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A revision of the genus *Conicofrontia* Hampson (Lepidoptera, Noctuidae, Apameini, Sesamiina), with description of a new species: new insights from morphological, ecological and molecular data

BRUNO LE RU[1,2,8], CLAIRE CAPDEVIELLE-DULAC[1], DESMOND CONLONG[3], BEATRICE PALLANGYO[4], JOHNNIE VAN DEN BERG[5], GEORGE ONG'AMO[6] & GAEL J. KERGOAT[7]

[1]*IRD/CNRS, Laboratoire Evolution Génomes Spéciation, Avenue de la terrasse, BP1, 91198, Gif-sur-Yvette, France and Université Paris-Sud 11, 91405 Orsay, France. -Email: Claire.Capdevielle-Dulac@legs.cnrs-gif.fr (CC)*
[2]*Unité de Recherche IRD 072, African Insect Science for Food and Health (icipe), PO Box 30772, Nairobi, Kenya. E-mail: bleru@icipe.org (BLR)*
[3]*South African Sugarcane Research Institute, Private Bag X02, Mount Edgecombe, 4300 South Africa and School of Biological and Conservation Sciences, University of KwaZulu-Natal, Private Bag X01 - Scottsville, Pietermaritzburg, Republic of South Africa. E-mail: Des.Conlong@sugar.org.za (DC)*
[4]*Biocontrol Program, PO Box 30031, Kibaha, Tanzania. E-mail: beatricepallangyo@yahoo.com (BP)*
[5]*School of Environmental Sciences and Development, North West University (Potchefstroom Campus), Private Bag X6001, Potchefstroom, 2520, Republic of South Africa. E-mail: Johnnie.VanDenBerg@nwu.ac.za (JVD)*
[6]*School of Biological Science, College of Physical and Biological Sciences (Chiromo Campus), University of Nairobi, PO Box 30197, Nairobi, Kenya. Email: gongamo@uonbi.ac.ke (GO)*
[7]*INRA - UMR 1062 CBGP (INRA/IRD/Cirad, Montpellier SupAgro), 755 Avenue du campus Agropolis, 34988 Montferrier-sur-Lez, France. E-mail: kergoat@supagro.inra.fr (GJK)*
[8]*Corresponding author*

Abstract

The aim of this study was to review the species of *Conicofrontia* Hampson, a small genus of noctuid stem borers (Noctuidae, Apameini) that is distributed in East and Southeastern Africa. We review the morphology of species in this group and provide new diagnoses and ecological data for five species. The following taxonomic changes are proposed: *Hygrostola dallolmoi* (Berio, 1973) (= *Conicofrontia dallolmoi* Berio, 1973) **comb. n.** and *Conicofrontia bipartita* (Hampson, 1910) (= *Phragmatiphila bipartita* Hampson, 1910) **comb. n., stat. rev.** One new species is also described: *C. lilomwa*, **sp. n.** from Tanzania. Wing patterns as well as male and female genitalia of the five species are described and illustrated. Finally we carried out molecular phylogenetic and molecular species delimitation analyses on a multi-marker dataset of 31 specimens and 15 species, including the five mentioned species. The results of molecular analyses provide a clear support for the proposed taxonomical changes.

Key words: *Conicofrontia*, molecular phylogenetics, molecular species delimitation, Sesamiina, systematics, taxonomy

Introduction

African noctuid stem borers of the tropical subtribe Sesamiina consist of 13 genera encompassing about 200 species (Zilli *et al.* 2005; Toussaint *et al.* 2012), which are usually hardly distinguishable without a thorough examination of wing patterns and genitalia (Moyal & Le Ru 2006; Moyal *et al.* 2010, 2011; Le Ru *et al.* 2014). About 65% of the species diversity in this subtribe is found in four genera: *Acrapex* Hampson (more than 80 species), *Sesamia* Guenée (more than 50 species) (Toussaint *et al.* 2012). The remaining genera consist of a few species only, as in the case of the genus *Conicofrontia* Hampson.

Hampson (1902) described the genus *Conicofrontia* for *Conicofrontia sesamoides* based on external characters such as the shape and venation of wings and the structure of palpi, frons and thorax; the genus was named after the slightly conical prominence of the frons. From the beginning, the taxonomic history of *Conicofrontia* has been a bit

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confusing as Hampson erroneously associated the male of *Speia vuteria* (Stoll) (= *Phalaena vuteria* Stoll) with the female of *C. sesamoides* in his original description (Hampson 1902). Later on Hampson provided a new description of the genus and described both sexes of *C. sesamoides* (Hampson 1910). However as pointed out by Tams & Bowden (1953), Hampson erroneously altered the original spelling of the name, *sesamoides*, to *sesamiodes*. Three species were further described in the genus *Conicofrontia* by Aurivillius (Aurivillius 1910) and Hampson (Hampson 1914, 1918): *C. mesophaeae* Aurivillius, *C. mesoscia* Hampson and *C. scotochroa* Hampson. In 1939, Janse included characters of male genitalia in its redescription of the genus. Major clarifications came with the work of Tams and Bowden (1953), who completed the description of the genus with characters of male and female genitalia for *C. sesamoides*. They transferred *Arenostola diamesa* Hampson to the genus *Conicofrontia* while transferring *C. mesophaeae*, *C. mesoscia* and *C. scotochroa* to the newly erected genus *Sciomesa* Tams & Bowden. Tams and Bowden also synonymized *C. sesamoides* with another species described by Hampson in 1910, *Phragmatiphila bipartita* Hampson, which was described based on the examination of a single female. Tams and Bowden (1953) also underlined the close morphological similarity of *Conicofrontia* with the genera *Speia* Tams & Bowden and *Sciomesa*. In 1973, Berio described a new species of *Conicofrontia*, *Conicofrontia dallolmoi* from Tanzania, putting up a total of three valid species for the genera. These three valid species (*C. sesamoides*, *C diamesa* and *C. dallolmoi*) were later recorded by Poole (1989) in his Lepidopterorum catalogus . Until 2004, little was known about *Conicofrontia* host preferences and ecology as specimens had been only obtained from light trap collections. Starting in 2004, extensive surveys were carried out in several sub-Saharan countries by Bruno Le Ru, collecting noctuid stem borer larvae in infested Poaceae and noctuid stem borer adults with light traps. These surveys enabled us to obtain dozen of adult male and female specimens, belonging to the three recorded *Conicofrontia* species (*C. diamesa, C. sesamoides* and *C. dallolmoi*) and to a new species from Tanzania. We also collected a fifth species from the Republic of South Africa, which is morphologically quite distinctive from other *Conicofrontia* species. In addition, molecular phylogenetic analyses were conducted on a multi-marker dataset that includes all *Conicofrontia* species and nine representatives of the subtribe Sesamiina. The resulting phylogenetic framework is further used to implement Poisson-Tree-Processes (PTP) molecular species delimitation procedures (Zhang *et al.* 2013), which provide an additional line of evidence to support our conclusions.

Abbreviations: BMNH, Natural History Museum, London, United Kingdom; MCSN, Museo Civico di Storia Naturale, Milan, Italy; MNHN, Muséum National d'Histoire Naturelle, Paris, France; NMK, National Museum of Kenya, Nairobi, Kenya; TMSA, Ditsong Museum: formerly Transvaal Museum of South Africa, Republic of South Africa.

Materials and methods

Sampling and morphological study. Sampling of visually damaged grasses (Poales) in Eastern and Southeastern Africa was conducted over ten years (2004–2014) to collect the larval stages of noctuid stem borers within their wild host-plants (Le Ru *et al.* 2006a,b). Larvae were reared on artificial diet (Onyango & Ochieng'Odero 1994) until pupation and emergence of adults (Le Ru *et al.* 2006a,b). Some adult specimens were also collected in light traps. 536 larvae belonging to the *Conicofrontia* genus were sampled in the localities listed in Table 1. In addition, 40 adults were collected from a light trap set up in Tanzania. The study is based on 87 adult specimens belonging to five species collected in 15 localities in two countries, South Africa and Tanzania. Plant specimens were identified by Kathleen Gordon-Gray (Pietermaritzburg University, South Africa) and Simon Mathenge (Botany Department, University of Nairobi, Kenya).

Genitalia were dissected after immersion of the end of the abdomen in a boiling 10% potash bath for a few minutes, then cleaned, immersed in absolute alcohol for a few minutes and mounted on slides in Euparal (after separating the aedeagus from the rest of the (male) genitalia. Collected insects were identified by comparison with types and specimens housed by BMNH the MCSN and the TMSA. The holotype of the new species was deposited in the MNHN, whereas paratypes were deposited in the MNHN and in the NMK.

DNA extraction and sequencing. For this study, 21 *Conicofrontia* specimens (sensu Poole 1989) were selected for the molecular analyses, including two specimens from the new species collected in Tanzania. In addition, we included representatives of five other genera in the subtribe Sesamiina as outgroups based on the results of a recent molecular study (Toussaint *et al.* 2012). We also used a specimen of the more distantly related

genus *Spodoptera* (Mitchell *et al.* 2006; Toussaint *et al.* 2012) to root the tree. DNA was extracted from hind legs using Qiagen DNAeasy tissue kits (Qiagen, Hilden, Germany). Polymerase chain reaction (PCR) amplifications were conducted for four mitochondrial gene fragments, a 658 bp region of the cytochrome oxidase I (COI), 976 bp of the cytochrome b (Cytb), 360 bp of the ribosomal 12S RNA (12S), and 566 bp of the ribosomal 16S RNA (16S). Two nuclear gene regions were also sequenced, 848 bp of the 28S ribosomal DNA (28S), and 1,240 bp of the elongation factor-1a (EF1a). For both genes, we used the primers and settings detailed in Kergoat *et al.* (2012). Resulting PCR products were processed by the French sequencing center Genoscope using a BigDye v3.1 sequencing kit and Applied 3730xl sequencers. Both strands were sequenced for all specimens to minimize PCR artefacts and ambiguities. Sequences of complementary strands were edited and reconciled using Geneious v5.1 software (available at: www.geneious.com/). All the sequences generated in this study were deposited in GenBank (see Appendix S1 for the accession numbers). Unlike the sequences of coding genes (COI, Cytb, and EF1a), the sequences of ribosomal genes (12S, 16S and 28S) were variable in length. Their alignment was accomplished using MAFFT 7 (Katoh & Standley 2013) with default option settings. For all protein-coding genes, we used Mesquite 3.0 (available at: www.mesquiteproject.org) to check the coding frame for possible errors or stop codons. The combination of the six gene fragments resulted in a combined matrix of 31 specimens and 4,648 aligned characters.

Phylogenetic and molecular species delimitation analyses. Phylogenetic analyses were conducted using Maximum likelihood (ML), as implemented in RAxML v8 (Stamatakis 2014). We used partitioned analyses to improve phylogenetic accuracy (Nylander *et al.* 2004). Partitions and substitution models were determined using PartitionFinder v1.1.1 (Lanfear *et al.* 2012). The corrected Akaike information criterion (AICc; Posada & Buckley 2004) was used as a metric for ML analyses. Based on the AICc results we used 12 partitions with either a General time reversible (GTR)+G+I model or a GTR+G model (see Appendix S2). The best tree was obtained using a heuristic search implementing 100 random-addition replicates. Clade support was then assessed using non-parametric bootstrap values (BV) (1,000 replicates were used). Nodes supported by BV > 70% were considered as strongly supported following Hillis and Bull (1993).

Poisson-tree-processes molecular species delimitations were conducted on the Web server of the Exelixis Lab (http://species.h-its.org/ptp/), with default settings. With the PTP model, speciation or branching events are modelled in terms of number of substitutions (represented by branch lengths), so it only requires a phylogenetic input tree. The corresponding analyses were carried out using the best tree from the ML analyses.

Results

Taxonomy

After having cross-checked against types preserved in the Museum to avoid coincidence of synonymies we provide morphological evidence to support the transfer of *C. dallolmoi* to *Hygrostola* Warren. We also establish that *P. bipartita* sensu Hampson is in fact a valid species, distinct from *C. sesamoides*; specimens of this species are in fact represented in our sampling and correspond to the fifth species, from the Republic of South Africa. We present the description of the new species *C. lilomwi* nov. sp. from Tanzania. We also provide a supplemental description of the *Conicofrontia* genus and of the previously described species, with male and female genitalia presented for the first time for all species.

Genus description. *Conicofrontia* Hampson, 1902:296. Type species: *Conicofrontia sesamoides* Hampson, 1902; *Conicofrontia* Hampson, 1910:338 (redescription); *Conicofrontia* Hampson, Janse, 1939: 379–383 (redescription, with characters of male genitalia); *Conicofrontia* Hampson, Tams & Bowden, 1953:651 (redescription, with characters of male and female genitalia).

The description by Hampson (1902) and further redescriptions (Hampson 1910; Janse 1939; Tams & Bowden 1953) of the genus *Conicofrontia* are confirmed by the re-examination of morphological characters. The genus has homogeneous habitus and genitalia. In all known species, palpi upturned, porrect in both sexes; frons with a slightly conical prominence in both sexes; antenna of male are serrate while those of female are simple; forewings with a longitudinal median brown streak most of the time, particularly marked in males. The forewings present colour, pattern and shape variation in all four species with males being darker than females and with more contrasted forewing pattern; the rather narrow forewing characteristics underlined by Hampson (1902, 1910),

Janse (1939) and Tams & Bowden (1953) is supported by our morphological study, for female only; the male forewing is less elongated than the female one, the apex rounded with the termen evenly curved not crenulated; all other characters are confirmed.

TABLE 1. Taxon sampling. If known, rearing information is provided (otherwise the abbreviation N/A is used). Specimens belonging to the five species of interest are listed first (names follow Poole 1989 with the exception of *P. bipartita* Hampson, 1910). The abbreviation ZAF is used for Republic of South Africa.

Species	voucher code	Country	Reared from
Conicofrontia dallolmoi Berio, 1973	HYTAG6454	Tanzania	N/A
Conicofrontia dallolmoi Berio, 1973	HYTAG7234	Tanzania	N/A
Conicofrontia diamesa (Hampson, 1919)	COASG3755	ZAF	*Cymbopogon* sp.
Conicofrontia diamesa (Hampson, 1919)	COASG3756	ZAF	*Cymbopogon* sp.
Conicofrontia diamesa (Hampson, 1919)	COASG3823	ZAF	*Cymbopogon* sp.
Conicofrontia lilomwa nov. sp.	COTAG3820	Tanzania	Cymbopogon giganteus
Conicofrontia lilomwa nov. sp.	COTAG6450	Tanzania	N/A
Conicofrontia sesamoides (Hampson, 1902)	COASG3757	ZAF	Miscanthus capensis
Conicofrontia sesamoides (Hampson, 1902)	COASG3821	ZAF	Miscanthus capensis
Conicofrontia sesamoides (Hampson, 1902)	COASG3822	ZAF	Miscanthus capensis
Conicofrontia sesamoides (Hampson, 1902)	COASG4041	ZAF	Miscanthus capensis
Conicofrontia sesamoides (Hampson, 1902)	COASG4080	ZAF	Miscanthus capensis
Conicofrontia sesamoides (Hampson, 1902)	COASG4094	ZAF	Miscanthus capensis
Conicofrontia sesamoides (Hampson, 1902)	COASG4888	ZAF	Miscanthus capensis
Conicofrontia sesamoides (Hampson, 1902)	COASG4889	ZAF	Miscanthus capensis
Conicofrontia sesamoides (Hampson, 1902)	COASG4890	ZAF	Miscanthus capensis
Conicofrontia sesamoides (Hampson, 1902)	COASG7188	ZAF	Miscanthus capensis
Conicofrontia sesamoides (Hampson, 1902)	COASG7191	ZAF	Miscanthus capensis
Phragmatiphila bipartita Hampson, 1910	COASG3743	ZAF	Miscanthus capensis
Phragmatiphila bipartita Hampson, 1910	COASG3875	ZAF	Miscanthus capensis
Phragmatiphila bipartita Hampson, 1910	COASG4887	ZAF	Miscanthus capensis
Acrapex stygiata (Hampson, 1910)	ACASG4037	ZAF	Miscanthus capensis
Acrapex unicolora (Hampson, 1910)	ACATAG4027	Tanzania	Cymbopogon gayanus
Busseola fusca (Fuller, 1901)	BUBEG1152	Benin	N/A
Busseola segeta Bowden, 1956	BUCAG3090	Cameroon	Pennisetum purpureum
Sciomesa bua Moyal *et al.*, 2010	SCTAG3804	Tanzania	Cyperus fischerianus
Sciomesa mesophea (Aurivillius, 1910)	SCASG3649	ZAF	Cyperus dichrostachyus
Sesamia calamistis Hampson, 1910	SEASG4088	ZAF	Typha latifolius
Sesamia cretica Lederer, 1857	SEERG3633	Eritrea	Sorghum bicolor
Speia vuteria (Stoll, 1790)	SPOUG3876	Uganda	Typha domingensis
Spodoptera littoralis (Boisduval, 1833)	SPCAM0144	Cameroon	N/A

The most characteristic features of male genitalia are the sacculus with a heavily sclerotized and dentate clavus and the presence of a heavily sclerotized and dentate plate across the upper edge. Other characters are tegumen with medium-size peniculi, uncus long, pointed apically; in contrast with Janse (1939) and Tams and Bowden (1953), we would describe vinculum with well-developed saccus, instead of small; valve elongate and narrow with a narrow cucullus rather rounded at the apex and costal margin with a small sclerotized ridge-like expansion; juxta plate like or oblong pear-shaped with a neck. No clasper, aedeagus short and stout, manica with two-lobed

sclerotization slightly dentate; two paired and strongly dentate ventral cornuti. The female genitalia description made by Tams and Bowden (1953) for *C. sesamoides* is insufficient. Additional description: bursa copulatrix large and membranous, with one signa; ductus bursae broad and strongly sclerotized throughout and sharply differentiated from the bursa; ductus seminalis from the base of the bursa; ostium bursae with strongly sclerotized ventral lip, the ostial segment membranous throughout. Ovipositor lobes short and broad with many stout bristles in addition to the small setae and an apical crest of short stout bristles.

***Conicofrontia bipartita* (Hampson, 1910) Le Ru, comb. nov., stat. rev.**
(Figs. 1a–1d, 3a, 3e, 3i, 4a)

Phragmatiphila bipartita Hampson, 1910:272
Conicofrontia sesamoides: Tams & Bowden, 1953:651

Material examined. Holotype (female) of *Phragmatiphila bipartita*: **Republic of South Africa**: E. Transvaal, White River, xii 1906, Agrotidae genitalia slide 1271, A.T. Cooke Coll., 1906-314 [BMNH].

Other material: Republic of South Africa: 1♂, 1♀, Kwazulu-Natal, Karkloof, 29°16.282'S, 30°21.381'E, 1291m asl, 08.ii.2007, ex larva (in stem of *Miscanthus capensis* (Nees) Andersson) [1♂ gen. prep LERU Bruno/G504, 1♀ gen. prep LERU Bruno/304] (B. Le Ru, leg.) [MNHN].

Redescription. The female holotype was poorly described by Hampson (1910). The male is described here for the first time; externally it looks very similar to the female, however the general shape of the female's forewing is more elongated at the apex than that of the male. Additions to the previous descriptions (Figs. 1a–1d): antennae ochreous, filiform in female, serrate in male, cilia short, fasciculate, flagellum adorned dorsally with brown scales, palpus brown. Head and front of thorax ochreous brown, tegulae bright ochreous, legs brown ochreous, abdomen greyish ochreous. Forewing: a longitudinal dark brown fascia from the base along the lower margin of the cell partly within the cell, partly without, extending to just before the termen; the cell ochreous, all other areas (costa, apex, termen and inner margin) ochreous suffused with brown scales; A small subterminal black spot on vein 5, all veins towards the apex adorned with ochreous scales. Fringe ochreous adorned successively with a narrow basal black line, a narrow ochreous line and a thick light brown line. Hindwing; grey strongly tinged with brown veins suffused with brown scales; fringe grey with a narrow basal grey-white line highlighted at the base with a narrow brown line. Underside of the forewing uniformly ochreous; slightly suffused with brown scales on the costa and apex, strongly suffused with brown scales from the cell to the termen, less suffusion in the inner margin. Underside of hindwing ochreous uniformly suffused with brown scales but more densely on costa and apex; veins of both forewing and hindwing adorned with ochreous scales.

Wingspan 35 mm (1 male), 34 mm (1 female).

Male genitalia (Figs. 3a, 3e). Uncus long and wide, tapering to a fine point and tufted with long hair on the upperside; tegumen with medium-size rounded peniculi, vinculum with medium-size triangular saccus; valves elongate and narrow; cucullus elongate, rounded at apex and tufted with medium size hairs; sacculus with an heavily sclerotized and dentate clavus, all dents with the same size; the presence of a sclerotized and slightly dentate plate, pear shaped, across the upper edge of the sacculus, costal margin with a small sclerotized ridge-like expansion roundly pointed and slightly curved inwardly; the juxta oblong, elongated pear-shaped without sclerotization with a long and narrow neck shortly bifid. Aedeagus short, slightly curved, manica with a two-lobed sclerotization, less than one fifth length of the aedeagus, ending in a Spinoza tip; vesica with two ventral cornuti slightly dented, one-quarter length of the aedeagus.

Female genitalia (Fig. 3i). Unfortunately the bursa copulatrix can not be described as it has been spoiled during the genitalia preparation; ductus bursae broad and strongly sclerotized on the ostium side; ventral plate of ostium bursae sclerotized bilobate with small lobes funnel-shaped; dorsal plate large, broad, weakly sclerotized. Ovipositor lobes relatively long and narrow (2.5 times longer than wide) with many stout bristles in addition to the small setae and an apical crest of short stout bristles.

Larvae L5 instar (Fig. 4a): length, 35–40mm, width, 4.0 mm; head smooth, orange brown, prothoracic shield pale yellow; body with ground colour buff, dorsally suffused with pink, pinacula pale yellow and caudal plate brown. Young larvae are very similar in appearance to mature ones.

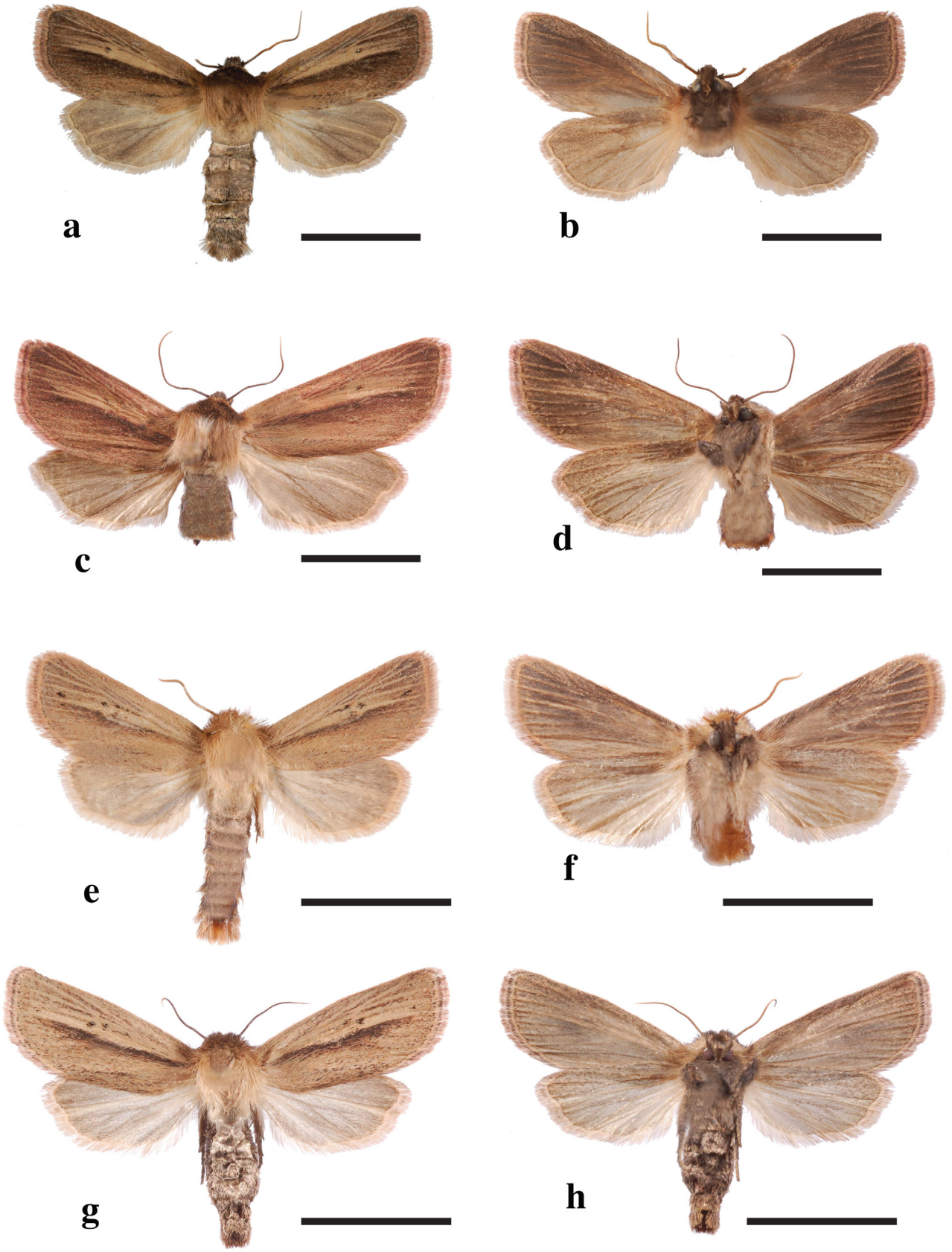

FIGURE 1. Adults of *Conicofrontia* species (*C. bipartita* and *C. diamesa*). Scale bar = 10 mm.
Conicofrontia bipartita: 1a—male upper side, 1b—male under side, 1c—female upper side, 1d—female under side.
Conicofrontia diamesa: 1e—male upper side, 1f—male under side, 1g—female upper side, 1h—female under side.

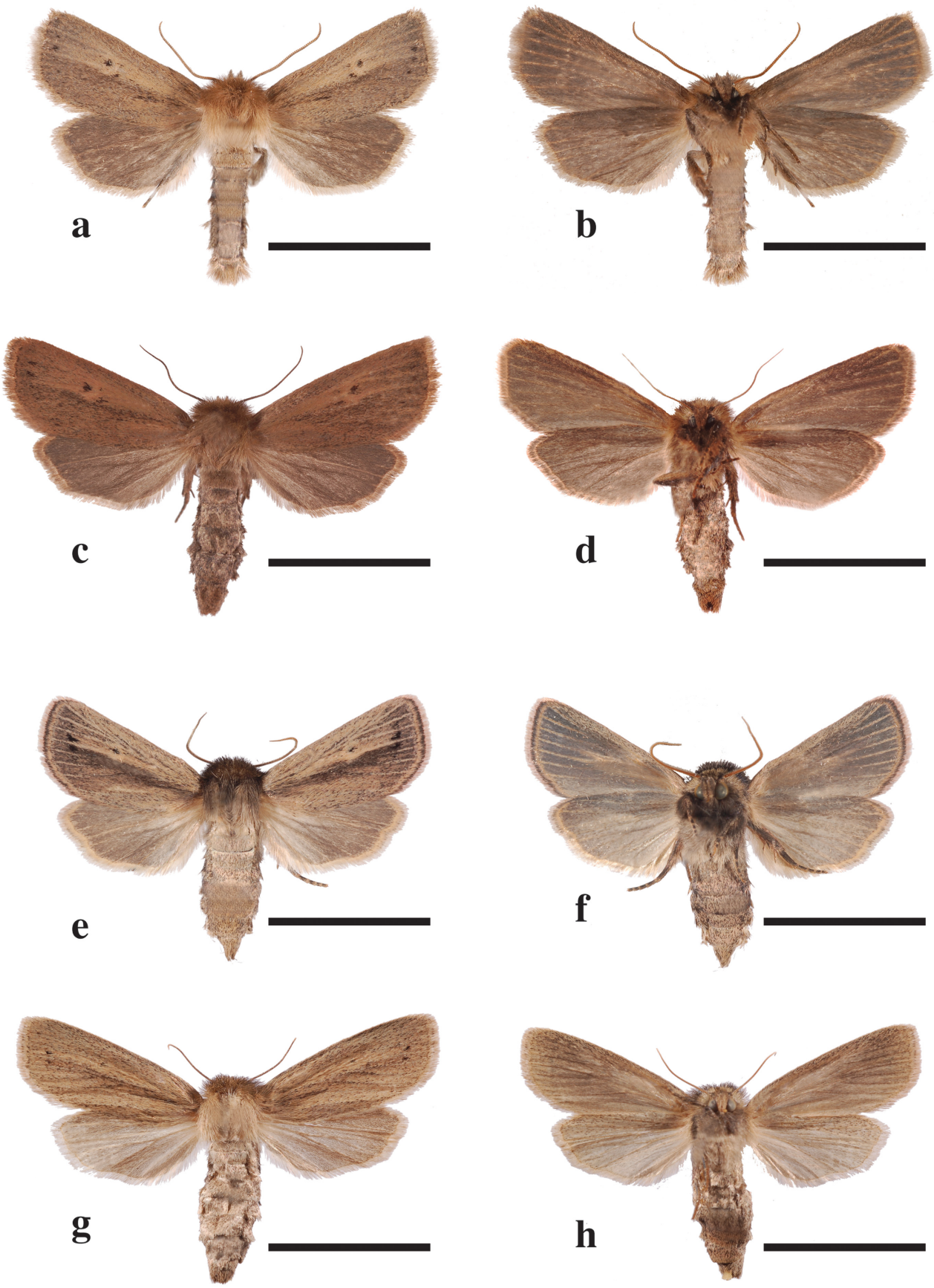

FIGURE 2. Adults of *Conicofrontia* species (*C. lilomwa* and *C. sesamoides*). Scale bar = 10 mm.
Conicofrontia lilomwa: 2a—male upper side, 2b—male under side, 2c—female upper side, 2d—female under side.
Conicofrontia sesamoides: 2e—male upper side, 2f—male under side, 2g—female upper side, 2h—female under side.

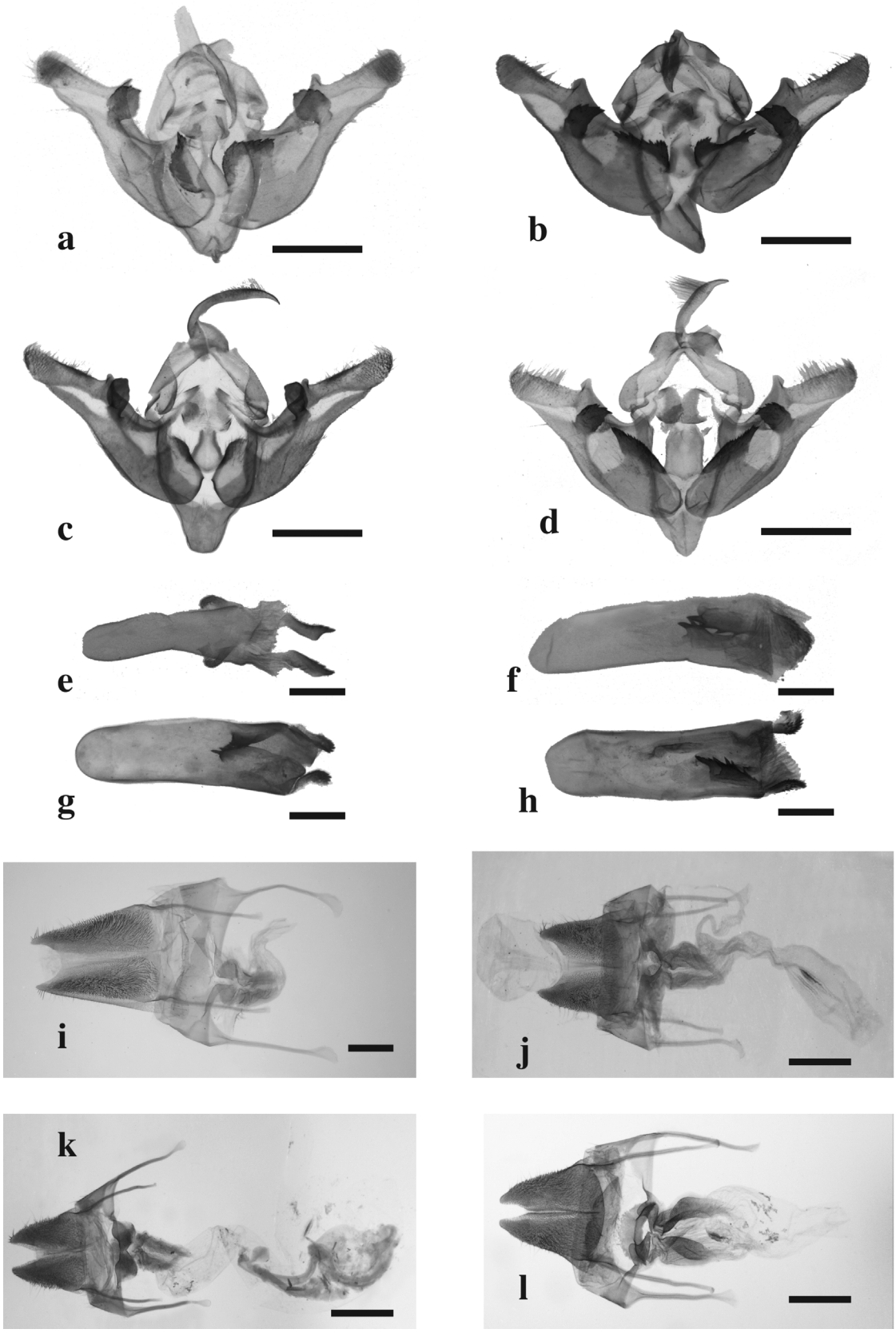

FIGURE 3. Genitalia of *Conicofrontia* species. Scale bar = scale bar = 1 mm and 0.5 mm for male penis.
Conicofrontia bipartita: 3a—male genitalia, 3e—male penis, 3i—female genitalia.
Conicofrontia diamesa: 3b—male genitalia, 3f—male penis, 3j—female genitalia.
Conicofrontia lilomwa: 3c—male genitalia, 3g—male penis, 3k—female genitalia.
Conicofrontia sesamoides: 3d—male genitalia, 3h—male penis, 3l—female genitalia.

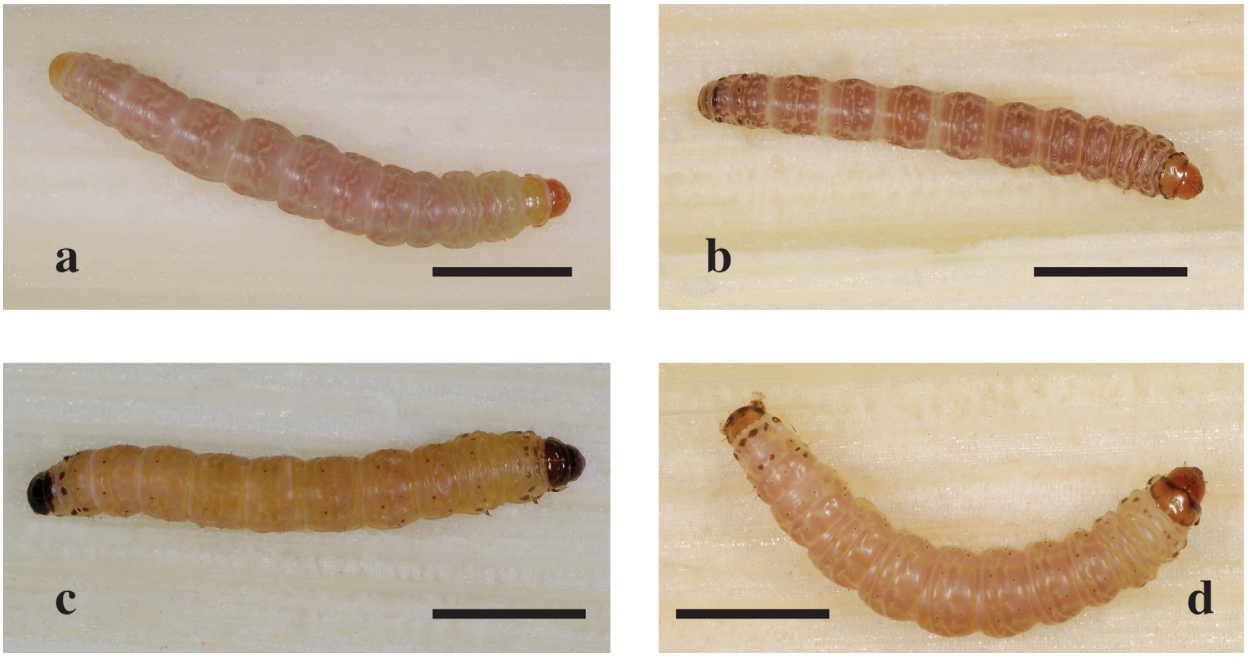

FIGURE 4. Last instar larvae of *Conicofrontia* species. Scale bar = 10 mm.
Conicofrontia bipartita: 4a; *Conicofrontia diamesa*: 4b; *Conicofrontia lilomwa*: 4c; *Conicofrontia sesamoides*: 4d.

Bionomics. *Conicofrontia bipartita* is a markedly hygrophilous species inhabiting grasses along banks of streams, rivers and marshes. Second and third instar larvae were collected at the bottom of *Miscanthus capensis* inflorescence stems, always gregarious. Typically, plants exhibiting signs of infestation by *C. bipartita* larvae have a dry, brown inflorescence. We suspect that the larvae disperse when they reach the fourth instar. No pupae were found in stems, and therefore borers probably pupate in the soil.

Distribution. South Africa. The two records are from Afromontane (Mosaic no 19) vegetation mosaic (White 1983) (Fig. 6).

Remarks. Easily separated from *C. sesamoides* with which it has been confused by Tams & Bowden (1953). The juxta is plate-like in *C. sesamoides* while it is pear-shaped in *C. bipartita*, with the valves broader at basal half in *C. bipartita* compared to *C. sesamoides* and the clavus much more elongated toward the apex in *C. sesamoides*.

Conicofrontia diamesa (Hampson, 1920)

(Figs. 1e–1h, 3b, 3f, 3j, 4b)

Arenostola diamesa Hampson, 1920: 257.
Conicofrontia diamesa (Hampson): Tams & Bowden, 1953:652.

Material examined. Holotype (male) of *Arenostola diamesa*: **Republic of South Africa:** Zululand, Eshowe, xii 1916, Agrotidae genitalia slide 1292, E.E. Platt Coll. [BMNH].

Other material: Republic of South Africa: 3♂, 4♀, Eston, 29°55.102'S, 30°37.222'E, 673m a.s.l., 02.ii.2009, ex larva (in stem of *Cymbopogon* sp.) [2♂ gen. prep LERU Bruno/G300-G643, 2♀ gen. prep LERU Bruno/G55-G301] (B. Le Ru, leg.) [MNHN].

Redescription. The male holotype was poorly described by Hampson (1920). The male looks very similar to the female, however the general shape of the female's forewing is more elongated at the apex. Additions to the previous descriptions (Figs. 1e–1h): antennae ochreous, filiform in female, serrate in male, cilia short, fasciculate, flagellum adorned dorsally with brown scales, palpus brown, eyes red brown. Head and front of thorax ochreous brown, tegulae bisque, legs brown ringed with bisque, abdomen brown ochreous, anal tuft ochreous. Forewing: a longitudinal brown fascia suffused with fuscous scales from the base along the lower margin of the cell partly within the cell, partly without, extending to just before the termen; the cell, costa, apex, termen and inner margin

bisque with areas between veins suffused with fuscous scales in apex and termen; 2–3 small black spots along the upper margin of the cell, sometimes one additional black spot in front of the cell. Fringe bright ochreous or bisque adorned successively from the base with a narrow basal brown line, a thick bisque line and a thick brown line. Hindwing; grey bistre strongly suffused with brown scales; fringe bistre with a narrow grey bistre line at the base. Underside of the forewing bistre suffused with brown and fuscous scales on the costa and apex, strongly suffused with brown scales from the cell to the termen, less suffusion in the inner margin. Underside of hindwing grey uniformly suffused with brown and fuscous scales but more densely on costa and apex; veins of both forewing and hindwing adorned with fuscous scales.

Wingspan 24–27 mm (males) (n = 6); 26–28 mm (females) (n = 6).

Male (27, 26, 25, 25, 24, 26), Female (27, 28, 26, 26, 27, 27)

Male genitalia (Figs. 3b, 3f). Uncus long and wide, tapering to a fine point and tufted with long hair on the upperside; tegumen with medium-size rounded peniculi, vinculum with medium-size triangular saccus; valves elongate and narrow, cucullus elongate, rounded at apex and tufted with medium size hairs; sacculus with an heavily sclerotized and dentate clavus, dents larger at both ends; the presence of a sclerotized and heavily dentate plate across the upper edge of the sacculus, costal margin with a small sclerotized ridge-like expansion roundly pointed and slightly curved inwardly; the juxta plate like, short and becoming smaller towards the top. Aedeagus short, slightly curved, manica with a two-lobed sclerotization, less than one fifth length of the aedeagus, ending in a spinose tip; vesica with two strongly dentate ventral cornuti, almost one third length of the aedeagus.

Female genitalia (Fig. 3j). Corpus bursae long and cylindrical with one signa; ductus seminalis from the basal part of the bursa; ductus bursae broad and strongly sclerotized on the ostium side; ventral plate of ostium bursae sclerotized bilobate deeply invaginated at middle, thus forming a circular-shaped ventral wall of antrum; dorsal plate large, broad, weakly sclerotized. Ovipositor lobes short and wide (1.5 times longer than wide) with many stout bristles in addition to the small setae and an apical crest of short stout bristles.

Larvae L5 instar (Fig. 4b): length, 30–35mm, width, 3.5 mm; head smooth, orange brown, prothoracic shield yellow orange; body with ground colour buff, dorsally suffused with pink, pinacula pale yellow and caudal plate brown. Young larvae are very similar in appearance to mature ones.

Bionomics. *Conicofrontia diamesa* is a hygrophilous species inhabiting grasses along banks of streams, rivers and marshes. Larvae were collected at the bottom of young stems of *Cymbopogon* sp. stems, always solitary. Typically, plants exhibiting signs of infestation by *C. diamesa* larvae have a curled, brown, central leaf. Damaged stems had a small hole (ca. 2 mm diameter) located approximately 10 cm from ground level. We suspect that the larvae disperse when they reach the fourth instar. No pupae were found in stems, and therefore borers probably pupate in the soil.

Distribution. South Africa. The two records are from Afromontane (Mosaic no 19) vegetation mosaic (White 1983) (Fig. 6).

Remarks. Easily separated from other *Conicofrontia* species with the short juxta plate-like, the dentate clavus with dents larger at both ends, the two strong dentate ventral cornuti of the vesica and the ventral plate of ostium bursae, sclerotized bilobate, deeply invaginated at middle, thus forming a circular-shaped ventral wall of antrum.

Conicofrontia lilomwa **Le Ru, sp. nov.**

(Figs. 2a–2d, 3c, 3g, 3k, 4b)

Type material. Holotype (male) of *Conicofrontia lilomwa*: **Tanzania:** Iringa region, Njombe, Lilomwi, 09°36.203’S, 35°10.875’E, 1555 m a.s.l., i.2012, ex light trap [gen. prep. LERU Bruno/G88] (B. Le Ru, leg.) [MNHN].

Paratypes: **Tanzania:** 5♂, 5♀, Iringa region, Njombe, Iboya, 09°25.541’S, 35°03.690’E, 1664 m a.s.l., iv.2014, ex light trap [1♂ gen. prep. LERU Bruno/G76, 2♀ gen. prep. LERU Bruno/G682-G707] (B. Le Ru, leg.) [MNHN]; 1♀, Iringa region, Njombe, Lilomwi, 09°36.203’S, 35°10.875’E, 1555m a.s.l., iii.2008, ex larvae in stem of *Cymbopogon giganteus* Chiov. (B. Le Ru, leg.) [MNHN]; 5♂, same data as holotype (B. Le Ru, leg.) [MNHN]; 1♂, Iringa region, Njombe, Igosi, 09°18.443’S, 34°29.132’E, 2119m a.s.l., i.2012, ex light trap (B. Le Ru, leg.) [MNHN]; 1♂, Iringa region, Sao Hill, 08°27.421’S, 35°10.036’E, 1845m a.s.l., i.2012, ex light trap (B. Le Ru, leg.) [MNHN].

Description. The male looks brighter the female, and the general shape of the female's forewing is more elongated at the apex than that of the male (Figs. 2a–2d). Antennae ochreous, filiform in female, serrate in male, cilia short, fasciculate, flagellum adorned dorsally with brown scales, palpus brown. Male: head and front of thorax ochreous, tegulae bright ochreous legs brown, abdomen grey ochreous. Forewing: a longitudinal brown fascia from the base along the lower margin of the cell partly within the cell, partly without, extending to just before the termen; the cell bistre, all other areas (costa, apex, termen and inner margin) ochreous suffused with fuscous and bistre scales; a small subterminal black spot on vein 5, a postmedial row of 3–4 black spots between the veins, all veins towards the apex adorned with bistre scales. Fringe bistre adorned with a narrow basal brown line. Hindwing; grey strongly suffused with brown scales; fringe bistre with a narrow basal brown line. Underside of the forewing uniformly brown chocolate, all veins adorned with ochreous scales. Underside of hindwing, grey uniformly suffused with brown scales but more densely on costa and apex; veins adorned with ochreous scales. Female: head and front of thorax brown chocolate, tegulae ochreous, legs brown, abdomen grey ochreous. Forewing: a longitudinal brown fascia from the base along the lower margin of the cell partly within the cell, partly without, extending to just before the termen; the cell dark ochreous, all other areas (costa, apex, termen and inner margin) dark ochreous suffused with brown scales; a small subterminal black spot on vein 5, a postmedial row of 3–4 black spots between the veins, all veins towards the apex adorned with ochreous scales. Fringe ochreous adorned with a narrow basal brown line. Hindwing; grey strongly suffused with brown scales; fringe grey ochreous with a narrow basal brown line. Underside of the forewing grey ochreous strongly suffused with brown scales, all veins adorned with ochreous scales. Underside of hindwing, grey uniformly suffused with brown scales but more densely on costa and apex; veins adorned with brown scales.

Wingspan 24–26 mm (males) (n = 10); 25–29 mm (females) (n = 9).

Male (24-26-25-24-24-24-26-26-26-25), Female (25-25-27-27-28-27-29-29-25)

Male genitalia (Figs. 3c, 3g). Uncus long and wide, tapering to a fine point and tufted with long hair on the upperside; tegumen with medium-size rounded peniculi, vinculum with medium-size triangular saccus; valves elongate and narrow, cucullus elongate, rounded at apex and tufted with medium size hairs; sacculus with a small sclerotized clavus without dent; the presence of a sclerotized and pear shaped plate across the upper edge, costal margin with a small sclerotized ridge-like expansion roundly pointed and slightly curved inwardly; the juxta short and pear-shaped. Aedeagus short, slightly curved, manica with a two-lobed sclerotization, less than one fifth length of the aedeagus, ending in a spinose tip; vesica with two dentate ventral cornuti, almost one fifth length of the aedeagus.

Female genitalia (Fig. 3k). Corpus bursae long and cylindrical with one signa; ductus seminalis from the basal part of the bursa; ductus bursae broad and strongly sclerotized on the ostium side; ventral plate of ostium bursae sclerotized bilobate with medium size lobes bean shaped; dorsal plate large, broad, weakly sclerotized. Ovipositor lobes short and wide (2 times longer than wide) with many stout bristles in addition to the small setae and an apical crest of short stout bristles.

Larvae L5 instar (Fig. 4c): length, 30–35 mm, width, 3.5 mm; head smooth, black, prothoracic shield dark brown; body with ground colour buff, dorsally suffused with pink, pinacula and caudal plate black. Young larvae are very similar in appearance to mature ones.

Etymology. Named after the village of Lilomwa in Tanzania.

Bionomics. *Conicofrontia lilomwa* is a markedly hygrophilous species inhabiting grasses along banks of streams, rivers and marshes. Larvae were collected at the bottom of young stems of *Cymbopogon giganteus* Chiov. Typically, plants exhibiting signs of infestation by *C. lilomwa* larvae have a curled, brown, central leaf. We suspect that the larvae disperse when they reach the fourth instar. No pupae were found in stems, and therefore borers probably pupate in the soil.

Distribution. Tanzania. The four recorded localities are from Afromontane (Mosaic no 19) vegetation mosaic (White 1983) (Fig. 6).

Remarks. Easily separated from other *Conicofrontia* species with the short juxta pear shaped, the small clavus without dent, and the ventral plate of ostium bursae, sclerotized bilobate bean-shaped.

***Conicofrontia sesamoides* Hampson, 1902**
(Figs. 2e–2h, 3d, 3h, 3l, 4d)

Conicofrontia sesamoides Hampson, 1902:296.
Conicofrontia sesamiodes (ex errore) Hampson, 1910:338 (recte *sesamoides* in Tams & Bowden, 1953:651).

Type material. Holotype (female) of *Conicofrontia sesamoides*: **South Africa:** Eastern Cape formerly Cape Colony, Transkei, no locality name, no collection date, Agrotidae genitalia slide 1212, 1947-345 [BMNH].

Other material: South Africa: 1♂, Kwazulu-Natal, Durban, xii.1909 [Agrotidae genitalia slide 1214] (G.F. Leigh, Coll.) [BMNH]; 2♂, 2♀, Kwazulu-Natal, Karkloof River, 29°13.416'S, 30°21.456'E, 1128m a.s.l., xi.2009, ex larvae in *Miscanthus capensis* (B. Le Ru, leg.) [MNHN]; 1♀, Kwazulu-Natal, Karkloof Forest, 29°16.282'S, 30°21.381'E, 12913m a.s.l., xi.2009, ex larvae in *M. capensis,* [1♀ gen. prep. LERU Bruno/G302] (B. Le Ru, leg.) [MNHN]; 1♂, 1♀, Kwazulu-Natal, Schevers Farm, 29°10.448'S, 30°21.243'E, 1053m a.s.l., xi.2009, ex larvae in *M. capensis* (B. Le Ru, leg.) [MNHN]; 1♂, 1♀, Kwazulu-Natal, Oak Hotel, 29°49.182'S, 30°10.414'E, 1069m a.s.l., xi.2009, ex larvae in *M. capensis* [1♂ gen. prep. LERU Bruno/G306] (B. Le Ru, leg.) [MNHN]; 1♂, 1♀, Kwazulu-Natal, Minerva Game Reserve, 29°47.275'S, 30°11.172'E, 1584m a.s.l., xi.2009, ex larvae in *M. capensis* [1♂ gen. prep. LERU Bruno/G642, 1♀ gen. prep. LERU Bruno/G305] (B. Le Ru, leg.) [MNHN]; 1♀, Eastern Cape, Slykraal, 33°22.185'S, 26°28.585'E, 348m a.s.l., xi.2009, ex larvae in *M. capensis* [1♀ gen. prep. LERU Bruno/G307] (B. Le Ru, leg.) [MNHN].

Redescription. The female holotype (Hampson 1902) and the male have been poorly described. Like for other *Conicofrontia* spp., the general shape of the female's forewing is more elongated at the apex than that of the male. Additions to the previous descriptions (Figs. 2e–2h): antennae ochreous, filiform in female, serrate in male, cilia short, fasciculate, flagellum adorned dorsally with brown scales, palpus ochreous. Head and front of thorax ochreous brown, tegulae bisque, legs brown ringed with bisque, abdomen bisque suffused with brown scales. Forewing: male: a longitudinal dark brown fascia from the base along the lower margin of the cell partly within the cell, partly without, extending to just before the termen; the cell bisque, all other areas (costa, apex, termen and inner margin) bisque suffused with brown scales; a small subterminal black spot on vein 5, a postmedial row of 3–4 black spots between the veins, all veins towards the apex adorned with bisque scales. Fringe bisque adorned successively with a narrow basal grey line, a thick bisque line and a thick brown line. Hindwing; grey strongly suffused with brown scales; fringe bisque with a thick wide basal line highlighted in the middle with a narrow brown line. Underside of the forewing buff, costa, apex and inner margin bisque suffused with brown scales, less suffusion in the inner margin. Underside of hindwing bisque suffused with brown scales but more densely on costa and apex. The wing pattern of the female is very similar but all colours brighter.

Wingspan 24–27 mm (males) (n = 9); 26–30 mm (females) (n = 9).

Male (27-24-24-25-25-27-25-25-26), Female (29-30-28-27-29-26-29-30-25)

Male genitalia (Figs. 3d, 3h). Uncus long and wide, tapering to a fine point and tufted with long hair on the upperside; tegumen with medium-size rounded peniculi, vinculum with medium-size triangular saccus; valves elongate and narrow; cucullus elongate, rounded at apex and tufted with medium size hairs; sacculus with an heavily sclerotized and dentate clavus pointed to the apex, all dents with the same size; the presence of a sclerotized and heavily dentate plate across the upper edge of the sacculus, costal margin with a small sclerotized ridge-like expansion roundly pointed and slightly curved inwardly; the juxta plate-like narrowing at the tip. Aedeagus short, slightly curved, manica with a two-lobed sclerotization, less than one fifth length of the aedeagus, ending in a spinose tip; vesica with two small dentate ventral cornuti, less than one sixth length of the aedeagus.

Female genitalia (Fig. 3l). Corpus bursae long and cylindrical with one signa; ductus seminalis from the basal part of the bursa; ductus bursae short, broad and strongly sclerotized on the ostium side; ventral plate of ostium bursae sclerotized bilobate deeply invaginated at middle, thus forming an oval-shaped ventral wall of antrum; dorsal plate large, broad, weakly sclerotized. Ovipositor lobes short and wide (2.5 times longer than wide) with many stout bristles in addition to the small setae and an apical crest of short stout bristles.

Larvae L5 instar (Fig. 4d): length, 30–35mm, width, 3.5 mm; head smooth, red brown, prothoracic shield orange brown; body with ground colour buff, dorsally suffused with pink, pinacula and caudal plate orange brown. Young larvae are very similar in appearance to mature ones.

Bionomics. *Conicofrontia sesamoides* is a markedly hygrophilous species inhabiting grasses along banks of streams, rivers and marshes. Larvae were collected at the bottom of young stems *Miscanthus capensis* stems,

always solitary. Typically, plants exhibiting signs of infestation by *C. sesamoides* larvae have a curled, brown, central leaf. Damaged stems had a small hole (ca. 2 mm diameter) located approximately 10 cm from ground level. We suspect that the larvae disperse when they reach the fourth instar. No pupae were found in stems, and therefore borers probably pupate in the soil. Infestation of sugar cane fields, *Saccharum officinarum* Linnaeus, was also recently observed in the Republic of South Africa by Bruno Le Ru (Y. Assefa. pers. com.).

Distribution. Republic of South Africa. The ten records are from Afromontane (Mosaic no 19) and Afromontane related (Mosaic n° 20, 24, 48) vegetation mosaics (White 1983) (Fig. 6).

Remarks. Easily separated from other *Conicofrontia* species with the long juxta plate-like, dentate clavus pointed to the apex and the ventral plate of ostium bursae sclerotized bilobate deeply invaginated at middle, thus forming an oval-shaped ventral wall of antrum.

***Hygrostola dallolmoi* (Berio) Le Ru, comb. nov.**
(Figs. 5a–5g)

Conicofrontia dallolmoi Berio, 1973:143.

Type material. Holotype (male) of *Conicofrontia dallolmoi*: **Tanzania:** Kipengere Mountain, Ikonda, 19-xii-1970, Prep. Berio N°4974 [MCSN].

Other material: Tanzania: 1♂, 1♀, Iringa region, Njombe, Igosi, 09°18.443'S, 34°29.132'E, 2119m a.s.l., i.2012, ex light trap [1♂ gen. prep. LERU Bruno/G90, 1♀ gen. prep. LERU Bruno/G91] (B. Le Ru, leg.) [MNHN]; 2♂, 1♀, Iringa, Dabaga, 08°01.549'S, 35°51.131'E, 1832 m a.s.l., xii.2012, ex light trap (B. Le Ru, leg.) [MNHN]; 1♀, Iringa, Sao Hill, 08°27.421'S, 35°10.036'E, 1845m a.s.l., i.2012, ex light trap [1♀, gen. prep. LERU Bruno/G98] (B. Le Ru, leg.) [MNHN].

Redescription. The male holotype was poorly described by Berio (1973). The female is described here for the first time; it looks very similar to that of the male, however a little bit larger (Figs. 5a–5d): antennae ochreous, filiform in female, serrate in male, cilia short, fasciculate, flagellum adorned dorsally with ochreous scales, palpus brown, eyes brown. Head and front of thorax ochreous brown, tegulae ochreous, legs fuscous with brown scales, ground colour of abdomen ochreous adorned with a dense suffusion of brown scales on the top particularly in the male. Forewing: a longitudinal thin and short brown fascia from the base along the lower margin of the cell, defined by the greatly indented sub-basal and antemedian veins. The cell ochreous, all other areas (costa, apex, termen and inner margin) ochreous suffused with brown scales; a black spot at the base of the fascia just on the sub-basal vein, antemedian vein adorned with brown scales. Fringe bistre adorned successively with a narrow basal ochreous line, and brown spots, variable in number, between the veins. Hindwing: ground colour ochreous strongly suffused with brown scales; an oblique longitudinal fuscous fascia between the posterior cubital and the 1A+2A anal veins, the anal area adorned with dark ochreous, a brown diffuse spot at the apex of the cell; fringe bistre adorned with a broken and brown broad basal line. Underside of forewing bright ochreous slightly suffused with brown scales in the costa, termen and inner margin areas, strongly suffused with brown scales in the apex and cell areas, two brown spots in the cell, a post-medial series of brown elongated marks on the veins, fringe bistre adorned with brown spots, variable in number, between the veins; Underside of hindwing uniformly suffused with brown scales, one brown spot in the cell, a post-medial series of brown elongated marks on the veins, fringe bistre adorned with brown spots, variable in number, between the veins.

Wingspan 53–56 mm (males) (n = 5); 57–58 mm (females) (n = 3).

Male (53, 56, 55, 54, 54), Female (57, 58, 58)

Male genitalia (Figs. 5e, 5f). Uncus long and thin, rounded at the apex and tufted with medium size hair on the upperside; tegumen with medium-size rounded peniculi, vinculum with medium-size rounded saccus, with a pronounced u-shaped indentation at the top margin; valves elongate and narrow; strong cucullus, club-shaped, with a short neck tufted with bristles; sacculus without clavus, presence of a sclerotized plate across the upper edge of the sacculus, costal margin with a small sclerotized ridge-like expansion roundly pointed and slightly curved inwardly; juxta small and flattened. Aedeagus short, curved, without cornuti, presence of a sclerotized elongate like carina crest, vesica armed with many rows of short stout spines.

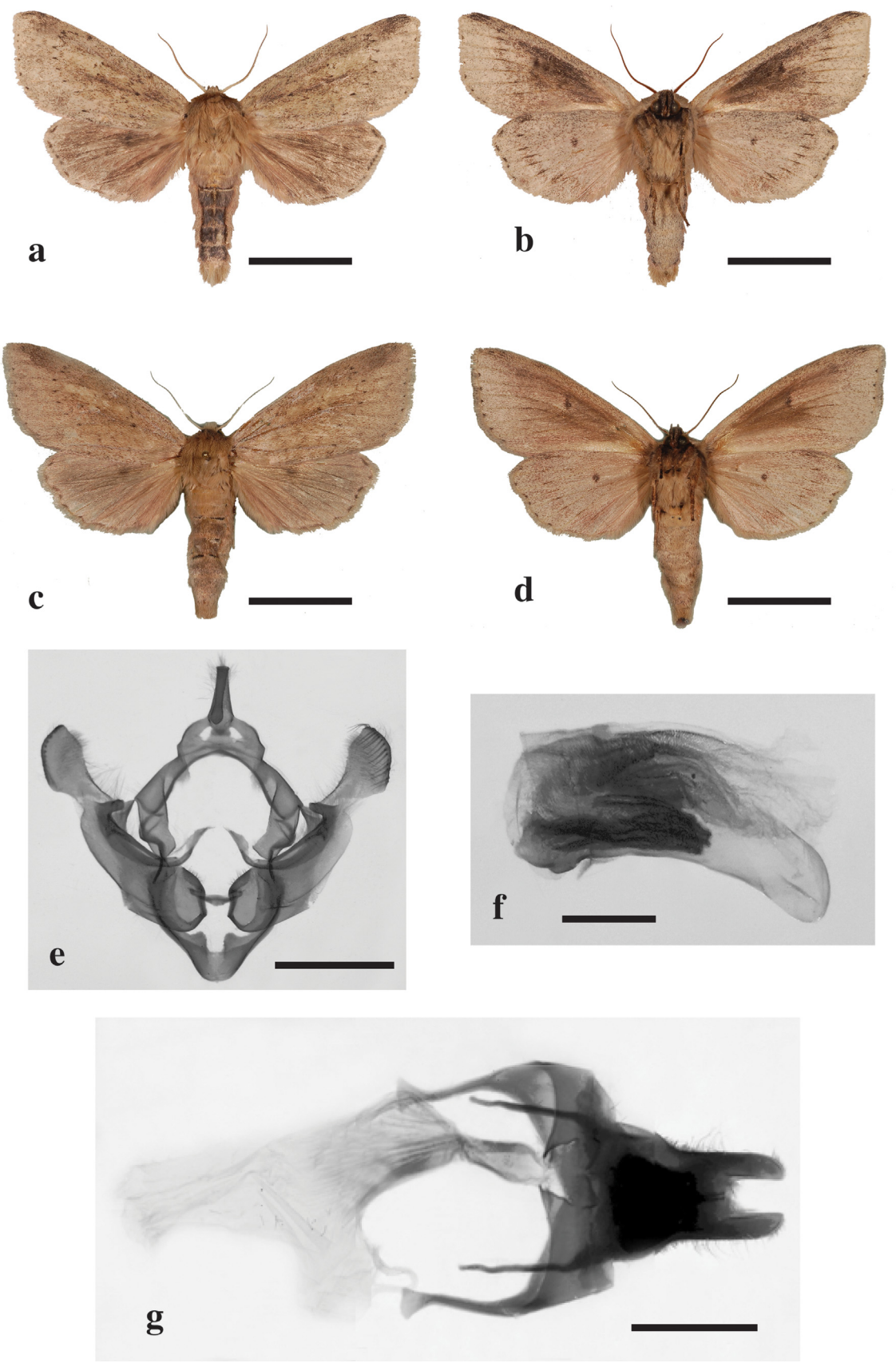

FIGURE 5. Adults and genitalia of *Hygrostola dallolmoi.* Scale bar = 10 mm for adults, 2 mm for male genitalia, 1 mm for male penis and 3 mm for female genitalia.
Hygrostola dallolmoi: 5a—male upper side, 5b—male under side, 5c—female upper side, 5d—female under side, 5e male genitalia, 5f—male penis, 5g—female genitalia.

Female genitalia (Fig. 5g). Corpus bursae long and cylindrical without signa; ductus seminalis from the basal part of the bursa; ductus bursae short, bulb-shaped and slightly sclerotized; ostium bursae small with a cup-shaped antrum; dorsal plate large broad, sclerotized. Ovipositor lobes long and narrow 3 times longer than wide, with small setae, rounded at apex with an apical crest of short stout bristles.

Bionomics. Biology unknown. The moths were caught with a light trap in grasslands surrounding wetlands inhabited with *Cymbopogon* spp., *Cyperus* spp., *Hyparrhenia* spp., *Sporobolus* spp. However considering the large size of this species, the host plant probably belongs to a species with a thick stem like *Cymbopogon giganteus* Chiov. or *Cyperus* spp.

Distribution. Tanzania. The four records are from Afromontane (Mosaic no 19) vegetation mosaic (White 1983) (Fig. 6).

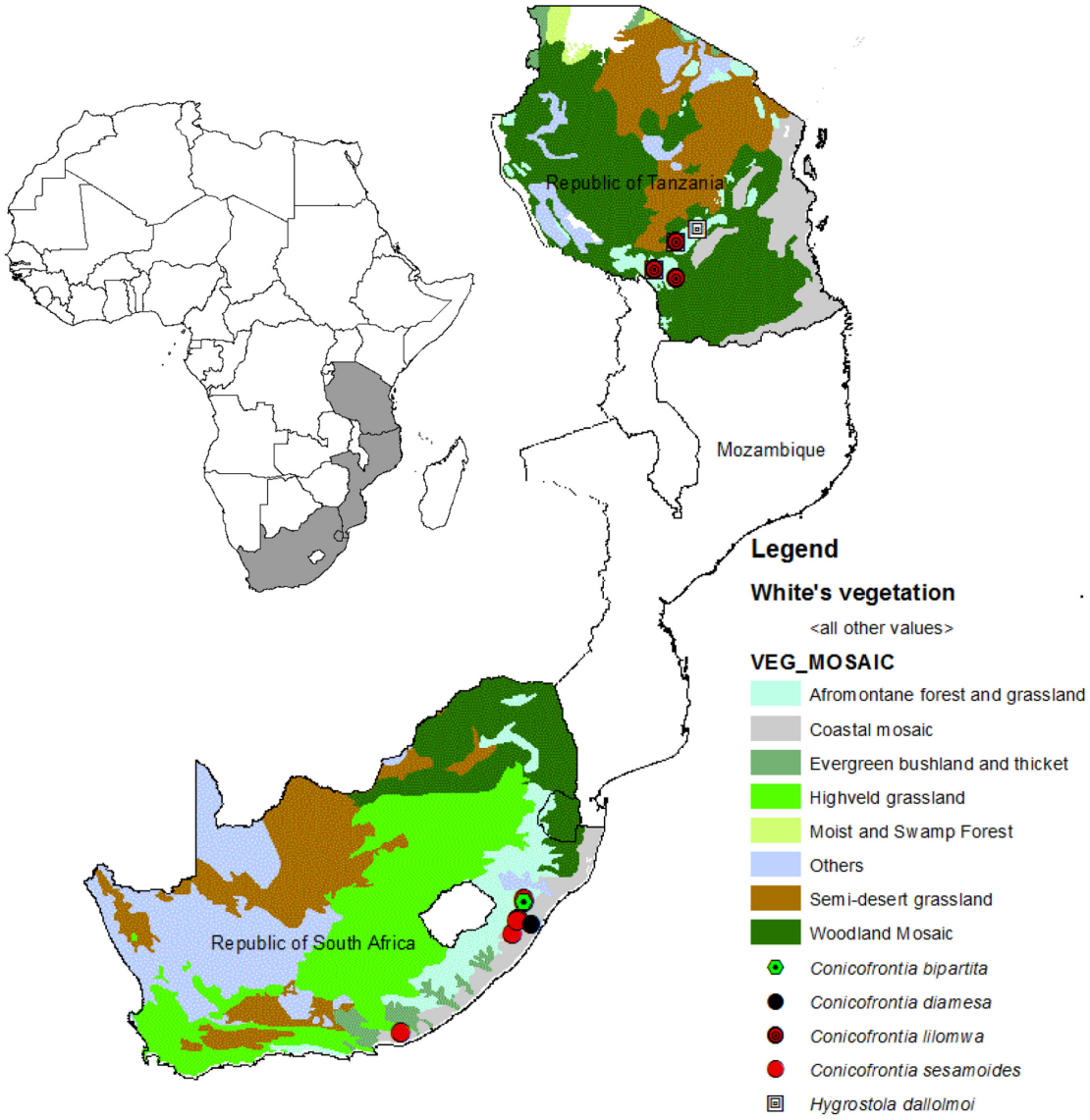

FIGURE 6. Distribution map of sampled *Conicofrontia* and *Hygrostola* specimens.

Remarks. Easily separated from *Conicofrontia* spp. with an uncus rounded apically, a broad club-shaped cucullus, a very small and flattened juxta, absence of two-lobed sclerotization on the manica, no cornuti, elongated ovipositor, no signa.

Phylogenetic and molecular species delimitation analyses. The ML analyses yield a best ML tree with a likelihood score of -14326.10 (Fig. 7). Overall the tree is well supported and all nodes leading to putative taxa (i.e. morphospecies) have BV $\geq$ 70%. Regarding the five species of interest, our analyses underline that *Conicofrontia* sensu Poole (1989) is paraphyletic because of the position of *H. dallolmoi*, which appears phylogenetically unrelated to the other *Conicofrontia* species. Specimens belonging to the *Conicofrontia* genus constitute a well-

supported clade (BV of 100%). Within this clade it is interesting to note that specimens corresponding to *C. bipartita* and *C. sesamoides* are not closely related. *Conicofrontia sesamoides* is sister to a clade grouping *C. bipartita* and *C. diamesa*; these three species which are distributed in the Republic of South Africa are sister to the last species, *C. lilomwa* from Tanzania. Regarding the PTP molecular species delimitation analyses, the putative molecular species clusters are completely consistent with the morphological identification.

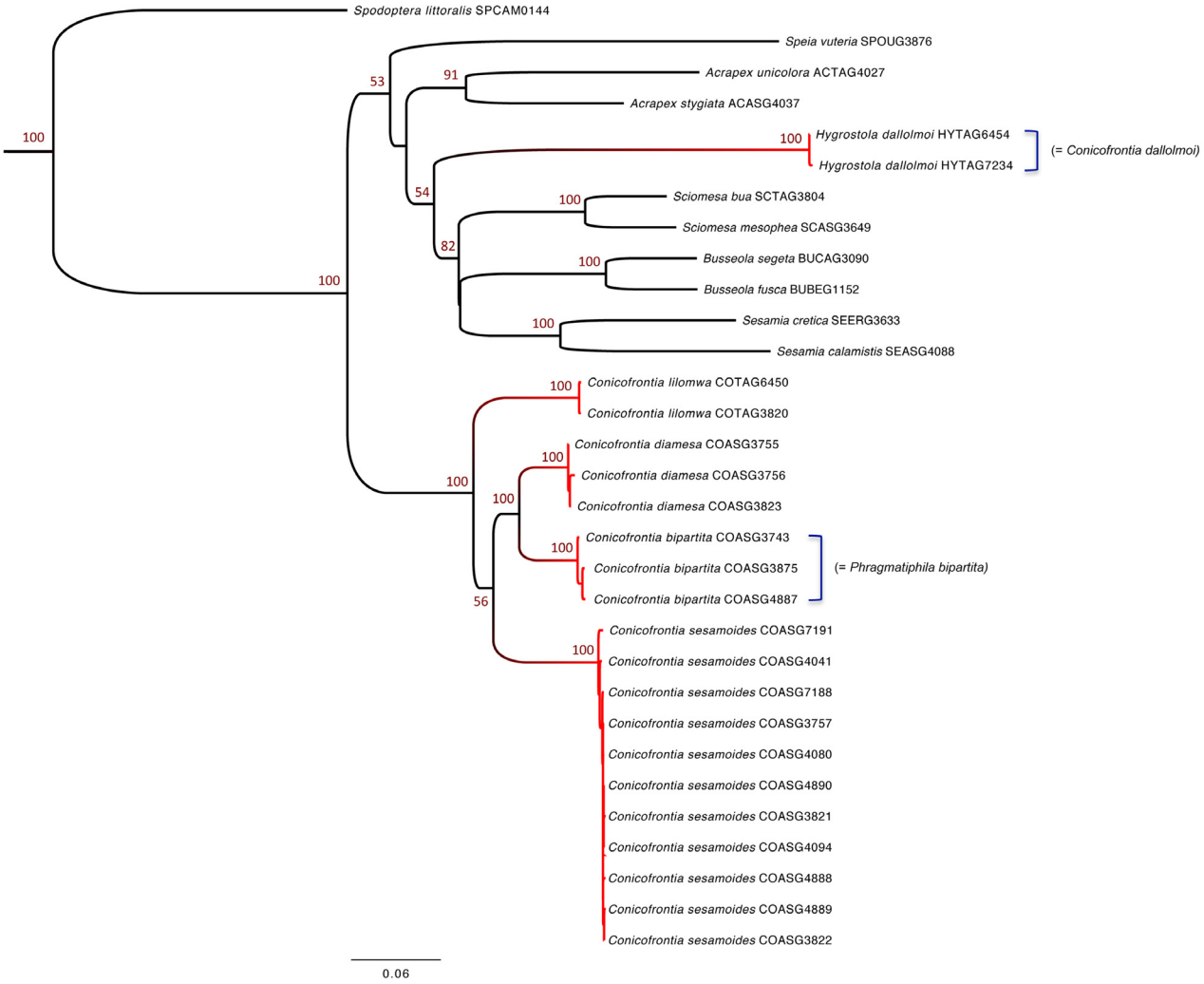

FIGURE 7. Results of molecular analyses. Support of major nodes is provided by BV (only BV ≥ 50% are shown). On the right we provide the former names of two species (sensu Poole 1989). Results of PTP analyses are figured using coloured branches. Putative molecular species clusters are indicated using transitions between blue-coloured branches to red-coloured branches.

Discussion

Systematics. The four species treated here make up a morphologically and ecologically homogeneous group, confirming the *Conicofrontia* genus redescription made by Tams and Bowden (1953). The important amount of specimens available for this study, with both sexes available for the five species, allows to precise and complete the *Conicofrontia* genus description and clarify the confusing taxonomic status of *C. sesamoides* and *Phragmatiphila bipartita*, the last one considered as synonym of *C. sesamoides* by Tams and Bowden (1953). The integrative taxonomy developed in this study provides clear morphological, ecological and genetics evidences, allowing us to confirm the status of *C. bipartita* bona species. The confusion made by Tams and Bowden (1953) in their revision is most probably the consequence of the scarce material available at that moment. As anticipated by Tams and Bowden (1953), our study confirms that *Arenostola diamesa* belongs to the *Conicofrontia* genus; however if the wing pattern is very close to that of *C. sesamoides* (Tams & Bowden 1953), the phylogeny show that *C. diamesa* is more related to the *C. bipartita*. On the other hand, both morphology and phylogeny results provide evidences that *C. dallolmoi* described by Berio (1973) does not belong to the *Conicofrontia* genus, but to the *Hygrostola* Warren

genus. Like *Hygrostola homomunda* Fletcher the male genitalia has a long and thin uncus, rounded at the apex; valves elongate and narrow; strong cucullus, club-shaped tufted with bristles, with a short neck; sacculus without clavus, presence of a sclerotized plate or spine across the upper edge of the sacculus, aedeagus short, curved, with vesica armed with rows of short stout spines. However it can be easily separated from *H. homomunda* with the less elongated sacculus, a sclerotized costal margin with a strong spine expansion, pointed backward, juxta large and plate-shaped, vesica with one strong cornuti, ovipositor less elongated, ostium bursae without a cup-shaped antrum.

The four *Conicofrontia* species collected in the field as larvae from host-plants belong to the *Sesamia*-like species as defined by Le Ru *et al.* (2006b). They are morphologically similar with ground colour pinkish buff without any markings; only *C. lilomwa* larvae looks different with head and thoracic shield dark brown when it is red-brown in the three other species.

Host-plant associations. We report here for the first time the host-plant associations of *Conicofrontia* spp. to four Andropogonae species, *Cymbopogon giganteus, Cymbopogon* sp., *Miscanthus capensis* and *Saccharum officinarum*. The feeding habits of *Conicofrontia diamesa*, *C. lilomwa* and *C. sesamoides* are similar, with the typical symptom of plant attack as death of the central tiller, often referred to as 'dead heart'. In addition, like for *Acrapex* spp. (Le Ru *et al.* 2014), we always found the larvae solitary in the stems. On the other hand, the feeding habits of *C. bipartita* is quite different with typical symptoms of plant attack as drying out of the inflorescence with second and third instar larvae found at the bottom of inflorescence, always gregarious up to 50–70 larvae. We speculate that *Conicofrontia* larvae typically fed on more than one stem before completing their development. The four *Conicofrontia* species larvae are also found to be markedly hygrophilous species inhabiting grasses along banks of streams, rivers and marshes. We suspect that the larvae disperse when they reach the fourth instar. No pupae were found in stems, and therefore borers probably pupate in the soil.

Our results suggest restricted distributions and host-plant associations of the four *Conicofrontia* species. Despite extensive surveys in more than 16 sub-Saharan countries we did not collect any *Conicofrontia* specimens in any other country than South Africa and Tanzania.

Acknowledgments

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APPENDIX S1. Accession numbers.

Species	Voucher	12S	GenBank accession 16S	Cytb	No. COI	28S	EF1a
Conicofrontia bipartita (Hampson, 1910)	COASG3743	KP682535	-missing-	KP682642	KP682613	KP682584	KP682671
Conicofrontia bipartita (Hampson, 1910)	COASG3875	KP682536	KP682564	KP682643	KP682614	KP682585	KP682672
Conicofrontia bipartita (Hampson, 1910)	COASG4887	KP682537	KP682565	KP682644	KP682615	KP682586	KP682673
Conicofrontia diamesa (Hampson, 1919)	COASG3755	KP682538	-missing-	KP682645	KP682616	KP682587	KP682674
Conicofrontia diamesa (Hampson, 1919)	COASG3756	KP682539	-missing-	KP682646	KP682617	KP682588	KP682675
Conicofrontia diamesa (Hampson, 1919)	COASG3823	KP682540	-missing-	KP682647	KP682618	KP682589	KP682676
Conicofrontia lilomwa nov. sp.	COTAG3820	KP682541	-missing-	-missing-	KP682619	KP682590	KP682677
Conicofrontia lilomwa nov. sp.	COTAG6450	KP682542	KP682566	KP682648	KP682620	KP682591	KP682678
Conicofrontia sesamoides (Hampson, 1902)	COASG3757	KP682543	-missing-	KP682649	KP682621	-missing-	KP682679
Conicofrontia sesamoides (Hampson, 1902)	COASG3821	KP682544	-missing-	KP682650	KP682622	KP682592	KP682680
Conicofrontia sesamoides (Hampson, 1902)	COASG3822	KP682545	-missing-	KP682651	KP682623	KP682593	KP682681
Conicofrontia sesamoides (Hampson, 1902)	COASG4041	KP682546	KP682567	KP682652	KP682624	KP682594	KP682682
Conicofrontia sesamoides (Hampson, 1902)	COASG4080	KP682547	-missing-	KP682653	KP682625	KP682595	KP682683
Conicofrontia sesamoides (Hampson, 1902)	COASG4094	KP682548	-missing-	KP682654	KP682626	KP682596	KP682684
Conicofrontia sesamoides (Hampson, 1902)	COASG4888	KP682549	KP682568	KP682655	KP682627	KP682597	KP682685
Conicofrontia sesamoides (Hampson, 1902)	COASG4889	KP682550	KP682569	KP682656	KP682628	KP682598	KP682686
Conicofrontia sesamoides (Hampson, 1902)	COASG4890	KP682551	KP682570	KP682657	KP682629	KP682599	KP682687
Conicofrontia sesamoides (Hampson, 1902)	COASG7188	KP682552	KP682571	KP682658	KP682630	KP682600	KP682688
Conicofrontia sesamoides (Hampson, 1902)	COASG7191	KP682553	KP682572	KP682659	KP682631	KP682601	KP682689
Hygrostola dallolmoi (Berio, 1973)	HYTAG6454	KP682554	KP682573	KP682660	KP682632	KP682602	KP682690
Hygrostola dallolmoi (Berio, 1973)	HYTAG7234	KP682555	KP682574	-missing-	-missing-	KP682603	KP682691
Acrapex stygiata (Hampson, 1910)	ACASG4037	KP682531	KP682562	KP682638	-missing-	KP682580	KP682667
Acrapex unicolora (Hampson, 1910)	ACTAG4027	KP682532	-missing-	KP682639	KP682610	KP682581	KP682668
Busseola fusca (Fuller, 1901)	BUBEG1152	KP682533	-missing-	KP682640	KP682611	KP682582	KP682669
Busseola segeta Bowden, 1956	BUCAG3090	KP682534	KP682563	KP682641	KP682612	KP682583	KP682670
Sciomesa bua Moyal *et al.*, 2010	SCTAG3804	KP682556	KP682575	KP682661	KP682633	KP682604	KP682692
Sciomesa mesophea (Aurivillius, 1910)	SCASG3649	KP682557	KP682576	KP682662	KP682634	KP682605	KP682693
Sesamia calamistis Hampson, 1910	SEASG4088	KP682558	KP682577	KP682663	KP682635	KP682606	KP682694
Sesamia cretica Lederer, 1857	SEERG3633	KP682559	KP682578	KP682664	KP682636	KP682607	KP682695
Speia vuteria (Stoll, 1790)	SPOUG3876	KP682560	-missing-	KP682665	KP682637	KP682608	KP682696
Spodoptera littoralis (Boisduval, 1833)	SPCAM0144	KP682561	KP682579	KP682666	KP682638	KP682609	KP682697