

A review of the southern African spider beetle genus *Scaleptinus* Borowski, 2006 (Coleoptera: Ptinidae: Ptininae) and notes on their unusual male genitalia

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ABSTRACT The spider beetle genus *Scaleptinus* Borowski, 2006 (Coleoptera: Ptinidae: Ptininae) was created to reclassify two morphologically distinct, scale-covered species of *Ptinus* known from the arid western regions of Namibia and South Africa. In this same publication, two new species, *S. beardae* and *S. similis*, were each described from single male specimens. Morphological examination reveals that *S. beardae* is within the range of morphological variation seen in *S. squamulosus* and is here proposed as a junior synonym. *Scaleptinus similis* appears to be a distinct species based on male genitalia illustrations but is externally similar to *S. sericans*. All three species are illustrated, including the two Borowski types as well as the sexual dimorphism seen in two species that have known females. Variation in genitalia and scutella are also presented as well as a note on the unusual male genitalia with double parameres as seen in two of the three species. A more complete documentation of the distribution of species via new records for *S. squamulosus* (Pic, 1908) and *S. sericans* (Péringuey, 1888) is also given.

KEYWORDS spider beetle; distribution; genitalia; Namib desert; diversity; synonymy; sexual dimorphism

INTRODUCTION

The ptinine genus *Scaleptinus* (Figures 1–12) was created by Borowski (2006) for two distinct and poorly known species from South Africa and Namibia (Figure 13) that were previously placed in the genus *Ptinus*, namely *S. sericans* (Péringuey, 1888) and *S. squamulosus* (Pic, 1908). The genus is defined by some unique morphological traits, most notably appressed setal scales covering the body, a lack of the typical body pubescence seen in most species of *Ptinus*, an elongate body, and an enlarged scutellum.

The type locality of *S. sericans* is Van Wyk's Vlei in the Northern Cape, with additional records from the Western Cape in the Karoo. The type locality of

S. squamulosus is Rooibank in the Erongo Region in west-central Namibia, with additional records throughout western Namibia and south into the extreme north of the Northern Cape in South Africa, near the Orange River. Interestingly, both species co-occur in Pofadder in the Northern Cape, having both been collected there using baited pitfall traps by J. Irish and E. Marais.

Borowski (2006) described two new species, each from single specimens. *Scaleptinus beardae* was collected in Grens, located in the ǀKharas Region, in southern Namibia, while *S. similis* was collected in Matjesfontein, in the Western Cape of South Africa. While the species are within or near the distributions of the previously described species, the morphology of each of these individuals was

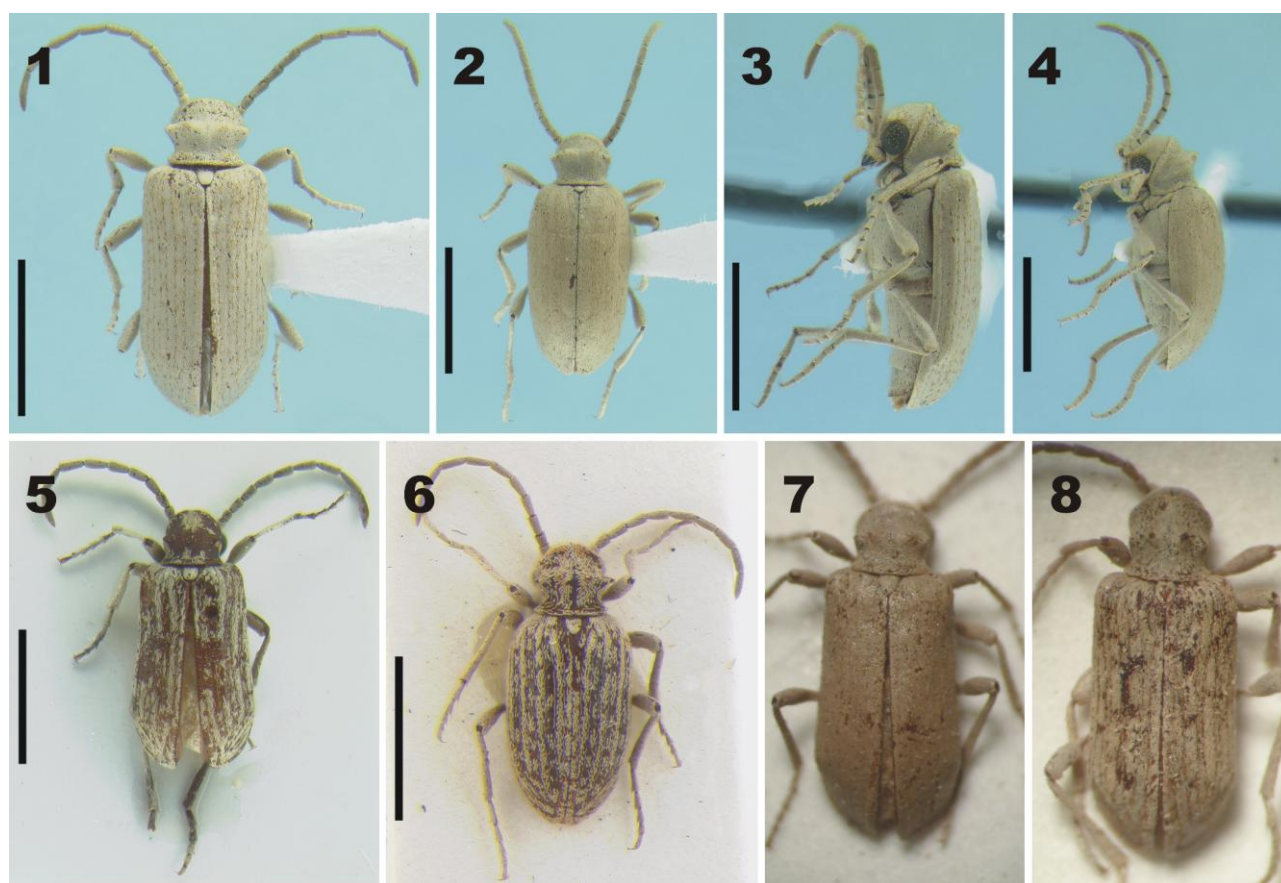
thought to be distinct enough to designate them as new species. However, a study of the defining characteristics and comparison of his types in the Natural History Museum, London with a large number of specimens of *S. sericans* and *S. squamulosus*, raised doubt as to the validity of at least one of the Borowski species. A search for additional characteristics that might separate or distinguish these four taxa led to the conclusion that, at most, only three species exist. Herein, we synonymise one of the Borowski species and clarify the distinguishing characteristics for the three remaining species, as well as document some of the morphological variability that occurs within each species, including sexual dimorphism.

METHODS

The two single type specimens of both *S. beardae* and *S. similis* were examined when the second author visited the Natural History Museum in London in 2013. Three specimens labelled as types

of *S. sericans* were also borrowed from the Iziko South African Museum, Cape Town. Borowski (2006) noted that none of these specimens is from the type locality and they were probably mislabelled by H. K. C. Andreae in the early 20th century. Additional material from the National Museum of Namibia (Windhoek), the Iziko South African Museum (Cape Town), the National Collection, and the Ditsong Museum (both in Pretoria, South Africa), was also borrowed and studied. Further specimens were acquired from field work conducted by the second author during January 2008 in the Richtersveld region in northwest South Africa. This last collection includes a relatively large reared series of 43 specimens of *S. squamulosus*.

To examine male genitalia, specimens were first placed in warm ethanol to remove them from the card or point. Once relaxed, the abdomen was then removed and soaked in lactic acid. Once cleared, the aedeagi were then dissected out and placed in



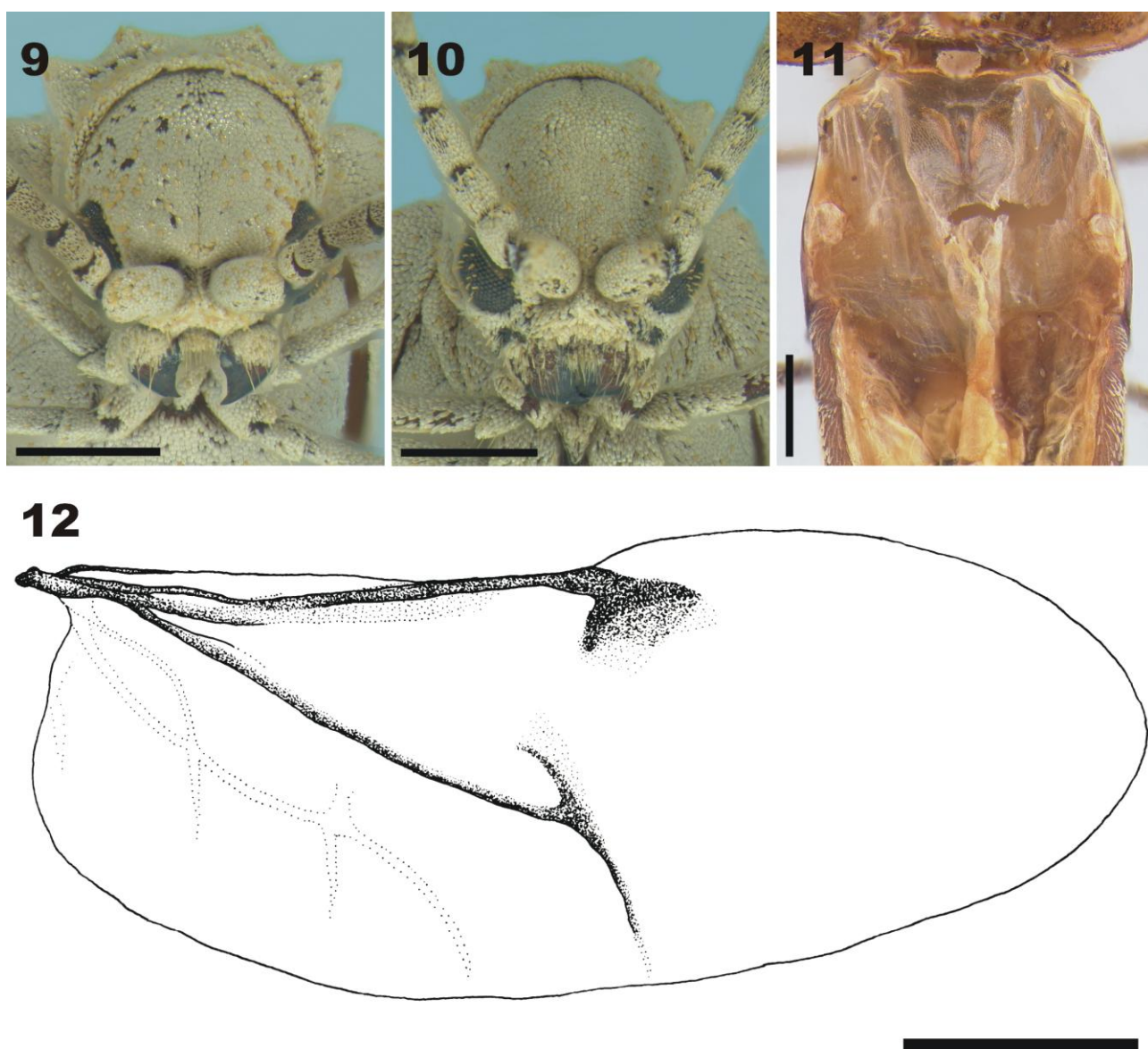
Figures 1–4 *Scaleptinus squamulosus*: 1) Dorsal habitus of male and 2) female. 3) Lateral view of 3) male and 4) female. Note the more convex elytra in female. **Figures 5–6** *Scaleptinus sericans*: Dorsal habitus of 5) male and 6) female. **Figure 7** *Scaleptinus beardae*: dorsal habitus of holotype male. **Figure 8** *Scaleptinus similis*: dorsal habitus of holotype male. Note that the slightly darker in figures 7 and 8 colour is due to the photographs being taken with a camera held against a microscope ocular lens during a visit to the Natural History Museum, London. Scale bars = 2 mm.

glycerine on a depression slide with a cover slip for imaging. After being photographed, aedeagi were either placed into a microvial with glycerine and pinned with the specimen or glued to the same card that holds the beetle.

Automontage photographs of beetles were taken with Synchroscope Automontage Pro software, using a Leica MZ16 for dissecting scope images and a compound Olympus BH-2 for images of genitalia. Images were edited for clarity using GIMP and CorelDraw software. Range maps were created in QGIS and edited in Inkscape.

Verbatim data labels are given in the “new records” section. Separate collections begin with an

asterisk (“*”) and the total number of specimens and sexes are given. Lines on the original label are separated by a slash (“/”). The institution from which the material was borrowed is given at the end in parentheses. Institutional codes are as follows: **NNIC**: Namibian National Insect Collection, National Museum of Namibia, Windhoek, Namibia, **SANC**: South African National Collection of Insects, Pretoria, South Africa, **DNMNH/TMSA**: Ditsong National Museum of Natural History (formally the Transvaal Museum), **SAMC**: Iziko South African Museum, Cape Town, South Africa, and the **TKPC**: The collection of the second author.



Figures 9–12 *Scaleptinus squamulosus*: frontal view of head of 9) male and 10) female. Scale bar = 0.5 mm. 11) Dorsal view of female *S. squamulosus* meso- and metanota with elytra lifted, showing complete aptery. Scale bar = 0.5 mm. 12) Illustration of wing of male *S. squamulosus* showing venation. Scale bar = 1 mm.

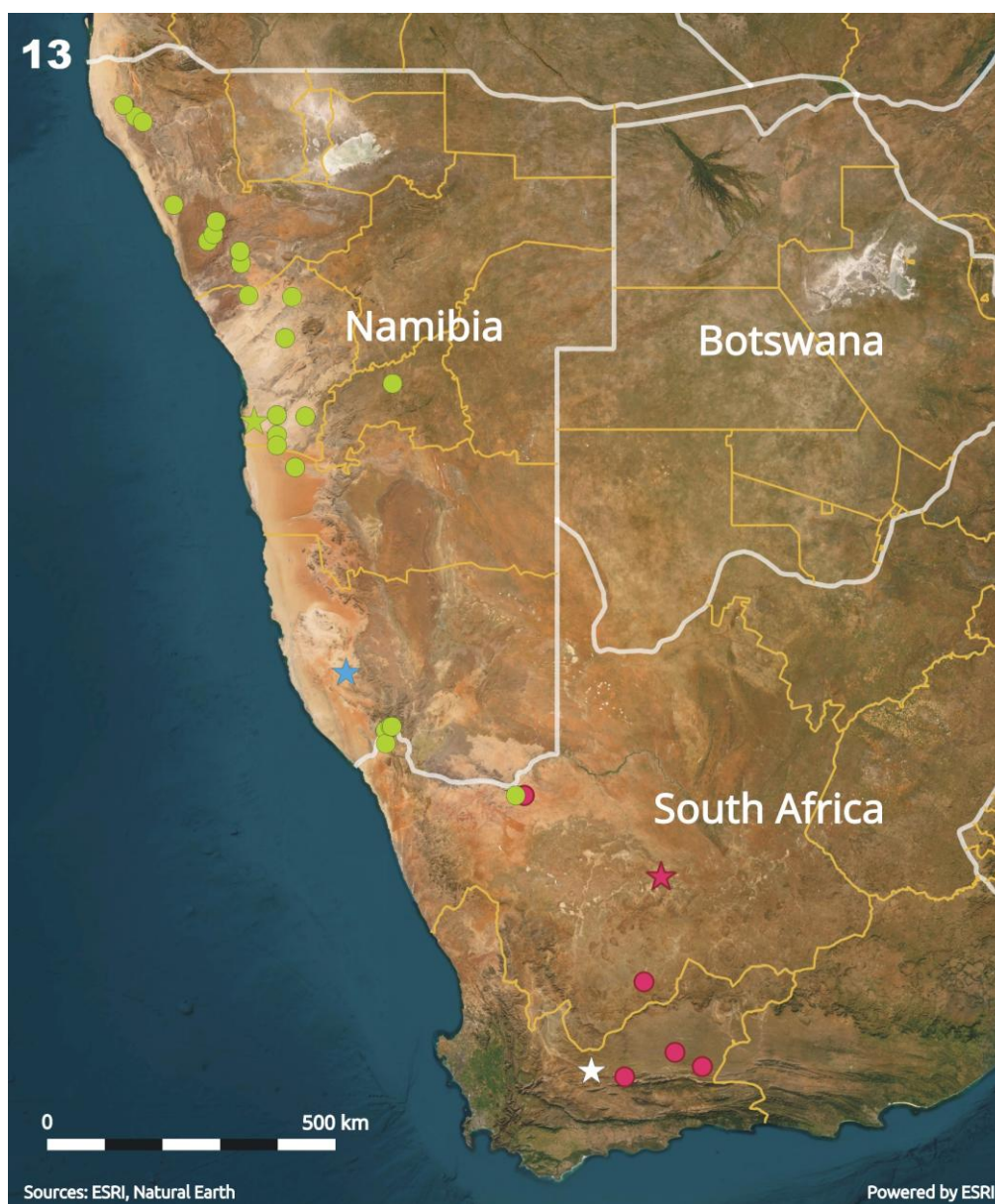


Figure 13 Map of southwestern Africa showing records of *S. squamulosus* (green dots) and its synonym *S. beardae* (blue star) as well as *S. sericans* (red star and dots) and *S. similis* (white star). Type localities are represented by a star; other locality records as circles.

RESULTS AND DISCUSSION

Scaleptinus Borowski

Scaleptinus squamulosus (Pic)

Scaleptinus beardae Borowski, New Synonymy

We have not found any evidence that supports the recognition of *S. beardae* as a valid species distinct from *S. squamulosus*. Characters used by Borowski (2006) to differentiate *Scaleptinus* taxa are primarily differences in elytral index values, scutellar shape, and male genitalia, none of which appear to be useful.

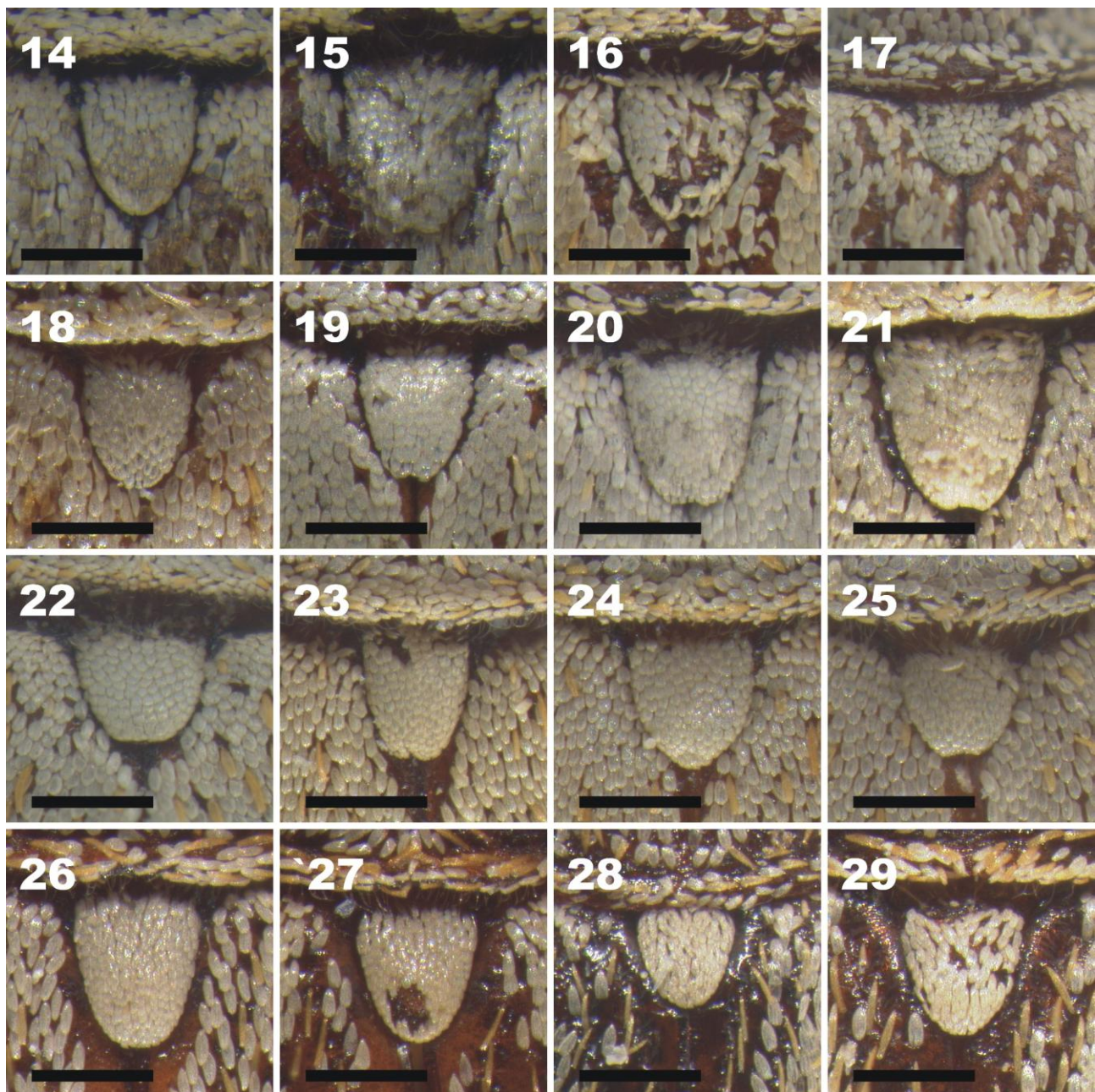
The elytral index is defined as the length of the elytra measured along the midpoint divided by the maximum width of the elytra, excluding any elytral gaps. Borowski (2006) gave an index of 1.9 for *S. beardae* but surprisingly, he does not give a value for *S. squamulosus*. Our measurements of *S. squamulosus* show a mean elytral index of 2.06 ± 0.07 ($n = 30$) while that of the single male type of *S. beardae* we measured (from a photo) is 2.03 and well within the range of the former. Moreover, although the total length of *S. beardae* (3.4 mm) is smaller than the range for *S. squamulosus* (3.8–4.2 mm) given by Borowski (2006), one of our specimens of the latter was only 3.2 mm in length.

Lastly, the dense covering of setal scales on the elytra is essentially the same in both species, showing a mix of broad and narrow scales.

The shape of the scutellum was also used as a diagnostic feature. However, variation in the shape of this sclerite is notable (Figures 14–29), and it does not appear to be useful to differentiate these two species. In *S. squamulosus*, it is described by Borowski (2006) as “markedly elongated, trapezoidal” compared to triangular in *S. beardae*, but the shape in the former species (Figures 14–25)

is highly variable and overlaps with that of the latter. Also, both the degree of apical bluntness or sharpness and the angle of the lateral margins show a high degree of variability. Differences between the four species as illustrated in Borowski (2006) are within the range of variation seen in *S. squamulosus* and *S. sericans* as well.

Borowski also stated that the degree of abdominal ventrite fusion is a way to differentiate these two species. Unfortunately, both Borowski types are glued to a card and the ventral surface was not

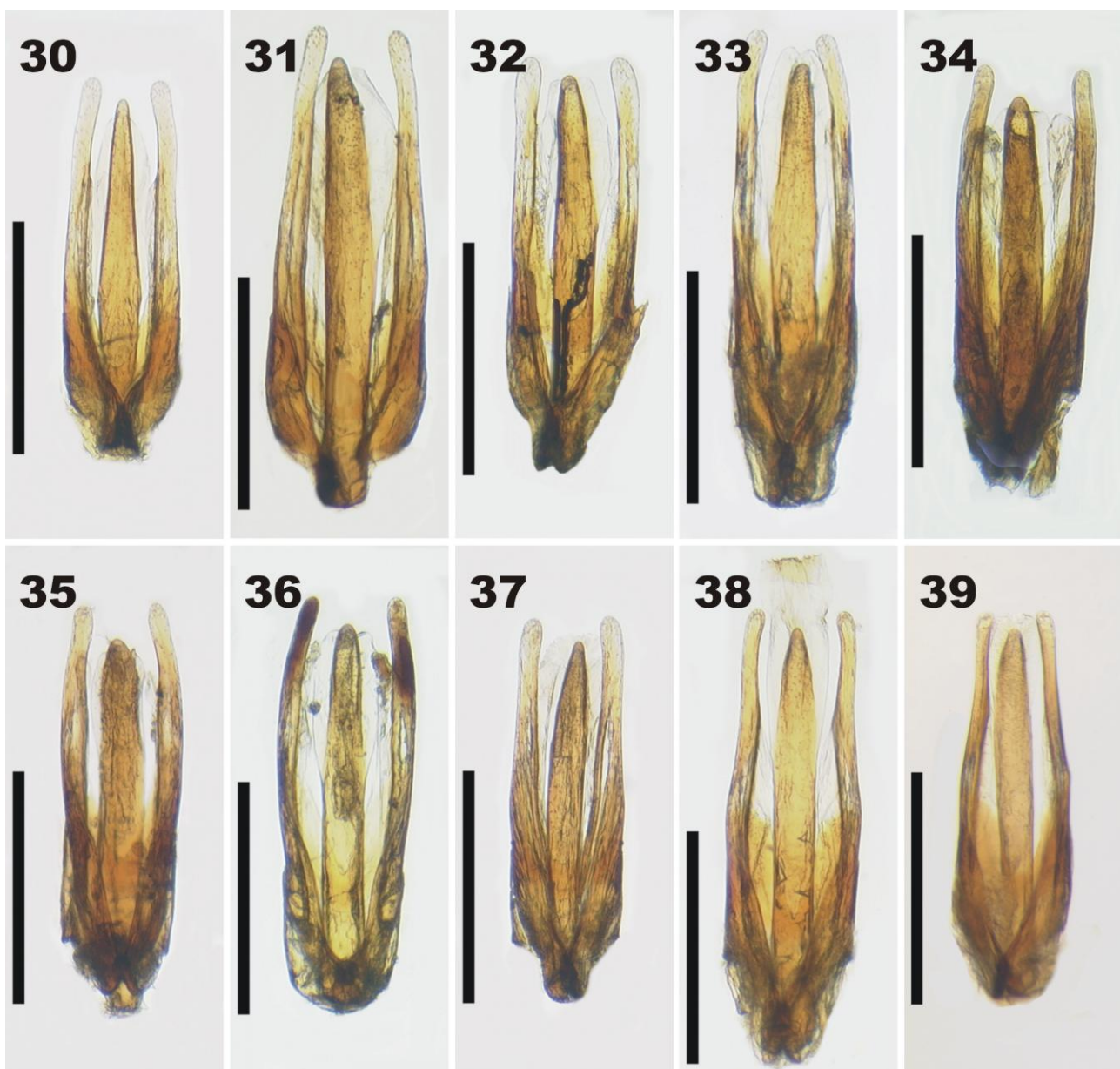


Figures 14–25 Scutella of *Scaptotritus squamulosus* arranged from northern to southern locality records. Note that 14–23 are males and 24–25 are females. **Figures 26–29** Scutella of *Scaptotritus sericans*. Scale bars = 0.2 mm and all are at the same magnification.

examined. But generally, these sutures are obscured by scales to various degrees and are especially dense along the midline of the body between the second and third ventrites and hence the degree of fusion is difficult to ascertain.

Male genitalia illustrated in Borowski (2006) appear to show dramatic differences between all four species he recognised. *Scalectinus squamulosus* is illustrated with the median lobe greatly expanded at the apical third and appearing lanceolate in contrast to all the other taxa. Male genitalia of *S. squamulosus* examined (Figures 30–

37) show the median lobe with a slight bulge at the middle and most notably in one northern individual (Figure 30), but not to the extent he illustrated. In contrast, most have the median lobe nearly parallel sided on the basal half with a slight taper toward the apex. Additionally, male genitalia examined from a large number of specimens of *S. squamulosus* show variation in paramere shape as well. All show “double parameres” (see below for additional details) but surprisingly they are not seen in Borowski’s (2006) illustrations of *S. squamulosus*. Hence male genitalia do not differentiate *S. beardae* from *S. squamulosus*. The type locality of *S. beardae*



Figures 30–39 Aedeagi of *Scalectinus* in dorsal view, arranged north to south in distribution. **Figures 30–37** *Scalectinus squamulosus*. **Figures 38–39** *Scalectinus sericans*. “Pseudo-parameres” are visible and often appearing as transparent structures between the parameres on either side of the median lobe and are part of an expansion of the internal sac. Note the greater degree of internal sac expansion in figure 38. Scale bars = 0.5 mm.

is well within the broader range of *S. squamulosus*, supporting the hypothesis of synonymy; the type locality is near the southern end of the Namib Desert in an area representing a gap in *S. squamulosus* collection records reported here, but nevertheless between numerous *S. squamulosus* records to the north and additional records to the south along the Orange River in the Richtersveld as well as Pofadder (Figure 13). There is no apparent reason why gene flow would be interrupted between this locality and surrounding populations. Most likely, the gap seen in the distribution of *S. squamulosus* is an artifact of a lack of sampling effort in southern Namibia, except in the extreme south along the Orange River. Therefore, for these reasons and those above, we propose that *S. beardae* should be considered a junior synonym of *S. squamulosus*.

Scaleptinus sericans (Péringuey)

Scaleptinus similis Borowski

These two species appear to be distinct but only in male genitalic differences. Most notably, *S. sericans* has the standard ptnine male genitalia with single parameres, while *S. similis* is illustrated with unusual “double parameres” (see below for details; the same feature also seen in *S. squamulosus*). Additionally, *S. sericans* is illustrated in Borowski (2006) with the median lobe nearly parallel-sided and the parameres elongate and slightly expanded near the apex. In contrast, *S. similis* is illustrated with a median lobe much shorter and stouter and with the parameres lacking any apical expansion. Specimens examined in this study (Figures 38–39) have median lobes much more elongate, although with a similar taper from the base to the apex. The paramere shape of *S. sericans* differs from that of *S. similis*, with a curvature inwards and a slight expansion at the apical third. If the interpretation by Borowski is accurate in regard to genitalic differences, *S. similis* should be considered valid. Unfortunately, genitalia of the only specimen of *S. similis* could not be examined at this time to confirm or refute his species hypothesis.

Notably, the Matjesfontein type locality of *S. similis* is only 55 km west of Vogelfontein, the nearest *S. sericans* record. Both localities are at a similar latitude in the Cape Fold Mountains region, an area of east-west trending mountain ranges that would enable gene flow in either an eastward or westward direction (Tassone et al. 2021).

To conclude, we suspect *S. similis* is likely a junior synonym of *S. sericans*, but to be conservative we have left the Borowski name as valid at this time.

Updated key to species

1. Elytra uniformly covered in pale yellowish scales, sometimes abraded but lacking distinctive longitudinal glabrous intervals. Range: coastal Namibia into the Northern Cape, South Africa *S. squamulosus*
1'. Elytra with alternating intervals of pale yellowish scales and longitudinal glabrous intervals. Range: Northern and Western Cape regions, South Africa 2
2. Parameres slightly bent and with a slight expansion at ~ apical 1/4. Elytral index about 1.9 *S. sericans*
2'. Parameres nearly straight and parallel sided, with a very slight expansion from middle to apex. Elytral index about 2.1 *S. similis*

Male genitalia and “pseudo-parameres”

All species of *Scaleptinus* have very unusual male genitalia with what sometimes appear to be two pairs of parameres (as referred to in Borowski 2006), one sclerotised and darkened and another set inside and adjacent to the outer pair that is translucent (Figures 30–39). This feature, clearly defined as separate lobes in the illustrations of *S. beardae* and *S. similis* in Borowski (2006), has not been observed in any other spider beetle male genitalia and initially appear to be highly distinctive and unique even within the Coleoptera (Sharp and Muir 1912). These inner “parameres” are simply membranous tissue that is likely an expansion of the internal sac (or endophallus) and appears to originate from the distal half of the median lobe. A related feature, a larger apical membrane expansion, can be seen at the tip of the median lobe in *S. sericans* (Figures 38–39), and this feature is seen in the illustrations of that species and *S. similis* in Borowski (2006) as well.

Wing Development

Scaleptinus males have well developed wings (Figure 12) similar to those of *Ptinus* (see Philips 2000, Figure 12) and can likely disperse across relatively large distances. Notably, the vast majority of collections of *Scaleptinus* are males, likely due to their high vagility and the collecting techniques used, such as blacklighting. In contrast,

females are apterous (Figure 11) and no doubt cannot disperse as far or as quickly as males. Adult *S. squamulosus* reared from Kudu antelope pellets collected in the Richtersveld by the second author are in a roughly equal male to female sex ratio (n = 36 specimens) as expected.

New records

Scaleptinus squamulosus

NAMIBIA: Kunene: *4♂♂, Torra Bay Road, / 30 km W turnoff / SE 2013 BC / Damaraland/ 6–9 June 1976 / S. Louw (NNIC), *2♂♂, Verbrande Berg / 20°36'S, 14°25'E / Damaraland / 12 Apr. 1987 / E. Marais, J. Irish (NNIC), *2♂♂, Skeleton Coast Park / Eastern Border at / 19°38'S, 13°14'E. / 6, 7 April 1979 / S. Louw, R. Wharton (NNIC), *2♂♂, Sanitatas / SE 1812 Bc / 25–26 Nov. 1970 (NNIC), *2♂♂, 8 km NE Omatjeguma / 17°58'S, 12°21'E / 22–25 Nov. 1970 (NNIC), *12♂♂, Bethanis 514 / SE 2014 Ad / Damaraland / 12–14 May 1978 / S. Louw, M.-L. Penrith (NNIC), *1♂, Bethanis 514 / Outjo / SE 2014 Ad / 8–10 May 1973 (NNIC), *1♂, Rooiplaat / SE 2013 Bd. / 14-I-1980 / Univ. v. Pretoria, *1♂, 20 km NW Palm / wag, S. W. A. / SE 1913 Db, / 23-I-1981 / Univ. van Pretoria, **Erongo:** *4♂♂, Gobabeb / Namib Naukluft Park / 23°24'S 15°03'E / I.1990 / M. Nel / Light trap in / Kuiseb River (NNIC), *1♂, South West Africa / Gobebeeb, at light / XII-19-1978 / Wharton, coll. (NNIC), *1♂, Spitzkoppe / Se 2115 Cc / Damaraland / 26–30 May 1976 / M.J. & M.-L. Penrith (NNIC), *1♂, Spitzkoppe / 10.8.63 / *Ptinus squamulosus* Pic / ♂ / Gaerdes Coll. (NNIC), *2♂♂, S.W.Afr., Kl. Spitz- / Koppe, 15.5.1972 / L & O Prozensky (SANC), *1♂, Brandberg / 4.5.56 / *squamulosus* Pic / Gaerdes Coll. (NNIC), *1♂, Okoyenye Mt. / Otjihorongo Reserve / 21°09'S, 15°19'E. / 1–2 April 1979 / S. Louw (NNIC), *7♂♂, Gobabeb, 23.34-15.03E / 14-19.I.1971, L. Prezesky / and A. Strydom (SANC), *3♂♂1♀ South West Africa / Namib / Naukluft Park / Ganab. 23.06S 15.33E / 16.iii.1983 / R.G. Oberprieler (SANC), *9♂♂, Gobabeb / Kuiseb Riv. / Centr. Namib / X.1957, C. Koch (SANC), *3♂♂, Rooibank / nr. Walvis Bay / V. 1959 / C. Koch (SANC), *1♂, S.W. Africa / Namibia / Namib / Naukluft Park / Kuiseb R. nr. Gobabeb / 23.34S 15.03E / 30.i.1988 / H. Robertson (SANC), *3♂♂, D.S.W.-Afrika / Rooibank / V. 05 / L. Schultze S. (SAM), **Hardap:** *3♂♂, S.W.Afr., Namib / Tsondab River bed / 3.5.1972, L. Schultze, **Khomas:** *1♂, Windhoek, S.W.A. / H. Kinges / 22.34S-17.06E (SANC), **||Kharas:** *1♂, Namibia / Boom River / ESE of Rosh Pinah / 28.01S 17.03E 2-

6.iv. / 2002 E. Holm & H. Gebhardt (SANC), *1♂, Namibia/ Boom River Canyon / 4 km N of Orange River / (ESE of Rosh Pinah) / 28.01S 17.03E / 25–30.x.1996 / M & A Wedd Expedition / Light Trap (SANC), *1♂, Namibia: Orange / Boom R. / confluence, 300' / 29.X.1999, Forgie, / Philips, Scholtz, Mansell / S 28°01.1', E 17°04.4' / ex. kudu pellets (SANC), **NAMIBIA:** *1♂, S.W.Afr., C. Namib / Thomas Mt. 70th E / 8.5.1972 / Schulze & Prozensky [Unknown locality] (SANC) **SOUTH AFRICA: Northern Cape:** *3♂♂, 2 km N Pofadder / N Cape Province, RSA / 29°05' S, 19°24' E. / 16.III.1988 / J. Irish, E. Marais (NNIC), *21♂♂15♀♀, South Africa: Northern / Cape Prov., Richtersveld / 54 m, 24.I.2008 / J. Andersland & T. K. Philips / S28°04'42", E16°57'43" (TKPC), *1♂, Numees Mine / Richtersveld / 23.III.1958 / G. van Son (SANC), *2♂♂2♀♀, Richtersveld / nr. Pootjiespram / 23 Jan. 2008 / S 28°42", E 16°43", 54 m / J. Andersland & T. K. Philips (TKPC), *2♂♂1♀, Richtersveld nr. Gannakouriep / S 28°23'45", E 17°09'19", 376 m / J. Andersland & T. K. Philips (TKPC).

Scaleptinus sericans

SOUTH AFRICA: Northern Cape: *3♂♂, 2 km N Pofadder / N Cape Province, RSA / 29°05' S, 19°24' E. / 16.III.1988 / J. Irish, E. Marais (NNIC), **Western Cape:** *2♂♂, S. Afr. Cape-Karoo / Zwartskraal farm / 33.10 S – 22.32 E / 2.3.1979, E-Y:1553 / groundtraps, 30 days / leg. R. Oosthuizen / groundtraps with / feces bait (SANC).

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