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Notes on Scythrididae of western South Africa and Namibia, with descriptions of eight new species (Lepidoptera: Scythrididae)

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Abstract: A list of 60 species embracing 1163 specimens of the family Scythrididae from western South Africa and Namibia is presented. The material was collected during 2016 in the course of two Finnish–Estonian expeditions to the Cape provinces of the RSA, and one further Estonian expedition to central and north-eastern Namibia. Eight new species are described from South Africa: *Haploscythris karoocola* sp. nov., *H. orthogonella* sp. nov., *H. sihvoneni* sp. nov., *H. swartbergensis* sp. nov., *Scythris curtiphallus* sp. nov., *S. kgalagadica* sp. nov., *S. sippolai* sp. nov., and *S. vaalamoi* sp. nov. The genitalia of previously unknown females of *Scythris claudioculella* Bengtsson, 2014, *S. exsoluta* Meyrick, 1920 and *Scythris unciclavella* Bengtsson, 2014 are described and illustrated, as well as the male genitalia of *S. potgieteri* Bengtsson, 2014 and *S. worcesterensis* Bengtsson, 2014. *Scythris eburnella* Bengtsson, 2014, *S. kebirella* (Amsel, 1935) and *S. ugabensis* Bengtsson, 2014 are reported as new to South Africa, and *S. clemens* Meyrick, 1921 as new to Namibia. The DNA barcodes were produced for 48 species. The known distribution range of each species is given, and the taxonomy of some species is briefly discussed.

Key words: Afrotropical region, Scythrididae, taxonomy, South Africa, Namibia, Cape provinces, new species

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INTRODUCTION

The scythridid fauna of the Afrotropical region was recently reviewed (Bengtsson, 2014), on the basis of thorough examination of available materials preserved in various museum and private collections. The majority of existing materials, comprising almost 4000 specimens, originate from just a few countries, namely South Africa, Namibia, Kenya, Yemen and Oman. Altogether, 123 species of Scythrididae were reported from South Africa by Bengtsson (2014).

The present paper is based on new materials of Scythrididae collected during 2016 in the course of two Finnish–Estonian expeditions to the Cape provinces of South Africa. Some further material collected by Allan Selin during 2017 from Namibia and donated to the author is also included in the present paper. The aim of the trips was to investigate nocturnal scythridids using various types of light traps, which have turned out to be effective, but have hitherto not been used on a large scale in the southern hemisphere.

MATERIALS AND METHODS

The Finnish–Estonian expeditions to western South Africa were made during 27.i.–5.ii.2016 and 22.xi.–3.xii.2016. The investigated area covered the Western and Northern Cape provinces at about 20 collecting sites. The habitats of some collecting sites are illustrated in Figs 6, 11, 12, 24 & 29. The Namibian material was collected during three nights in the second half of January, 2017.

Altogether 60 species constituted by 1163 specimens of scythridids were recorded during the trips; 48 species/1053 specimens in South Africa and 18 species/110 specimens in Namibia. The material was collected by light trapping at night. Four to five light traps were used every night, with various UV-tube and LED-lamps, as well as 160 W incandescent lamps. Tissue samples (dried legs) of numerous specimens, comprising 48 species, were shipped to the Canadian Centre for DNA Barcoding in Guelph for DNA sequence analysis. The barcodes are preserved in the Barcode of Life Data Systems (BOLD; see http://v4.boldsystems.org), and were used to calculate genetic distances reported below. The material is deposited in the research collection of T. & K. Nupponen (Espoo, Finland). The types are available for loan via the Finnish Museum of Natural History, University of Helsinki, Finland, or directly from the author. The coordinates of South African localities are presented in degrees and decimal minutes, and those of Namibian sites in degrees, minutes and seconds.

Abbreviations

NUPP = research collection of T. & K. Nupponen, Espoo, Finland. FMNH = Finnish Museum of Natural History, University of Helsinki, Finland.

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DESCRIPTIONS OF NEW SPECIES

***Haploscythris karoocola* sp. nov.** (Fig. 1)
urn:lsid:zoobank.org:act:AB6E8C09-D338-4E3E-AA84-5E15F67AE710

Type material. Holotype (♀), labeled: "South Africa, Western Cape prov.; 33°17′S 22°28′E; Groot Swartberg Mts., 800 m; 3.xii.2016; K. Nupponen & R. Haverinen leg. [white label]", "prep. no.; 2/20.xi.2017; K. Nupponen [white label]", "DNA sample; KN00992; Lepid. phyl. [green label]", "HOLOTYPE; *Haploscythris karoocola*; K. Nupponen [red rectangle label]" (NUPP/FMNH). Paratypes (11 ♂♂, 17 ♀♀): 10 ♂♂, 17 ♀♀, same collecting data as the holotype; South Africa, Northern Cape prov., 32°10′S 21°46′E, 1245 m, Nuweveld Mts, Oukloof Pass, 1 ♂ 1.xii.2016, K. Nupponen & R. Haverinen leg. Genitalia slides: K. Nupponen prep. no. 1/20.xi.2017 (♀), 5/25.iii.2018 (♂), 1/26.iii.2018 (♂), 4/30.iii.2018 (♂). Two genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00938, KN00993, KN00994 (NUPP).

Figure 1 – Adults of *Haploscythris karoocola* sp. nov. Left column: males (paratypes); Right column: females (above: holotype; below: paratype).

Description (Fig. 1) Wingspan 13–15 mm. Head, collar and thorax pale brown mixed with ivory. Neck tuft white. Haustellum ivory, with a few ivory scales. Scape fuscous, ivory laterally, ventral hairscales ivory. Flagellum fuscous, 0.75 × length of forewing. Labial palp: segment I white; II and III: upper surface, base and distal tip white, lower surface brown. Fore leg: femur ivory mixed with pale beige; base, distal tip and ventral surface of tibia white, otherwise mixed with various shades of brown; tarsus pale beige. Middle leg ivory mixed with brown and beige; dorsal surface of tibia distally with dark brown dash. Hind leg: femur and tibia white, tarsus and dorsal hairscales of tibia pale beige. Abdomen pale fuscous dorsally, whitish ventrally. Forewing suffused with white, grey, brown and blackish; more or less indistinct longitudinal black streak below fold at 0.15–0.25; obliguely extended black spot in fold at 0.4, edged by white dashes; indistinct black spots beyond dorsum and at cell end; few black spots at cilia line. Males are paler than females, due to scarce black scales. Hind wing grey; fringes pale brown at apical area, otherwise pale beige.

Male genitalia (Figs 2 & 3). Uncus a polygonal plate. Gnathos basally with two round lateral extensions and

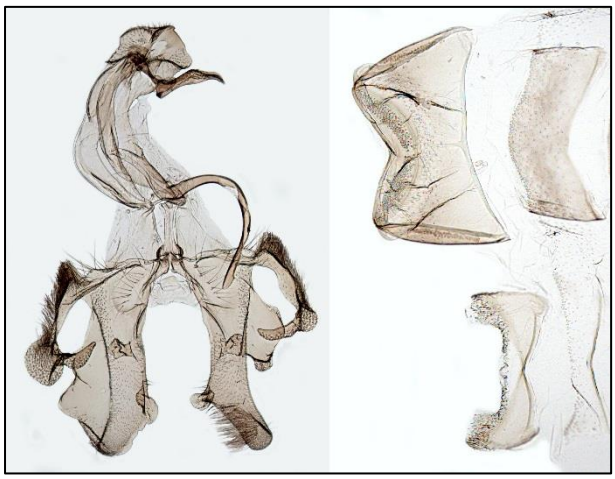

Figure 2 – *Haploscythris karoocola* sp. nov. Left: male genitalia; Right: abdominal segment VIII (above: sternum; below: tergum). (paratype; slide 1/26.iii.2018 KN)

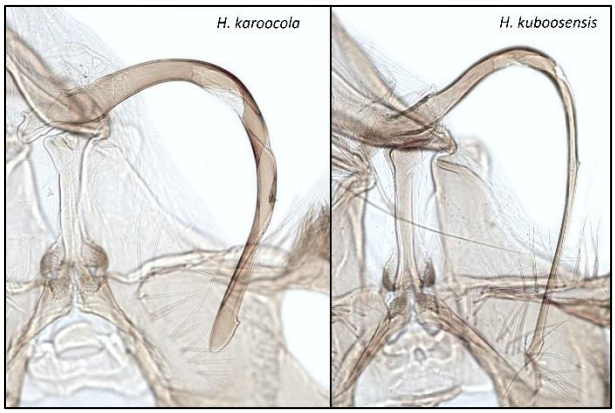

Figure 3 – Phallus of *Haploscythris karoocola* sp. nov. (left; paratype, slide 1/26.iii.2018 KN) and *H. kuboosensis* Bengtsson, 2014 (right; slide 2/6.iv.2018 KN).

small basal loop; distal arm bent at apical third, medially somewhat swollen; apical 1/5 tapered, tip pointed. Valvae asymmetrical with large and setose appendix on dorsal side of each valva; both appendixes extended subbasally at dorsal margin, and with subapical round bulge; tips robust and turned backwards, right one being distinctly longer; left valva beyond middle bulging dorsally, a mushroom-like process ventrally at middle and a twisted flap subapically; apical part of valva hood-shaped; right valva: dorsally at middle a large subtrapezoid extension with semicircular dorso-lateral flap, two mushroom-like processes ventrally at middle and subapically, apex of valva digitate, setose and swollen at inner surface. Phallus curved, spiral-like at medial third, tip slightly widened; minute thorns at 2/3 and subapically. Vinculum short, subquadrangular. Sternum VIII subtrapezoid, posteriorly incurved, and broadly reinforced. Tergum VIII basically rectangular, anteriorly incurved; posterior shanks short and conspicuously quadrangular, gap between them straight with minute medial hump.

Female genitalia (Fig. 4). Sterigma large and basically subtrapezoid; posterior margin medially straight, with setose posterolateral projections. Ostium situated

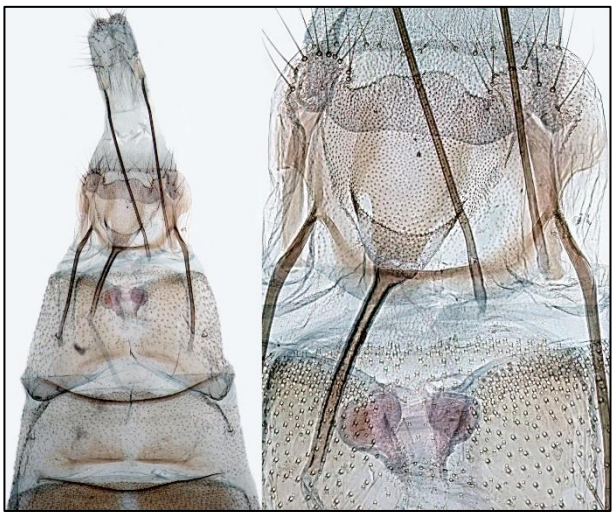

Figure 4 – *Haploscythris karoocola* sp. nov. Left: female genitalia; Right: sterigma enlarged. (holotype; slide: 2/20.xi.2017 KN).

anteriorly at sterigma, edged by a funnel-shaped sclerotization. Ductus bursae sclerotized, thin, straight and evenly broad. Sternum VII subrectangular, 1.5 times wider than high, with deep medioposterior cleft; a pair of small roundish sclerites subposterioly at middle; anterior margin shallowly concave, with two transverse diffuse sclerotizations. Apophyses anteriores 0.75 × length of apophyses posteriores.

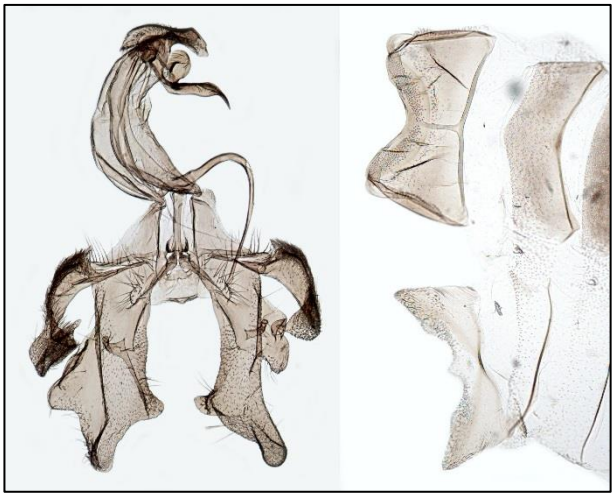

Figure 5 – *Haploscythris kuboosensis* Bengtsson, 2014. Left: male genitalia; Right: abdominal segment VIII (above: sternum; below: tergum). (slide 2/6.iv.2018 KN).

Diagnosis. Externally *H. karoocola* sp. nov. is a rather variable species, and may be confused with several other medium-sized scythridids. In particular it resembles *H. kuboosensis* Bengtsson, 2014, but may be separated by the brownish rather than greyish forewings. The male genitalia of *H. karoocola* are close to those of *H. kuboosensis* (Fig. 5), but differ by an evenly curved, thicker and medially spiral phallus (Fig. 3); considerably longer apex of both appendixes, mushroom-like medioventral processes of the valvae, a hood-shaped apex of left valva, and quadrangular posterior shanks of tergum VIII. In the female genitalia the subtrapezoid sterigma and a sclerotized, thin, straight and evenly broad ductus bursae are characteristic.

Habitat. The species inhabits semi-arid valleys and gorges in the southern Karoo range (Fig. 6). The moth is nocturnal and comes to light. Immature stages are unknown.

Figure 6 – Habitat of *Haploscythris karoocola* sp. nov., *H. sihvoneni* sp. nov., *H. swartbergensis* sp. nov., and several other scythridids reported in the present article: a semi-arid valley by northern foothills of the Groot Swartberg Mountains in the southern edge of the Karoo range, Western Cape prov., South Africa. (Photo: K. Nupponen).

Distribution. South Africa (Western & Northern Cape provinces).

Etymology. Lat. *colo* = to inhabit. The name of the species refers to its habitat, the South African Karoo.

Remarks. The DNA barcode sequence (COI) of *H. karoocola* (n=4) differs by a minimum distance of 1.86 % from *H. kuboosensis* (n=1), which is considered its closest relative, based on resemblance of the male genitalia as well. Sternum VII in the female abdomen of *H. karoocola* closely resembles that of *Scythris bitterfonteinica* Bengtsson, 2014. Although the two taxa are easily separated by the sterigma and ductus bursae, the structure of these organs indicate that the latter taxon should be placed in the genus *Haploscythris*. Unfortunately, the male of *S. bitterfonteinica* is unknown and further material is needed to solve the problem.

***Haploscythris orthogonella* sp. nov.** (Fig. 7)
urn:lsid:zoobank.org:act:E5C01013-B384-4F52-B49D-E6296DCCF050

Type material. Holotype (♂), labeled: ”South Africa, Northern Cape prov.; 32°10′S 21°46′E; Nuweveld Mts, 1245 m; Oukloof pass, 1.xii.2016; K. Nupponen & R. Haverinen leg. [white label]”, ”prep. no.; 1/5.iv.2018; K. Nupponen [white label]”, “HOLOTYPE; *Haploscythris orthogonella*; K. Nupponen [red rectangle label]” (NUPP//FMNH). Paratypes (1 ♂, 5 ♀♀): 1 ♂, 2 ♀♀, same collecting data as the holotype; South Africa, Northern Cape prov., 29°03′S 17°06′E, 305 m, Rictersweld distr., near Lekkersing village, 3 ♀♀ 28.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia slides: K. Nupponen prep. no. 5/20.iii.2018 (♂), 2/25.iii.2018 (♀), 1/6.iv.2018 (♀). DNA

samples (Lepid. Phyl., green label): KN00939, KN00940, KN00942 (NUPP).

Figure 7 – Adults of *Haploscythris orthogonella* sp. nov. (above: male, holotype; below: female, paratype).

Description (Fig. 7). Wingspan 14–16.5 mm. Head, collar, neck tuft, haustellum, scape and thorax pale beige mixed with few whitish scales. Flagellum pale brown, 0.7 × length of forewing. Labial palp: segment I white; segment II basally, terminally and at inner surface pale beige, otherwise brown; segment III pale beige, except lower surface brown. Legs beige in various shades, except upper side of tibia sub-posteriorly brown. Abdomen beige dorsally; whitish beige ventrally. Forewing pale beige with faint pink hue; scattered white, black and dark fuscous scales exist over the wing; black spots in fold at 0.25 and 0.4, at dorsum and at cell end; row of indistinct black spots in cilia. Hind wing pale fuscous.

Male genitalia (Figs 8 & 9). Uncus a square plate. Gnathos 0,45 × length of valva, medially swollen, distal third thin and tapered, apex bent downwards, tip pointed. Valva moderately broad, digitate, with small subapical dorsal flap, apex hood-like; in middle of each valva a rather thin and bristled lateral protuberance, subapically widened and curved inwards, apically thin, tip pointed. Phallus 0.85 × length of valva, in middle bent at right angle, distal portion thin and slightly tapered; at 0.75 a ventral tooth. Vinculum short, quadrangular, posterior corners rounded. Sternum VIII subtrapezoid, posteriorly widely reinforced. Tergum VIII subtrapezoid, widest posteriorly, anterior margin deeply incurved, posteriorly concave with triangular membranous median flap.

Figure 8 – *Haploscythris orthogonella* sp. nov. Left: male genitalia; Right: abdominal segment VIII (above: sternum; below: tergum). (holotype; slide 1/5.iv.2018 KN).

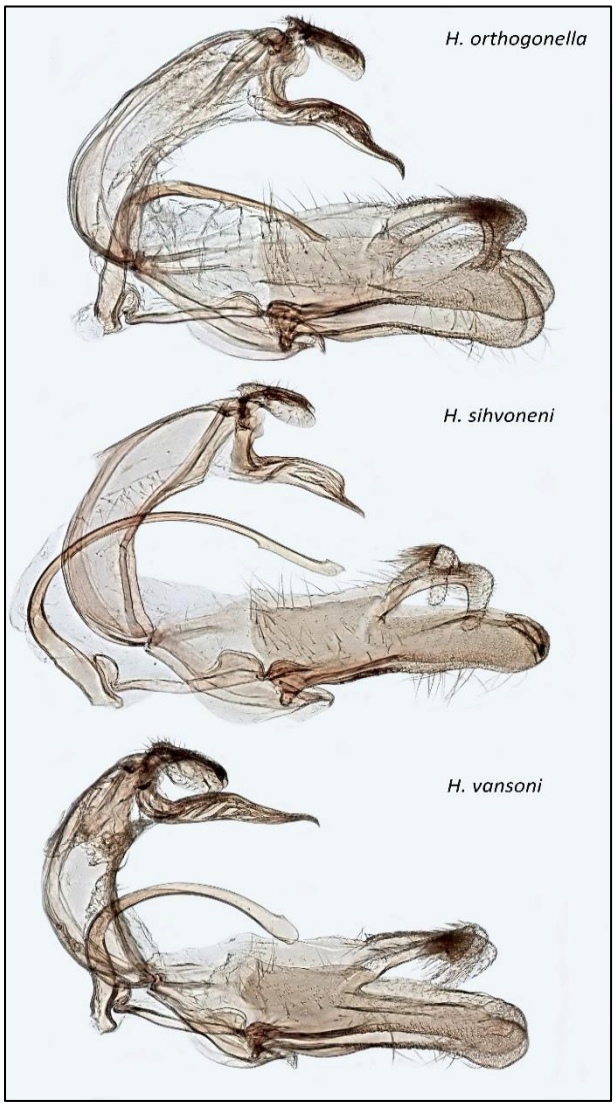

Figure 9 - Male genitalia (lateral view) of *Haploscythris* spp. Above: *H. orthogonella* sp. nov. (paratype; slide 5/20.iii.2018 KN); centre: *H. sihvoneni* sp. nov. (paratype; slide 2/19.iii.2018 KN); below: *H. vansoni* Bengtsson, 2014 (slide 3/30.iii.2018 KN).

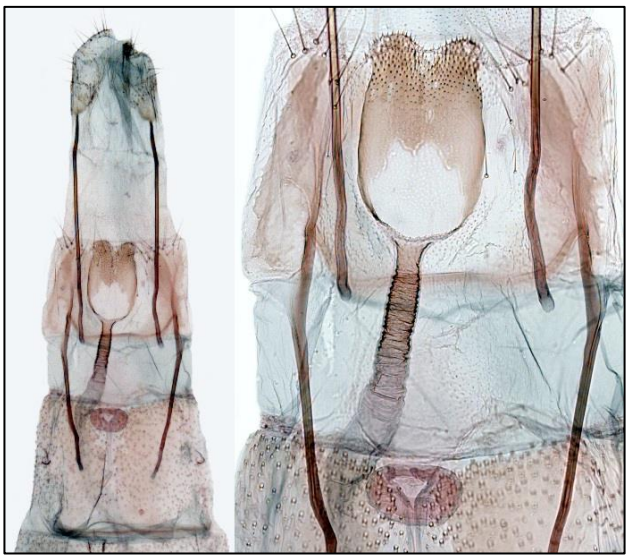

Figure 10 – *Haploscythris orthogonella* sp. nov. Left: female genitalia; Right: sterigma enlarged. (paratype; slide: 2/25.iii.2018 KN).

Female genitalia (Fig. 10). Sterigma subrectangular, 1.65 times longer than wide, posteriorly incised, posterior half granulated. Ostium wide, funnel-shaped, situated anteriorly at sterigma. Antrum sclerotized and transversely wrinkled, both gradually decreasing towards a slightly widened anterior part. Sternum VII quadrangular, medioposteriorly incurved with annular appendix, anterior margin concave. Apophyses anteriores 0.7 × length of apophyses posteriores.

Diagnosis. Externally *H. orthogonella* sp. nov. is similar to several medium-sized scythridids, eg. *H. vansoni* Bengtsson, 2014, *H. richtersveldensis* Bengtsson, 2014, and some forms of *H. vulturoides* Bengtsson, 2014, but may be separated from those by the more distinct black spots on the forewings. The male genitalia are close to those of *H. sihvoneni* sp. nov. (see below) and *H. vansoni*, but differ by a short and distally thin phallus bent at right angle in middle, and with a moderately large ventral tooth (dorsal tooth absent); a medially moderately swollen gnathos arm; and a long and thin apical portion of lateral protuberances of the valvae. The female genitalia are similar to those of *H. kuboosensis* Bengtsson, 2014, but differ by a longer sterigma, a slightly broader sclerotized part of antrum, and a wider ostium situated at anterior margin of sterigma. The genetic distance between *H. orthogonella*, *H.sihvoneni* and *H. vansoni* are discussed in remarks under *H. sihvoneni*.

Habitat. The species inhabits semi-arid rocky hills and slopes in the Succulent Karoo (Figs 11 & 12). The moth is nocturnal and comes to light. Immature stages are unknown.

Distribution. South Africa (Northern Cape Province).

Etymology. Lat. *orthogonius* = right-angled. The species name alludes to a phallus in the male genitalia, being right-angled in middle.

Remarks. See remarks under *H. sihvoneni* below.

Figure 11 – Habitat of *Haploscythris orthogonella* sp. nov. and *Scythris vaalamoi* sp. nov.: a semi-arid rocky slope in the northern Succulent Karoo range by the Richtersweld district, Northern Cape prov., South Africa. (Photo: K. Nupponen).

Figure 12 – Habitat of *Haploscythris orthogonella* sp. nov. and *Scythris curtiphallus* sp. nov.: semi-arid rocky hills around the Oukloof Pass in the southern Karoo range, Northern Cape prov., South Africa. (Photo: K. Nupponen).

***Haploscythris sihvoneni* sp. nov.** (Fig. 13)
urn:lsid:zoobank.org:act:4E646056-459A-4ACF-A74F-302F722CF72C

Type material. Holotype (♂), labeled: ”South Africa, Western Cape prov.; 33°17′S 22°28′E; Groot Swartberg Mts., 800 m; 3.xii.2016; K. Nupponen & R. Haverinen leg. [white label]”, ”prep. no.; 3/5.iv.2018.; K. Nupponen [white label]”, “HOLOTYPE; *Haploscythris sihvoneni*; K. Nupponen [red rectangle label]” (NUPP/FMNH). Paratypes: 25 ♂♂ 25 ♀♀, same collecting data as the holotype. Genitalia slides: K. Nupponen prep. no. 1/19.iii.2018 (♂), 2/19.iii.2018 (♂), 1/27.iii.2018 (♀), 2/27.iii.2018 (♀), 2/30.iii.2018 (♂). DNA sample (Lepid. Phyl., green label): KN00941 (NUPP).

Description (Fig. 13). Wingspan 11–14.5 mm; male is, on average, larger than female. Head, neck tuft, and thorax pale beige. Collar, haustellum and scape cream white. Flagellum pale brown, 0.7 × length of forewing. Labial palp: segment I white; segment II basally, terminally and at inner surface pale beige, otherwise brown; segment III pale beige, except lower surface brown. Legs pale greyish beige. Abdomen beige dorsally; cream white ventrally.

Figure 13 – Adults of *Haploscythris sihvoneni* sp. nov. (above: male, holotype; centre: male, paratype; below: female, paratype.

Figure 14 – *Haploscythris sihvoneni* sp. nov. Left: male genitalia; Right: abdominal segment VIII (above: sternum; below: tergum). (holotype; slide 3/5.iv.2018 KN).

Forewing pale grey with pale beige hue, mixed with white, especially in fold; black and dark fuscous scales forming a patch in fold at 0.4, and more or less indistinct spots at 0.2 in fold, at dorsum, at cell end and subapically; the intensity of markings varying, and some specimens almost lack a pattern. Hind wing pale fuscous.

Male genitalia (Figs 9 & 14). Uncus a square plate with concave posterior margin. Gnathos 0.45 × length of valva, shallowly bent downwards, medially swollen, distal portion thin and tapered, tip pointed. Valva moderately broad, digitate, with subapical dorsal flap, apex hood-like; in middle of each valva a bristled lateral protuberance of more or less constant width, tip curved inwards. Phallus 1.3 × length of valva, thin and curved, basally shallowly widened; minute teeth ventrally at 0.9 and dorsally at apex. Vinculum short, quadrangular, posterior corners rounded. Sternum VIII subtrapezoid, posteriorly widely reinforced. Tergum VIII subtrapezoid, widest posteriorly, anterior margin deeply incurved, posteriorly widely concave with semicircular membranous median flap.

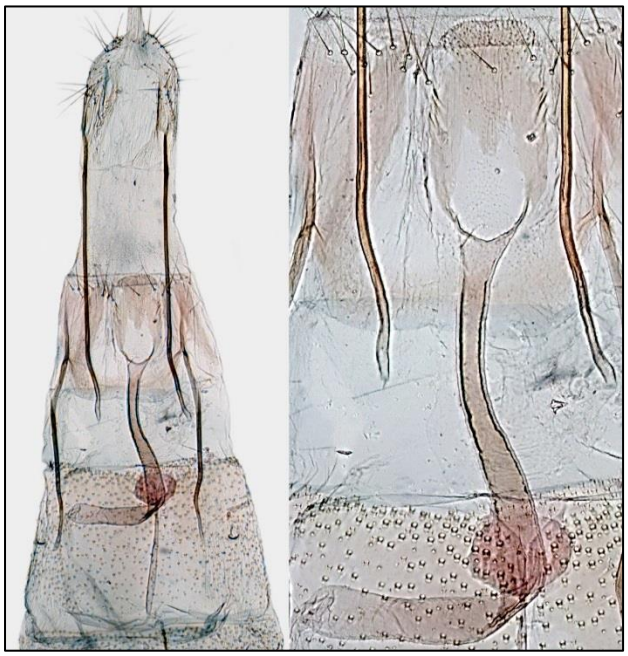

Figure 15 – *Haploscythris sihvoneni* sp. nov. Left: female genitalia; Right: sterigma enlarged. (paratype; slide: 2/27.iii.2018 KN).

Female genitalia (Fig. 15). Sterigma subrectangular, twice as long as wide, posterior margin almost straight, posterior half shallowly granulated. Ostium wide, funnel-shaped, situated anteriorly at sterigma. Antrum sclerotized but not wrinkled, bent 90˚ at 0.7 from base, sclerotization about 2.5 times longer than sterigma; anterior quarter tapered, then gradually widening. Sternum VII quadrangular, medioposteriorly with small V-shaped incision and round appendix. Apophyses anteriores 0.7 × length of apophyses posteriores.

Diagnosis. Externally *H. sihvoneni* sp. nov. resembles several other species in the genus *Haploscythris*, especially *H. vansoni* Bengtsson, 2014 and *H. vulturoides* Bengtsson, 2014, but may be separated from those by its more greyish

colour and smaller size. The male genitalia of *H. sihvoneni* are very similar to those of *H. vansoni* and *H. orthogonella. H. sihvoneni* differs from the other two species by a considerably longer and thinner phallus with minute ventral and dorsal teeth, a medially distinctly swollen gnathos arm, and subapically unwidened lateral protuberances of the valvae. In the female genitalia, a longish sterigma and a very long sclerotized part of antrum are characteristic.

Habitat. The species inhabits semi-arid valleys in the northern foothills of the Groot Swartberg Mountains on the southern edge of the Karoo (Fig. 6). The moth is nocturnal and comes to light. Immature stages are unknown.

Distribution. South Africa (Western Cape Province).

Etymology. The species is dedicated to Pasi Sihvonen, a Finnish lepidopterist.

Remarks. *H. sihvoneni*, *H. orthogonella* and *H. vansoni* form a species complex, and especially the male genitalia of the three taxa are very close to each other (Fig. 17). However, the morphological differences are well supported by the DNA barcodes, which reveal distinct K2P divergences between the three taxa: *H. sihvoneni – H. orthogonella* 4.29 %, *H. sihvoneni – H. vansoni* 4.63 %, and *H. orthogonella – H. vansoni* 2.83 %.

***Haploscythris swartbergensis* sp. nov.** (Fig. 16)
urn:lsid:zoobank.org:act:9038E430-6299-43ED-8BC9-8B46FDB82FA3

Type material. Holotype (♀):"South Africa, Western Cape prov.; 33°17′S 22°28′E; Groot Swartberg Mts., 800 m; 3.xii.2016; K. Nupponen & R. Haverinen leg. [white label]", "prep. no.; 2/21.xi.2017; K. Nupponen [white label]", "DNA sample; KN00984; Lepid. phyl. [green label]", "HOLOTYPE; *Haploscythris swartbergensis*; K. Nupponen [red rectangle label]" (NUPP/FMNH). Paratypes: 2 ♂♂, same collecting data as the holotype. Genitalia slides: K. Nupponen prep. no. 1/20.iii.2018, 2/5.iv.2018 (NUPP).

Figure 16 – Adult female of *Haplocythris swartbergensis* sp. nov. (holotype).

Description (Fig. 16). Wingspan 17 mm. Head brown, forehead densely mixed with ivory and whitish fuscous. Collar, neck tuft, haustellum, tegula and thorax brown, more or less mixed with ivory and white. Scape dark brown dorsally, ivory ventrally and laterally, ventral hairscales ivory. Flagellum brown, 0.75 × length of forewing. Labial palp ivory, except lower surface of segments II and III medially dark brown. Legs ivory, tibia and tarsus mixed with various shades of brown; tibia of each leg with rather conspicuous dark brown subterminal patch dorsally. Abdomen in male greyish beige dorsally, dirty white ventrally mixed with pale beige, anal tuft pale ochreous dorsally; in female fuscous dorsally, pale fuscous ventrally mixed with whitish. Forewing basically brown, suffused with white, grey and blackish; white scales forming an indistinct row of 4–5 patches below fold; indistinct black spot at cell end. Hind wing fuscous.

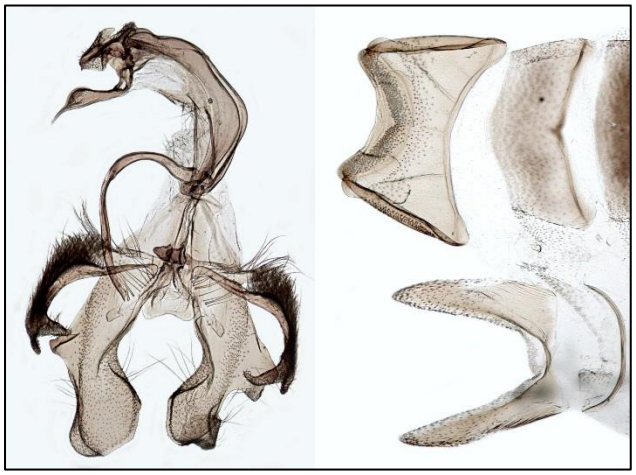

Figure 17 – *Haploscythris swartbergensis* sp. nov. Left: male genitalia; Right: abdominal segment VIII (above: sternum; below: tergum). (paratype; slide 2/5.iv.2018 KN).

Male genitalia (Fig. 17). Uncus a subpentagonal hood with two anterolateral and two anteromedial setose labiate processes. Gnathos basally with two semicircular lateral extensions and small basal loop; distal arm bent at apical half, medially distinctly swollen; apical 1/5 thin and tapered, tip pointed. Valvae asymmetrical, rather complex with several extensions; each valva with elongated flap subbasally at dorsal margin; robust, asymmetrical and setose appendix on dorsal side of each valva; both appendixes extended subbasally and subapically at dorsal margin, and subapically at ventral margin, tip thin and turned backwards, right one with small triangular extension ventrally near apex; at base of appendix basally setose narrow process with cut off tip, attached to valva at middle; rest of valva rather broad, dorsal margin with large extensions at middle, left one subtriangular, right one broad and distally bifurcate; distal portion of valvae hood-shaped, with flaps of various length at margins. Phallus curved, as long as valva, tip slightly widened. Juxta basally with parallel subtriangular lobes, length of which about half of juxta. Vinculum short, subquadrangular, posterior corners shallowly extended. Sternum VIII subtrapezoid, posterior margin concave and broadly reinforced. Tergum VIII a large U-shaped plate; anterior corners somewhat widened, posterior prongs knife-like.

Female genitalia (Fig. 18). Sterigma sub-oval, large, densely covered with spicules; posterior margin shallowly convex, laterally sclerotized at its widest point at anterior 0.4. Ostium situated anteriorly at sterigma, edged by a wide

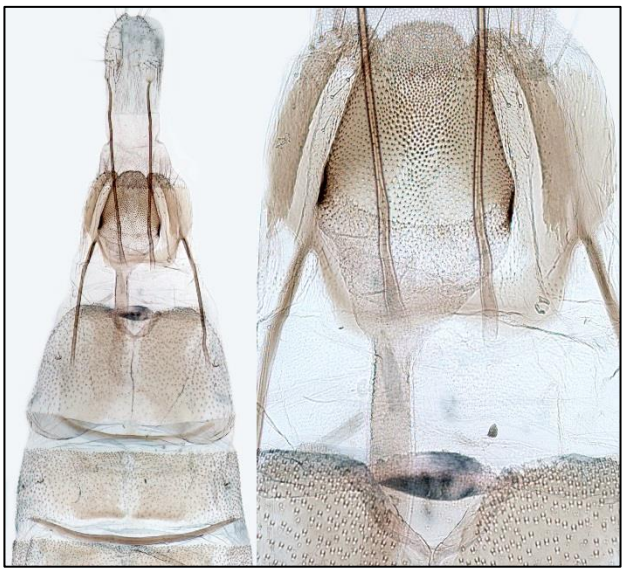

Figure 18 – *Haploscythris swartbergensis* sp. nov. Left: female genitalia; Right: sterigma enlarged. (holotype; slide: 2/21.xi.2017 KN).

funnel-shaped sclerotization. Ductus bursae thick, straight and evenly broad, more or less sclerotized, sclerotization gradually decreasing. Sternum VII subrectangular, 1.25 times wider than high, with V-shaped medioposterior indentation; a shallow oval flap medioposteriorly at middle; anterior margin widely concave, anterolateral corners round. Apophyses anteriores 0.9 × length of apophyses posteriores.

Figure 19 – *Haploscythris vredendalensis* Bengtsson, 2014. Left: male genitalia; Right: abdominal segment VIII (above: sternum; below: tergum). (slide 4/20.iii.2018 KN).

Diagnosis. *H. swartbergensis* sp. nov. is easily confused with several other species of the genus on its external appearance, and examination of the genitalia is required for confident determination. It may be separated externally by a more intensive dark suffusion of the forewings, giving an impression of flat greyish ground colour. The male genitalia of *H. swartbergensis* resemble those of *H. vredendalensis* Bengtsson, 2014 (Fig. 19), but differ from those in details, such as a medially swollen distal arm of the gnathos, a longer and apically less widened phallus, much shorter apical parts of appendixes with triangular extension at right one, distally hood-shaped valvae without extensions at dorsal margins, and distinctly longer basal lobes of the juxta. In the female genitalia the shape of the sterigma is diagnostic.

Habitat. The specimens were discovered in a semi-arid valley in the northern foothills of the Groot Swartberg Mountains on the southern edge of the Karoo (Fig. 6). The moth is nocturnal and comes to light. Immature stages are unknown.

Distribution. South Africa (Western Cape Province).

Etymology. The species name refers to the type locality, the Swartberg Mountains, located in the eastern part of the Western Cape Province.

Remarks. The DNA barcode sequence (COI) of *H. swartbergensis* (n=1) differs by a minimum distance of 4.27 % from *H. vredendalensis* (n=1), which is considered its closest relative on the basis of similar structures of the male and female genitalia.

***Scythris curtiphallus* sp. nov.** (Fig. 20)
urn:lsid:zoobank.org:act:B09DCD33-0538-44F6-9894-C35361C32292

Type material. Holotype (♂), labeled: ”South Africa, Northern Cape prov.; 32°10′S 21°46′E; Nuweveld Mts, 1245 m; Oukloof pass, 1.xii.2016; K. Nupponen & R. Haverinen leg. [white label]”, ”prep. no.; 1/15.iv.2017; K. Nupponen [white label]”, “DNA sample; KN01008; Lepid. phyl. [green label]”, “HOLOTYPE; *Scythris curtiphallus*; K. Nupponen [red rectangle label]” (NUPP/FMNH).

Figure 20 – Adult male of *Scythris curtiphallus* sp. nov. (holotype).

Description (Fig. 20). Wingspan 12.5 mm. Head, collar, neck tuft and thorax beige, head slightly darker than collar. Haustellum cream. Scape brown, ventral hairscales paler. Flagellum brown, 0.7 × length of forewing. Labial palp: segment I cream, II and III beige mixed with a few brown and cream scales. Legs: femur cream, tibia and tarsus brown, except hind leg tibia cream; hind leg tibia covered by long hairscales dorsally. Abdomen pale beige dorsally, anterior margin of each segment glossy grey; white ventrally. Forewing narrow, monochromatic beige, pattern absent. Hind wing pale fuscous.

Male genitalia (Fig. 21). Uncus robust, bifurcate; prongs

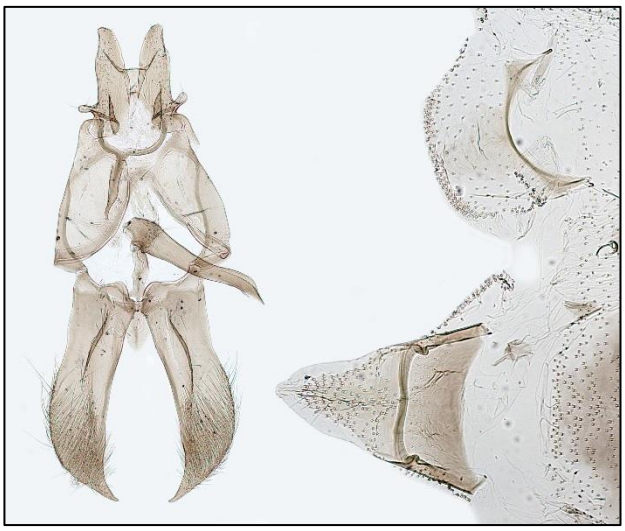

Figure 21 – *Scythris curtiphallus* sp. nov. Left: male genitalia; Right: abdominal segment VIII (above: tergum; below: sternum). (holotype; slide 1/15.iv.2017 KN).

parallel and stout, tip slightly bent outwards, each prong with longitudinal flap from base to 0.4, and digitate basal projection. Gnathos with basal loop, distal arm straight, apical quarter tapered, tip slightly enlarged. Valva robust; basal 0.8 of even width and straight, with a longitudinal median ridge from 0.1 to 0.6; distal 0.2 tapered and bent inwards, apex pointed; proximal third bristled. Phallus 0.75 × length of valva, almost straight and uniformly broad, apically tapered and slightly bent, tip pointed. Sternum VIII subtriangular, lateral and posterior margins reinforced; posteriorly a large triangular projection. Tergum VIII subrectangular, anterior margin widely incurved, posterior margin shallowly convex.

Female genitalia. Unknown.

Diagnosis. Externally *S. curtiphallus* sp. nov. can be confused with several pale and unicolorous scythrid ids. Narrow forewings may help to identify the moth, but examination of the genitalia is required for confident determination (see also Remarks below). The structure of the male genitalia of *S. curtiphallus* is similar to that of *S. aciella* Bengtsson, 1997 and *S. digitibasella* K. Nupponen & Saldaitis, 2013, but differ in details. The uncus lobes are of medium length, broad and distally diverging in *curtiphallus*; long, narrow and straight in *digitibasella*; short, robust and bent inwards in *aciella*. Tip of the valva is evenly tapered and bent inwards in *curtiphallus*; rapidly tapered with nipple-like extension at middle in *digitibasella*; a ventrad elongate projection with slightly bent apex in *aciella*. Length of the phallus is about 0.75 × length of valva in *curtiphallus* and *digitibasella*, as the ratio is distinctly larger (1,05) in *aciella*. Posterior projection of sternum VIII is rather long in *curtiphallus*, a little longer in *aciella*, and distinctly shorter in *digitibasella*; *curtiphallus* and *aciella* may not be separable by that character.

Habitat. The holotype was discovered in a semi-arid rocky pass in the Karoo (Fig. 12). The moth is nocturnal and comes to light. Immature stages are unknown.

Distribution. South Africa (Northern Cape Province).

Etymology. Lat. *curtus* = short. The species name alludes to a short phallus in the male genitalia, one of the diagnostic characters separating the new species from its allopatric sibling *S. aciella*.

Remarks. *S. curtiphallus* sp. nov. forms a species complex with *S. aciella* and *S. digitibasella*. The latter two taxa were tentatively placed in the heterogeneous *pascuella* species-group (Bengtsson, 1997; Nupponen & Saldaitis, 2013). However, there are several details in the genitalia common for the three species, which do not coincide with species in the *pascuella* species-group, these being (a) basal projections of the uncus, (b) absence of furcation in the posterior margin of sternum VIII, and (c) an apically distinctly tapered and pointed phallus. Thus, placement of the three species in the *pascuella* species-group is somewhat doubtful.

Externally *S. curtiphallus* is easy to separate from *S. digitibasella*, which is almost patternless too, but much darker. *S. aciella* is an externally variable species (Nupponen, 2013), and the available material is insufficient to decide whether it is separable from the former two taxa on external characters alone. The DNA barcodes reveal distinct K2P divergences between the three taxa: *S. curtiphallus* – *S. aciella* 9.01 %, *S. curtiphallus* – *S. digitibasella* 7.77 %, and *S. aciella* – *S. digitibasella* 6.75 %. *S. aciella*, *S. curtiphallus* and *S. digitibasella* are considered allopatric species. *S. aciella* occurs in a wide area on the border between Palaearctic and Afrotropical regions, from Tunisia eastwards to Oman. *S. curtiphallus* is restricted to South Africa, and *S. digitibasella* is endemic to the island of Socotra.

***Scythris kgalagadica* sp. nov.** (Fig. 22)
urn:lsid:zoobank.org:act:9259CED2-AA60-4547-822F-FF046BD4815E

Type material. Holotype (♂), labeled: ”South Africa, Northern Cape prov.; 26°31′S 20°36′E; Twee Rivieren 5 km SSW, 900 m; Kgalagadi Lodge, 26.xi.2016; K. Nupponen & R. Haverinen leg. [white label]”, ”prep. no.; 1/21.ii.2017; K. Nupponen”, “DNA sample; KN01000; Lepid. phyl. [green label]”, ”HOLOTYPE; *Scythris kgalagadica*; K. Nupponen [red rectangle label]” (NUPP/FMNH). Paratypes (4 ♂♂, 3 ♀♀): 1 ♀, same collecting data as the holotype; 4 ♂♂, 2 ♀♀, same locality as the holotype but 29.i.2016. Genitalia slides: K. Nupponen prep. no. 3/23.xi.2017 (♂), 1/27.iv.2017 (♀), 3/20.xi.2017 (♀). One genitalia preparation preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00999, KN01011, KN01012 (NUPP).

Description (Fig. 22). Wingspan 12.5 mm. Head, collar, neck tuft, haustellum and thorax monochromatic cream-white. Scape cream-white; in female a fuscous patch dorsally. Flagellum in male cream-white basally, otherwise brown in both sexes, 0.75 × length of forewing. Labial palp cream-white, second segment longer than third one. Fore leg: upper surface of femur and tarsus fuscous mixed with white, otherwise white; tibia brown, mixed basally with white. Middle leg and hind leg white, except tips of apical spurs and distal quarter of tarsus brown. Abdomen in male

Figure 22 – Adults of *Scythris kgalagadica* sp. nov. (above: male, holotype; below: female, paratype).

pale fuscous dorsally, glossy white ventrally; in female whitish fuscous laterally, white ventrally, pale ochreous dorsally, except segments I and II whitish fuscous. Forewing ivory, in male monochromatic, in female suffused with fuscous at costal third; indistinct fuscous spots below fold at 0.45 and 0.6, and at cell end; fringes pale fuscous, a little darker than wing. Hind wing whitish fuscous.

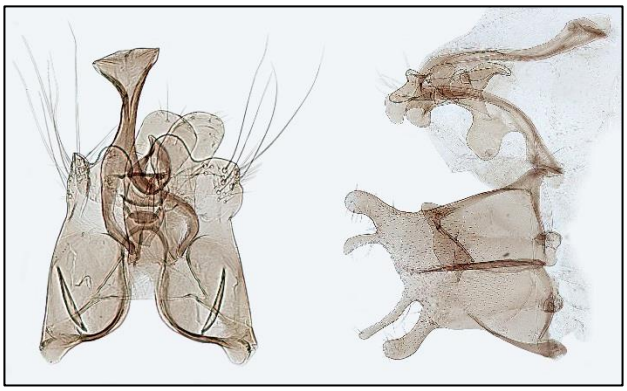

Figure 23 – *Scythris kgalagadica* sp. nov. Left: male genitalia; Right: abdominal segment VIII (above: tergum; below: sternum). (holotype; slide 1/21.ii.2017 KN).

Male genitalia (Fig. 23). Uncus two large, basally fused and slightly diverging lobes. Gnathos large; from basal loop a straight and distally triangularly extended arm. Tegumen broad, with semicircular posterior extensions, and setose posterolateral bulges representing valvae. Phallus short and thick, distally tapered and bent, tip more or less pointed. Sternum VIII a subquadrangular asymmetrical plate with longitudinal median fold; posterolaterally two robust clavate projections, and two further thin projections of different lengths posteriorly; at middle of plate a subrectangular asymmetrical flap on right side; anterolateral corners elongated, anteriorly two parallel round projections. Tergum VIII complex and strongly asymmetrical, basically subtriangular; one lateral side with subrectangular extension; distal half difficult to interpret, consists of about five projections of different shape and size, partly fused to each other.

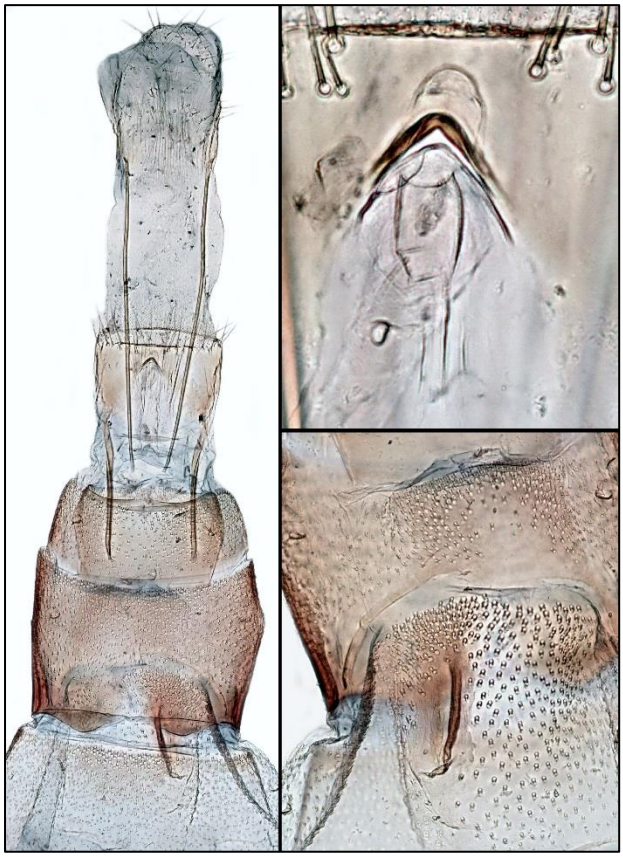

Figure 24 – *Scythris kgalagadica* sp. nov. Left: female genitalia; Right: sterigma enlarged (above): longitudinal sclerotization of tergum V (below). (paratype; slide: 3/20.xi.2017 KN).

Female genitalia (Fig. 24). Sterigma a weakly sclerotized plate with posteriorly reinforced medial invagination; posterior sclerotization with labiate flap. Ostium small, situated at ′bottom′ of invagination. Antrum anteriorly swollen, champagne glass shaped, then thin and straight, weakly sclerotized. Sternum VII rectangular, 1,75 times wider than high. Sternum VI twice higher than sternum VII, quadrangular, sclerotized, anterior margin with pair of flat bulges. Tergum V with sclerotized longitudinal incision at middle. Apophyses anteriores 0.35 × length of apophyses posteriores.

Diagnosis. *S. kgalagadica* sp. nov. is sexually dimorphic: forewings of the male are monochromatic, while those of the female are distinctly suffused with fuscous at costal third. The species is easily confused on external characters with several other medium-sized scythridids, eg. *S. sericiella* Bengtsson, 2014, *S. aratrella* Bengtsson, 2014 and *S. kavangensis* Bengtsson, 2014. Examination of the genitalia is required for confident determination. The male genitalia of *S. kgalagadica* are typical for species in the *abyanensis* species-group, but readily separated from those of the other described taxa in many details, such as a large

and triangularly extended tip of the gnathos, and a characteristic shape of the abdominal segment VIII. In the female genitalia, the shape of the anterior part of the antrum, and particularly a sclerotized longitudinal incision in tergum V, are characteristic. The female genitalia resemble those of *S. pulveratella* Bengtsson, 2014, but the latter lacks a longitudinal incision in tergum V. Externally the two species cannot be confused. See also Remarks.

Habitat. The species inhabits deserts of the southern Kalahari (Fig. 25). The moth is nocturnal and comes to light. Immature stages are unknown.

Figure 25 – Habitat of *Scythris kgalagadica* sp. nov., *S. nigrispersa* Meyrick, 1918 and several other scythridids: dry savanna near Twee Rivieren in the southern Kalahari, Northern Cape Prov., South Africa. (Image: K. Nupponen).

Distribution. South Africa (Northern Cape Province).

Etymology. The species name refers to the collecting site near the Kgalagadi Transfrontier Park, a large National Park located in the southern Kalahari.

Remarks. *S. kgalagadica* sp. nov. belongs to the *abyanensis* species-group, established by Bengtsson (2014). Even though males of the taxon are externally different from females, they were confirmed to be conspecific by the DNA barcodes, which are identical.

***Scythris sippolai* sp. nov.** (Fig. 26)
urn:lsid:zoobank.org:act:DABDFC82-8D66-4ABC-AE26-D3B1F8351988

Type material. Holotype (♂), labeled: ”South Africa, Northern Cape prov.; 31°22′S 19°01′E; Bokkeveld Mts., Vanrhyn′s Pass; Nieuwoudtville 9 km W, 755 m; 2.ii.2016; K. Nupponen & R. Haverinen leg. [white label]”, ”prep. no.; 1/29.xi.2017; K. Nupponen [white label]”, “DNA sample; KN00998; Lepid. phyl. [green label]”, ”HOLOTYPE; *Scythris sippolai*; K. Nupponen [red rectangle label]” (NUPP/FMNH). Paratype: 1 ♂, same collecting data as the holotype. Genitalia slide: K. Nupponen prep. no. 1/19.iv.2017. DNA sample (Lepid. Phyl., green label): KN00997 (NUPP).

Description (Fig. 26). Wingspan 11–11.5 mm. Head, collar, neck tuft, haustellum, scape and thorax fuscous, more or less mixed with dirty white. Flagellum brown, 0.75

Figure 26 – Adult male of *Scythris sippolai* sp. nov. (holotype).

× length of forewing. Labial palp: segment I white; II brown, upper surface scattered and posterior tip covered by white; III brown mixed with white. Legs brown, more (femur and tibia) or less (tarsus) mixed with dirty white. Abdomen lead grey dorsally; dirty white ventrally, mixed with fuscous basally. Forewing fuscous scattered with white; at middle of fold a dark brown spot restricted to white dashes basally and distally; small dark brown spot at cell end; apical area covered by whitish dark tipped scales; fringes fuscous, darkest at apex. Hind wing pale fuscous.

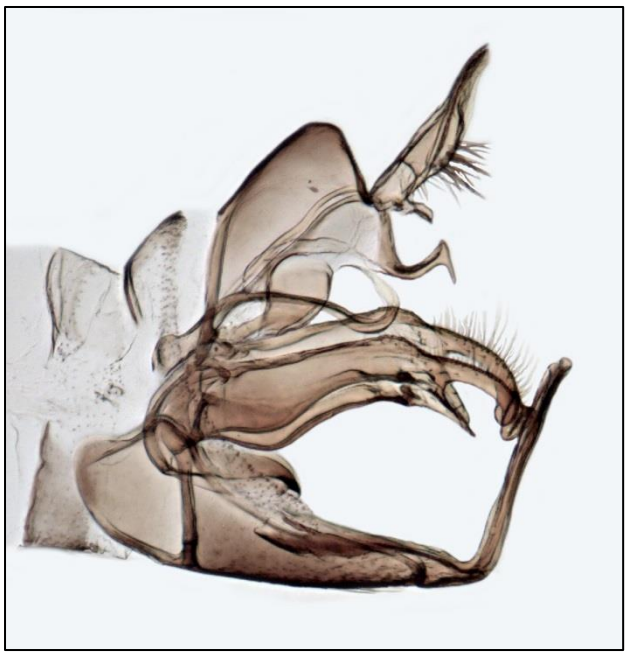

Figure 27 – Male genitalia (lateral view) of *Scythris sippolai* sp. nov. (holotype; slide 1/29.xi.2017 KN).

Male genitalia (Figs 27 & 28). Uncus large, bilobed; lobes broad and subbasally bristled. Gnathos slightly curved upwards, broad basally, at middle strongly tapered, tip bent downwards and pointed; subapically a small semicircular dorsal flap. Valva almost straight and evenly broad, basal half with a wide ventral flap; distal half of ventral margin with two blunt extensions at 0.75 and 0.85, apex tapered and pointed downwards; costal margin with a large and robust, bent projection subapically with enlarged tip. Phallus 0.65 × length of valva, rather thin, somewhat enlarged basally, then evenly broad and slightly bent, distally recurved. Vinculum rectangular. Sternum VIII subtrapezoid, posteriorly with two long, claviform and

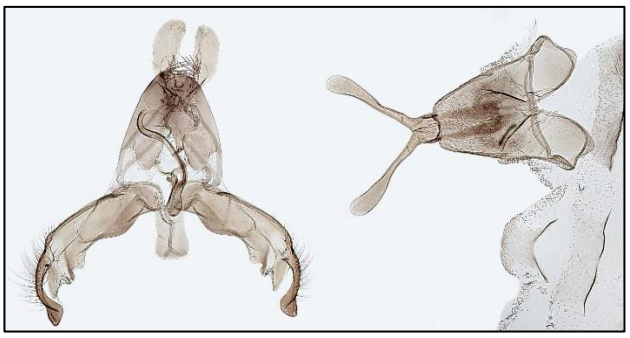

Figure 28 - *Scythris sippolai* sp. nov. Left: male genitalia; Right: abdominal segment VIII (above: sternum; below: tergum). (paratype; slide 1/19.iv.2017 KN).

diverging projections; *in situ* the projections are directed 90˚ upwards (those of *S. cooperi* Bengtsson, 2014 and *S. valvaerimella* are only shallowly upcurved). Tergum VIII much smaller than sternum VIII, subtrapezoid, anteriorly concave.

Female genitalia. Unknown.

Diagnosis. S. sippolai sp. nov. is placed in the *exsoluta* species-group, on the basis of genitalic characters defined by Bengtsson (2014). It is a sibling species of *S. valvaerimella* Bengtsson, 2014. The two taxa are difficult to separate from each other externally. In the male genitalia of *S. sippolai*, diagnostic characters are large lobes of the uncus, and details in the valva: a robust and distally enlarged subapical projection, a wide ventral flap at basal half, and absence of mid-ventral notch.

Habitat. The species was discovered below vertical cliffs in the margin between coastal lowland and the Karoo plateau (Fig. 29). The moth is nocturnal and comes to light. Immature stages are unknown.

Figure 29 – Habitat of *Scythris sippolai* sp. nov.: cliffs on Vanrhyn′s Pass in the margin between coastal lowland and the Karoo plateau, Northern Cape Prov., South Africa. (Image: K. Nupponen).

Distribution. South Africa (Northern Cape Province).

Etymology. The species is dedicated to Leo Sippola, a Finnish lepidopterist.

Remarks. *S. sippolai* sp. nov. belongs to the *exsoluta* species-group, established by Bengtsson (2014).

***Scythris vaalamoi* sp. nov.** (Fig. 30)
urn:lsid:zoobank.org:act:EAF54708-8767-47C4-9F09-A01BACC0B53E

Type material. Holotype (♂), labeled: ”South Africa, Northern Cape prov.; 29°03′S 17°06′E; Richtersveld distr., 305 m; near Lekkersing village; 28.xi.2016; K. Nupponen & R. Haverinen leg. [white label]”, ”HOLOTYPE; *Scythris vaalamoi*; K. Nupponen [red rectangle label]” (NUPP/FMNH). Paratypes (10 ♂♂, 2 ♀♀): 9 ♂♂ 2 ♀♀, same data as holotype; 1 ♂, South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 27.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia slides: K. Nupponen prep. no. 2/21.ii.2017 (♂), 3/16.iv.2017 (♀). DNA samples (Lepid. Phyl., green label): KN01001, KN01002; (NUPP).

Figure 30 – Adult male of *Scythris vaalamoi* sp. nov. (holotype).

Description (Fig. 30). Wingspan 11.5–14.5 mm. Head, collar, neck tuft, haustellum, scape and thorax brown. Flagellum dark brown, 0.7 × length of forewing. Labial palp: upper surface cream, otherwise brown with a few darker scales. Legs brown, femur paler than tibia and tarsus; upper surface more (femur and tibia) or less (tarsus) mixed with dirty white. Abdomen fuscous dorsally; white ventrally, in female mixed with ochreous. Forewing brown, dorsal area and apical third with scattered dirty white scales; blackish brown spots dorsally at 0.35, subdorsally at 0.4 and in fold at 0.5, forming incomplete oblique fascia; small spot of same colour at cell end, and few black scales apically at cilia; fringes brown, at dorsum darker than forewings, paler at apex; more or less distinct separate small blackish brown spot apically. Hind wing fuscous.

Male genitalia (Fig. 31). Uncus broad, subtriangular. Gnathos base hood-shaped; distal arm thorn-like, tip bent downwards and pointed. Valva long and rather narrow; basal 0.8 straight, at middle slightly extended ventrally; at 0.8 bent 90°; distal 0.2 digitate, pointing downwards, apex blunt; numerous bristles beyond middle at costa. Phallus 0.65 × length of valva, almost straight, basal half evenly broad, distally tapered. Sternum VIII subtrapezoid, posteriorly deeply incurved, projections parallel and narrow; anteriorly a wide semicircular incurvation. Tergum VIII subrectangular, 1.5 times wider than high; posterior corners semicircularly extended, anterior margin shallowly concave.

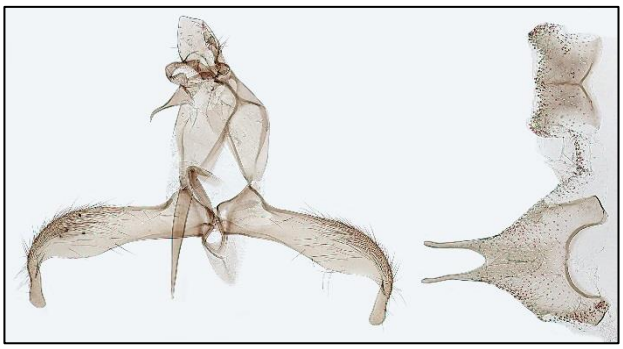

Figure 31 – *Scythris vaalamoi* sp. nov. Left: male genitalia; Right: abdominal segment VIII (Above: tergum; Below: sternum). (paratype; slide 2/21.ii.2017 KN).

Figure 32 – Female genitalia of *Scythris vaalamoi* sp. nov. (paratype; slide 3/16.iv.2017 KN).

Female genitalia (Fig. 32). Sterigma rather large, heart-shaped, medially membranous. Ostium wide, anteriorly edged by funnel-like sclerotization. Ductus bursae thin, rather distinct. Sternum VII rectangular, 1.4 times wider than high, medioposteriorly with large round flap. Apophyses anteriores 0.75 × length of apophyses posteriores.

Diagnosis. Externally *S. vaalamoi* sp. nov. is easily separated from the other scythridids of the same size by the narrow brown forewing, with a conspicuous although incomplete oblique fascia, and distinct blackish spots at cell end and in fringe at apex. The male genitalia of *S. vaalamoi* are typical for the *valvaearcella* species-group, and readily separated from those of its closest relatives, *S. cooperi* Bengtsson, 2014 and *S. durbanensis* Bengtsson, 2014 by the valvae, which are pointed downwards distally at a right angle, and without lateral flap. The female genitalia of *S. vaalamoi* resemble those of several other species, especially *S. claudioculella* Bengtsson, 2014 and species in the *kebirella* species-group, but the large round flap attached to posterior margin of sternum VII is diagnostic. Females of most species in the *valvaearcella* species-group are unknown, and comparison therefore impossible.

Habitat. The species inhabits semi-arid rocky hills and slopes in the northern Succulent Karoo (Fig. 11). The moth is nocturnal and comes to light. Immature stages are unknown.

Distribution. South Africa (Northern Cape Province).

Etymology. The species is dedicated to Kari Vaalamo, a Finnish entomologist.

Remarks. *S. vaalamoi* sp. nov. belongs to the *valvaearcella* species-group, established by Bengtsson (2014).

Species with previously unknown males or females

Scythris claudioculella Bengtsson, 2014

Material. South Africa, Northern Cape prov., 32°10′S 19°58′E, 585 m, Tankwa Karoo, 2 ♂♂ 28.i.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 4 ♂♂ 1.ii.2016, 18 ♂♂ 2 ♀♀ 27.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 2 ♂♂ 1 ♀ 24.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 31°22′S 19°01′E, 755 m, Bokkeveld Mts., Vanrhyn′s Pass, Nieuwoudtville 9 km W, 2 ♂♂ 30.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 32°55′S 19°30′E, 960 m, Swartruggens Mts., Ceres 55 km NNE, 2 ♀♀ 27.i.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 5 ♂♂ 3.xii.2016, K. Nupponen & R. Haverinen leg. Genitalia slides: K. Nupponen prep. no. 1/29.iv.2017 (♀), 2/27.iv.2017 (♂). Four genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00973, KN00974, KN00975.

Female genitalia (Fig. 33). Sterigma quadrangular, laterally sclerotized, medially more or less membranous. Antrum funnel-shaped, quite narrow. Ductus bursae somewhat sclerotized, evenly broad, posteriorly slightly furrowed. Sternum VII quadrangular; posterior margin medially incised; at ′bottom′ of incision a laterally

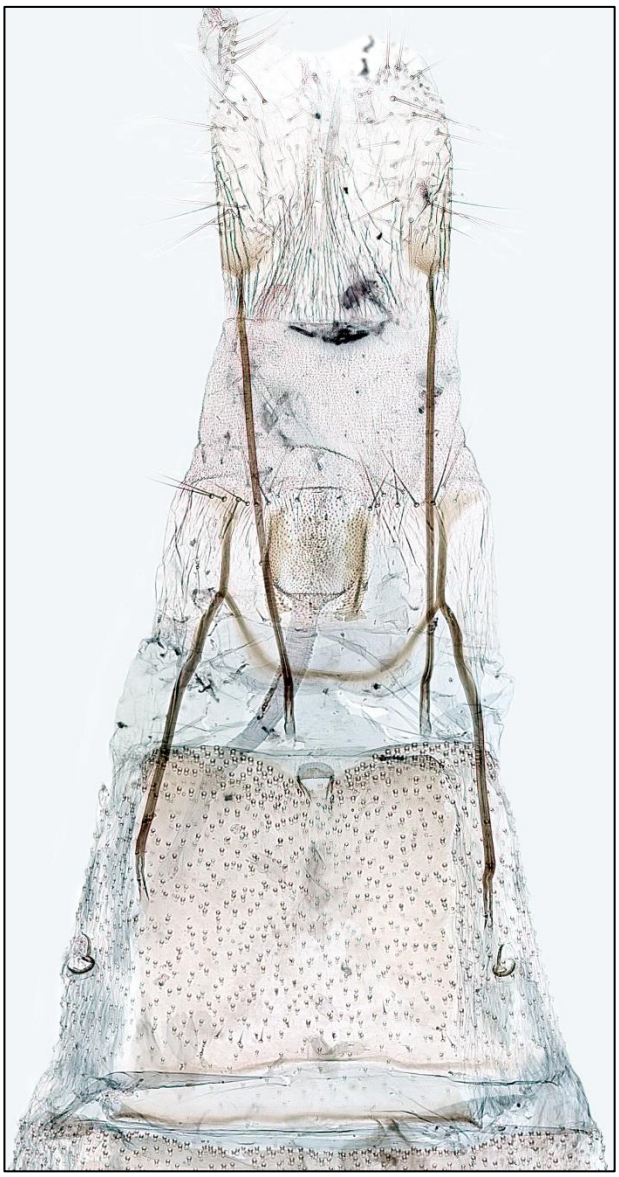

Figure 33 – Female genitalia of *Scythris claudioculella* Bengtsson, 2014 (slide 1/29.iv.2017 KN).

reinforced projection with labiate posterior flap. Apophyses anteriores 0.7 × length of apophyses posteriores.

Distribution. South Africa (Western & Northern Cape provinces).

Remarks. *S. claudioculella* was previously known from two males collected in 1927 and 1970. Indeed, the species is widely distributed in the Karoo. The hitherto unknown female genitalia of the species are illustrated and described for the first time. The female genitalia resemble those of *S. unciclavella* Bengtsson, 2014, but differ from those in details, such as a more ′open′ posterior part of the sterigma, a wider antrum, and a small medioposterior flap, and absence of medial hole in sternum VII.

Scythris potgieteri Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°03′S 17°06′E, 305 m, Rictersweld distr., near Lekkersing village, 3 ♂♂ 28.xi.2016, K. Nupponen & R. Haverinen leg.; Genitalia slide: K. Nupponen prep. no. 2/15.iv.2017. DNA samples (Lepid. Phyl., green label): KN01024, KN01025.

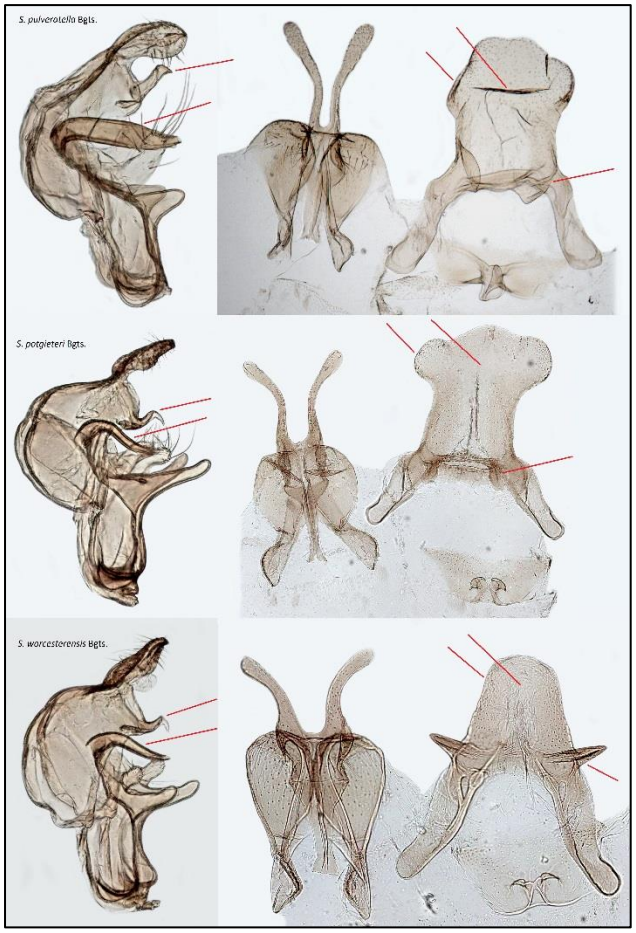

Figure 34 – Male genitalia (lateral view) and abdominal segment VIII of *Scythris* spp. Above: *S. pulveratella* Bengtsson, 2014 (slide 1/21.xi.2017 KN); Centre: *S. potgieteri* Bengtsson, 2014 (slide 2/15.iv.2017 KN); Below: *S. worcesterensis* Bengtsson, 2014 (slide 1/21.iv.2017 KN).

Male genitalia (Fig. 34). Uncus spatular and setose, wider than long. Gnathos with short basal loop; distal arm 0.6 × length of uncus, basally upcurved, distally bent 80˚ downwards and tapered, tip pointed. Valva digitate, as long as phallus, with elongate setose process basally. Phallus twice as long as gnathos arm, gradually tapered, basal half bent 90˚ downwards, distally almost straight. Vinculum anterolaterally with pair of round extensions. Sternum VIII complex, basically X-shaped; posterior shanks claviform, long and distally diverging; anterior shanks ventrally straight, dorsally convex; at middle a large roundish plate, and parallel processes with basal flaps. Tergum VIII subrectangular with large, robust, diverging and digitate anterolateral processes; posterolaterally on each side large and slightly asymmetrical semicircular extensions, transverse sclerotization between them absent; anteriorly a transverse reinforcement with parallel labiate processes. Tergum VII with an extra sclerite of variable shape.

Distribution. South Africa (Western & Northern Cape provinces).

Remarks. First record from the Northern Cape Province. The type series of *S. potgieteri* consists of two females collected in 1968. The present material includes only males, and the determination is based on the external resemblance to *S. pulveratella* Bengtsson, 2014, as well as a conspicuous similarity of the male genitalia between the two species (see Bengtsson 2014). The male genitalia of *S. potgieteri* are illustrated and described for the first time.

The male genitalia of *S. potgieteri* are confusingly similar to those of *S. pulveratella* and particularly *S. worcesterensis* (Fig. 34). The diagnostic characters between the three taxa are found in the phallus, the gnathos arm, and tergum VIII. *S. pulveratella* is readily separated from the two other species by the thick and straight phallus and gnathos arm, and tergum VIII with a distinct transverse subposterior sclerotization (absent in *potgeteri* and *worcesterensis*) and large but weakly sclerotized anterolateral processes.

S. potgieteri differs from *S. worcesterensis* by a slightly more curved phallus, a distally less bent gnathos arm; and tergum VIII with large posterolateral extensions (absent in *worcesterensis*), transverse anterior reinforcement with labiate processes (in *worcesterensis* reinforcement is absent), and absence of lateral processes (in *worcesterensis* a robust lateral process on each side). The aforesaid morphological differences are well supported by the DNA barcodes, which reveal distinct K2P divergences between the three taxa: *S. potgieteri – S. worcesterensis* 5.91 %, *S. potgieteri – S. pulveratella* 6.06 %, and *S. worcesterensis – S. pulveratella* 6.40 %. The valvae of both *S. potgieteri* and *S. worcesterensis* vary in length, and they cannot be used as a diagnostic character.

Scythris worcesterensis Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 2 ♂♂ 1 ♀ 1.ii.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 32°10′S 21°46′E, 1245 m, Nuweveld Mts, Oukloof pass, 1 ♂ 1.xii.2016, K. Nupponen & R. Haverinen leg. Genitalia slides: K. Nupponen prep. no. 2/20.iv.2017 (♀), 1/21.iv.2017 (♂), 2/4.xii.2017 (♂), 3/4.xii.2017 (♂). DNA sample (Lepid. Phyl., green label): KN01026, KN01027.

Male genitalia (Fig. 34). Uncus spatulate and setose, wider than long. Gnathos with short basal loop; distal arm half length of uncus, basally shallowly upcurved, distally bent 90˚ downwards and tapered, tip pointed. Valva short, digitate, basally with elongate and sparsely setose process basally. Phallus twice as long as gnathos arm, gradually tapered, basal half bent 60˚ downwards, distally almost straight. Vinculum anterolaterally with pair of round extensions. Sternum VIII complex, basically X-shaped; posterior shanks claviform and bent outwards; anterior shanks ventrally straight, dorsally convex; at middle a large more or less roundish plate, and basally extended parallel processes. Tergum VIII subtrapezoid with large, robust, diverging and digitate anterolateral processes; posteriorly blunt without extensions and sclerotizations; transverse anterior reinforcement absent; laterally on each side a more or less flat sclerotized process. Tergum VII with an extra sclerite of variable shape.

Distribution. South Africa (Northern & Western Cape provinces).

Remarks. First record from the Northern Cape Province. The species was previously known only from the holotype female, collected in 1966. The male genitalia of *S. worcesterensis* are illustrated and described for the first time. The male is associated with the female of *S. worcesterensis* on the basis of the DNA barcodes, which are identical. For further information about differences between *S. worcesterensis* and closely related *S. potgieteri* and *S. pulveratella*, see remarks under *S. potgieteri* above.

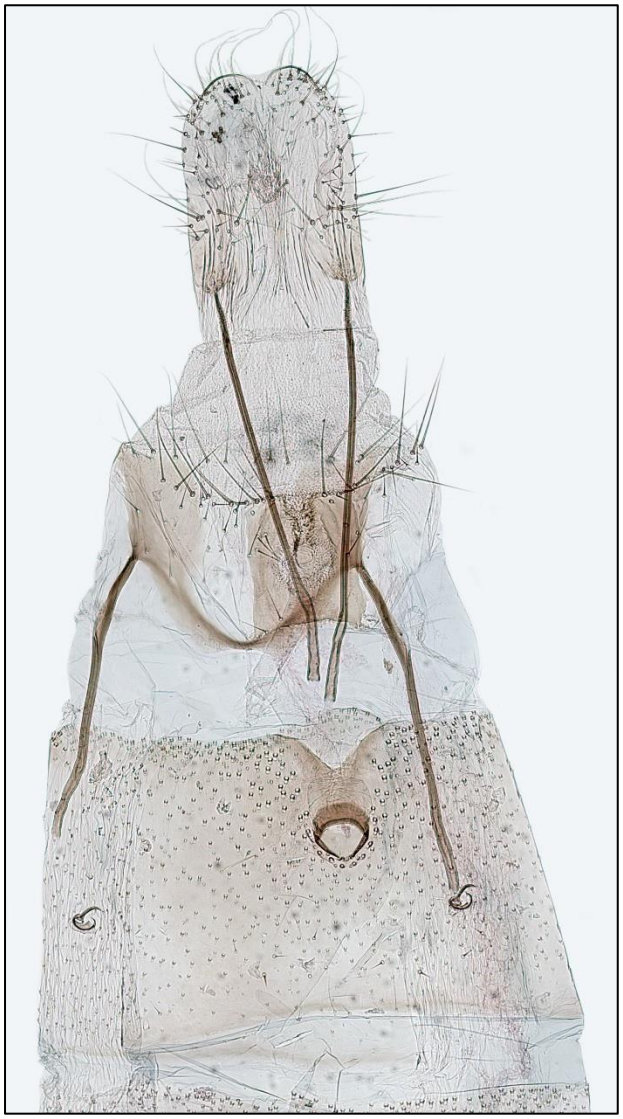

Figure 35 – Female genitalia of *Scythris unciclavella* Bengtsson, 2014 (slide 2/29.iv.2017 KN).

Scythris unciclavella Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 3 ♂♂ 1.ii.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 31°22′S 19°01′E, 755 m, Bokkeveld Mts., Vanrhyn′s Pass, Nieuwoudtville 9 km W, 1 ♂ 2.ii.2016, K.

Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 4 ♂♂ 1 ♀ 24.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 1 ♂ 27.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°41′S 17°53′E, 900 m, Springbok, 1 ♂ 29.xi.2016, K. Nupponen & R. Haverinen leg.; Genitalia slides: K. Nupponen prep. no. 2/29.iv.2017 (♀), 2/22.xi.2017 (♂). Three genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN01005, KN01006.

Female genitalia (Fig. 35). Sterigma quadrangular with medioposterior cleft. Ostium round, situated at middle of sterigma. Antrum funnel-shaped, quite narrow. Ductus bursae somewhat sclerotized, rather thin and evenly broad. Sternum VII rectangular, 1.4 times wider than high; medially beyond middle a round hole with reinforced borders, and somewhat sclerotized area extends to a medially incised posterior margin. At medioposterior incision a labiate flap. Apophyses anteriores 0.8 × length of apophyses posteriores.

Distribution. South Africa (Northern Cape Province).

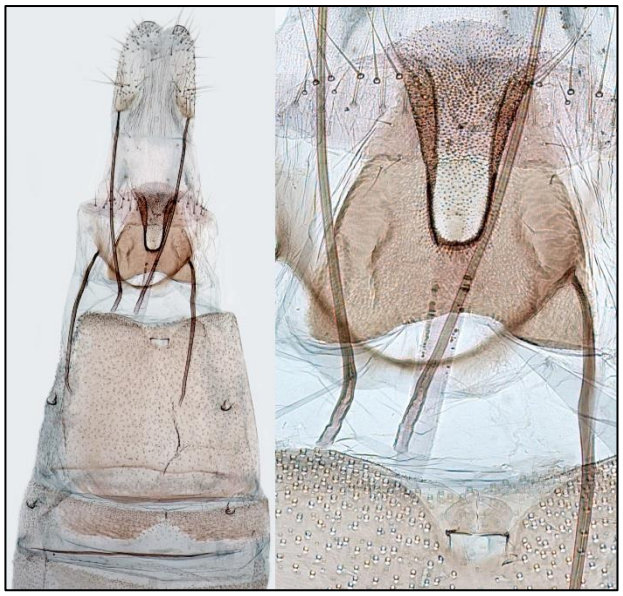

Figure 36 – *Scythris exsoluta* Meyrick, 1920. Left: female genitalia; Right: sterigma enlarged. (slide: 2/23.xi.2017 KN).

Remarks. The type series of *S. unciclavella* consists of four males collected during 2002–2008. The female genitalia of the species are illustrated for the first time. The female genitalia resemble those of *S. claudioculella* Bengtsson, 2014, but differ from those in details (see remarks under *S. claudioculella* above).

Scythris exsoluta Meyrick, 1920

Material. South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 5 ♂♂ 1 ♀ 3.xii.2016, K. Nupponen & R. Haverinen leg. Genitalia slides: K. Nupponen prep. no. 1/22.xi.2017 (♂), 2/23.xi.2017 (♀). Two genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00988, KN00989.

Female genitalia (Fig. 36). Sterigma subtrapezoidal; anterior margin medially widely concave; medioposteriorly a deep U-shaped incision with narrow lateral flaps. Ostium oval, situated at middle of sterigma, laterally and anteriorly reinforced. Ductus bursae somewhat sclerotized, rather thin and evenly broad. Sternum VII quadrangular; posterior margin medially incurvate with small labiate flap. Apophyses anteriores 0.7 × length of apophyses posteriores.

Distribution. South Africa (Western Cape Province).

Remarks. S. exsoluta was previously known from three males. The female genitalia of the species are illustrated for the first time. In the female genitalia the shape of the sterigma is diagnostic.

ANNOTATED SCYTHRIDIDAE RECORDS FROM WESTERN SOUTH AFRICA AND NAMIBIA

The species are listed alphabetically in generic and specific order. The known distribution of each species is given.

Apostibes deckerti Bengtsson, 2014

Material. Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 1 ♀ 21.i.2017, A. Selin leg. Genitalia slide: K. Nupponen prep. no. 3/26.xi.2017.

Distribution. Kenya, Namibia, Yemen.

Apostibes halmyrodes (Meyrick, 1921)

Material. South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 15 exx. 29.i.2016, 4 exx. 30.i.2016, 27 exx. 25.xi.2016, 129 exx. 26.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 7 exx. 24.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 1 ♂ 1.ii.2016, K. Nupponen & R. Haverinen leg.; Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 1 ♀ 21.i.2017, A. Selin leg. Four genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00958, KN00959.

Distribution. Malawi, Namibia, South Africa, Zimbabwe.

Haploscythris albifuscella Bengtsson, 2014

Material. South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 3 ♂♂ 1 ♀ 3.xii.2016, K. Nupponen & R. Haverinen leg. Three genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00981, KN00982, KN00983.

Distribution. South Africa (Northern & Western Cape provinces).

Remarks. First record from the Western Cape Province.

Haploscythris brachiohirsutella Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 2 ♂♂ 24.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°03′S 17°06′E, 305 m, Rictersweld distr., near Lekkersing village, 2 ♂♂ 28.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 2/20.iii.2018. Three genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00985, KN00986.

Distribution. South Africa (Northern Cape Province).

Haploscythris canispersa (Meyrick, 1913)

Material. South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 10 ♂♂ 1 ♀ 24.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 1 ♀ 25.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 7 ♂♂ 3 ♀♀ 27.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°03′S 17°06′E, 305 m, Rictersweld distr., near Lekkersing village, 4 ♂♂ 1 ♀ 28.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°41′S 17°53′E, 900 m, Springbok, 8 ♂♂ 4 ♀♀ 29.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 3 ♂♂ 1.ii.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 1 ♂ 3.xii.2016, K. Nupponen & R. Haverinen leg. Two genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00946, KN00947, KN00948.

Distribution. South Africa (Northern & Western Cape provinces).

Remarks. According to Bengtsson (2014), the identity of *Scythris canispersa* Meyrick, 1913 has not been fully clarified. The neotype of *canispersa* was selected and illustrated by Bengtsson (2014). The present material perfectly matches the neotype, both externally and in the genitalia.

Haploscythris chloraema (Meyrick, 1887)

Material. South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 1 ♂ 24.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 2 ♂♂ 1 ♀ 25.xi.2016, 24 ♂♂ 24 ♀♀ 26.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°41.408′S 17°53.022′E, 900 m, Springbok, 1 ♂ 29.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 32°10′S 21°46′E, 1245 m, Nuweveld Mts, Oukloof pass, 2 ♂♂ 3 ♀♀ 1.xii.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 1 ♂ 3.xii.2016, K. Nupponen & R. Haverinen leg. Five genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00950, KN00951, KN00952.

Distribution. Botswana, Namibia, South Africa (Northern & Western Cape provinces).

Haploscythris eberti Bengtsson, 2014

Material. South Africa, Northern Cape prov., 32°10′S 19°58′E, 585 m, Tankwa Karoo, 2 ♂♂ 28.i.2016, K. Nupponen & R. Haverinen leg. One genitalia preparation preserved in glycerol. DNA sample (Lepid. Phyl., green label): KN01009.

Distribution. Namibia, South Africa (Northern & Western Cape provinces).

Haploscythris kuboosensis Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 1 ♀ 24.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 31°22′S 19°01′E, 755 m, Bokkeveld Mts., Vanrhyn′s Pass, Nieuwoudtville 9 km W, 1 ♂ 2.ii.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 25 ♂♂ 3.xii.2016, K. Nupponen & R. Haverinen leg. Genitalia slides: K. Nupponen prep. no. 3/20.iii.2018 (♂), 4/25.iii.2018 (♂), 2/26.iii.2018 (♂), 1/30.iii.2018 (♀), 2/6.iv.2018 (♂). Four genitalia preparations preserved in glycerol. DNA sample (Lepid. Phyl., green label): KN00937.

Distribution. South Africa (Northern & Western Cape provinces).

Remarks. First record from the Western Cape Province. The type series of *H. kuboosensis* consists of two males and one female, collected in 1933 and 1958.

Haploscythris valvaecrinitus Bengtsson, 2014

Material. South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 1 ♀ 25.xi.2016, K. Nupponen & R. Haverinen leg. South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 1 ♂ 3.xii.2016, K. Nupponen & R. Haverinen leg. Two genitalia preparations preserved in glycerol. DNA sample (Lepid. Phyl., green label): KN01015.

Distribution. Namibia, South Africa (Northern & Western Cape provinces), Zimbabwe.

Haploscythris vansoni Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 1 ♀ 24.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 1 ♂

25.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°03′S 17°06′E, 305 m, Rictersweld distr., near Lekkersing village, 1 ♂ 28.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 1 ♂ 1 ♀ 3.xii.2016, K. Nupponen & R. Haverinen leg. Genitalia slides: K. Nupponen prep. no. 3/25.iii.2018 (♀), 1/25.iii.2018 (♂), 3/30.iii.2018 (♂). DNA samples (Lepid. Phyl., green label): KN00943, KN00944.

Distribution. Namibia, South Africa (Northern & Western Cape provinces).

Haploscythris vredendalensis Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 1 ♂ 24.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia preparation preserved in glycerol. DNA sample (Lepid. Phyl., green label): KN00996.

Distribution. Namibia, South Africa (Northern & Western Cape provinces).

Remarks. First record from the Northern Cape Province. The species was previously known from four males and one female, collected in 1927 and 2008.

Haploscythris vulturoides Bengtsson, 2014

Material. South Africa, Northern Cape prov., 32°10′S 19°58′E, 585 m, Tankwa Karoo range, 1 ♂ 28.i.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 47 ♂♂ 26 ♀♀ 3.xii.2016, K. Nupponen & R. Haverinen leg. Four genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00953, KN00954, KN00955.

Distribution. Namibia, South Africa (Northern & Western Cape provinces).

Scythris accumulata Meyrick, 1914

Material. Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 17 ♂♂ 10 ♀♀ 21.i.2017, A. Selin leg. One genitalia preparation preserved in glycerol.

Distribution. Namibia, South Africa, Zimbabwe.

Scythris anaecapitella Bengtsson, 2014

Material. South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 1 ♂ 26.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 2/16.iv.2017. DNA sample (Lepid. Phyl., green label): KN01013.

Distribution. Namibia, South Africa (Northern Cape Province).

Scythris bernardi Bengtsson, 2014

Material. Namibia, Khomas district, 23°16′58”S 16°28′12”E, 1720 m, Windhoek–Solitor 110 km, 1 ♂ 30.i.2017, A. Selin leg. Genitalia preparation preserved in glycerol.

Distribution. Namibia.

Scythris bicalamella Bengtsson, 2014

Material. Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 1 ♀ 21.i.2017, A. Selin leg. Genitalia preparation preserved in glycerol.

Distribution. Namibia.

Scythris bontebokensis Bengtsson, 2014

Material. South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 3.xii.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 1/16.iv.2017. DNA sample (Lepid. Phyl., green label): KN01004.

Distribution. South Africa (Western Cape Province).

Remarks. The species was previously known only from the holotype, collected in 2000.

Scythris brevimanubriella Bengtsson, 2014

Material. South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 3 ♂♂ 1 ♀ 3.xii.2016, K. Nupponen & R. Haverinen leg. One genitalia preparation preserved in glycerol. DNA sample (Lepid. Phyl., green label): KN01007.

Distribution. Namibia, South Africa (Western Cape Province).

Scythris calciflua Meyrick, 1921

Material. Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E 18 ♂♂ 6 ♀♀ 21.i.2017, A. Selin leg.; Namibia, Khomas district, 23°16′58”S 16°28′12”E, 1720 m, Windhoek–Solitor 110 km, 4 ♂♂ 30.i.2017, A. Selin leg. Genitalia preparation preserved in glycerol.

Distribution. Mozambique, Namibia, South Africa, Zimbabwe.

Scythris camelella Walsingham, 1907

Material. South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 1 ♂ 2 ♀♀ 29.i.2016, 3 ♀♀ 26.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 2 ♂♂ 2 ♀♀ 1.ii.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 31°22′S 19°01′E, 755 m, Bokkeveld Mts., Vanrhyn′s Pass, Nieuwoudtville 9 km W, 1 ♂ 2.ii.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 21 ♂♂ 11 ♀♀ 3.xii.2016, K. Nupponen & R. Haverinen leg.; Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 8 ♂♂ 1 ♀ 21.i.2017, A. Selin leg. Genitalia slide: K.

Nupponen prep. no. 1/3.xii.2017 (♂). One genitalia preparation preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00961, KN00962.

Distribution. Palaearctic Region: Afghanistan, Algeria, Egypt, Iran, Jordan, Pakistan, Syria, Tunisia; Afrotropical Region: Kenya, Namibia, South Africa, Sudan, Yemen.

Remarks. The interpretation of different organs in the male genitalia is incorrect in the earlier literature (see Bengtsson, 1997, 2014), probably due to the fact that impression of the genitalia on a slide is misleading. To clarify the situation, a three-dimensional ventral view of the male genitalia is presented in Fig. 37.

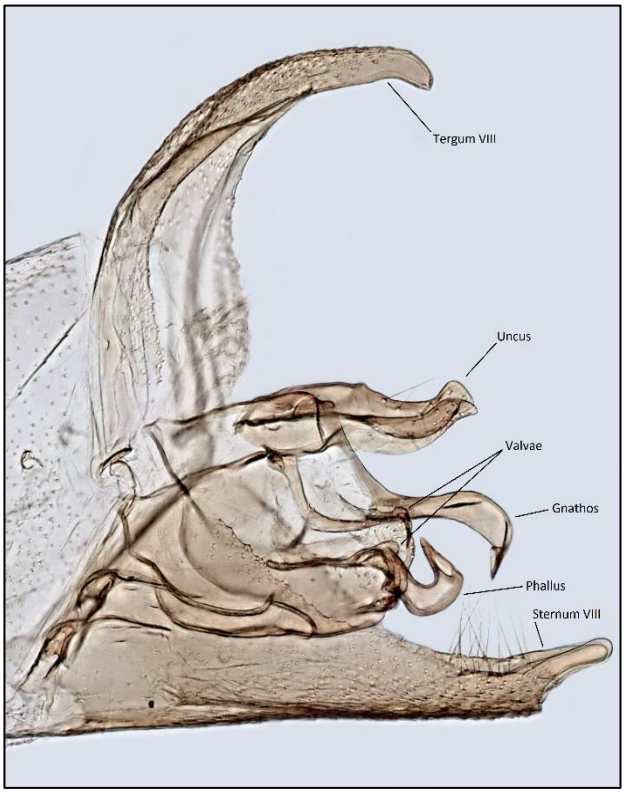

Figure 37 – Male genitalia (lateral view) of *Scythris camelella* Walsingham, 1907 (slide 1/3.xii.2017 KN).

Scythris clemens Meyrick, 1921

Material. Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 2 ♂♂ 2 ♀♀ 21.i.2017, A. Selin leg. Genitalia slides: K. Nupponen prep. no. 1/26.xi.2017 (♂), 2/26.xi.2017 (♀).

Distribution. Mozambique, Namibia.

Remarks. New for Namibia. There are minor differences in the male genitalia of the Namibian specimen (Fig. 38), compared to those illustrated by Bengtsson (2014) from South Africa (Pretoria). The differences are considered to represent intraspecific variation.

Scythris cooperi Bengtsson, 2014

Material. South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 1 ♂ 3.xii.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K.

Figure 38 – *Scythris clemens* Meyrick, 1921. Left: male genitalia; Right: abdominal segment VIII (above: tergum; below: sternum). (slide 1/26.xi.2017 KN).

Nupponen prep. no. 2/3.xii.2017. DNA sample (Lepid. Phyl., green label): KN01014.

Distribution. South Africa (Eastern & Western Cape provinces).

Remarks. First record from the Western Cape Province. The species was previously known only from the holotype, collected in 1939.

Scythris eburnella Bengtsson, 2014

Material. South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 1 ♀ 26.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 2/21.iv.2017.; Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E 1 ♂ 21.i.2017, A. Selin leg. DNA sample (Lepid. Phyl., green label): KN00995.

Distribution. Namibia, South Africa (Northern Cape Province).

Remarks. New to South Africa. The species was previously known from two specimens, collected in 1992 from SE Namibia, about 150 km to the northwest from the collecting site of the present South African specimen.

Scythris eburnipterella Bengtsson, 2014

Material. South Africa, Northern Cape prov., 32°10′S 19°58′E, 585 m, Tankwa Karoo range, 5 ♂♂ 1 ♀ 28.i.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 32°10.701′S 21°46.905′E, 1245 m, Nuweveld Mts, Oukloof pass, 1 ♂ 1.xii.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 3 ♂♂ 3.xii.2016, K. Nupponen & R. Haverinen leg. Seven genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00979, KN00980.

Distribution. Namibia, South Africa (Northern & Western Cape provinces).

Scythris etoshensis Bengtsson, 2014

Material. Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 1 ♂ 21.i.2017, A. Selin leg. Genitalia preparation preserved in glycerol.

Distribution. Namibia.

Scythris fonticola Meyrick, 1921

Material. South Africa, Northern Cape prov., 32°10′S 19°58′E, 585 m, Tankwa Karoo range, 4 ♂♂ 28.i.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 4 ♂♂ 25.xi.2016, 4 ♂♂ 26.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 8 ♂♂ 27.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°41′S 17°53′E, 900 m, Springbok, 2 ♂♂ 1 ♀ 29.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 11 ♂♂ 3.xii.2016, K. Nupponen & R. Haverinen leg.; Namibia, Khomas district, 23°16′58”S 16°28′12”E, 1720 m, Windhoek–Solitor 110 km, 1 ♂ 30.i.2017, A. Selin leg. Five genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00965, KN00966.

Distribution. Namibia, South Africa (Northern & Western Cape provinces).

Scythris geminella Bengtsson, 2014

Material. South Africa, Northern Cape prov., 25°25′S 20°35′E, 955 m, Kalahari desert, 4 ♂♂ 1 ♀ 31.i.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 9 ♂♂ 29.i.2016, 2 ♂♂ 1 ♀ 25.xi.2016, 2 ♂♂ 26.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 1/4.iii.2017. One genitalia preparation preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00969, KN00970.

Distribution. Namibia, South Africa (Northern Cape Province).

Scythris griseella Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°03′S 17°06′E, 305 m, Rictersweld distr., near Lekkersing village, 1 ♀ 28.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 1/23.xi.2017. DNA sample (Lepid. Phyl., green label): KN00987.

Distribution. South Africa (Northern Cape Province).

Remarks. The species was previously known only from the type series, consisting of two males and one female collected in 1933 and 1979.

Scythris helskloofensis Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°03′S 17°06′E, 305 m, Rictersweld distr., near Lekkersing village, 1 ♂ 4 ♀♀ 28.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 1 ♀ 1.ii.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 4/20.iv.2017 (♀), 3/6.iv.2018 (♂). Two genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00990, KN00991.

Distribution. South Africa (Northern Cape Province).

Remarks. The species was previously known only from the type locality in the Richtersveld.

Scythris jamakensis Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 1 ♀ 1.ii.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 3/20.iv.2017. DNA sample (Lepid. Phyl., green label): KN01021.

Distribution. South Africa (Northern & Western Cape provinces).

Remarks. First record from the Northern Cape Province. The species was previously known only from the type locality.

Scythris justifica Meyrick, 1911

Material. Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 4 ♂♂ 21.i.2017, A. Selin leg.

Distribution. Botswana, Namibia, South Africa, Zimbabwe.

Scythris kalaharii Bengtsson, 2014

Material. South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 1 ♂ 29.i.2016, 1 ♂ 26.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 3/15.iv.2017. One genitalia preparation preserved in glycerol. DNA sample (Lepid. Phyl., green label): KN01016.

Distribution. South Africa (Northern Cape Province).

Remarks. The species was previously known only from the holotype, collected in 1958 in the same vicinity as the present specimens.

Scythris kavangensis Bengtsson, 2014

Material. Namibia, Caprivi district, 17°38′51”S 24°07′30”E, 970 m, Katima Mulilo, 1 ♂ 19.i.2017, A. Selin leg. Genitalia preparation preserved in glycerol.

Distribution. Namibia.

Scythris kebirella (Amsel, 1935)

Material. South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 6 exx. 24.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 1 ♂ 26.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 40 exx. 27.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°03′S 17°06′E, 305 m, Rictersweld distr., near Lekkersing village, 120 exx. 28.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°41′S 17°53′E, 900 m, Springbok, 16 exx. 29.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 32°10′S 21°46′E, 1245 m, Nuweveld Mts, Oukloof pass, 16 exx. 1.xii.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 33°17′S 22°28′E, 800 m, Groot Swartberg Mts., 82 exx. 3.xii.2016, K. Nupponen & R. Haverinen leg. Three genitalia preparation preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00956, KN00957.

Distribution. Palaearctic Region: Iran, Israel, Jordan, ”North Africa”, Oman, Pakistan, Saudi Arabia, UAE; Oriental Region: India; Afrotropical Region: Namibia, Sudan, South Africa, Yemen (Socotra).

Remarks. New to South Africa. *S. kebirella* is a widely distributed and abundant species in the Cape provinces.

Scythris krooni Bengtsson, 2014

Material. South Africa, Northern Cape prov., 31°22′S 19°01′E, 755 m, Bokkeveld Mts., Vanrhyn′s Pass, Nieuwoudtville 9 km W, 3 ♂♂ 2.ii.2016, 1 ♂ 30.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 33°38′S 19°05′E, 450 m, Wellington 7 km E, Bainskloof Pass, 3 ♂♂ 3.ii.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 34°19′S 18°59′E, 32 m, Kogelberg, 6 ♂♂ 22.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Western Cape prov., 34°20′S 18°50′E, 37 m, Pringle Bay, Hangklip, 1 ♂ 23.xi.2016, K. Nupponen & R. Haverinen leg.. Genitalia slide: K. Nupponen prep. no. 1/5.xii.2017. DNA samples (Lepid. Phyl., green label): KN00967, KN00968.

Distribution. South Africa (Northern & Western Cape provinces).

Remarks. S. krooni was the only scythridid species recorded in the Fynbos range during the two expeditions in 2016.

Scythris kruegeri Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 1 ♀ 1.ii.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 1/20.iv.2017. DNA sample (Lepid. Phyl., green label): KN01019.
Distribution. South Africa (Northern Cape Province).

Scythris latebrosa Meyrick, 1913

Material. Namibia, Caprivi district, 17°38′51”S 24°07′30”E, 970 m, Katima Mulilo, 3 ♂♂ 15 ♀♀ 19.i.2017, A. Selin leg.; Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 1 ♀ 21.i.2017, A. Selin leg. Genitalia preparation preserved in glycerol.

Distribution. Kenya, South Africa, Tanzania, Uganda, Zimbabwe.

Scythris magnipedella Bengtsson, 2014

Material. Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 1 ♂ 21.i.2017, A. Selin leg. Genitalia preparation preserved in glycerol.

Distribution. Namibia, South Africa.

Scythris messinensis Bengtsson, 2014

Material. South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 2 ♂♂ 26.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 1/7.xii.2017. One genitalia preparation preserved in glycerol. DNA sample (Lepid. Phyl., green label): KN01010.

Distribution. South Africa (Northern Cape Province, Limpopo Province).

Remarks. First record from the Northern Cape Province. The species was previously known only from the holotype, collected in 1954.

Scythris meyi Bengtsson, 2014

Material. South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 1 ♂ 29.i.2016, 1 ♂ 30.i.2016, 1 ♂ 25.xi.2016, 8 ♂♂ 1 ♀ 26.xi.2016, K. Nupponen & R. Haverinen leg.; Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 1 ♀ 21.i.2017, A. Selin leg. Five genitalia preparations preserved in glycerol. DNA sample (Lepid. Phyl., green label): KN00949, KN00977.

Distribution. Namibia, South Africa (Northern Cape Province).

Scythris nigrispersa Meyrick, 1918

Material. South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 1 ♂ 29.i.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 1/1.v.2017. DNA sample (Lepid. Phyl., green label): KN00976.

Distribution. South Africa (Northern Cape Province, Gauteng Province).

Remarks. First record from the Northern Cape Province. The species was previously known only from the holotype, collected by A.J.T. Janse in 1913 from Pretoria, where the

habitats have been strongly modified by urbanization since then.

Scythris paarlensis Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 1 ♂ 1.ii.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 2/7.xii.2017. DNA sample (Lepid. Phyl., green label): KN01018.

Distribution. South Africa (Northern & Western Cape provinces).

Remarks. The species was previously known from three specimens, collected in 1966 and 1997.

Scythris pulveratella Bengtsson, 2014

Material. South Africa, Northern Cape prov., 31°22′S 19°01′E, 755 m, Bokkeveld Mts., Vanrhyn′s Pass, Nieuwoudtville 9 km W, 5 ♂♂ 2.ii.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 1/21.xi.2017. One genitalia preparation preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN01022, KN01023.

Distribution. South Africa (Northern & Western Cape provinces).

Remarks. For further information on morphological and genetic differences between *S. pulveratella* and closely related species, see remarks under *S. potgieteri* above.

Scythris rivigera Meyrick, 1911

Material. South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 2 ♂♂ 1 ♀ 24.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 26°31′S 20°36′E, 900 m, Twee Rivieren 5 km SSW, Kgalagadi Lodge, 3 ♂♂ 1 ♀ 25.xi.2016, 23 ♂♂ 1 ♀ 26.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°37′S 17°56′E, 1075 m, Springbok 7 km ENE, 1 ♂ 27.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°03′S 17°06′E, 305 m, Rictersweld distr., near Lekkersing village, 1 ♂ 28.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 29°41′S 17°53′E, 900 m, Springbok, 8 ♂♂ 3 ♀♀ 29.xi.2016, K. Nupponen & R. Haverinen leg.; South Africa, Northern Cape prov., 32°10′S 21°46′E, 1245 m, Nuweveld Mts, Oukloof pass, 2 ♂♂ 1.xii.2016, K. Nupponen & R. Haverinen leg.; Namibia, Caprivi district, 17°38′51”S 24°07′30”E, 970 m, Katima Mulilo, 1 ♂ 19.i.2017, A. Selin leg.; Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E, 4 ♂♂ 2 ♀♀ 21.i.2017, A. Selin leg. Seven genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green label): KN00971, KN00972.

Distribution. Namibia, South Africa (Northern Cape Province), Yemen, Zimbabwe.

Scythris subconcurrens Bengtsson, 2014

Material. Namibia, Oshikoto district, 18°47′01”S 17°03′36”E, 1085 m, Etosha Pan E 2 ♂♂ 21.i.2017, A. Selin leg. One genitalia preparation preserved in glycerol.
Distribution. Namibia.

Scythris ugabensis Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°54′S 17°40′E, 333 m, Springbok 33 km SW, near Namaqua Nat.P., 3 ♂♂ 24.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 4/6.iv.2018. One genitalia preparation preserved in glycerol. DNA sample (Lepid. Phyl., green label): KN01003.

Distribution. Namibia, South Africa (Northern Cape Province).

Remarks. New to South Africa. The species was previously known from three specimens from NW Namibia.

Scythris valvaerimella Bengtsson, 2014

Material. South Africa, Northern Cape prov., 29°03′S 17°06′E, 305 m, Rictersweld distr., near Lekkersing village, 1 ♂ 28.xi.2016, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 3/3.xii.2017. DNA sample (Lepid. Phyl., green label): KN01020.

Distribution. South Africa (Northern Cape Province).

Remarks. The species was previously known only from the holotype, collected in 2000.

DISCUSSION

Despite increased efforts to study the Microlepidoptera of the southern part of the Afrotropical Region, the scythridid fauna of South Africa can be considered to be moderately poorly known. Including the research presented in this paper, altogether total of 134 species of the family Scythrididae are now known from the RSA. Of the 48 species recorded by the author, eight (17 %) were undescribed species. This corresponds well with results in similar habitats in arid regions of Central Asia and southern Siberia (Nupponen, 2009), where surveys using modern methods are seldom focused on the Microlepidoptera.

The scythridid fauna of the Karoo and southern Kalahari is very rich in species. In contrast, Scythrididae seem to be depauperate in the Fynbos, despite an exceptionally rich flora in the biome. During several nights of collecting, only a single scythridid species was recorded in the Fynbos, namely *S. krooni* Bengtsson, 2014. Possibly the climate of the Fynbos is unfavourable for Scythrididae, which generally prefer hot and dry habitats. The majority of scythridids in southern Africa are nocturnal, and not a single specimen was recorded during the day. This is typical for scythridids everywhere in deserts and corresponding areas with a xerothermic climate. In temperate regions, on the other hand, most scythridids are diurnal.

Although many species have a wide range, it is often fragmented. On the other hand, many localities rich in scythridids are unremarkable, and include roadsides, lodge backyards, and even dump pits, none of which entomologists find attractive. Habitat loss in the Karoo seems not to be a serious problem for scythridids on a wide scale as yet. Large areas of the Karoo are still unexplored, indicating that the scythridid fauna may be much more diverse than known presently.

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