunt tip as long as wide *congoensis*
- 8' corpus bursae with pointed tip longer than wide9
- 9 posterior sclerotized area of the ductus bursae strongly widened towards ostium*capensis*
- 9' posterior sclerotized area of the ductus bursae little widened towards ostium *nonagrioides*

3.5.3. Ecology and distribution of the *non-agrioides* subgroup

Hosts are known for nine of the ten species belonging to the *nonagrioides* subgroup; encompassing a total of 43 host plant species belonging to families Poaceae, Cyperaceae and Typhaceae. One species, *S. nonagrioides*, is polyphagous as it was reared from 41 host plant species belonging to these three families. All other taxa were reared from a much more restricted host plant range: *S. capensis*, *S. libode*, *S. natalensis* and *S. roumeti* were reared from two to four species of Poaceae and Typhaceae; *S. congoensis*, *S. satauensis* from two and one species of Poaceae, respectively; *S. luyaensis* from one species of Cyperaceae, and *S. typhae* from one species of Typhaceae. All the species belonging to this subgroup show marked ecological preferences for hygrophilous habitats, inhabiting wet-

lands, riversides and marshes. Although *S. nonagrioides* is widespread in sub-Saharan Africa, it has always been collected in hygrophilous habitats, sometimes isolated in the middle of dry areas (e.g., the Okavango Delta in North Botswana), indicating that it might be a good disperser, as other sesamiine species such as *Busseola fusca* (Fuller, 1901) or *Sesamia inferens* (see Dupas et al. 2014 and Sun et al. 1993, respectively). During field surveys, an interesting gregarious behaviour was recorded for the young larvae of eight of ten species belonging to this subgroup (except for *S. satauensis*, for which only two young larvae were found together, and *S. kouilouensis*, which was only collected using light traps). When inspecting symptoms or stemborer damage or infestation, we frequently found dozens of first or second instar larvae at the bottom of dead hearts; this gregarious behaviour is lost for third instar larvae, which disperse and live in isolation.

Regarding the distribution of the *nonagrioides* subgroup, with the exception of *S. nonagrioides* which occurs over a wide area in sub-Saharan Africa [Western, Central and Eastern Africa until north of Southern Africa (North Botswana)] and in the Palearctic region (from Western Europe and Northern Africa to Iran), all other taxa were recorded from a restricted area in one African bioregion (sensu Linder et al. 2012): *S. capensis*, *S. libode*, *S. natalensis* and *S. typhae* from Southern African bioregion; *S. congoensis*, *S. kouilouensis* and *S. luyaensis* from the Congolian bioregion; *S. satauensis* from the Zambezi bioregion; *S. roumeti* from the Ethiopian bioregion. The *nonagrioides* subgroup colonised all the sub-Saharan bioregions, but Southern Africa is by far the area of greatest diversity of the subgroup with records of six (including *S. nonagrioides* found in the Okavango delta) of the 10 known species of the group.

3.6. *Sesamia* genus

3.6.1. Morphology and taxonomy of the *Sesamia* genus

For the genus *Sesamia*, the diagnostic characters reported by Tams and Bowden (1953) and confirmed by Viette (1967) are supported by this study. However, with regard to male genitalia, the following amendments for the phallus and juxta are proposed: phallus short and stout, lamina ventralis with an elongate carinal crest produced or not into paired lateral lobes, more or less spinose with or without one or two elongate scobinate lobes; vesica with or without a more or less large flat semi-circular or triangular or ridged cornutus; juxta more or less pointed or rounded at base, the superior plate with a bifid termination, without medial projection or, heart-shaped or trapezoid with or without dorsal projection.

3.6.2. Identification keys to *Sesamia* species groups and *nonagrioides* subgroups

Keys to the *Sesamia* species groups based on the morphology of male (A) and female (B) genitalia.

A

- 1 valve with sacculus and cucullus fused..... *cretica* group
- 1' valve with sacculus and cucullus separated2
- 2 sacculus with several large spines arranged in a row along its inner margin *coniota* group
- 2' sacculus with a more or less elongated extension bearing several rows of short spines *nonagrioides* group

B

- 1 ventrolateral plates of female segment A8 small *cretica* group
- 1' ventrolateral plates of female segment A8 large2
- 2 posterior section of ductus bursae strongly sclerotized or with small narrow sclerotized areas *nonagrioides* group
- 2' posterior section of ductus bursae without such characteristics *coniota* group

Within the *nonagrioides* species group, although the genitalia look superficially quite similar, the following identification key can be used to differentiate between the three subgroups.

Keys to separate the *calamistis* – *incerta* – *nonagrioides* subgroups based on the morphology of male (A) and female (B) genitalia.

A Males

- 1 antennae serrate or shortly bipectinate..... *incerta* subgroup
- 1' antennae strongly bipectinate.....2
- 2 extension of the sacculus narrowed to apex, inner margin without tooth..... *calamistis* subgroup
- 2' extension of the sacculus club-shaped *nonagrioides* subgroup

B Females

- 1 ventrolateral plates of female segment A8 small or elongated2
- 1' ventrolateral plates of female segment A8 large and broad3
- 2 ductus bursae strongly sclerotized or very slightly sclerotized posteriorly without narrow elongated sclerotized areas *calamistis* subgroup
- 2' ductus bursae slightly sclerotized posteriorly with narrow elongated sclerotized areas..... *nonagrioides* subgroup
- 3 ventrolateral plates of A8 almost ovoid *nonagrioides* subgroup
- 3' ventrolateral plates of A8 not ovoid..... *incerta* subgroup

Identification keys for species belonging to the *coniota* (Le Ru et al. 2020) and *cretica* species groups (Le Ru et al. 2022) are in Le Ru et al. (2020) and Le Ru et al. (2022), respectively. In this latest study on the genus *Sesamia*, we present the preceding key that allows for identification to species group and subgroup.

3.6.3. Ecology, distribution and pest status of *Sesamia*

In the Afrotropics, the genus *Sesamia* is found in all vegetation mosaics (White 1983) and all sub-Saharan bio-regions (sensu Linder et al. 2012), where its species show a strong affinity for open and intermediate canopy-cover habitats, with only one species (*S. congoensis*) found exclusively in closed habitats. Members of the *coniota* species group and members of the *calamistis*, *fuscifrontia*, *nonagrioides* and *wiltshirei* subgroups are hygrophilous, typical inhabitants of wetlands, riversides and marshes, while members of the *albivena*, *cretica*, *incerta* and *salama* subgroups are mesophilous, inhabiting grasslands and woodlands, with the exception of *S. incerta*, that is found in wetlands. Of the 37 Afrotropical species for which we have precise information on host plants (Le Ru et al. 2020, 2022, this study), the vast majority of records are from Poaceae (mainly on Andropogoneae and Paniceae), while six and eight species were found on Cyperaceae and Typhaceae, respectively. All species of the *fuscifrontia* and *wiltshirei* subgroups were found to be monophagous on Poaceae (nine species on Paniceae and one species on Zoysieae) whereas the three species of the *cretica* subgroup turned out to be monophagous or oligophagous on Poaceae (Andropogoneae) (Le Ru et al. 2022). Species of the *coniota* species group were collected from Poaceae (Paniceae), Cyperaceae and Typhaceae, with no record on Andropogoneae (Le Ru et al. 2020); in this species group one species (*S. jansei* Tams & Bowden, 1953) is more polyphagous and was recorded from all the three plant families. Species of the *incerta* subgroup were collected on Poaceae (seven species on Paniceae and four on Andropogoneae); four of them were found to be monophagous on Paniceae, and only *S. incerta* was observed monophagous on Andropogoneae. Species of the *nonagrioides* subgroup were found on Poaceae (seven species), Cyperaceae (two species) and Typhaceae (six species); three species were found to be monophagous (*S. satauensis* on Andropogoneae, *S. luyaensis* on Cyperaceae, *S. typhae* on Typhaceae), one oligophagous (*S. congoensis* on Poaceae) and five polyphagous, including *S. nonagrioides* which has the broadest host plant spectrum in the genus *Sesamia* (Kergoat et al. 2015, this study). Regarding the *calamistis* subgroup, except for *S. calamistis*, which is well known for its polyphagy (but never collected on Typhaceae), the three remaining species have been found mainly on Paniceae, with few records on Andropogoneae (*S. oriaula*) and Typhaceae (*S. kabirara*).

The highest diversity of the genus occurs in sub-Saharan Africa (including Madagascar), which hosts 64 species (including 62 endemics), while 11 species are found outside the Afrotropics (Table S5). In sub-Saharan Africa,

51 species are found in just one of the region's bioregions. The highest diversity recorded is in the Zambebian bioregion (33 species), followed by the Congolian (18 species) and Southern African (15 species) bioregions (Table S6). The Ethiopian and Sudanian bioregions host eight and seven species, respectively; four species are also recorded from Madagascar and three species from Somalia. In sub-Saharan Africa, only one species (*S. corymbosus*) has been found above 3000 m a.s.l. As a matter of fact, the genus is poorly represented at elevations above 2000 m a.s.l. (ten species recorded); 21 species have been recorded between 1500 and 2000 m a.s.l. and the highest diversity is found between 1000 and 1499 m a.s.l. (35 species recorded); the species richness decreases at lower elevations, with 28 species recorded between 500 and 999 m a.s.l. and 29 species below 499 m a.s.l.

4. Discussion

4.1. Systematics, diversity and distribution of the genus *Sesamia*

Most *Sesamia* species resemble each other in terms of external morphology, and only the study of the characters of the male and female genitalia has revealed good diagnostic characters and confirmed the division of the genus into three species groups: the *coniota* species group (revised in Le Ru et al. 2020), the *cretica* species group (revised in Le Ru et al. 2022), that can be split into five subgroups, and the *nonagrioides* species group, that can be split into three subgroups (Kergoat et al. 2015; this study). The *coniota* and the *nonagrioides* species groups, as well as *calamistis*, *incerta*, and *nonagrioides* subgroups, are recovered as monophyletic with high support by the phylogenetic analyses (SH-aLRT values $\geq 85.1\%$, and uBV values $\geq 98\%$). However, the *cretica* species group is neither recovered as monophyletic by this nor the previous phylogenetic study focusing on the group (Le Ru et al. 2022). Within the *cretica* species group, almost all subgroups are recovered as monophyletic (SH-aLRT values $\geq 86\%$, uBV values of 100%), with the exception of the *fuscifrontia* subgroup. As a potential explanation for the discrepancy between morphology and molecular data for members of the *cretica* species group, we postulate that the grouping of the various *S. cretica* lineages on the basis of morphology is artefactual and due to the sharing of homoplasious genitalic characters, namely the valve with fused sacculus and cucullus in the male genitalia and the small ventrolateral plates of female segment A8. We also cannot exclude the hypothesis that this discrepancy results from conflicting gene tree histories caused by horizontal gene transfer (either through introgression or hybridization) or incomplete lineage sorting.

Further studies and taxonomic changes in *Sesamia* will still be required, which is expected as many species have just been described in the genus without a thorough analysis of the male or female genitalia. Based on the examina-

tion of genitalic characters, we can confidently state that 12 Afrotropical species should be excluded from the genus *Sesamia*: (i) “*S. nigritarsis* Hampson, 1914” belongs to the genus *Hygrostola* Warren, 1913, (ii) “*S. sabulosa* Hampson, 1910” belongs to the genus *Sciomesa* Tams & Bowden, 1953, and (iii) “*S. albicolor* Janse, 1939”, “*S. ammopoecilma* Krüger, 2005”, “*S. mediostriga* Krüger, 2005”, “*S. mesosticha* Fletcher, 1961”, “*S. plagiographa* Fletcher, 1961”, “*S. royi* Laporte, 1973”, “*S. steniptera* Hampson, 1914”, “*S. sciagrapha* Fletcher, 1961”, “*S. stictica* Berio, 1976” and “*S. sylvata* Janse, 1939” belong to several new genera not yet described. Outside the Afrotropics, five species also belong to different genera: (i) “*S. confusa* (Sugi, 1982)” from Japan and Korea, “*S. pseudoturpis* Kononenko & Ahn, 1998” and “*S. turpis* (Butler, 1879)” from Taiwan (Formosa) are related to “*S. albicolor* Janse, 1939” and “*Acrapex similimystica* Berio, 1976” and they all belong to a new genus not yet described; (ii) “*S. cristophi* Hacker, 1998” from Turkmenistan belongs to the genus *Sciomesa* Tams & Bowden, 1953 and “*S. boursini* (Wiltshire, 1957)” from Iraq belongs either to the genus *Pirateolea* or to the genus *Sciomesa*. The examination of the genitalia also makes it possible to assign species distributed outside sub-Saharan Africa to specific species groups. As such, two species, *S. grisescens* and *S. inferens*, belong to the *coniota* species group. *Sesamia inferens* is distributed from India to China, but it should likely be split into at least two species (Lee et al. 2019), and even three species based on the results of the SD analyses (see Fig. 15). The true *S. inferens* should be from the Indian subcontinent from where it has been described (Sri Lanka) whereas the two taxa from China and Southeast Asia probably correspond to different species; this issue is of importance because *S. inferens* is a major agricultural pest in Asia and it would be interesting to investigate this question further with more molecular data and an in-depth study of the genitalia. The existence of this species complex is supported by all SD analyses but one (see Fig. 1). Four species (*S. rungsi* Boursin, 1957 from Afghanistan, *Acrapex exsanguis* Lower, 1902 and an undescribed *Sesamia* species, both from Australia, and *S. waziristana* Gyulai, 2020 from Pakistan) belong to the *cretica* species group (see also Lee et al. 2019) and most likely to the *fuscifrontia* subgroup. However, the status of six *Sesamia* species (*S. arfaki* Bethune-Baker, 1910, *S. celebensis* Roepke, 1938, *S. hemiparacta* Wileman & West, 1929, *S. melianooides* Rothschild, 1915, *S. pallida* (Butler, 1883) and *S. tosta* Snellen, 1872) remains unclear as we were unable to study their genitalia. Based on this reassessment of the status of *Sesamia* species, we can confidently assert that the genus now consists of at least 73 valid species (Table S5). The bulk of the genus’s diversity is found in the Afrotropics with 64 species recorded, and only 11 outside sub-Saharan Africa. The number of *Sesamia* species will probably go up in the future, knowing that the status of several taxa needs to be reassessed, such as *S. inferens* or the species whose assignment remains unclear in the absence of the examination of genitalic characters (including undescribed species from Australia, see Lee et al. 2019). It is interesting to point out

that some *Sesamia* species are known from only a few or single specimens, echoing that most insect diversity remains to be discovered and described (the so-called ‘dark taxa’; Page 2016); for *Sesamia* such an endeavour is facilitated by the fact that genitalic characters are highly informative and diagnostic. In addition, several specimens in collections likely belong to new species. This is the case for specimens belonging to the *nonagrioides* species group that are kept in Hermann Hacker’s collection (see below for more details). Finally, it is almost certain that new species have yet to be discovered, particularly in the Oriental region, which has not been studied as much for its stemborer diversity.

Overall, the species delimitation analyses in this study were in agreement with morphological results. When considering the results of the two SD analyses with the highest *mCtax* values, 40 of the 59 species are supported by both analyses, 17 returned to be split by at least one analysis, and two species happen to be lumped by both analyses (Fig. 1). Concerning the species split by the SD analyses, the separation is often caused by a single specimen ending up as sister to all remaining samples of the same morphological species. Over-splitting was also more prevalent in our SD analyses whenever species were represented by numerous specimens.

For our dataset, the corresponding sampling imbalances across taxa (from singletons to 119 specimens for *S. nonagrioides*) has probably led to some level of over-splitting, as observed in other studies (e.g., Talavera et al. 2013; Ahrens et al. 2016). For the other inferred splits, the morphology of specimens was re-examined in detail and no differences were found; following a conservative approach, the corresponding species (e.g., *S. coniota* Hampson, 1902 or *S. salama* Le Ru, 2022) were not split. It is interesting to note the performance of GMYC analyses (on the concatenated dataset as well as on *COI* and *cytb*), as they are recovered in four of the six most likely SD analyses by LIMES, showing that this approach is fairly robust for our dataset. Furthermore, tree-based methods inferred from 57 to 100 putative species and distance-based methods inferred from 61 to 125 putative species. Thus, here we see the opposite of what is expected as tree-based SD methods are generally known to over-split, while distance-based SD methods tend to over-lump (Pentinsaari et al. 2017; Renner et al. 2017; Dellicour and Flot 2018).

When we compare our results with those of two previous studies using SD analyses on *Sesamia*, we find some interesting differences. For example, when examining the results of the PTP analyses carried out on the concatenated dataset on members of the *nonagrioides* subgroup, the present study suggests several splits (for *S. capensis*, *S. luyaensis* and *S. nonagrioides* lineages) whereas the study of Kergoat et al. (2015) found a perfect match between morphospecies and results of a similar PTP analysis (on a concatenated dataset). The main difference between the two studies is related to sampling; in the 2015 study, apart from the *nonagrioides* subgroup, only two specimens of other *Sesamia* species and 11 stemborer outgroups were included; as a result, interspecific branch lengths are on

average longer, which potentially improved the performance of the PTP method for the *nonagrioides* subgroup. In the study of Le Ru et al. (2022) on the *cretica* species group, the same analytical pipeline was used for the SD analyses, and similarly to the study of Kergoat et al. (2015), the sampling scheme was only focused on the group of interest (*cretica* species group in that case), thus only a few outgroups and members of *Sesamia* species groups were included. For the *cretica* species group, results of all SD analyses were very similar (over-splits or over-lumps are recovered for the same taxa), and the same approaches (GMYS.concatenated, PTP.concatenated, GMYS.COI, GMYS.cytb, and ASAP.cytb) were found in five of the six SD analyses with the highest level of congruence (as indicated by *mCtax* values).

4.2. Revision of the *nonagrioides* species group

The *nonagrioides* species group reviewed in this study forms a highly supported monophyletic group (SH-aLRT value of 97% and uBV value of 100%) exhibiting quite homogeneous wing patterns and colours (except for *S. mapalense* sp. nov.). Within this species group, three main subgroups can be identified, the *calamistis*, *incerta* and *nonagrioides* subgroups, all of which have been recovered as monophyletic with high support (SH-aLRT values $\geq 80\%$, and uBV values $\geq 95\%$), and can be identified by the analysis of the male and female genitalia (see 3.6.2 for detailed characters). The 29 species belonging to this species group are distributed exclusively in the Afrotropics (except for *S. nonagrioides* which is also distributed in the Palearctic region); compared with the *coniota* and *cretica* species groups, this species group has the widest host range (being found on Cyperaceae, Paniceae, Poaceae and Typhaceae) and also includes more pest species (four pests, compared with two and one for the *coniota* and *cretica* species groups, respectively).

Within the *calamistis* subgroup, all morphospecies are recovered as putative species by the five best SD analyses, with the exception of *S. calamistis* whose status is only supported by two of the five best SD analyses. The species *S. mapalense* is of particular interest; while the morphology of this species is quite distinctive compared to the other species of the subgroup (in terms of wing patterns and colours and female genitalia; see the description and section 3.3.2 for details), the molecular analyses confirm without any doubt that *S. mapalense* belongs to the *calamistis* subgroup. The diversity of the *calamistis* subgroup (eight species to date) is also probably underestimated, given that potential new species are likely to be found in Hermann Hacker's personal collection. Among the pictures of male genitalia he sent us in 2017 (Le Ru pers. com.), three of them have very unique features and probably correspond to unknown species related to *S. calamistis*: one specimen from Botswana (genitalia N°17064) has a juxta almost spherical without a narrowed superior plate; one specimen from Kenya (genitalia N°24988) has a very thick and robust costal spine and

juxta with a long and wide superior plate; one specimen from Burkina Faso (genitalia N°1973) has a pear-shaped elongated juxta.

Within the *incerta* subgroup, all morphospecies are recovered as putative species by at least two of the five best SD analyses. Of particular interest is the status of the sister species *S. kamba* and *S. epunctifera*. Moyal et al. (2011) originally thought they belonged to a single species (*S. epunctifera*) divided into a southern and an eastern clade because no differences in morphology or ecology were observed at the time of the study; however this study was only based on few specimens (eight and 30 for the southern and eastern clades, respectively) collected from a few localities (four and 13 for the southern and eastern clades, respectively). Since then, dozens of additional specimens have been collected (56 and 174 for the southern and eastern clades, respectively) from many localities (14 and 96 for the southern and eastern clades, respectively). A reassessment of the morphology revealed clear differences in genitalic characters, supporting their specific distinction, and this is also further evidenced by their distinct ecology (host preferences) and the SD analyses, with *S. epunctifera* in Southern Africa (South Mozambique, Republic of South Africa and Zambia) and *S. kamba* in Eastern Africa (Ethiopia, Kenya, North Mozambique, Tanzania and Uganda).

Another point of interest for the *incerta* subgroup is the placement of *S. firmata*, a species morphologically quite distinct from the other members of the subgroup, that has been recovered within the *incerta* subgroup (in a relatively derived position), confirming thus the results reported by Moyal et al. (2011). As with the two other subgroups, the diversity of this subgroup (eleven species to date) is underestimated. Hermann Hacker sent us several pictures of male genitalia belonging to the *incerta* subgroup from his personal collection (Le Ru pers. com.); two of them presumably belong to unknown species. A specimen from Yemen (genitalia N°12407) has a unique juxta shape whereas a specimen from Burkina Faso (genitalia N°24932) has a unique apical extension of the sacculus; another specimen identified as *S. nonagrioides* from Ghana is morphologically quite close to *S. penniseti* (genitalia N°14968), but we are unable to reach any conclusion on his identity.

Within the *nonagrioides* subgroup, all morphospecies are recovered as putative species by at least one of the five best SD analyses, with the exception of *S. libode* and *S. typhae* which resulted to be lumped together. However, these can be considered as valid species due to morphological differences when looking at the anterior side of the ventrolateral plates of female segment A8, which is almost straight in *S. typhae*, while it is convex in *S. libode* (see the description of *S. libode* above and section 3.5.2). The fact that most distance-based analyses (ABGD and ASAP), which are known for their tendency of over-lumping (Pentinsaari et al. 2017; Renner et al. 2017; Dellicour and Flot 2018), generally recover them as distinct species is rather unexpected. The over-splitting of *S. nonagrioides* inferred by most SD analyses probably results from the fact that numerous specimens from

many localities were included; this increase in the spatial scale of sampling is a known cause of error in SD analyses (e.g., Bergsten et al. 2012). Another case worth of note is *S. capensis*, which is sometimes split or lumped with *S. natalensis* by the SD analyses; a reassessment of the morphology of this species (and those of *S. natalensis*) found no evidence supporting either a split or a lump. For the time being, the *nonagrioides* subgroup consists of the seven species recorded by Kergoat et al. (2015) plus the three species described here. The diversity of the subgroup will probably be expanded to include other (undescribed) species. For example, a specimen from Ghana (genitalia N°14961) in Hermann Hacker's collection has a very large ovoid juxta with a short superior plate, and probably corresponds to an undescribed species related to *S. nonagrioides*.

5. Conclusions

This study, which uses a combination of morphological, molecular (604 sequenced specimens from 59 *Sesamia* species) and ecological data, provides the most complete overview to date on the systematics of the genus *Sesamia*. Our combined integrative taxonomy approach reveals important discrepancies in the results of molecular SD analyses, with a general tendency towards over-splitting. That being said, the results of the SD analyses are overall congruent with the morphology, and we thus think that these SD methods are still useful when used in an iterative way in the light of other lines of evidence such as morphology or ecological data. The updated list of *Sesamia* species along with their distribution and pest status is likely not definitive as they are still new species to be described or discovered in the future. It is especially the case in the Oriental and Australasian regions, where collecting efforts have been less extensive so far. Additional studies on museum specimens from these regions will likely reveal new species as well.

6. Author Contributions

Noémie M.-C. Hévin (Conceptualization, Methodology, Formal analysis, Investigation, Writing – Original draft, Writing – Review and Editing, Visualization);

Gael J. Kergoat (Conceptualization, Methodology, Formal analysis, Resources, Writing – Original draft, Writing – Review and Editing, Visualization, Project administration, Funding Acquisition);

Alberto Zilli (Resources, Writing – Original draft, Writing – Review and Editing);

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Onésime Mubenga Kandonda (Resources, Writing – Review and Editing);

Grégoire Bani (Resources, Writing – Review and Editing);

Richard Molo (Resources, Writing – Review and Editing);

Gilson Chipapika (Resources, Writing – Review and Editing);

George Ong'amo (Resources, Writing – Review and Editing);

Anne-Laure Clamens (Investigation, Writing – Review and Editing);

Jérôme Barbut (Resources, Writing – Review and Editing);

Bruno Le Ru (Conceptualization, Methodology, Investigation, Resources, Data Curation, Writing – Original draft, Writing – Review and Editing, Visualization, Project administration, Funding Acquisition).

7. Data availability statement

The data that support the findings of this study are openly available in Figshare at <https://doi.org/10.6084/m9.figshare.23732148>. Accession numbers for all gene fragments are listed in Table S2.

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Supplementary Material 1

Tables S1–S7

Authors: Hévin NM-C, Kergoat GJ, Zilli A, Capdevielle-Dulac C, Musyoka BK, Sezonlin M, Conlong D, Van Den Berg J, Ndemah R, Le Gall P, Cugala D, Nyamukondiwa C, Pallangyo B, Njaku M, Gofitshu M, Assefa Y, Kandonda OM, Bani G, Molo R, Chipabika G, Ong'amo G, Clamens A-L, Barbut J, Le Ru B (2024)

Data type: .xlsx

Explanation notes: **Table S1.** Localities at which specimens of the *Sesamia calamistis*, *S. incerta* and *S. nonagrioides* species subgroups were collected. — **Table S2.** GenBank accession numbers. — **Table S3.** Best-score tree and substitution model obtained with IQ-TREE 2. — **Table S4.** Host plants on which *Sesamia calamistis*, *S. incerta* and *S. nonagrioides* species subgroups were collected. — **Table S5.** *Sesamia* species list along with additional information on taxonomy, distributional information and pest status. — **Table S6.** Ecological characteristics of the African *Sesamia* species. — **Table S7.** Results of species delimitation analyses.

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