

A revision of the genus *Microschismus* Fletcher, 1909 (Lepidoptera: Alucitidae)

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ABSTRACT

The genus *Microschismus* Fletcher, 1909 is revised for the first time. Four species are synonymised: *M. serricornis* Meyrick, 1914 is the junior synonym of *M. fortis* (Walsingham, 1881); *M. ctenias* Meyrick, 1911, *M. columella* Meyrick, 1927 and *M. cato* Meyrick, 1927 are the junior synonyms of *M. antennatus* Fletcher, 1909. Three species are described as new: *M. lenzi* sp. n. (Zimbabwe), *M. reginus* sp. n., *M. sterkfonteini* sp. n. (both South Africa). A new subfamily Microschisminae subfam. n. is established. The imago and genitalia of all type specimens are illustrated for the first time. The article contains brief descriptions of imagos of the known species and detailed descriptions of their genitalia. Identification keys based on the external characters of the imago and the male genitalia are provided.

KEYWORDS: Lepidoptera, Alucitidae, Microschisminae, *Microschismus*, many-plumed moths, revision, new subfamily, new species, new synonymies, Southern Africa, identification keys.

INTRODUCTION

The genus *Microschismus* was established by Fletcher (1909) on the basis of the following characteristics: the labial palpi are very long; and the splitting of blades on the forewings is not deep, barely reaching the middle of the wing. The first description of a representative of this genus belongs to Lord Walsingham, who included it in the genus *I* (Walsingham 1881). After Fletcher's allocation of the new genus and the description of the new species in his work (Fletcher 1909) all other new descriptions were made by Meyrick (1911, 1913, 1914, 1918, 1927). There were no changes or additions after these publications. The types have not been re-examined until recently, and their genital structures have not been investigated at all. We carried out a detailed revision of all existing material, including types, old material and our own collections. In this article we establish a new subfamily Microschisminae, describe three species new to science, and synonymise four previously described species.

This genus is known so far only from Southern Africa. Moths seem to be quite rare, with only a handful of specimens collected to date. Their biology is unknown. Moths fly from November to May, and occur mainly in bush and savannah.

MATERIAL AND METHODS

This work is based on the study of the type material stored in the Ditsong National Museum of Natural History (formerly the Transvaal Museum, Pretoria; TMSA), and the Hope Department of the Oxford University Museum of Natural History (Oxford, Great Britain; OXUM). In addition, we used material from the Natural History Museum (London; BMNH), the Museum für Naturkunde der Humboldt-Universität (Berlin, Germany; ZMHB) and our own collections from our expeditions to Southern Africa. Holotypes of newly described species are stored in the TMSA and BMNH. The paratypes

are in the museums mentioned above and in the private collection of P. Ustjuzhanin and V. Kovtunovich (CUK) (Russia; Novosibirsk & Moscow).

The preparation of genitalia slides is a necessary condition for the identification of Alucitidae. Normally, the abdomen is boiled in 10–15 % solution of potassium hydroxide until it becomes semitransparent. After this, it is rinsed thoroughly for permanent preparation and further identification. On the mount, genitalia are put in a small drop of Euparal after being rinsed in water and soaked in 100% ethanol. The mount then is covered with a cover glass. In case the genitalia structures are not well sclerotized, they are stained with Chlorazol Black to give greater contrast. A permanent preparation must desiccate for at least two weeks before it can be studied.

TAXONOMY

Family Alucitidae Leach, 1815

Subfamily **Microschisminae** subfam. n.

Type genus: *Microschismus* Fletcher, 1909.

Diagnosis: Size small to medium (11–23 mm). The forewings are split to the middle of the wing. The labial palpi are very long, 4–5× as long as than the eye diameter. In the male genitalia, the uncus is usually wide, with the entire apex and the valves narrow, with appendages on the lower edge of the bottom or the middle part. The aedeagus is slightly curved, usually without cornuti. In the female genitalia, the vaginal plate has a characteristic oval cut, the bursa copulartrix has no signa and the ductus is short tubular.

Remarks: The systematics of Alucitidae have not yet been investigated. There is no division into subfamilies. Many species are groundlessly placed in the same genus. For example, the genus *Alucita* L., 1758 includes 90 % of all species of the world many-plumed moths fauna, spread over all continents. There is no doubt that this classification does not give a true picture; it is obviously outdated and requires a thorough revision. At this stage we establish a new subfamily with characteristic differences from the Alucitinae, including the Palaearctic species of the genera *Alucita* and *Pterotopteryx* Hannemann, 1959. The other genera, recorded from the Australasian, Oriental and Neotropical regions, are not considered here and require thorough study.

The main criteria for erecting the new subfamily are very long palpi, forewings split only to their midlength, the entire apex of the uncus, and the presence of the vaginal plate with a characteristic oval cut in the female genitalia.

Genus *Microschismus* Fletcher, 1909

Microschismus: Fletcher 1909: 253. Type species: *Alucita fortis* Walsingham, 1881, by orig. des.
Macrembola Meyrick, 1909: 5. Type species: *Alucita fortis* Walsingham, 1881, by monotypy.

Microschismus antennatus Fletcher, 1909

Figs 1–12

Microschismus antennatus: Fletcher 1909: 253–254. Type loc.: Bothaville [Free State, South Africa].
Microschismus ctenias Meyrick, 1911: 222. Type loc.: 'Nggeleni' [Nggeleni, Eastern Cape, South Africa].

Syn. n.

Microschismus columella Meyrick, 1927: 373. Type loc.: Haenertsburg [Limpopo, South Africa]. **Syn. n.**
Microschismus cato Meyrick, 1927: 374. Type loc.: Mahuba's Kloof [Limpopo, South Africa]. **Syn. n.**

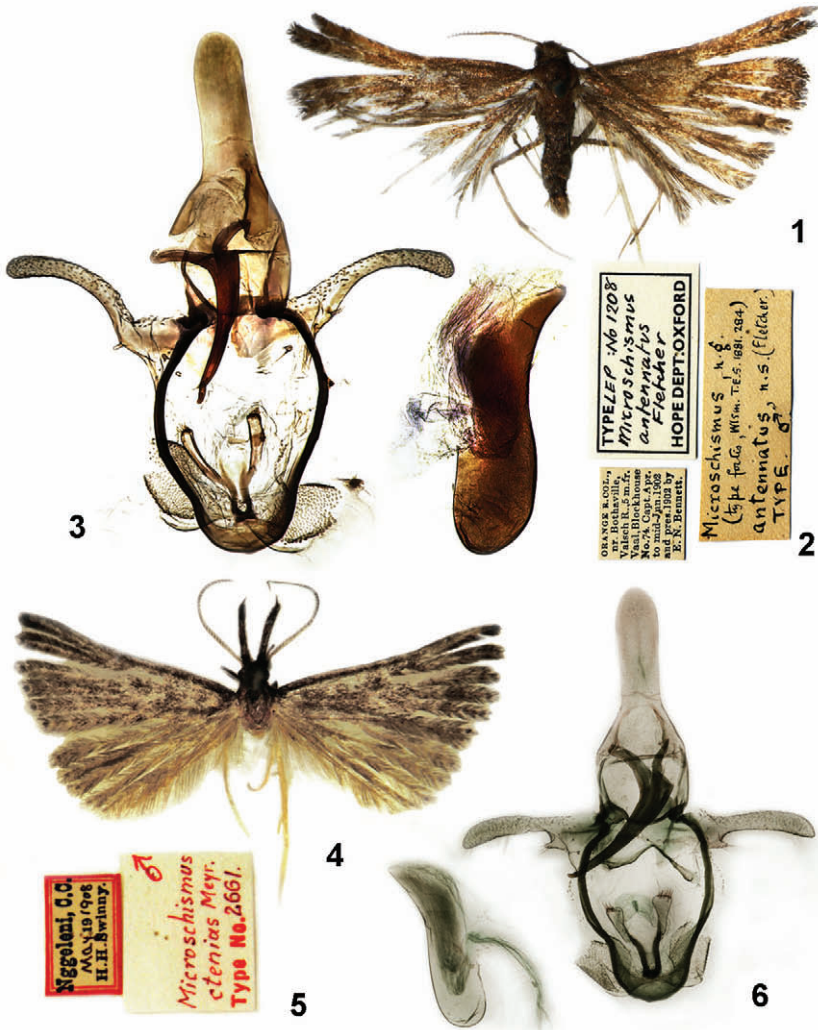
Redescription:

Male.

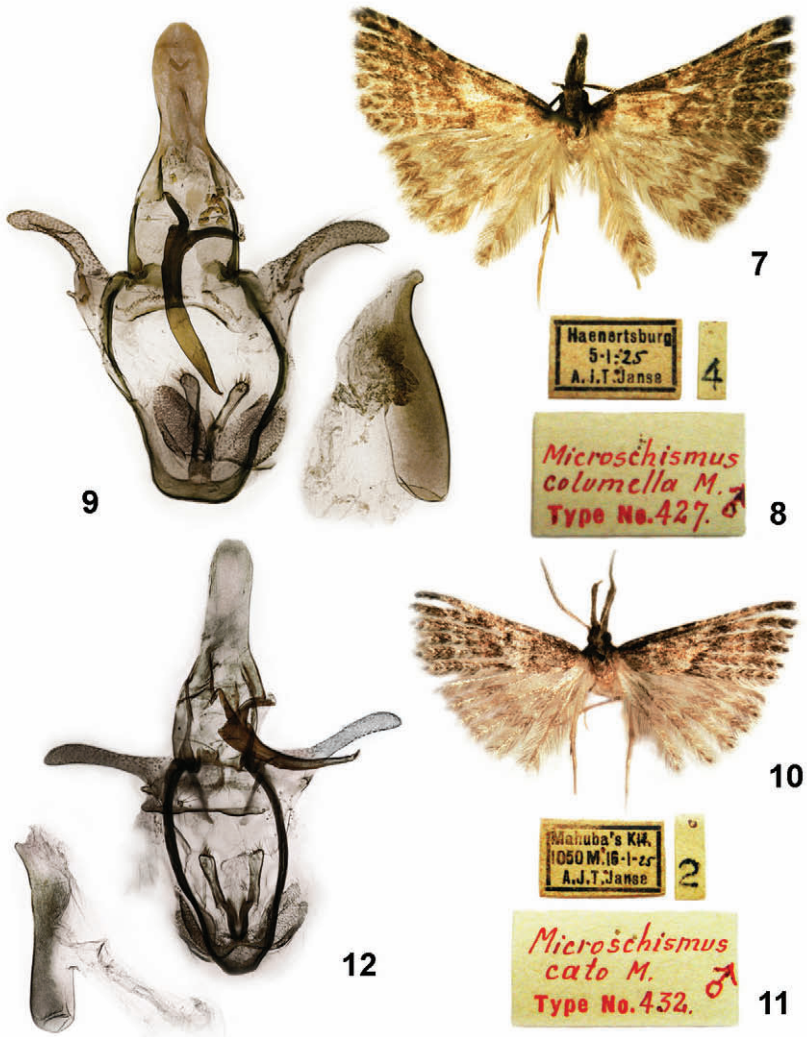
External characteristics: Moths grey-brown. Median dark brown slanted stroke on forewing poorly developed or absent. Wingspan 13–21 mm. Antennae ciliated.

Genitalia: Uncus wide along entire length, rounded at apex. Gnathos long and narrow, pointed towards apex. Valvae narrow, dangling towards apex. Appendage on valve short, located beyond its middle. Anellus branches quite long and straight. Outer edge of saccus rounded. Aedeagus concave on outer edge, apex slanted.

Female. Unknown.



Figs 1–6. *Microschismus antennatus* Fletcher, 1909: (1–3) holotype of *M. antennatus*: imago (1), label (2), male genitalia (3); (4–6) holotype of *M. ctenias*: imago (4), label (5), male genitalia (6).



Figs 7–12. *Microschismus antennatus* Fletcher, 1909: (7–9) holotype of *M. columella*: imago (7), label (8), male genitalia (9); (10–12) holotype of *M. cato*: imago (10), label (11), male genitalia (12).

Holotype *antennatus*: ♂ SOUTH AFRICA: *Free State*: nr Bothaville [27°23'S:26°36'E], iv–vi.1902, E.N. Bennett (OXUM, 1208).

Holotype *ctenias*: ♂ SOUTH AFRICA: *Eastern Cape*: Ngqeleni [31°40'S:29°02'E], v.1908, H.H. Swinny (TMSA, 2661).

Holotype *columella*: ♂ SOUTH AFRICA: *Limpopo*: Haenertsburg [23°57'S:29°57'E], 5.i.1925, A.J.T. Janse (TMSA, 427).

Holotype *cato*: ♂ SOUTH AFRICA: *Limpopo*: Mahuba's Kloof [?22°59'S:30°06'E], 1050 m, 16.i.1925, A.J.T. Janse (TMSA, 432).

Remarks: During comparison of the type specimens it was revealed that *M. ctenias*, *M. columella* and *M. cato* are identical to *M. antennatus* in their external features, as well as in the genitalia. As a result we regard these names as synonyms.

Microschismus cymatias Meyrick, 1918

Figs 13–16

Microschismus cymatias: Meyrick 1918: 35. Type loc.: Pretoria, South Africa.

Redescription:

External characteristics: Wings light grey with contrasting white bands. Hindwings lighter than forewings, almost white from base to middle. Female larger and darker than male. Wingspan 20–25 mm. Antennae simple.

Male genitalia: Uncus wide along entire length, with flat edge on apex. Gnathos long, narrow, pointed towards apex. Valves narrow and straight. Appendages on valves long, located at their bases. Anellus branches quite long and straight. Outer edge of saccus with cut in middle. Aedeagus flat on outer edge, apex slanted at an acute angle.

Female genitalia: Anal papillae narrow. Front apophyses thick and wavy; rear apophyses thick, slightly shorter than front. Vaginal plate with deep oval cut. Antrum short tubular. Smooth transition from ductus to oval bursa copulatrix.



Figs 13–16. *Microschismus cymatias* Meyrick, 1918: (13) holotype; (14) holotype label; (15) male genitalia, TMSA, 16043; (16) female genitalia, holotype, TMSA, 15965.

Holotype: ♀ SOUTH AFRICA: *Gauteng*: Pretoria [25°44'S:28°11'E], 4.iv.1914, A.J.T. Janse (TMSA, 431).
 Other material examined: SOUTH AFRICA: *Free State*: 1♂ Sasolburg [26°49'S:27°52'E], 27.ii.1970, D.M. Kroon (TMSA).

Microschismus fortis (Walsingham, 1881)

Figs 17–26

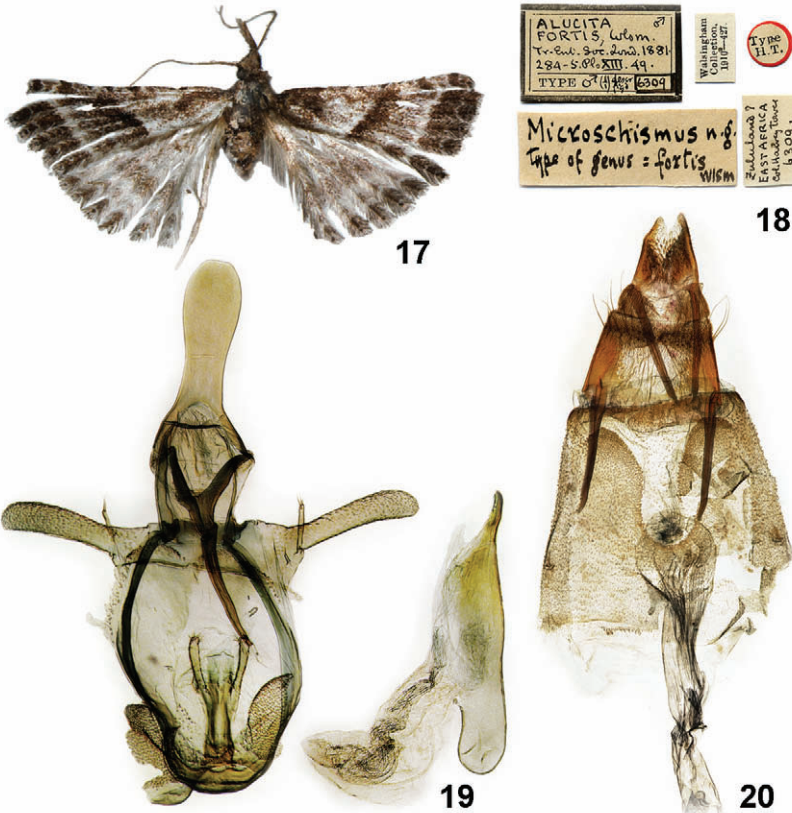
Alucita fortis Walsingham, 1881: 284. Type loc.: ?Zululand [South Africa].

Microschismus serricornis Meyrick, 1914: 187. Type loc.: Pretoria [South Africa]. **Syn. n.**

Redescription:

External characteristics: Moths grey-brown. Median dark brown slanted stroke well defined. Wingspan 15–23 mm. Antennae ciliated.

Male genitalia: Uncus wide along entire length, with flat edge on apex. Gnathos long and narrow, pointed towards apex. Valves quite narrow. Appendages on valves long, located at their bases. Anellus branches quite long and straight. Outer edge of saccus wide and rounded. Aedeagus quite wide, relatively flat on outer edge, apex slanted at acute angle.



Figs 17–20. *Microschismus fortis* (Walsingham, 1881): (17) imago, holotype; (18) holotype label; (19) male genitalia, ZMHB, 201111; (20) female genitalia, holotype, TMSA, 22880.



Figs 21–26. *Microschismus fortis* (Walsingham, 1881), syntypes of *M. serricornis* Meyrick, 1914: (21, 22) imago male and female; (23, 24) labels of male and female syntypes; (25) male genitalia, TMSA, 15971; (26) female genitalia, TMSA, 15972.

Female genitalia: Anal papillae narrow, elongated. Front apophyses thick and straight; equal in length to rear apophyses. Vaginal plate with deep oval cut. Antrum short tubular. Smooth transition from ductus to oval bursa copulatrix.

Remarks: Comparing the types *A. fortis* and *M. serricornis* in their external features, as well as in the genitalia, it was revealed that the latter is a junior synonym of the first.

Holotype *fortis*: ♀ SOUTH AFRICA: *KwaZulu-Natal*: “?Zululand, Col[onel]. Harvey Tower” (BMNH, 6309).

Syntypes *serricornis*: 1♂ 1♀ SOUTH AFRICA: *Gauteng*: Pretoria [25°44'S:28°11'E], 1&4.iv.1913, A.J.T. Janse (TMSA, 428, 429).

Other material examined: SOUTH AFRICA: *KwaZulu-Natal*: 1♂ Dragon Peaks Park [29°01'S:29°26'E], 9–12.xi.1993, Mey & Ebert (ZMHB).

***Microschismus lenzi* sp. n.**

Figs 27, 28

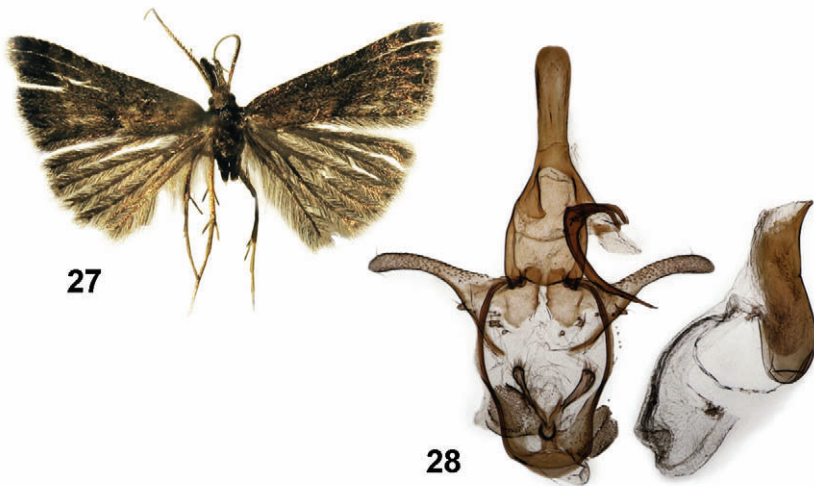
Etymology: The species is named in honour of Jurgen Lenz, a German lepidopterist who lives and works in Zimbabwe, and actively collecting Alucitidae and Pterophoridae.

Diagnosis: Externally, this new species is distinguished from all congeners by the dark (almost black) colour of the wings, and by the double pectinate antennae. In the male genitalia it is similar to *M. antennatus* in the shape of the saccus, gnathos and aedeagus, but can be easily distinguished by the shape of the anellus (its branches are widened towards the apex in the new species but are parallel-sided in *M. antennatus*) and the valves (supplementary appendages are developed at the very base in the new species, whereas they are situated above the base in *M. antennatus*).

Description:

Male.

External characteristics: Head, thorax and tegulae dark grey, almost black. Labial palpi also dark, very long, more than 5× as long as eye diameter. Antennae dark brown, double pectinate. Wingspan 12–17 mm (holotype, 17). Forewings dark brown, almost black. In distal part of wing all blades have a slanted, light grey, narrow band. Towards middle of wing, where splitting of blades ends, is a black contrasting band perpendicular to wing. Tops of all six blades of forewing terminated by distinct black spots. Hindwings plain, dark brown. Legs yellow.



Figs 27, 28. *Microschismus lenzi* sp. n., holotype: (27) imago; (28) male genitalia, BMNH, 22929.

Male genitalia: Uncus wide, slightly widened and rounded at apex. Gnathos narrow, long, pointed towards apex. Valves narrow. Appendage on valve short, located basally. Anellus branches straight, markedly expanded at top. Outer edge of saccus rounded. Aedeagus concave on outer edge in central part, apex slanted at an acute angle.

Female. Unknown.

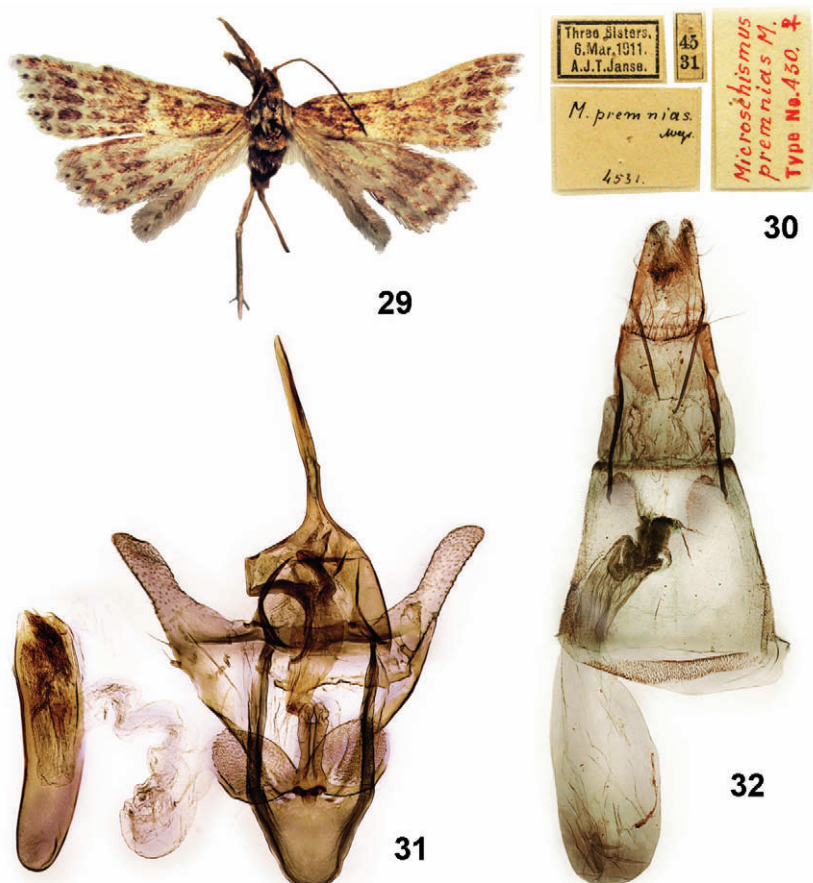
Holotype: ♂ ZIMBABWE: *Manicaland*: Bvumbe, Seldomseen Holliday cottages, 19°06'S:32°45'E, 1580 m, 12–14.iv.2011. V. Kovtunovich & P. Ustjuzhanin (BMNH, 22929).

Paratypes: ZIMBABWE: *Manicaland*: 12♂ same data as holotype (CUK, BMNH, TMSA); 1♂ Nyanga, Kwaraguza, 18°13'S:32°50'E, 2170 m, 13.iv.2011, J. Lenz (CUK).

Microschismus premnias Meyrick, 1913

Figs 29–32

Microschismus premnias: Meyrick 1913: 269. Type loc.: Three Sisters [Northern Cape, South Africa].



Figs 29–32. *Microschismus premnias* Meyrick, 1913, syntypes: (29) female imago; (30) its label; (31) male genitalia, TMSA, 15966; (32) female genitalia, TMSA, 15968.

Redescription:

External characteristics: Forewings brown, hindwings greyish brown. On fore- and hindwings, undermarginal bright band thin and winding. Outer band white, wide, located from second to fifth blade of forewings and on all blades of hindwings. Hindwings with middle thin, white, winding band. At cleft bases of both wings are dark dots bleached on the outside. Wingspan 16–21 mm. Antennae simple, cilia barely visible.

Male genitalia: Uncus wide along entire length, pointed towards apex. Gnathos wide and flattened, rounded towards apex. Valves short and narrow. Appendages on valves short, located basally. Anellus branches straight, with distinct peaks. Outer edge of saccus with rounded apex. Aedeagus wide, slightly concave at outer edge, with cornutus at apex.

Female genitalia: Anal papillae narrow, elongated. Front apophyses thick, straight. Rear apophyses thin, straight, a little shorter than front ones. Vaginal plate has deep oval cut. Antrum is short and wide. Ductus wide, with smooth transition to oval bursa copulatrix.

Syntypes: SOUTH AFRICA: ♀ *Northern Cape*: Three Sisters [31°53'S:23°05'E], 6.iii.1911, A.J.T. Janse (TMSA, no. 4531); ♂ *KwaZulu-Natal*: Pinetown [29°49'S:30°51'E], A.J.T. Janse" (TMSA).

***Microschismus reginus* sp. n.**

Figs 33, 34, 34a

Etymology: From Latin *regina* (queen).

Diagnosis. Externally, due to the light foreground of the wings, the new species is similar to *M. sterkfonteini*, but differs in the spotty colouring of the forewings and the absence of spots and bands on the hindwings, except for spots on the tops of the blades. In the male genitalia it is also similar to *M. sterkfonteini*, but can be easily distinguished by the presence of additional appendages at the bases of the valves, straight valves not pending to the apex and a differently shaped anellus.

Description:

Male.

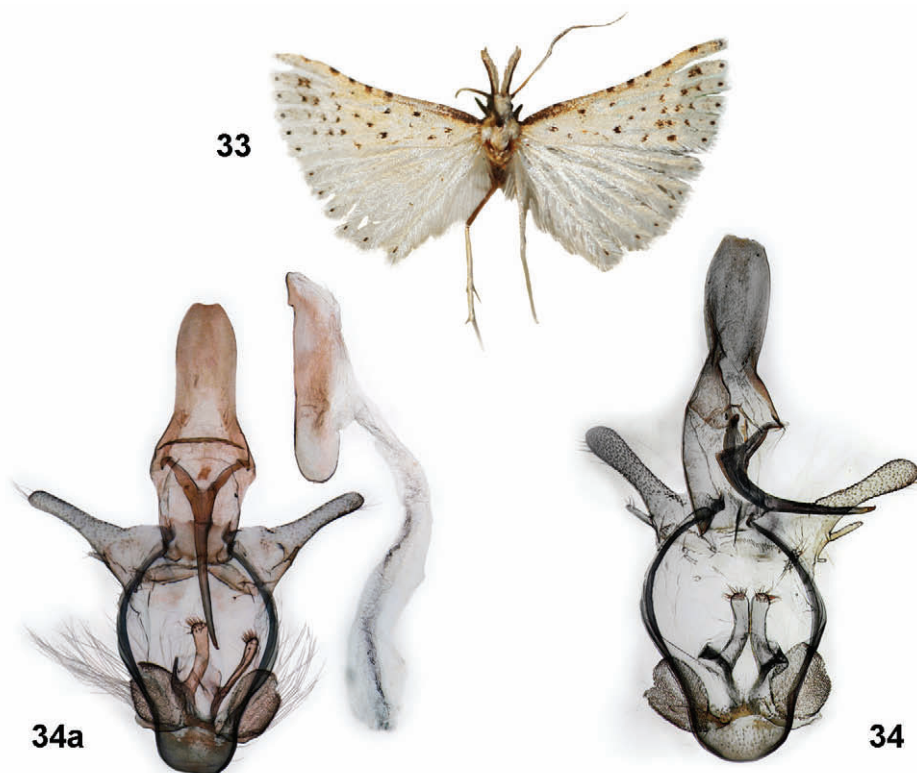
External characteristics: Head, thorax and tegulae white. Labial palpi white, brown only from the outside, 5 times as long as eye diameter. Antennae simple, light yellow. Wingspan 20 mm. Forewings white with dark brown spots. Costal edge of forewing with a series of dark brown spots, basal part distinctly brown. Tops of all six blades of forewing ended with distinct brown spots. Hindwings monochromatic white, with brown spot at top of each blade this spot elongated on sixth blade. Legs light yellow.

Genitalia: Uncus wide oval with flat edge at apex. Gnathos narrow, long, pointed towards apex. Valves quite narrow, slightly widening to apex. Basal part of valve with long appendage, with small appendages below. Anellus branches of uniform width, quite long, slightly concave. Outer edge of saccus rounded. Aedeagus straight along outer margin, with distinct projection near apex.

***Female.* Unknown.**

Holotype: ♂ SOUTH AFRICA: *Limpopo*: Gladde Klipkop [Gladdeklipkop, 24°09'S:29°29'E], 1–9.iii.1954, A.J.T. Janse (TMSA, 16032).

Paratypes: 2♂ SOUTH AFRICA: *Limpopo*: Nylstroom, Abba Game Lodge, 24°42'S:28°25'E, 1350 m, 16–17.iii.1998, G. Bassi (CUK, 079, 080).



Figs 33, 34, 34a. *Microschismus reginus* sp. n.: (33, 34) holotype imago and male genitalia, TMSA, 16032; (34a) male genitalia of a paratype.

Microschismus sceletias Meyrick, 1911

Figs 35–37

Microschismus sceletias: Meyrick 1911: 222. Type loc.: Woodb[ush]. Vill[age]. [Limpopo, South Africa].

Redescription:

Male.

External characteristics: Moths brown. Undermarginal bright band on forewings thin, winding; outer band distinct, wide, white, widening towards wing base; inner band thin, whitish. Similar bands on hindwings less marked. Wingspan 11–13 mm. Antennae simple, with barely visible cilia.

Genitalia: Uncus wide along entire length, rounded at apex. Gnathos narrow, long, pointed towards apex. Valves short and wide. Appendages at valves long, located in middle. Anellus branches quite short, strongly curved in middle part. Outer edge of saccus with cut. Aedeagus wide, concave at outer edge with well distinguished cornuti; apex is rounded.

Female. Unknown.

Holotype: ♂ SOUTH AFRICA: *Limpopo*: Woodbush Village [$23^{\circ}47'S; 30^{\circ}04'E$], 13.xii.1909, C.J. Swierstra (TMSA, no. 2662).



Figs 35–37. *Microschismus sceletias* Meyrick, 1911, holotype: (35) imago; (36) label; (37) male genitalia, TMSA, 15969.

***Microschismus sterkfonteini* sp. n.**

Figs 38–40

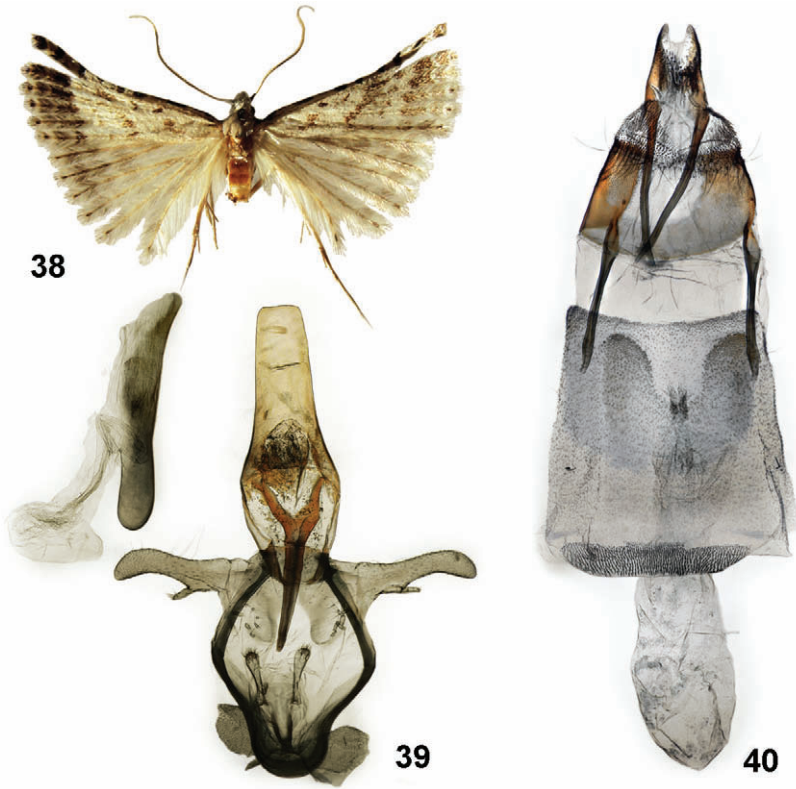
Etymology: From the type locality, Sterkfontein Dam in the Free State Province.

Diagnosis: Externally, due to the wing colour, the new species is slightly similar to *M. cymatias*, but differs markedly from the latter in the location of the bands, a lighter tone and the colour of the legs (the new species has pale yellow legs, *M. cymatias* has brown legs). In the male genitalia the shape of the valves, their appendages and the gnathos are similar to *M. fortis*, but *M. sterkfonteini* can be easily distinguished by the shape of the uncus, which has a flat apex, and the straight outer edge of the aedeagus.

Description:

External characters: Head, thorax and tegulae white. Labial palpi light grey at top, brown on sides, 4 times longer than eye diameter. Antennae light grey, weakly serrated. Wingspan 17–19 mm (holotype, 19). Forewings white with dark brown spots and bands. Costal edge of forewing has a series of dark brown spots of various shapes. One quarter of outer edge of wing is brown. In middle part of wing, closer to base, are oblique, indistinct brown stripes. Hindwings white with a mixture of brown. In middle of wing is a rather broad, light brown band. Legs pale, without pigmentation.

Male genitalia: Uncus wide along entire length, with flat edge at apex. Gnathos narrow, long, pointed towards apex. Valves rather narrow, pendent towards apex. Appendage on valve short, located behind its midlength. Anellus branches quite long and straight, evenly expanding to apex. Outer edge of saccus rounded. Aedeagus flat at outer edge, apex slanted at an acute angle.



Figs 38–40. *Microschismus sterkfonteini* sp. n.: (38, 39) holotype imago and male genitalia, BMNH, 22927; (40) female genitalia, paratype, BMNH, 22928.

Female genitalia: Anal papillae narrow, elongated. Front apophyses thick, slightly winding. Rear apophyses thick, rather long at bottom and near top. Vaginal plate has deep oval cut. Antrum short, tubular. Smooth transition from ductus to oval bursa copulatrix.

Holotype: ♂ SOUTH AFRICA: *Free State*: 20 km S of Harrismith, Sterkfontein Dam, 28°23'S:29°23'E, 1750 m, 11–12.i.2011, V. Kovtunovich & P. Ustjuzhanin (BMNH, 22927).

Paratypes: 16♂ 1♀ same data as holotype (CUK, BMNH, TMSA), 2♂ same data as holotype but 29–30.xii.2007; 2♂ same data as holotype but 20.i.2009 (CUK, BMNH, TMSA).

Key to the species of the genus *Microschismus* on male genitalia

- | | | |
|---|--|------------------|
| 1 | Uncus wide, gnathos narrow, pointed to apex..... | 2 |
| – | Uncus narrow, gnathos wide with blunt apex | premnias |
| 2 | Appendages at bases of valves, cornuti indistinct..... | 3 |
| – | Appendages at valve midlength, cornuti distinct | sceletias |
| 3 | Uncus rounded at apex..... | 4 |
| – | Uncus with flat edge to apex | 6 |
| 4 | Appendages on valves long..... | fortis |
| – | Appendages on valves short..... | 5 |

- 5 Anellus branches parallel-sided throughout length.....**antennatus**
 – Anellus branches widened towards apex **lenzi** sp. n.
 6 Additional appendages at base of valves**reginus** sp. n.
 – No additional appendages at base of valves.....7
 7 Valves slightly curved, almost straight.....**cymatias**
 – Valves pendant to top; anellus branches widened towards top
 **sterkfonteini** sp. n.

Key to the species of the genus *Microschismus* on external characters

- 1 Background of wings grey-brown to black.....2
 – Background of wings light to white6
 2 Background of wings dark brown, almost black.....3
 – Background of wings is grey-brown.....4
 3 Antennae simple, with barely visible cilia**sceletias**
 – Antennae complex, with double comb..... **lenzi** sp. n.
 4 Median dark brown oblique stroke on forewing well developed.....**fortis**
 – Median dark brown oblique stroke on forewing poorly developed or absent5
 5 Antennae simple.....**premnias**
 – Antennae ciliated.....**antennatus**
 6 Hindwings monochrome, without bands**reginus** sp. n.
 – Hindwings with bands.....7
 7 Larger, 20–25 mm, of contrasting colours, with distinct bands on hindwings; legs brown**cymatias**
 – Smaller, 17–19 mm, colours not contrasting, bands on hindwings poorly developed; hind legs pale yellow..... **sterkfonteini** sp. n.

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