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Revision of *Vilargus* Theron (Hemiptera: Cicadellidae: Deltocephalinae) from South Africa

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Abstract

The South African grass-feeding leafhopper *Vilargus* Theron is revised. *Vilargus pumilicans* (Naudé) is redescribed and the specific status of *V. campanus* (Naudé) is discussed. Seven new species of *Vilargus* are described: *V. bicornicans* **sp. n.**, *V. budenticans* **sp. n.**, *V. dentulicans* **sp. n.**, *V. lobulicans* **sp. n.**, *V. simulans* **sp. n.**, *V. triquetricans* **sp. n.** and *V. trunculicans* **sp. n.** A key is provided to males and known females of *Vilargus*. The species of this genus are small, light brown leafhoppers, commonly associated with grass in the Grassland Biome of South Africa, and rarely from the Savanna and Fynbos Biomes.

Key words: Grassland herbivore guild, Fynbos, Grassland, Afrotropical leafhopper fauna, Paralimnini

Introduction

The South African leafhopper genus *Vilargus* was described by Theron (1975), based on the male of *Deltocephalus pumilicans* Naudé, 1926. The male of this species is redescribed and the female is described for the first time. Additionally seven new species are described. *Vilargus* is placed in the tribe Paralimnini based on the shape of the connective that has its arms fused, and that is articulated with the aedeagus, based on tribal definitions (Webb & Heller, 1990, Zahniser & Dietrich, 2008).

This revision is the fifth contribution on leafhoppers of the Grassland Biome of South Africa (Stiller, 1998, 2009a, 2009b. 2010). *Vilargus* species are small, 2.0–3.2 mm long and generally light brown in colour without significant markings. They occur in various habitats such as moribund grassland, in flush after fire, in grass and forbs on road verges (considered unburned and ungrazed) and in pastures or grasslands grazed to varying degrees. Some of the dominant graminoids and cyperoids in these habitats which were sampled during the course of this study included the following: *Ficinia sp.* (Cyperaceae), *Andropogon schirensis* A.Rich., *Elionurus muticus* (Spreng.) Kunth, *Eragrostis capensis* (Thunb.) Trin., *E. curvula* (Schrad.) Nees, *E. gummiflua* Nees, *E. sclerantha* Nees subsp. *sclerantha*, *Eragrostis* sp., *Festuca* sp., *Harpachloa falx* (L.f.) Kuntze, *Heteropogon contortus* (L.) Roem. & Schult., *Loudetia simplex* (Nees) C.E. Hubb., *Melinis nerviglumis* (Franch.) Zizka, *Merxmuellera* sp., *Panicum natalensis* Hochst., *Themeda triandra* Forssk. (Poaceae). However, rigorous host associations cannot be made as these plant species or other grasses rarely occurred in pure stands where the species of *Vilargus* were collected, as discussed previously (Stiller, 2010). Most species of *Vilargus* appear to be less common than those of *Pravistylus* (revised by Stiller, 2010), with both often occurring together. The only possible exception is *V. pumilicans* that is widely distributed in the Fynbos and Grassland Biomes. Furthermore, *Vilargus* is very similar to *Pravistylus* in colour, shape, dimensions and some external male and female genitalic features. A discussion of the differences between these genera follows the redescription of *Vilargus*.

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Material and methods

About 1000 specimens were examined. They were collected with a sweep net and DVac motorized suction machine. Some material was sourced from a survey of the Maloti-Drakensberg Transfrontier Park (MDTP) (Hamer & Slotov, 2008). Maceration was made with cold KOH and dissections were made in glycerine, and examined under a transmission light microscope. Images were recorded with an SZX-12 Olympus microscope, colorView III camera and AnalySIS™ software. Stacking of images to improve depth of field was done by using CombineZ computer freeware. Terminology follows Blocker and Triplehorn (1985) and Zahniser & Dietrich (2008). Material is deposited (Codens and depositories according to Evenhuis, 2009) in the insect collection of the Department of Conservation Ecology and Entomology University of Stellenbosch, Stellenbosch, South Africa (DCEE) (not in Evenhuis), the National Collection of Insects, ARC-PPRI, Pretoria, South Africa (SANC), The Natural History Museum, London, United Kingdom (BMNH) and Illinois Natural History Survey, Champaign, Illinois, USA (INHS).

Redescription

Vilargus Theron 1975: 198.

Type species: *Deltocephalus pumilicans* Naudé, 1926: 49; by original designation.

Type locality. Viljoen's Pass [South Africa, Western Cape Province, Viljoen's Pass north of Grabouw, *c.* 34°04′S 19°04′E].

Diagnosis. 2.0–3.2 mm in length. Ochraceous. Alary polymorphic, macropters rare. Aedeagus modified, usually with basal, lateral or ventral appendage of variable length, arising from preatrium, or shaft; or rarely absent, with shaft apex expanded asymmetrically; gonopore apical or subapical; aedeagus usually articulated with connective. Plate variable, usually short and rounded or truncate, sometimes acutely triangular, or with narrow, truncate or rounded posterior process. Sternite 7 of female with various configurations: posterior medial, wide, shallow notch (four species); notch narrow (one species); raised notch flanked by rounded lobes (one species); short, blunt medial ligula (one species).

Male and female. Dimensions. Head 1.0–1.1 times wider than pronotum. Vertex 1.3–1.6 times longer medially than length next to eyes; anteriorly rounded to face; discal region smooth, fontal region and face granular. Clypeus with horizontal arcs; clypellus narrowing distally. Gena below lorum about as wide as ocellocular distance. Ocellus separated from eye by distance 1.1–1.6 times the diameter of ocellus. Lateral margins of pronotum very short, non-carinate. Brachypterous forms common (occasionally up to four abdominal segments visible, commonly pygofer and tergite 8 visible, tergite 7 partially visible (e.g. Figs 2, 5, 9, 18)), macropters and submacropters rare, more common in females (tegmina and hind wing as long as or extending beyond apex of abdomen (e.g. Figs 20, 21, 33)). Tegmina in brachypter without appendix or reduced, four reduced apical cells, 3 closed anteapical cells, veins wide, often pigmented, basal costal and opaque Tegmina in macropter with narrow appendix, apical cells elongate, 3 closed anteapical cells, veins narrow, pigmentation indistinct, cells sometimes with fuscous markings, otherwise translucent. Hind wing of brachypter reduced, 0.3–0.5 times as long as length of forewing. Hind wing of macropter normal, four anteapical cells, $R_{2+3,}$ median, cubitus 1 and 2, postcubitus, vanal 1 and 2 and jugal lobe. Spinulation of protibia 1+4. Profemur setal row AV short, setae relatively thick, intercalary row up to about three times longer than AV, AV_1 slightly longer and thicker than intercalary setae; AM_1 close to and slightly longer and sometimes darker than AV_1. Mesotibial setal formula 4+4. Metafemoral setal formula 2+2+1, apical pair slightly shorter than subapical setae, medial pair of different length and thickness, distal seta longer than other setae.

Male. Genitalia. Aedeagus variable, usually with basal (e.g. Figs 44, 69), lateral (e.g. Figs 53, 93, 104) or ventral appendage (Figs 36, 87), appendage of variable length, arising from atrium, preatrium; or rarely shaft

without appendage, then shaft with apex modified asymmetrically (Figs 60, 61); gonopore apical or subapical; preatrium articulated with connective.

Connective linear, stem and arms of similar length, sometimes arms asymmetrical, with one arm more curved, the other arm more straight (e.g. Figs 45, 54, 70, 94, 106); articulating with aedeagus.

Style with conspicuous preapical angle; dorsal apophysis about half as wide as width across preapical angle, apex truncated or acute, directed lateroposteriad, of variable position relative to plate, with ventral teeth; distal and basal parts of similar length; anterior medial lobe right-angled (e.g. Figs 46, 71, 89) or acutely angled to base (e.g. Figs 38, 55, 63, 107); anterior lateral lobe directed anteriad, weakly sclerotized.

Plate of variable shape, usually broadly triangular with rounded posterior margin (Figs 39, 47, 72, 73), sometimes acutely triangular with acute posterior margin (Fig. 99); or posterior margin with narrow truncate or rounded posterior process (Figs 56, 64) or with posterior margin broadly truncate (Fig. 90, 108); uniseriate macrosetae along lateral margin.

Valve large, wide, apex triangular, base somewhat rectangular.

Pygofer setose; posterodorsal angle usually lobate (reduced as in Fig. 49); base of pygofer lobe less than half as wide as width of pygofer, near dorsal margin of pygofer, apex acute (Figs 66, 74, 91, 110) or blunt (Figs 41, 58, 101, 102); posteromedial margins curved medially, sometimes with sclerotized ridge (Figs 39, 58). Pygofer, dorsally, with anal tube shallowly incised; tergite 10 weakly sclerotized, about as long as tergite 11; articulating dorsally with internal sclerotized ridge; ventrally articulating with dorsal apodeme of aedeagus (e.g. Figs 40, 41, 48, 49, 100, 101).

Female. Genitalia. Sternite 7 variable, usually with rounded notch, of variable depth and width.

a. Notch shallow, rounded, variable depth, width; e.g. *Vilargus dentulicans* **sp. n.** (Fig. 59), *V. lobulicans* **sp. n.** (Fig. 67), *V. pumilicans* **sp. n.** (Figs 77–79) and *V. trunculicans* **sp. n.** (Figs 111–115).
b. Notch parallel-sided, narrow; e.g. *Vilargus bicornicans* **sp. n.** (Fig. 42).
c. Posterior margin with narrow, rectangular ligula; e.g. *Vilargus triquetricans* **sp. n.** (Fig. 103).
d. Margin variable, generally with shallow notch flanked by variably narrow, long lobes; e.g. *Vilargus budenticans* **sp. n.** (Figs 50, 51).

Valvula 3: 2–4 macrosetae, usually more distal, up to 14–24 µm long, about 1.0 µm wide at base, smaller setae, up to 9–13 µm in length, usually more proximal; number of larger setae variable between left and right valvula.

Valvula 2: Variable serration, as follows: *V. triquetricans* teeth uniformly rounded, rounded trough; *V. dentulicans* and *V. bicornicans* apical teeth very small, distal teeth contiguous; *V. lobulicans* and *V. budenticans* teeth broadly rounded, narrow trough, posterior margin of tooth with small teeth, anterior margin smooth; *V. trunculicans* shallow, small teeth.

Valvula 1: Lanceolate, with dorsal microsculpture reticulate (*Vilargus pumilicans*, *V. lobulicans*, *V. trunculicans*) or imbricate (*V. dentulicans*, *V. bicornicans*).

Valvifers: First and second valvifer shape and sensory setae, similar in all species.

Relationships. *Vilargus* closely resembles *Pravistylus* in colour, shape and wing length. However, the configuration of the male genitalia differs considerably between these two genera. In *Pravistylus* the aedeagus usually has a symmetrical shaft, that is generally C-shaped in lateral view, without basal, lateral or ventral process or without the preatrium or rarely with the atrium produced into a spine-like process. The plate in *Pravistylus* is more elaborate, being produced at the apex, notched or sinuous. In contrast the aedeagus of *Vilargus* bears a basal, lateral or ventral process on the atrium, preatrium or base of the aedeagal shaft. The plate in *Vilargus* is usually less modified, and is short and rounded or truncate, with two exceptions that resemble that of *Pravistylus*. The style of *Vilargus* generally has the basal part differing from that of *Pravistylus*. In *Vilargus* the anterior medial lobe is usually short and angled acutely to the distal part of the style, or sometimes it is right angled to the distal part. The anterior lateral lobe is usually well developed. In *Pravistylus* the style usually has the anterior medial lobe elongate, variably angled, and the anterior lateral lobe reduced.

The females of *Vilargus* and *Pravistylus* are more difficult to distinguish. The shape of the posterior margin of the sternite 7 in *Vilargus* is usually notched or sometimes ligulate. In *Pravistylus* the sternite 7 is usually ligulate and rarely notched. In these exceptions species recognition is facilitated by associated male genitalia.

Key to males of species of *Vilargus* (females, where known, included).

1. Aedeagus with spine arising ventrally (Figs 36, 44, 69, 87) or laterally (Figs 53, 93, 96–98, 105) from base of shaft or from preatrium; plate with rectangular posterior protrusion (Fig. 56), or if without protrusion then truncate (Figs 90, 108), acutely triangular (Fig. 99) or broadly rounded (Figs 39, 47, 72, 73) 2
- Aedeagus without spine arising from base of shaft, but with apex expanded (Figs 60, 61), gonopore laterally on one side of apex; apex of plate with narrow, short rounded protrusion (Fig. 64); [style (Fig. 63), pygofer (Fig. 66); connective (Fig. 62); female sternite 7 (Fig. 67)] ..... *Vilargus lobulicans* **sp. n.**
2. Aedeagal preatrium with long, pointed paraphysis (e.g. Figs 44, 69) 3
- Aedeagal preatrium without paraphysis, but with shaft with basal or lateral process (e.g. Figs 36, 52, 87, 92, 96, 104) 4
3. Aedeagus with preatrium acutely angled to paraphysis (Fig. 44); apex of aedeagal shaft almost reaching apex of paraphysis (Figs 43, 44); paraphysis symmetrical (Figs 43, 44, 47); pygofer with posterior dorsal and ventral angles rectangular (Fig. 49); apophysis of style sometimes extending slightly beyond posterior margin of plate (Fig. 47); female sternite 7 variable, with shallow or deep raised notch flanked by variably long lobes (Figs 50, 51) ..... *Vilargus budenticans* **sp. n.**
- Aedeagus with preatrium right-angled to paraphysis (Fig. 69); apex of aedeagal shaft reaching half-way into paraphysis (Figs 68, 69); paraphysis asymmetrical (Figs 68, 69, 72, 73), with lateromedial margin produced dorsally; pygofer with dorsoposterior margin with subapical triangular lobe (Fig. 74); apophysis of style not extending beyond posterior margin of plate (Figs 72, 73); female sternite 7 notched (Figs 77–79) ..... *Vilargus pumilicans* (Naudé)
4. Plate rectangular, medial, posterior and lateral margins more or less right-angled (Figs 90, 108) 5
- Plate variable, acutely triangular (Fig. 99), broadly rounded (Fig. 39) or somewhat triangular with narrow truncated apex (Fig. 56) 6
5. Aedeagal shaft in dorsal view arising on midline from atrium (Fig. 86), short, narrow, pointed process arising ventrolaterally subbasally from shaft (Fig. 87), process about half as long as length of shaft; style (Fig. 89); connective (Fig. 88); pygofer (Fig. 91); [female unknown] ..... *Vilargus simulans* **sp. n.**
- Aedeagal shaft in dorsal view arising laterad of midline from atrium (Fig. 104), with parallel-sided process arising from opposite side of atrium (Fig. 104), process with apex expanded, up to two times as long as length of shaft (Fig. 105); style (Fig. 107); connective (Fig. 106); pygofer (Fig. 110); [female sternite 7 (Figs 111–115)] ..... *Vilargus truncucilicans* **sp. n.**
6. Plate acutely triangular, medial and lateral margins straight, convergent (Fig. 99), plate laterally with apex curved or angled dorsad; aedeagus with process parallel-sided, about as long as shaft or half as long as shaft (Figs 92, 93, 96–98); style (Fig. 95); connective (Fig. 94); pygofer (Fig. 101, 102); female sternite 7 with short, blunt ligula (Fig. 103) ..... *Vilargus triquetricans* **sp. n.**
- Plate variable, broadly rounded (Fig. 39) or somewhat triangular basally with narrow truncated apex (Fig. 56) 7
7. Plate posterior margin broadly rounded (Fig. 39); aedeagal shaft with process arising ventrolaterally from base of shaft uniformly tapered, larger than shaft, extending posteriad of shaft (Figs 35, 36); style with dorsal apophysis about 2.5 times longer medially than width across apex, anterior medial lobe short, angle acutely to base (Fig. 38); connective with stem slightly wider than its length and wider the width across arms (Fig. 36); female sternite 7 with narrow, deep U-shaped notch (Fig. 42) ..... *Vilargus bicornicans* **sp. n.**
- Plate basally triangular, caudally apex narrow, truncated (Fig. 56); aedeagal process narrowly triangular, laterobasal, one third as long as length of shaft (Figs 52, 53); style with dorsal apophysis about 3.6 times longer medially than width across apex, anterior medial lobe long, right angled to base (Fig. 55); connective with stem about as long as wide and narrower that width across arms (Fig. 54); female sternite 7 with narrow, V-shaped notch (Fig. 59) ..... *Vilargus dentulicans* **sp. n.**

***Vilargus bicornicans* sp. n.**
(Figs 1–3, 35–42).

Diagnosis. Aedeagus dorsally with transverse, ovoid dorsal apodeme, laterally with tapered process arising lateroventrally from basal part of shaft, and curved dorsad, shaft and process of similar length. Plate medial margin straight, posterior margin broadly rounded, lateral margin rounded, sometimes slightly sinuous. Pygofer and pygofer lobe extending well beyond apex of plate; posteromedial margin below pygofer lobe with medially curved sclerotized lobe. Female with sternite 7 posterior margin with narrow, parallel-sided notch.

Etymology. Latin, *bi*, two, *cornus*, horn, referring to the aedeagus appearing to have two horn-like structures.

Colour. Male, **female and nymph**. Ochraceous (Figs 1–3, specimens from Dordrecht, Eastern Cape Province).

Male. Dimensions. (n=65) Length from apex of vertex to apex of tegmina 2.2–2.3 mm, length from apex of vertex to apex of abdomen 2.5–2.8 mm, median length of vertex 0.4 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.8 mm, width of pronotum 0.7–0.8 mm, diameter of ocellus 27–30 µm, ocellocular distance 28–41 µm.

Genitalia. Aedeagus, dorsally, dorsal apodeme transverse, reniform; shaft tapered, with ventrolateral, tapered process (Fig. 35); laterally, process basally widely merged with shaft, tapering towards apex; shaft tubular, both curved dorsad, of similar length; gonopore dorsal, apical (Fig. 36). Connective symmetrical, stem slightly wider than width across arms (Fig. 37). Style with anterior medial arm short, not extending beyond base of apophysis, acutely angled to base; apophysis elongate, apex truncate, with teeth ventrally on posterior margin, fine serration ventromedially (Fig. 38). Plate in general roundly triangular; medial margin straight, posterior margin broadly rounded, lateral margin rounded, sometimes slightly sinuous (Fig. 39); 2–5 marginal macrosetae. Pygofer, laterally, dorsal and basal ventral margins parallel, distal ventral margin angled dorsad, medially with sclerotized, rounded protrusion (Fig. 41); dorsally as in Fig. 40. Pygofer lobe short, rounded (Fig. 41); extending well beyond apex of plate.

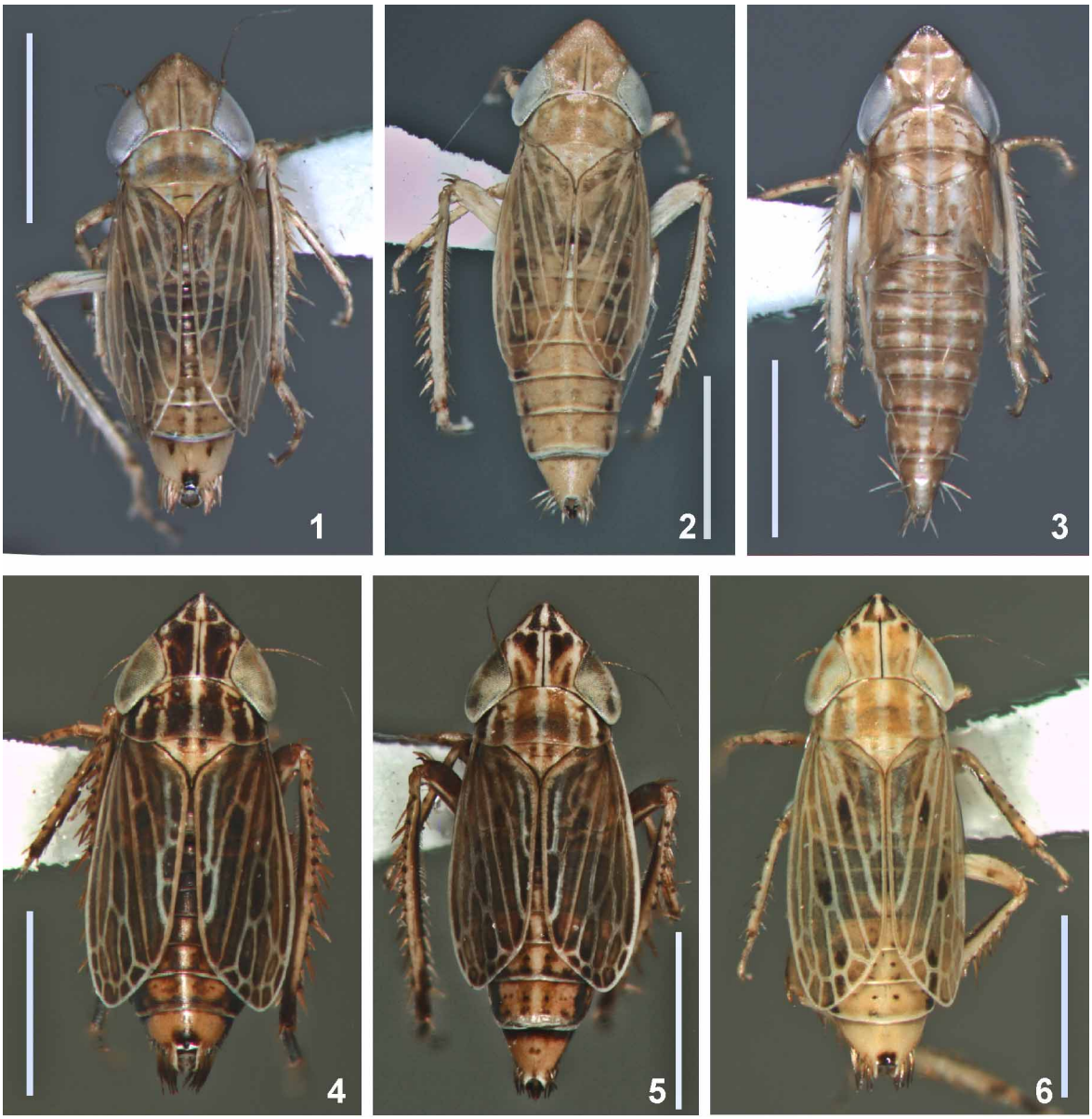
Female. Dimensions. (n=36) Length from apex of vertex to apex of tegmina 2.3–2.5 mm, length from apex of vertex to apex of abdomen 3.0–3.4 mm, median length of vertex 0.5 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.9 mm, width of pronotum 0.7–0.9 mm, diameter of ocellus 26–31 µm, ocellocular distance 35–47 µm.

Genitalia. Sternite 7 posteriorly with narrow, deep notch, narrower, and deeper than in any other species (Fig. 42).

Material examined. Holotype male. South Africa. **Eastern Cape Province**. Dordrecht, 31°32′S, 26°57′E, 1436 m, 26.iv.2006, M. Stiller, DVac, short grazed grass and forbs in road reserve (SANC). Paratypes. 68♂, 41♀, 4 nymphs. **Eastern Cape Province**. 1♂, 3♀, Cathcart, 32°18′S, 27°12′E, 20.i.1984, J.G. Theron, sweeping; 1♂, Ongeluksnek, site #44, 30°20′S, 28°21′E, 1740 m, 5.xii.2005, MDTP survey, sweeping; 1♂, Ongeluksnek, site #39, 30°20′S, 28°19′E, 1824 m, 8.xii.2005, MDTP survey, sweeping; 1♂, Prentjiesberg, 31°07′S, 28°10′E, 1428 m, 11.xii.2005, MDTP survey, sweeping; 7♂, 3♀, Penhoek, between Aliwal North and Queenstown, 31°26′S, 26°41′E, 1854 m, 19.iv.2006, DVac, grazed pasture; 13♂, 5♀, 1 nymph, Charlton Farm, N Somerset East, 32°40′S, 25°40′E, 1271 m, 23.iv.2006, DVac, pasture with tufted, ungrazed (unpalatable) grass; 23♂, 17♀, Doon Farm, Thomas River, Cathcart, 32°28′S, 27°17′E, 1115 m, 24.iv.2006, DVac, grass on rocky outcrop covered with aloes; 19♂, 12♀, 3 nymphs, *ibid.*, holotype; 1♂, between Dordrecht and Rossouw, 31°48′S, 26°06′E, 1767 m, 26.iv.2006, DVac, road reserve; 2♂, 1♀, Groendal, Dordrecht, 31°09′S, 27°06′E, 1804 m, 26.iv.2006, DVac, road reserve; all collected by M. Stiller (BMNH, INHS, SANC).

Remarks. The plate of *V. bicornicans* (Fig. 39) resembles that of *V. pumilicans* (Figs 72, 73) and to a lesser extent with that of *V. budenticans* (Fig. 47). However, there are marked differences in the aedeagal configuration of these three species. *Vilargus pumilicans* has an elongate ventral paraphysis and short aedeagal shaft (Figs 68, 69), *V. budenticans* has a short ventral paraphysis and long aedeagal shaft (Figs 43,

44) and *V. bicornicans* has a dorsally curved shaft and ventrolateral tapering process arising from the base of the shaft (Figs 35, 36). The female sternite 7 of *V. bicornicans* has a notch that is narrower, parallel-sided and deeper (Fig. 42) than that of any other species of *Vilargus.* None of the dissections of 13 males and 5 females shows deformities.



FIGURES 1–6. *Vilargus* species. Habitus. 1–3, *V. bicornicans* **sp. n.** 1, male; 2, female; 3, nymph. 4–6, *V. budenticans* **sp. n.** 4–5, male; 6, female (scale = 1 mm).

***Vilargus budenticans* sp. n.**
(Figs 4–6, 43–51).

Diagnosis. Aedeagus with preatrium elongate, with single, symmetrical paraphysis, acutely angled to shaft; shaft with apex reaching as far as apex of paraphysis. Plate medial margin rounded to slightly sinuous, posterior margin shallowly sinuous, lateral margin broadly rounded, sometimes slightly sinuous. Pygofer with posterior dorsal and ventral margins square. Female with sternite 7 with shallow, rounded notch flanked by paired lobe of variable size.

Etymology. Latin, *bu-*, prefix meaning large, huge, great; *dentis*, tooth, masculine.

Colour. Male and female. Pale colour form is ochraceous with few fuscous markings, dark colour form is reddish brown with many fuscous markings on dorsum (specimens from Serala Forestry Station, Limpopo Province, Fig. 4–5, dark colour form; Fig. 6, pale colour form).

Male. Dimensions. (n=45) Length from apex of vertex to apex of tegmina 2.2–2.4 mm, length from apex of vertex to apex of abdomen 2.5–2.7 mm, median length of vertex 0.4–0.5 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.8–0.9 mm, width of pronotum 0.7–0.8 mm, diameter of ocellus 28 µm, ocellocular distance 38–49 µm.

Genitalia. Aedeagus, dorsally with dorsal apodeme reduced (Fig. 43). Aedeagal shaft, laterally, L-shaped, apex reaching as far as apex of paraphysis (Fig. 44 p); gonopore apical; preatrium expanded, angled acutely ventroposteriorly, membranously fused (Fig. 44 mf) anteriorly with almost symmetrical paraphysis; dorsal part of aedeagus close to paraphysis (Fig. 44). Connective fused (Fig. 44 fc) to paraphysis, arms parallel, stem reduced (Figs 44, 45). Style with anterior medial arm long, extending beyond base of apophysis, perpendicular to base, anterior lateral arm short, narrow; apophysis directed posteriad, basal half parallel, apex acute (Fig. 46); apophysis sometimes extending beyond margin of plate (Fig. 47). Plate generally roundly triangular; medial margin rounded to slightly sinuous, posterior margin shallowly sinuous, lateral margin broadly rounded, sometimes slightly sinuous; 2–6 submarginal macrosetae (Fig. 47). Pygofer rectangular (Fig. 49); dorsally as in Fig. 48. Pygofer lobe narrowly rectangular, widely fused with pygofer (Fig. 49).

Female. Dimensions. (n=28) Length from apex of vertex to apex of tegmina 2.3–2.6 mm, length from apex of vertex to apex of abdomen 2.9–3.2 mm, median length of vertex 0.5 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.9 mm, width of pronotum 0.8 mm, diameter of ocellus 28 µm, ocellocular distance 40–53 µm.

Genitalia. Sternite 7 posterior margin with notch of variable depth, flanked by rounded process of variable length and width (Figs 50, 51).

Material examined. Holotype male. South Africa. **Limpopo Province**. Serala Forestry Station, fire lookout, 24°00′S, 29°57′E, 2029 m, 7.xi.2005, M. Stiller, DVac, moribund grass (SANC). Paratypes. 64♂, 53♀, 15 nymphs. **Limpopo Province**. 6♂, 5♀, 6 nymphs, Wolkberg, at base of Serala Peak, 24°01′S, 30°03′E, 1700 m, 15.xii.2003, sweeping grass regrowth after fire, common species: *Elionurus muticus*, *Harpachloa falx*, *Melinis nervi-glumis*, *Panicum natalensis*, *Themeda triandra*, *Festuca* sp. (Poaceae); 38♂, 24♀, *ibid.*, holotype; 6♂, 5♀, Wolkberg Wilderness, grassy hills, 23°59′S, 30°04′E, 1775 m, 23.ix.2007, sweeping, *Festuca* sp, and moribund grass; 1♀, Wolkberg near Tzaneen, 23°50′S, 30°10′E, 18.iv.1992; 3♂, 1♀, 1 nymph, Marake Peak at base, Drakensberg, 24º03′32.48″S, 30º09′49.66″E, 1473 m, 24.iv.2009; 8♂, 13♀, 6 nymphs, Marake Peak near summit, Drakensberg, 24º04′48.62″S, 30º10′11.08″E, 1705 m, 24.iv.2009; 3♂, 4♀, 1 nymph, Thabina River valley, 24º02′54.17″S, 30º07′00.08″E, 1434 m, 24.iv.2009; all collected by M. Stiller (BMNH, INHS, SANC).

Remarks. The aedeagus of *V. budenticans* (Figs 43, 44) resembles that of *V. pumilicans* (Figs 68, 69). In *V. budenticans* the paraphysis and connective are fused and the apex of the shaft extends as far as the apex of the paraphysis. In *V. pumilicans* the connective articulates with the paraphysis, and has the aedeagal shaft only about half as long as the length of the paraphysis. Furthermore the pygofer in *V. pumilicans* has the posterior dorsal angle produced into a triangular lobe (Fig. 74), and in *V. budenticans* the lobe is narrow and rectangular (Fig. 49). Other differences include the shape of the plate with the apophysis of the style sometimes protruding beyond its posterior margin (Fig. 47), which in *V. pumilicans* is always retracted behind the posterior margin (Figs 72, 73). Sternite 7 of the females of these two species also differs significantly. The sternite 7 of *V. budenticans* (Figs 50, 51) of some examined specimens showed damage to the posterior margin (Fig. 51). One male of this species had the paraphysis broken off. None of the dissected specimens displayed obvious signs of parasitism.

Vilargus campanus (Naudé)

Deltocephalus campanus Naudé, 1926: 48; 1929: 12.
Vilargus campanus (Naudé), Webb & Viraktamath, 2009: 30.

Remarks. This species was described in *Deltocephalus* from a single female from Bloemfontein in the Free State Province, according Naudé (1926). Despite extensive search the specimen could not be traced and is assumed lost. Based on the original description and figures, Webb & Viraktamath (2009) placed this species in the genus *Vilargus.* Four species of *Vilargus* have a similar shape of the female sternite 7, that is *V. dentulicans* (Fig. 59), *V. lobulicans* (Fig. 67), *V. pumilicans* (Figs 77–79) and *V. trunculicans* (Figs 111–115), when compared to Naudé's drawing of the female sternite 7 of *V. campanus.* Present distribution records indicate that *V. pumilicans* and *V. trunculicans* occur in the Free State Province, albeit not from the type locality of *V. campanus*. For these reasons and the lack of unique external features in most species of *Vilargus,* the status of *V. campanus* cannot be confirmed, other than its correct placement in *Vilargus.*

***Vilargus dentulicans* sp. n.**
(Figs 7–9, 52–59).

Diagnosis. Aedeagal shaft laterally with subbasal triangular process, about one third as long as shaft; dorsally with concave dorsal apodeme. Plate triangular with posterior medial margin truncated. Pygofer posteromedial margin, below pygofer lobe, with rounded, sclerotized, posteriad protrusion.

Etymology. Latin, *dentulus*, diminutive of tooth, for the small tooth on the shaft of the aedeagus.

Colour. Male. Ochraceous (Fig. 7, specimen from Clocolan; Fig. 8, specimen from Rhodes, collected 2000, with few fuscous markings dorsally; Fig. 9, specimen from Rhodes, collected 2006, with more fuscous markings dorsally).

Male. Dimensions. (n=69) Length from apex of vertex to apex of tegmina 2.0–2.3 mm, length from apex of vertex to apex of abdomen 2.5–2.8 mm, median length of vertex 0.4 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.8 mm, width of pronotum 0.7–0.8 mm, diameter of ocellus 26–30 µm, ocellocular distance 30–45 µm.

Genitalia. Aedeagus dorsally, with single, acutely triangular spine, arising lateroventrally from subbasal part of shaft, spine about one third as long as shaft; shaft apex deflected slightly laterad (towards side with spine); dorsal apodeme transverse, concave (Fig. 52). Aedeagus laterally, shaft C-shaped, apex angled dorsoposteriorly; gonopore subapical, ventral (Fig. 53). Connective with arms asymmetrical, one arm curved laterad, shorter than other, straight arm (Fig. 54). Style with anterior medial arm perpendicular to base, apophysis with apex truncate, 3–4 ventroapical teeth (Fig. 55). Plate with base triangular, medial margin straight, divergent, lateral margin sinuous apically, rounded basally; apex somewhat rectangular, sometimes lateral distal angle acute, usually right-angled, sometimes notched medially; 3–7 uniseriate, marginal macrosetae (Fig. 56), sometimes one offset more medially; aedeagus in cleared specimen, when viewed as in Fig. 56, with spine always on left side. Pygofer laterally, about rectangular, dorsal and ventrobasal margin parallel, ventrodistal margin angled dorsad, sinuous, medially with sclerotized lobe (Fig. 58); dorsally, as in Fig. 57. Pygofer lobe narrow, rounded, merged with dorsal margin of pygofer; apex extending well beyond posterior apex of plate (Fig. 58).

Female. Dimensions. (n=21) Length from apex of vertex to apex of tegmina 2.1–2.4 mm, length from apex of vertex to apex of abdomen 2.7–3.1 mm, median length of vertex 0.4–0.5 mm, length of vertex next to eye 0.4–0.5 mm, length of pronotum 0.3 mm, width of head 0.8–0.9 mm, width of pronotum 0.7–0.8 mm, diameter of ocellus 26–30 µm, ocellocular distance 31–45 µm.

Genitalia. Sternite 7 with posterior margin with shallow, narrow notch (Fig. 59).

Material examined. Holotype male. South Africa. **Free State Province**. Platberg, summit, Ladybrand, 29°11′S, 27°25′E, 1740 m, 5.iii.2002, M. Stiller, DVac, common grasses and sedges as follows: *Andropogon schirensis; Eragrostis capensis, E. curvula, E. sclerantha* subsp. *sclerantha, Heteropogon contortus* (Poaceae), *Ficinia* sp. (Cyperaceae) (SANC). Paratypes. 79♂, 35♀. **Eastern Cape Province**. 1♂, 2♀, Aliwal North, 30°45′S, 26°45′E, 12.i.1986, J.G. Theron, sweeping; 4♂, 2♀, Rhodes, 30°48′S, 27°58′E, 23.iv.2000, M. Stiller, sweeping grass; 18♂, 5♀, Rhodes, 30°51′S, 27°54′E, 1965 m, 27.iv.2006, M. Stiller, DVac, roadside grass and forbs, *Eragrostis* sp. dominant. **Free State Province**. 1♂, Golden Gate, 28°31′S, 28°37′E, 6.i.1971, R. Kluge, sweeping; 1♂, Fouriesburg, 28°37′S, 28°13′E, 19.xii.1978, J.G. Theron, sweeping; 3♂, 2♀,

Clocolan, 28°54′S, 27°32′E, 11.i.1986, J.G. Theron, sweeping; 8♂, 6♀, Zastron 1 km N, 30°15′S, 27°04′E, 1550 m, 5.iii.2002, M. Stiller, DVac, *Themeda triandra* dominant on dry embankment on road verge; 21♂, 9♀, *ibid.*, holotype; 1♂, 3♀, Koloniesplaas, Memel, 27°42′S, 28°36′E, 1850 m, 14.xi.2003, M. Stiller, grazed pasture, sweeping, short, grazed grass (less than 5cm long); 2♂, Golden Gate, site #5, 28°31′S, 28°34′E, 1890 m, 23.x.2005, MDTP survey, blue and white pan trap. **KwaZulu-Natal Province**. 1♂, 2♀, Dundee, 28°10′S, 30°14′E, 21.i.1981, J.G. Theron, sweeping. **Mpumalanga Province**. 1♂, Ossewakop, Wakkerstroom, 27°23′S, 30°09′E, 2160 m, 7.iii.2002, M. Stiller, DVac; 12♂, Cedarmont road, 26°44′S, 29°03′E, 1550 m, 4.i.2004, M. Stiller, sweeping; 3♂, Belfast 1 km W, 25°41′S, 29°58′E, 1900 m, 17.ii.2005, M. Stiller, grass and forbs in grazed pasture, DVac. **North-West Province**. 2♂, 1♀, Vredefort Dome near Parys, 26°48′S, 27°22′E, 26.xii.2000, M. Stiller, grass and forbs, sweeping (BMNH, INHS, SANC).

Remarks. The male of *V. dentulicans* can be recognized by the narrow rectangular plate apex (Fig. 56) and the lateral, single, triangular spine on the aedeagal shaft (Figs 52, 53). All other species of *Vilargus* have the plate rounded, truncate or triangular, except in *V. lobulicans*, where the process of the plate is also narrow, but distinctly rounded (Fig. 64). *Vilargus lobulicans* is also the only species that does not have a distinct process on the shaft or preatrium, and is considered to have fused with the shaft, and therefore giving rise to the expanded, asymmetrical apex of the shaft. The pygofer lobe of *V. dentulicans* with its ventral, rounded sclerotized tooth is similar to that found in *V. bicornicans*, but the plate and aedeagus of this species and *V. dentulicans* differ significantly. The shape of the plate is however similar to *Pravistylus trunculidiscus* Stiller, 2010, although the aedeagus does not correspond with that of this species, or for that matter with the genus. None of the 27 dissected males of *V. dentulicans* show obvious signs of parasitism by Dryinidae or Pipunculidae.

***Vilargus lobulicans* sp. n.**
(Figs 10–14, 60–67).

Diagnosis. Aedeagus without process, but apex expanded with small, lateral, asymmetric lobes. Plate triangular, with posterior medial margin narrowly digitate. Pygofer lobe acutely triangular.

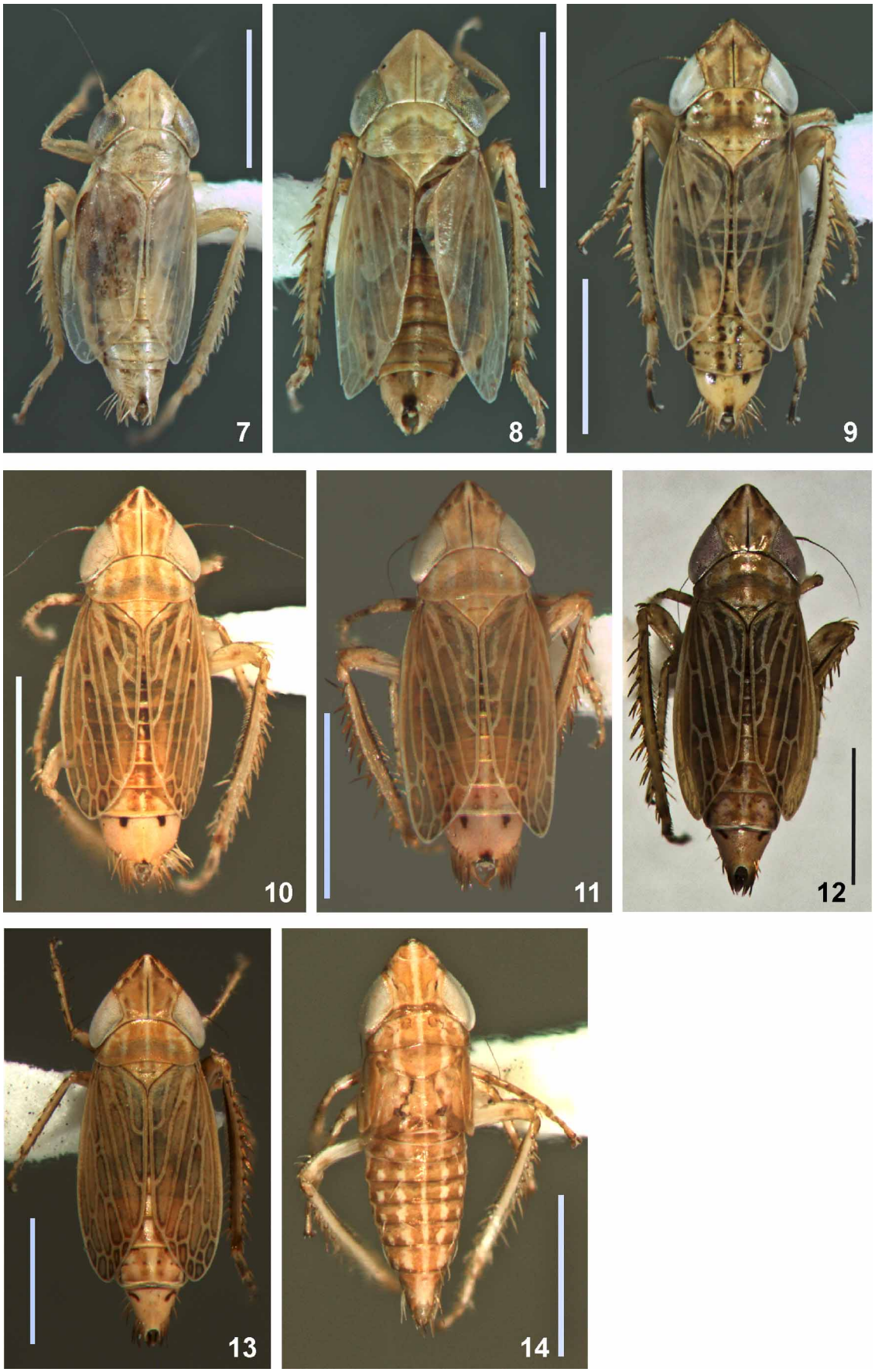
Etymology. Latin, *lobus*, m. an elongated protuberance or projection, *lobulicus*, diminutive, for the shape of the subgenital plate that has the posterior margin produced into a blunt process.

Colour. Male, **female and nymph**. Ochraceous (Figs 10, 12, 14, specimens from Henderson Heights; Figs 11, 13, specimens from Matatiele).

Male. Dimensions. (n=60) Length from apex of vertex to apex of tegmina 2.2–2.4 mm, length from apex of vertex to apex of abdomen 2.5–2.8 mm, median length of vertex 0.4 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.8 mm, width of pronotum 0.7–0.8 mm, diameter of ocellus 21–30 µm, ocellocular distance 36–46 µm.

Genitalia. Aedeagal shaft without basal or medial process; dorsally, apex of shaft bearing small, paired, lateral, asymmetric lobes, base of shaft parallel-sided, dorsal apodeme expanded posterolaterally (Fig. 60); laterally, shaft slightly curving dorsally, tapering towards apex (Fig. 61); gonopore apical, on one side of expanded apex (Fig. 60). Connective symmetrical, stem slightly narrower than width across arms, stem and arms of similar width, stem about half as long as arms (Fig. 62). Style with anterior medial arm short, not reaching beyond base of apophysis, acutely angled to base; apophysis elongate, apex acute, base parallel-sided (Fig. 63). Plate generally equidistantly triangular, medial margin straight, divergent; lateral margin subapically variably sinuous, sometimes straight, apex narrowed, digitate, about one third as long as length of plate, sometimes sclerotized; 3–6 uniseriate, medial macrosetae (Fig. 64). Pygofer rectangular, ventroposterior margin rounded (Fig. 66); dorsal view as in Fig. 65. Pygofer lobe subapical, acutely triangular (Fig. 66).

Female. Dimensions. (n=50) Length from apex of vertex to apex of tegmina 2.4–2.6 mm, length from apex of vertex to apex of abdomen 3.0–3.2 mm, median length of vertex 0.4–0.5 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.8–0.9 mm, width of pronotum 0.8 mm, diameter of ocellus 25–29 µm, ocellocular distance 39–47 µm.



FIGURES 7–14. *Vilargus* species. Habitus. 7–9. *V. dentulicans* **sp. n.** male. 10–14. *V. lobulicans* **sp. n.** 10–11, male; 12–13, female; 14, nymph. (scale = 1 mm).

Genitalia. Sternite 7 posterior margin with rounded notch (Fig. 67).

Material examined. Holotype male. South Africa. **Eastern Cape Province**. Vlakfontein Farm, south Queenstown, 31°57′S, 26°47′E, 1075 m, 19.iv.2006, M. Stiller, DVac, pasture grass (SANC). Paratypes. 57♂, 38♀, 9 nymphs. **Eastern Cape Province**. 3♂, 1♀, Queenstown, 31°54′S, 26°53′E, 20.i.1984, sweeping; 1♂, Cathcart, 32°18′S, 27°12′E, 20.i.1984; 1♂, Lady Grey, 30°40′S, 27°15′E, 12.i.1986, sweeping; all J.G. Theron; 16♂, 18♀, *ibid.*, holotype; 2♂, road between Molteno and Steynsburg, 31°15′S, 26°00′E, 1617 m, 20.iv.2006, DVac, *Merxmuellera* sp. dominant; 3♂, 5♀, Doon Farm, Thomas River, Cathcart, 32°28′S, 27°17′E, 1115 m, 24.iv.2006, DVac, wet grass on rocky slope, leading to ridge covered with aloes; 9♂, 6♀, 9 nymphs, Henderson Heights, NE Cathcart, 32°15′S, 27°11′E, 1270 m, 24.iv.2006, DVac, grazed pasture; 18♂, 8♀, Matatiele, 30°25′S, 28°39′E, 1435 m, 30.iv.2006, DVac, grazed pasture. **Northern Cape Province**. 4♂, Warrenton, 10 km E, 28°10′S, 24°56′E, 1225 m, 3.viii.2005, DVac, grass and forbs; all collected by M. Stiller (BMNH, INHS, SANC).

Remarks. *Vilargus lobulicans* is known from widely separated localities in the Eastern and Northern Cape Provinces but probably also occurs elsewhere. The aedeagus of specimens from all these localities is remarkably uniform, whereas the shape of the plate is variable. Furthermore, the aedeagus of this species is the least characteristic of all the species of *Vilargus* as it does not have a lateral or ventral process (Figs 60, 61). It is speculated that the characteristic shape of the male aedeagus of this species is the result of fusion of the process with the shaft, resulting in the relatively thick shaft and apical modifications. The species is placed in *Vilargus* due to the notched posterior margin of the female sternite 7. In terms of the aedeagus, it closely resembles a number of species of *Pravistylus,* such as *P. mecophysis, P. bidentidiscus* and *P. caenophallus* (Stiller, 2010). However, in general the sternite 7 of females of *Pravistylus*, is ligulate, or occasionally notched, but then flanked by paired, acute processes (Stiller, 2010). Conversely species of *Vilargus* are characterized by having the female with the sternite 7 notched, e.g. *V. bicornicans*, Fig. 42, *V. dentulicans*, Fig. 59, *V. lobulicans*, Fig. 67, *V. pumilicans*, Figs 76–79, and *V. trunculicans*, Figs 111–115. Two exceptions are *V. budenticans*, (Figs 50, 51, notch flanked with rounded process) and *V. triquetricans* (Fig. 103, ligulate). The males of these latter two species have the aedeagus with a basal paraphysis or an asymmetric process respectively. No parasitized or deformed specimens were found in the dissections of 23 males and 10 females.

***Vilargus pumilicans* (Naudé)**
(Figs 15–21, 68–85).

Deltocephalus pumilicans Naudé, 1926: 49.
Vilargus pumilicans (Naudé); Theron, 1975: 198.

Diagnosis. Aedeagal preatrium with single, elongate, posteriad paraphysis, about twice as long as shaft, paraphysis asymmetrical. Pygofer lobe triangular, subapical. Female sternite 7 with notch of variable depth and width.

Colour. Male and female. Vertex colouration variable, yellowish to ochraceous, sometimes with fuscous markings. About 7 horizontal arcs visible on clypeus. Usually brachypterous, with female occasionally macropterous or rarely males macropterous. Brachypters as in Figs 15, 17, specimens from Steenkoolspruit; Figs 16, 18, specimens from Volksrust. Macropters as in Figs 19, 20, specimens from Steenkoolspruit; Fig. 21, specimen from Volksrust.

Abdominal apodeme. Figs 75, 76.

Male. **Dimensions**. (n=80) Length from apex of vertex to apex of tegmina 2.1–2.4 mm, length from apex of vertex to apex of abdomen 2.3–2.7 mm, median length of vertex 0.4 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.7–0.8 mm, width of pronotum 0.7 mm, diameter of ocellus 26–29 µm, ocellocular distance 33–46 µm.

Genitalia. Aedeagus, dorsally, with dorsal apodeme expanded laterad, about two times wider than width across paraphysis (Fig. 68). Aedeagal shaft, laterally, arising dorsally from atrium, curved dorsally; preatrium expanded ventrad, sclerotized fusion with paraphysis (Fig. 69 sf), paraphysis (Fig. 69 p) directed posteriad,

dorsal part of aedeagus well separated from paraphysis; paraphysis mediolateral margin sometimes asymmetrically expanded dorsad; shaft about one third as long as length of paraphysis (Fig. 69); gonopore apical, oblique. Connective with stem and arms of similar length, arms slightly asymmetric (Fig. 70), articulating with aedeagus at fusion between paraphysis and expanded preatrium (Fig. 69 c). Style with apophysis variably positioned in plate:

a. Apophysis near base of plate (Fig. 72, specimen from Charlton Farm, Eastern Cape Province) and in specimens from other localities in Eastern Cape Province, Free State Province, Gauteng Province, KwaZulu-Natal Province, and Mpumalanga Province.
b. Apophysis near apex of plate (Fig. 73, specimen from De Hoop Nature Reserve, Western Cape Province).

Plate generally triangular; medial margin short, straight, divergent or parallel, posterior margin broadly rounded, lateral margin converging on medial margin, slightly rounded; 3–5 marginal macrosetae; median length from apex of valve to apex of plate slightly less than greatest median length of valve (Figs 72, 73). Pygofer lobe subapical, triangular (Fig. 74).

Female. **Dimensions**. Brachypter (n=73). Length from apex of vertex to apex of tegmina 2.3–2.5 mm, length from apex of vertex to apex of abdomen 2.7–3.0 mm, median length of vertex 0.4–0.5 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.8–0.9 mm, width of pronotum 0.7–0.8 mm, diameter of ocellus 26–29 µm, ocellocular distance 36–50 µm.

Macropter (n=6). Length from apex of vertex to apex of tegmina 2.9–3.2 mm, length from apex of vertex to apex of abdomen 2.7–3.0 mm, median length of vertex 0.4–0.5 mm, length of vertex next to eye 0.2–0.3 mm, length of pronotum 0.3–0.4 mm, width of head 0.8–0.9 mm, width of pronotum 0.8 mm, diameter of ocellus 28 µm, ocellocular distance 34–45 µm.

Genitalia. Sternite 7 with posterior margin notched, of variable depth and width (narrow, shallow as in Figs 77, specimen from Bergville; wide, shallow as in Fig. 78, specimen from Cedarmont; deep as in Fig. 79, specimen from Charlton Farm)

Valvula 3 with about 8 submarginal setae (Figs 80, 81); valvula 2 uniformly pointed (Fig. 82), finely denticulate (Fig. 83); valvula 1 lanceolate (Fig. 84), sculpture imbricate (Fig. 85).

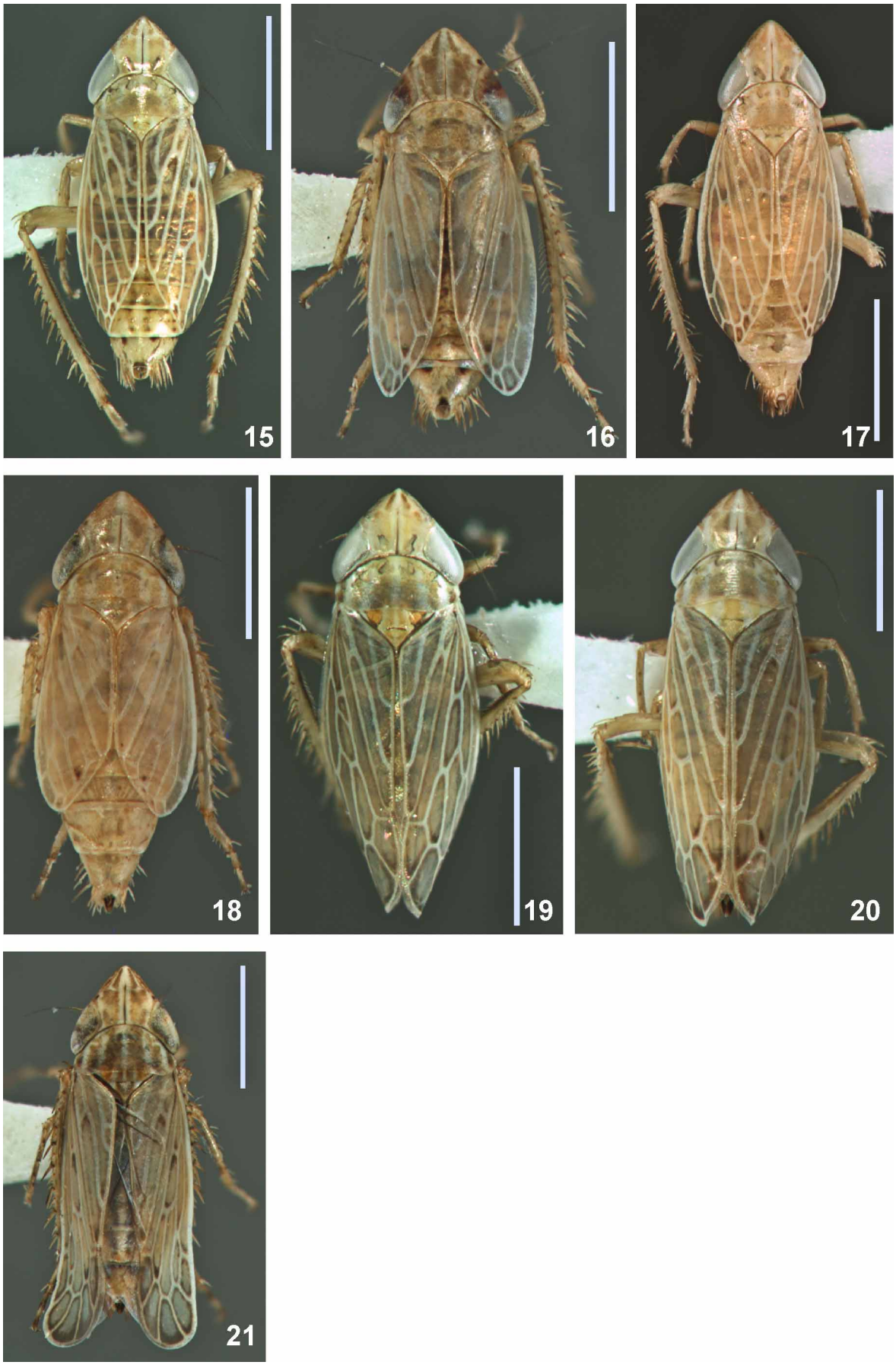
Type material examined. Holotype male. South Africa. Western Cape Province. Viljoen's Pass, [*c.* 34°05′S, 19°04′E], 12.i.1923, F.W. Pettey (SANC). Paratypes. 3♂, *ibid.*, holotype (SANC).

Additional material examined. 346♂, 251♀, 23 nymphs. Numerous localities in Lesotho and the following provinces in South Africa: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Northern Cape, North-West, Western Cape (BMNH, INHS, SANC).

Remarks. Naudé (1926) described this species from 5 males reportedly recorded from Viljoen's Pass near Elgin in the Western Cape Province. The holotype and three paratypes have remained in the collection (SANC), and as these specimens were preserved in alcohol (according to Naudé) their colours are now almost completely faded. Theron (1975) reported that no specimens of *V. pumilicans* were found at the type locality and that it appeared that their distribution was probably highly sporadic. This trend is also evident in material acquired more recently, and that colouration is also variable.

Vilargus pumilicans is variable in the degree of asymmetry of the paraphysis of the aedeagus of the male. Furthermore, there appears to be a small but consistent difference between the male specimens from the Western Cape and those from other provinces. In the Western Cape the dorsal apophysis of the style is elongated and reaches the apex of the posterior margin of the plate, and in specimens from other provinces the style is shorter and well retracted into the plate. Throughout the distribution of *V. pumilicans* the posterior margin of the female sternite 7 is highly variable, with the notch as deep as wide, to very shallow and wide. For instance *V. lobulicans* (Fig. 67), *V. trunculicans* (Figs 111–115) and to a lesser extent *V. dentulicans* (Fig. 59) have a similar notch to that of *V. pumilicans* (Fig 77–79). Species recognition is therefore based on the male, and only when at least one species of *Vilargus* is found at a particular site, can the associated female sometimes be identified to species.

The aedeagus of *V. pumilicans* is similar to that of *V. budenticans* with differences in the shape of the plate, pygofer and female sternite 7 as discussed under the remarks of the latter. The plate of *V. pumilicans* and



FIGURES 15–21. *Vilargus pumilicans* **sp. n.** Habitus. 15–16, 19, male; 17–18, female; 20–21, female (scale = 1 mm).

V. bicornicans are similar, with distinct difference found in the aedeagus, pygofer, pygofer lobe and female sternite 7, as discussed under the remarks of the latter.

Parasitized specimens are rare. Out of 60 dissected males, four were parasitized and three had the paraphysis broken. Three of the four parasitized specimens have a Y-shaped connective, and one has a deformed plate but normal connective.

***Vilargus simulans* sp. n.**
(Figs 86–91).

Diagnosis. Aedeagal shaft with subbasal, ventrolateral, narrow spine. Plate rectangular.

Etymology. Latin, *simulatus*, imitate, copy, for the similarity of the plate to that of *V. trunculicans* **sp. n.**

Colour. Male. Ochraceous, few or no fuscous markings dorsally (all examined material collected into alcohol).

Male. Dimensions. (n=32) Length from apex of vertex to apex of tegmina 2.0–2.2 mm, length from apex of vertex to apex of abdomen 2.4–2.6 mm, median length of vertex 0.4 mm, length of vertex next to eye 0.2–0.3 mm, length of pronotum 0.3 mm, width of head 0.7–0.8 mm, width of pronotum 0.7 mm, diameter of ocellus 28 µm, ocellocular distance 37–44 µm.

Genitalia. Aedeagus ventrally, shaft arising from preatrium, spine arising ventrolaterally, subbasally on shaft, spine about half as long as shaft; dorsal apodeme produced laterally, with sclerotized concave margin; gonopore apical, posterior (Figs 86, 87). Connective with arms slightly asymmetric, one arm shorter, more curved than other, straight arm; stem triangular, about as long as arms (Fig. 88). Style with anterior medial arm short, not reaching much beyond base of apophysis, approximately right-angled to base; apophysis digitate, apex pointed (Fig. 89). Plate generally rectangular, short, medial and posterior margins right-angled, lateral margin slightly convergent; 2–4 macrosetae (Fig. 90). Pygofer about rectangular; posteroventral margin rounded (Fig. 91). Pygofer lobe acutely triangular, subbasal (Fig. 91).

Female. Unknown.

Material examined. Holotype male. South Africa. **Eastern Cape Province**. Qachasnek, site #31, 30°10′S, 28°36′E, 1717 m, 29.xi.2005, MDTP survey, sweeping (SANC). Paratypes. 24♂. **Lesotho**. 1♂, Sehlabathebe Nature Reserve, 29°53′S, 29°04′E, 1.iv.1994, M. Stiller, sweeping grass. **South Africa**. **Eastern Cape Province**. 3♂, Qachasnek, site #32, 30°10′S, 28°36′E, 1706 m, 29.xi.2005, MDTP survey, sweeping; 20♂, *ibid.*, holotype (BMNH, INHS, SANC).

Remarks. *Vilargus simulans* is very similar in external appearance and shape of the plate to that of *V. trunculicans*. However the male genitalia, specifically the aedeagus, are distinctly different in these two species. In *V. trunculicans* the aedeagal shaft in dorsal view is positioned laterad of the midline, with a process that is longer than the shaft, arising from the opposite side of the preatrium (Figs. 104, 105). In *V. simulans* the aedeagal shaft arises on the midline, and has a process that is about half as long as the shaft, arising subbasally and ventrolaterally from the shaft (Figs 86, 87). No other species of *Vilargus* has a process of similar length. So far *V. simulans* has been recorded from Qachasnek and Sehlabathebe, whereas *V. trunculicans* occurs further north in a number of provinces. Some male and female specimens of *V. pumilicans* were also recorded from Qachasnek. No significant differences in colour and shape of the sternite 7 between females from the type locality and females of *V. pumilicans* are recognized. Therefore a female cannot be assigned to *V. simulans*. No deformed specimens were examined.

***Vilargus triquetricans* sp. n.**
(Figs 22–27, 92–103).

Diagnosis. Aedeagus with parallel-sided process arising laterally from base of shaft, length variable (as long as or shorter than shaft). Plate acutely triangular, apex angled dorsad, of variable length. Female sternite 7 posterior margin with short, blunt, median ligula.

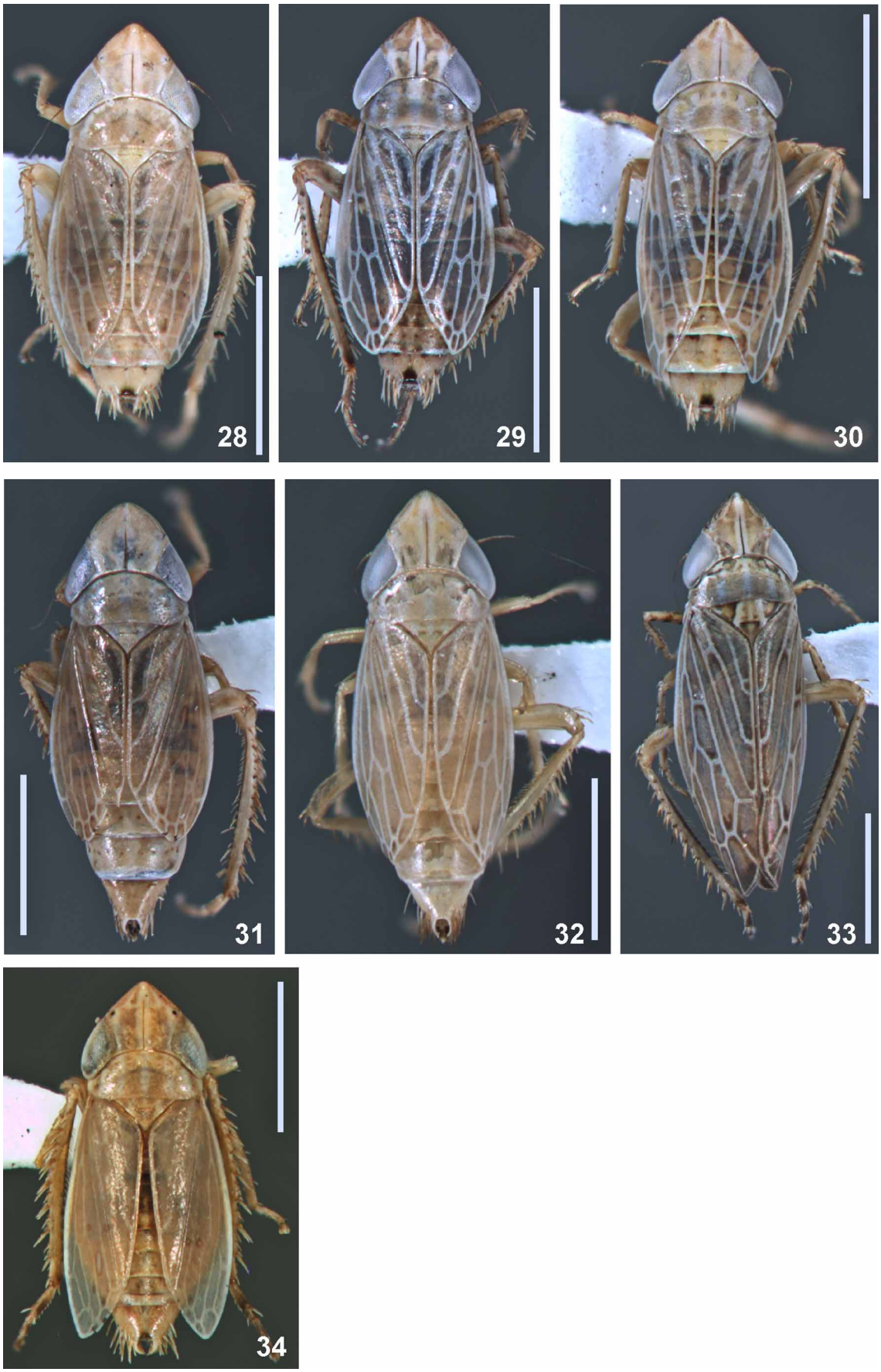
FIGURES 22–27. *Vilargus triquetricans* **sp. n.** Habitus. 22–24, male; 25–26, female; 27, nymph (scale = 1 mm).

Etymology. Latin, *tri*, three, *quetra*, suffix meaning angle, for the triangular shape of the subgenital plate.

Colour. Male, **female and nymph**. Ochraceous, sometimes with more distinct darker fuscous markings dorsally (Figs 22, 23, 25 (fuscous markings); nymph, Fig. 27, all specimens from Orrie Baragwanath; Figs 24, 26, specimens from Serala (few or without fuscous markings).

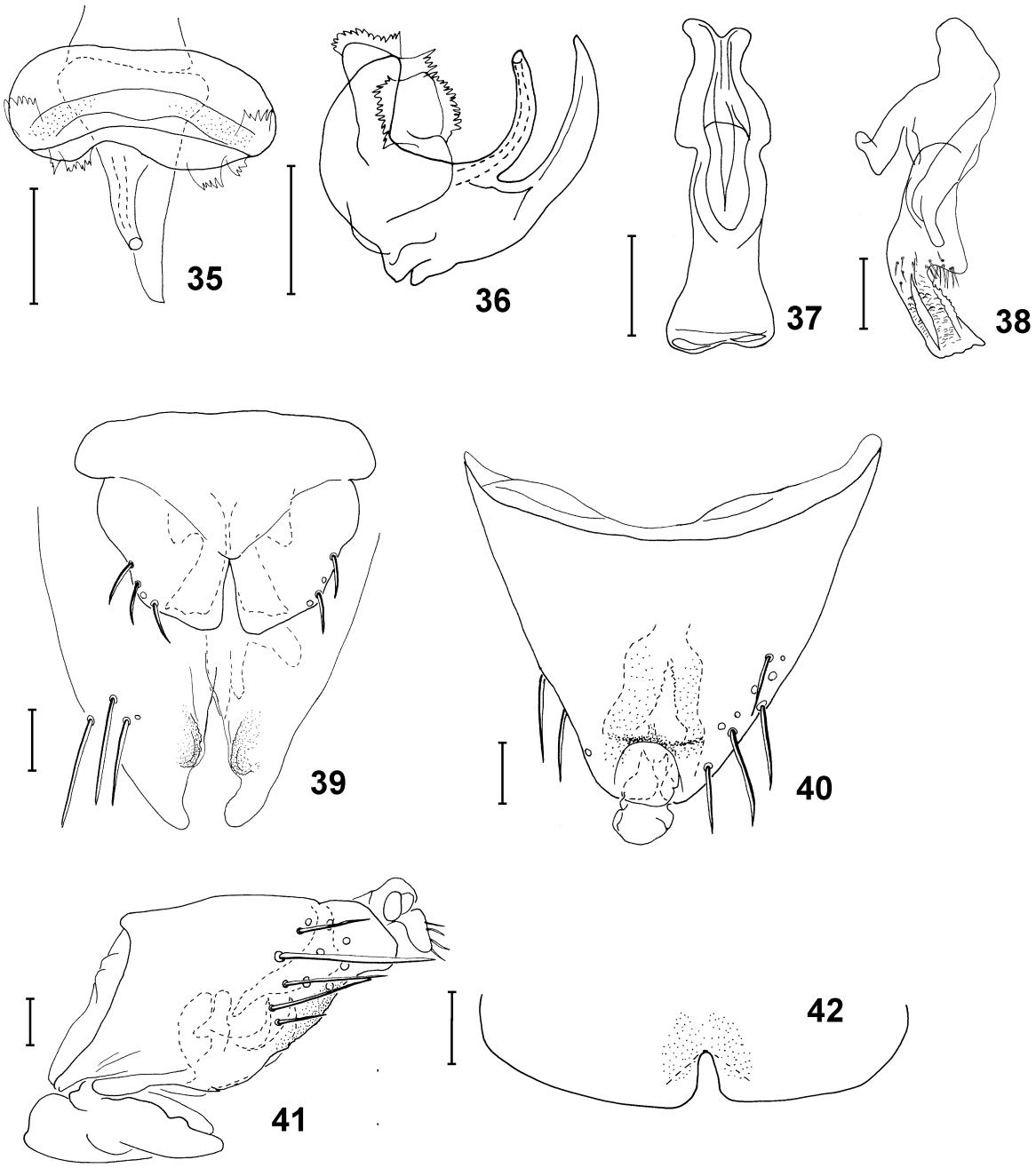
Male. Dimensions. (n=23) Length from apex of vertex to apex of tegmina 2.0–2.2 mm, length from apex of vertex to apex of abdomen 2.4–2.6 mm, median length of vertex 0.4–0.5 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.7–0.8 mm, width of pronotum 0.7 mm, diameter of ocellus 28 µm, ocellocular distance 36–47 µm.

Genitalia. Aedeagus, laterally, dorsal apodeme angled or curved posteriad, shaft arising from preatrium, C-shaped, wide basally, tapered toward apex (Fig. 93). Aedeagus, posteriorly, dorsal apodeme semicircular, shaft somewhat depressed, asymmetrical, single spine arising laterobasally from shaft (Fig. 92). Shaft and spine variable (Figs 92, 96, 97, 98), three forms recognized: Aedeagus, veiwed ventrally,



FIGURES 28–34. *Vilargus trunculicans* **sp. n.** Habitus. 28–30, male; 31–34, female (scale = 1 mm).

a. Spine as long as shaft, curved widely, tapered uniformly (Figs 92, 93); apex of shaft asymmetrical, acute; gonopore subapical; specimens from Strydpoortberg.
b. Spine about half as long as shaft with apex compressed (Figs 96, 97); apex of shaft asymmetrical, laterally with two unpaired, variable triangular processes, apex deflected laterad; gonopore apical (Figs 96, 97); specimens from Orrie Baragwanath Pass.
c. Spine slightly shorter than shaft, digitate; opposite side with very short rounded protrusion (Fig. 98); apex asymmetrical, with long, acute subapical spine, apex curved slightly laterad; gonopore apical (Fig. 98); specimens from Serala Forestry Station.



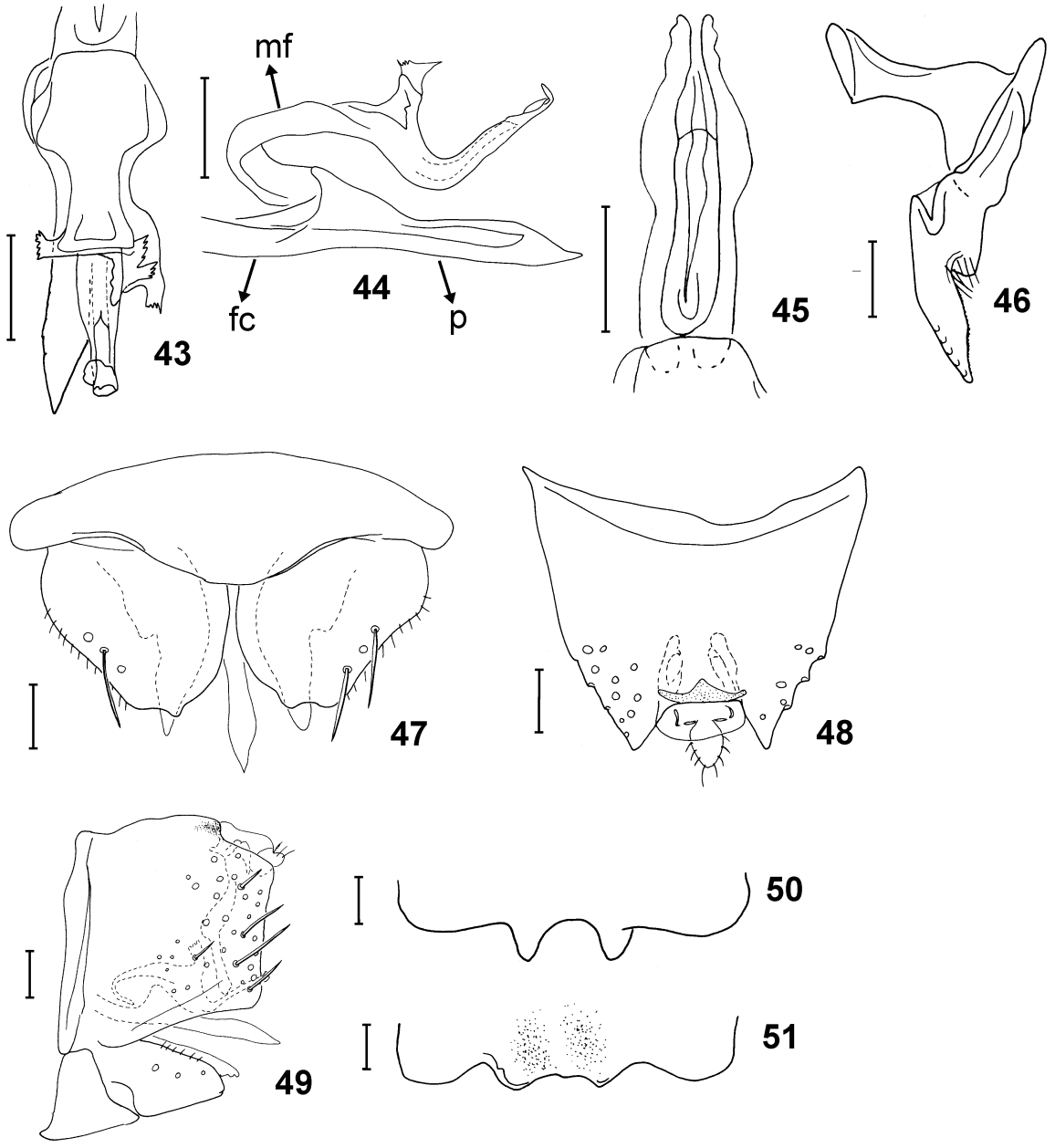
FIGURES 35–42. *Vilargus bicornicans* **sp. n.** Male and female genitalia. 35, aedeagus, dorsally; 36, aedeagus, laterally; 37, connective; 38, style; 39, plate; 40, pygofer, dorsally; 41, pygofer, laterally; 42, female, sternite 7 (scale = 0.1 mm).

Connective symmetrical, width across stem and arms similar; stem one third length of arms, constricted at base (Fig. 94). Style (Fig. 95) with anterior medial lobe extending beyond base of apophysis, acutely angled to base; apophysis acute. Plate ventrally acutely triangular; apex curved or bent dorsad at right angle, apex of

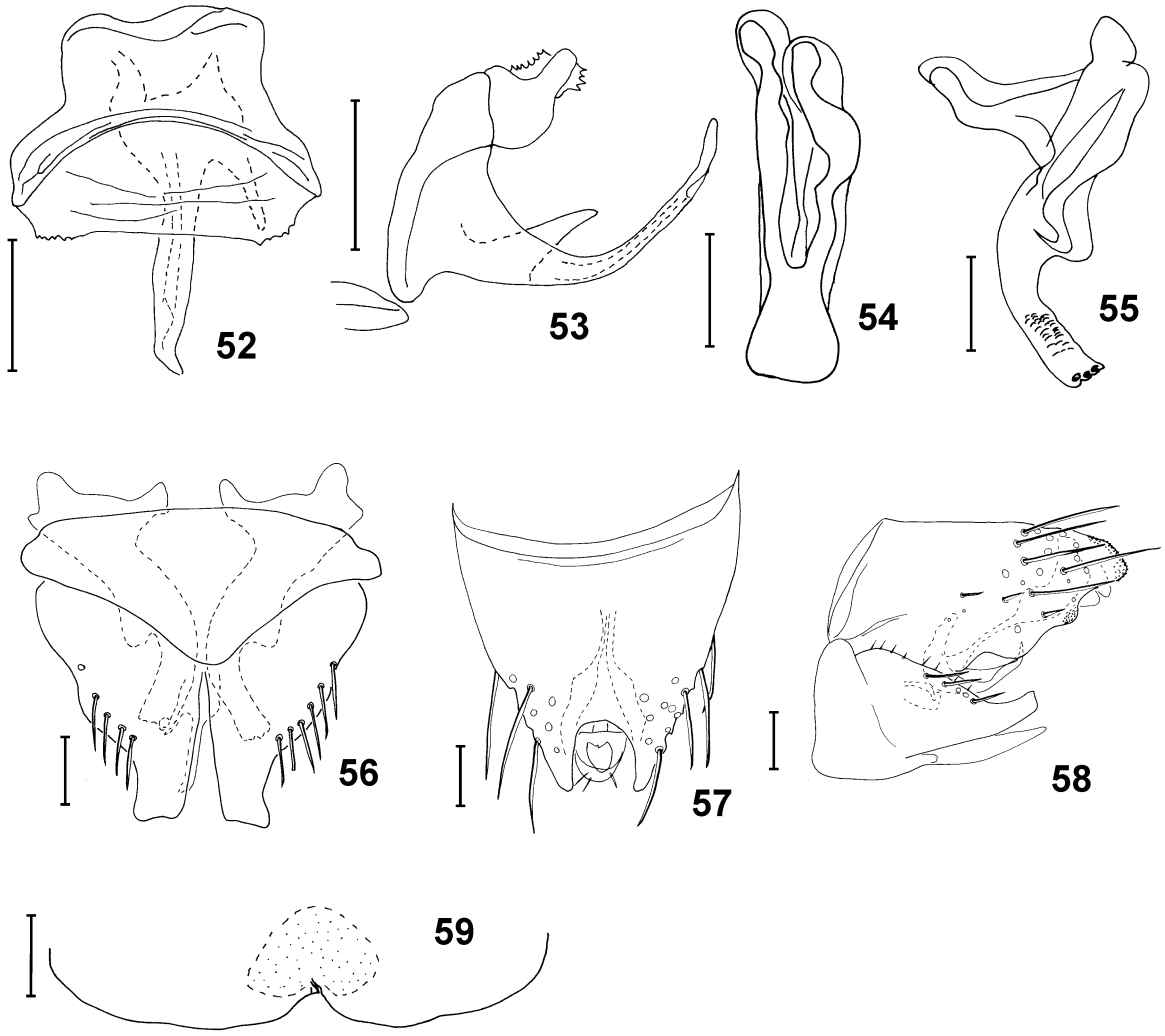
variable length: about one quarter as long as length of plate (specimens from Serala Forestry Station and Strydpoortberg), or about one third as long as length of plate (Fig. 99) (specimens from Orrie Baragwanath Pass); aedeagus in cleared specimen, when viewed as in Fig. 99, with spine always on right side. Pygofer, laterally, rectangular (Fig. 101, 102); dorsally as in Fig. 100. Pygofer lobe variable, rounded or triangular, arising apically or subapically from dorsoposterior margin of pygofer, about half as wide across base as width of pygofer (Figs 101, 102).

Female. **Dimensions**. (n=11) Length from apex of vertex to apex of tegmina 2.2–2.4 mm, length from apex of vertex to apex of abdomen 2.8–3.2 mm, median length of vertex 0.5 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.8–0.9 mm, width of pronotum 0.7–0.8 mm, diameter of ocellus 28 µm, ocellocular distance 39–50 µm.

Genitalia. Sternite 7 posterior margin with short, blunt ligula (Fig. 103).



FIGURES 43–51. *Vilargus budenticans* **sp. n.** Male and female genitalia. 43, aedeagus, dorsally; 44, aedeagus, laterally, mf = membranous fusion, fc = fused connective, p = paraphysis; 45, connective; 46, style; 47, plate; 48, pygofer, dorsally; 49, pygofer, laterally; 50, female, sternite 7; 51, female, sternite 7 (scale = 0.1 mm).



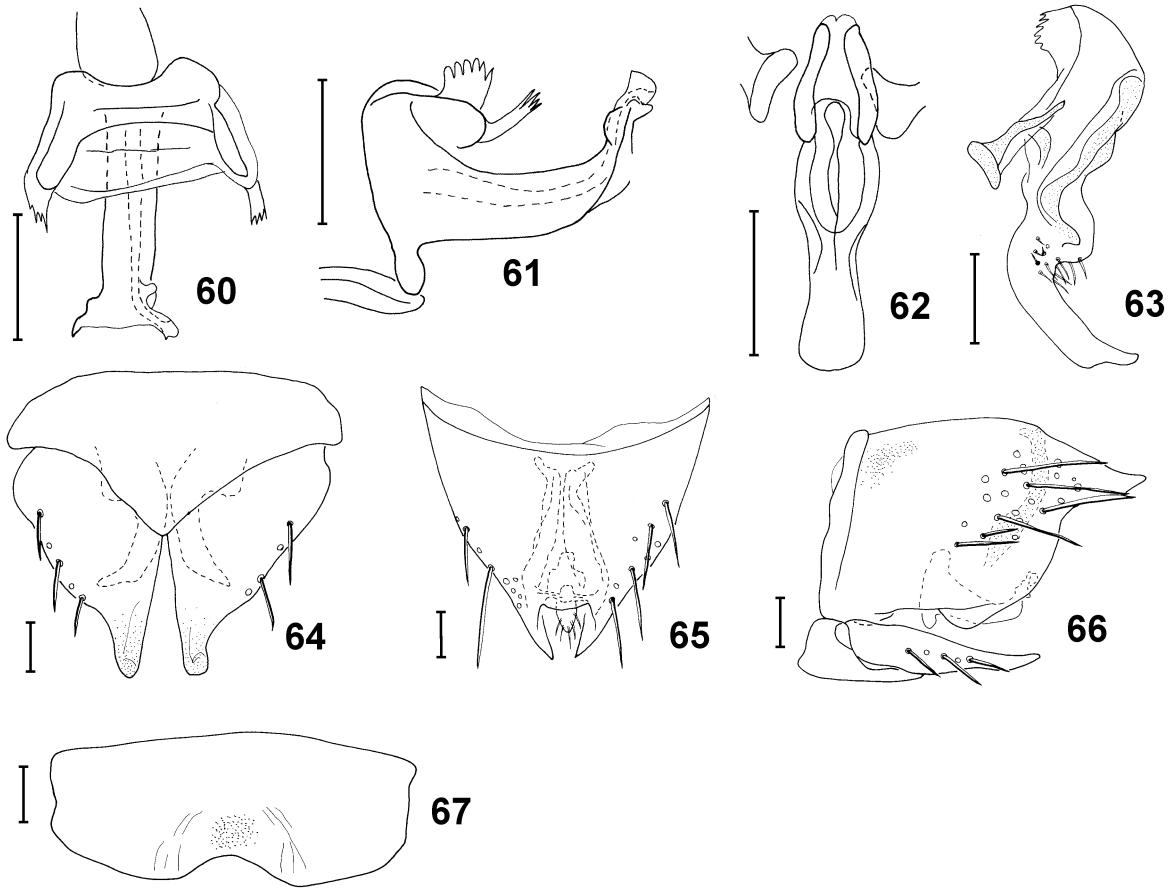
FIGURES 52–59. *Vilargus dentulicans* **sp. n.** Male and female genitalia. 52, aedeagus, dorsally; 53, aedeagus, laterally; 54, connective; 55, style; 56, plate; 57, pygofer, dorsally; 58, pygofer, laterally; 59, female, sternite 7 (scale = 0.1 mm).

Material examined. Holotype male. South Africa. **Limpopo Province**. Orrie Baragwanath Pass, 24°08′S, 30°11′E, 1361 m, 8.xi.2005, M. Stiller, DVac, short moribund grass (SANC). Paratypes. 22♂, 14♀. **Limpopo Province**. 6♂, 2♀, Serala Forestry Station, fire lookout, 24°00′S, 29°57′E, 2029 m, 7.xi.2005, DVac, moribund grass, including *Festuca* sp.; 2♂, Strydpoortberg, SE Polokwane, 24°04′S, 29°49′E, 1800 m, 13.xii.2003, sweeping, grass on sandstone outcrop; 1♂, 1♀, Strydpoortberg, SE Polokwane, 24°03′S, 29°48′E, 1900 m, 13.xii.2003, sweeping, grass on S-slope, sandstone; 13♂, 11♀, *ibid.*, holotype; all collected by M. Stiller (BMNH, SANC).

Remarks. *Vilargus triquetricans* has a unique acutely triangular plate, with narrow dorsally angled apex, of variable length and the aedeagus that is variable in its structure, but has a laterobasal spine and C-shaped shaft. Three forms are recognized, but that are considered as intraspecific variation. The structure of the aedeagus of this species corresponds well with that of the genus, and therefore does not justify placement in another genus. The sternite 7 of associated females is least typical of the genus, and no corresponding intraspecific variation is visible, and is considered of secondary importance in the placement of this species.

The plate in specimens from Orrie Baragwanath Pass has the apical third angled dorsad (Fig. 102). Specimens from Serala and Strydpoordberg have the apical quarter angled dorsoposteriad (Fig. 101).

The aedeagus in the Orrie Baragwanath Pass specimens has the basal process shorter than the shaft and compressed, and has the apex tapered and ending in the gonopore (Figs 96, 97).



FIGURES 60–67. *Vilargus lobulicans* **sp. n.** Male and female genitalia. 60, aedeagus, dorsally; 61, aedeagus, laterally; 62, connective; 63, style; 64, plate; 65, pygofer, dorsally; 66, pygofer, laterally; 67, female, sternite 7 (scale = 0.1 mm).

The aedeagus in the Serala specimens has the basal process shorter than the shaft, but tubular, and not compressed. It has the apex with a lateral, blunt spine and the gonopore opening in a short tube. Additionally there is a short stub at the base of the shaft, opposite the elongate basal process (Fig. 98).

The aedeagus in the Strydpoortberg specimens has the longest basal process, that is not compressed, and the apex of the shaft has a more elongate lateral spine, and the gonopore is flush with the apex of the shaft, and does not open at the end of a tube (Figs 92, 93).

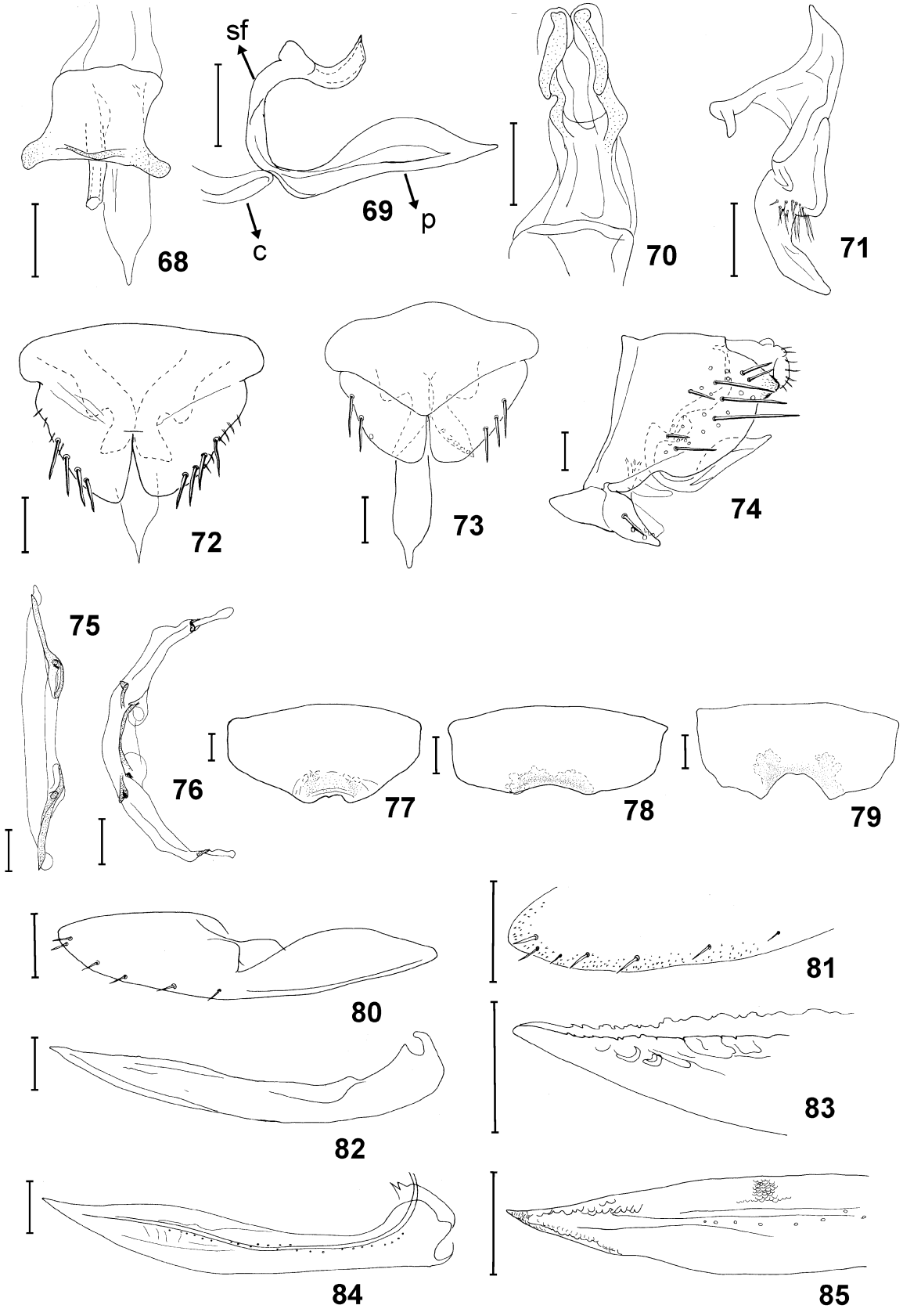
There are no differences in the connective and style between the male specimens from these three localities.

No other species of *Vilargus* has a similar acutely triangular plate in the male. *Vilargus budenticans* was also found at Serala Forestry Station and appeared to be more common than *V. triquetricans* (62 specimens of *V. budenticans* versus 8 specimens of *V. triquetricans*). These two species are readily distinguished by the shape of the plate of the male, and the shape of the sternite 7 of the female.

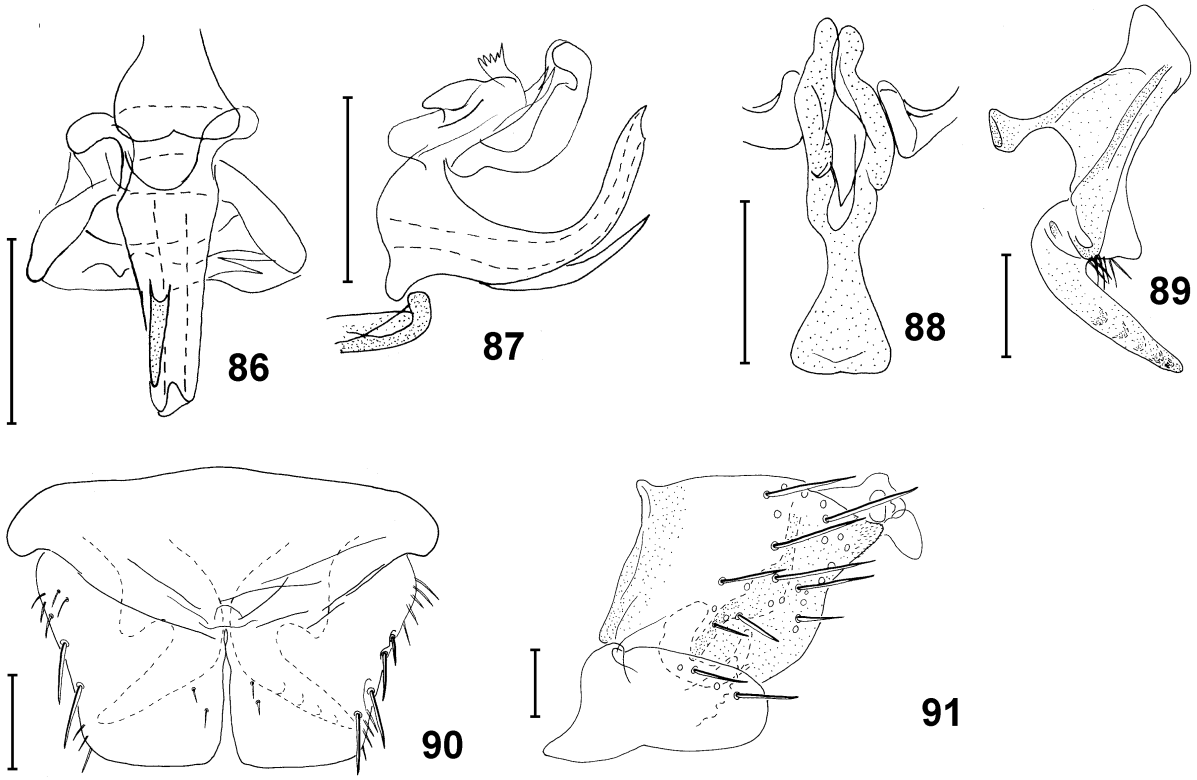
The structure of the plate of *Pravistylus varicudiscus* Stiller, 2010 is similar to that of *V. triquetricans* (Fig. 99). In both these species the apex of the plate is similar in shape with the apex right-angled dorsad. However the known distributions of these two species differ and other structures of the male and female differ significantly.

***Vilargus trunculicans* sp. n.**
(Figs 28–34, 104–115).

Diagnosis. Male with aedeagus in dorsal view with shaft off-set from midline, opposite side of shaft with parallel-sided process, reaching beyond apex of shaft, and apex of process expanded. Plate rectangular.



FIGURES 68–85. *Vilargus pumilicans* **sp. n.** Male and female genitalia. 68, aedeagus, dorsally; 69, aedeagus, laterally, sf = sclerotized fusion, c = connective, p = paraphysis;; 70, connective; 71, style; 72, plate; 73, plate; 74, pygofer, laterally; 75, anterior abdominal apodeme; 76, posterior abdominal apodeme; 77–85, female. 77–79, sternite 80, valvula 3; 81, valvula 3, ultrastructure; 82, valvula 2; 83, valvula 2, ultrastructure; 85, valvula 1, ultrastructure (scale = 0.1 mm).



FIGURES 86–91. *Vilargus simulans* **sp. n.** Male genitalia. 86, aedeagus, ventrally; 87, aedeagus, laterally; 88, connective; 89, style; 90, plate; 91, pygofer, laterally (scale = 0.1 mm).

Etymology. Latin, *truncus*, maimed, cut off, for the truncated posterior margin of the subgenital plate.

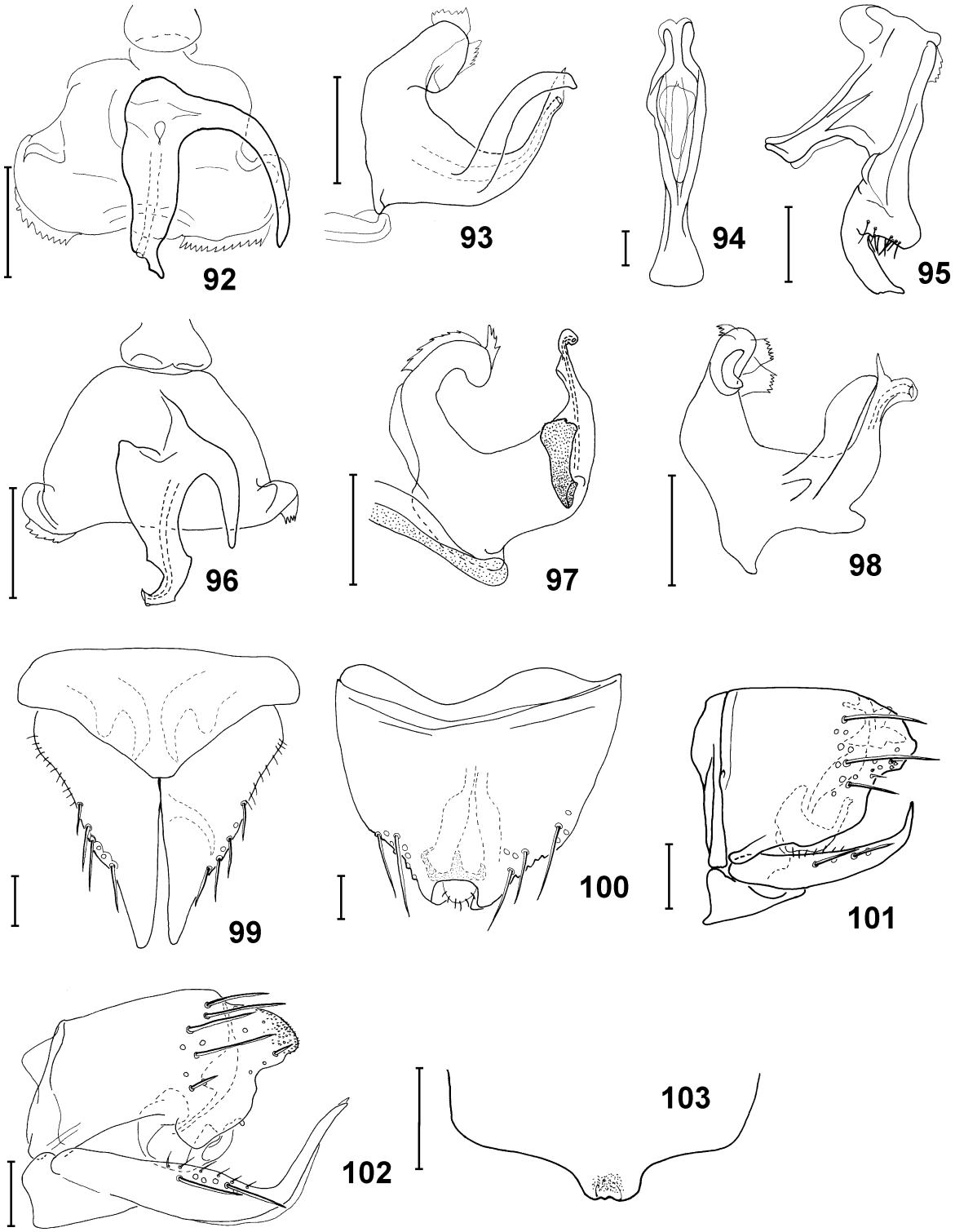
Colour. Male and female. Ochraceous (Figs 28–30, brachypter, specimens from Longtom Rail Siding, Qachasnek and Steenkoolspruit respectively. Figs 31–32, 34, brachypter, specimens from Qachasnek and Steenkoolspruit; Fig. 33, macropter, specimen from Steenkoolspruit).

Male. Dimensions. (n=77) Length from apex of vertex to apex of tegmina 2.0–2.3, length from apex of vertex to apex of abdomen 2.3–2.6, median length of vertex 0.4 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.8 mm, width of pronotum 0.7 mm, diameter of ocellus 24–30 µm, ocellocular distance 37–46 µm.

Genitalia. Aedeagal shaft, laterally, C-shaped, gradually curved dorsally (Fig. 105); dorsally, shaft arising laterad of midline, process on opposite side, longer than shaft, apex with acute points; gonopore subapical, ventral (Fig. 104). Connective with arms asymmetric, one arm shorter, more curved and angled laterad of other, more straightened arm (Fig. 106); stem triangular, usually membranous. Style with anterior medial arm short, not reaching beyond base of apophysis, acutely angled to base; apophysis digitate, teeth ventrally, apex pointed (Fig. 107). Plate short, rectangular; medial margin slightly divergent, posterior and lateral margins right-angled, posterior margin truncate; 2–5 macrosetae (Fig. 108); aedeagus in cleared pygofer, viewed as in Fig. 108, with process on always on right side. Pygofer rectangular, ventroposterior margin rounded. Pygofer lobe with acutely triangular, with narrow base (Fig. 110); dorsal view (Fig. 109).

Female. Dimensions. (n=118) Length from apex of vertex to apex of tegmina 2.1–2.3 mm, length from apex of vertex to apex of abdomen 2.7–3.0 mm, median length of vertex 0.4–0.5 mm, length of vertex next to eye 0.3 mm, length of pronotum 0.3 mm, width of head 0.8–0.9 mm, width of pronotum 0.7–0.8 mm, diameter of ocellus 28 µm, ocellocular distance 31–49 µm.

Genitalia. Sternite 7 with posterior margin variable, shallow notch widely rounded or narrowly V-shaped (Fig. 111, specimen from Belfast; Figs 112, 113, specimens from Ossewakop; Figs 114, 115, specimens from Volksrust).

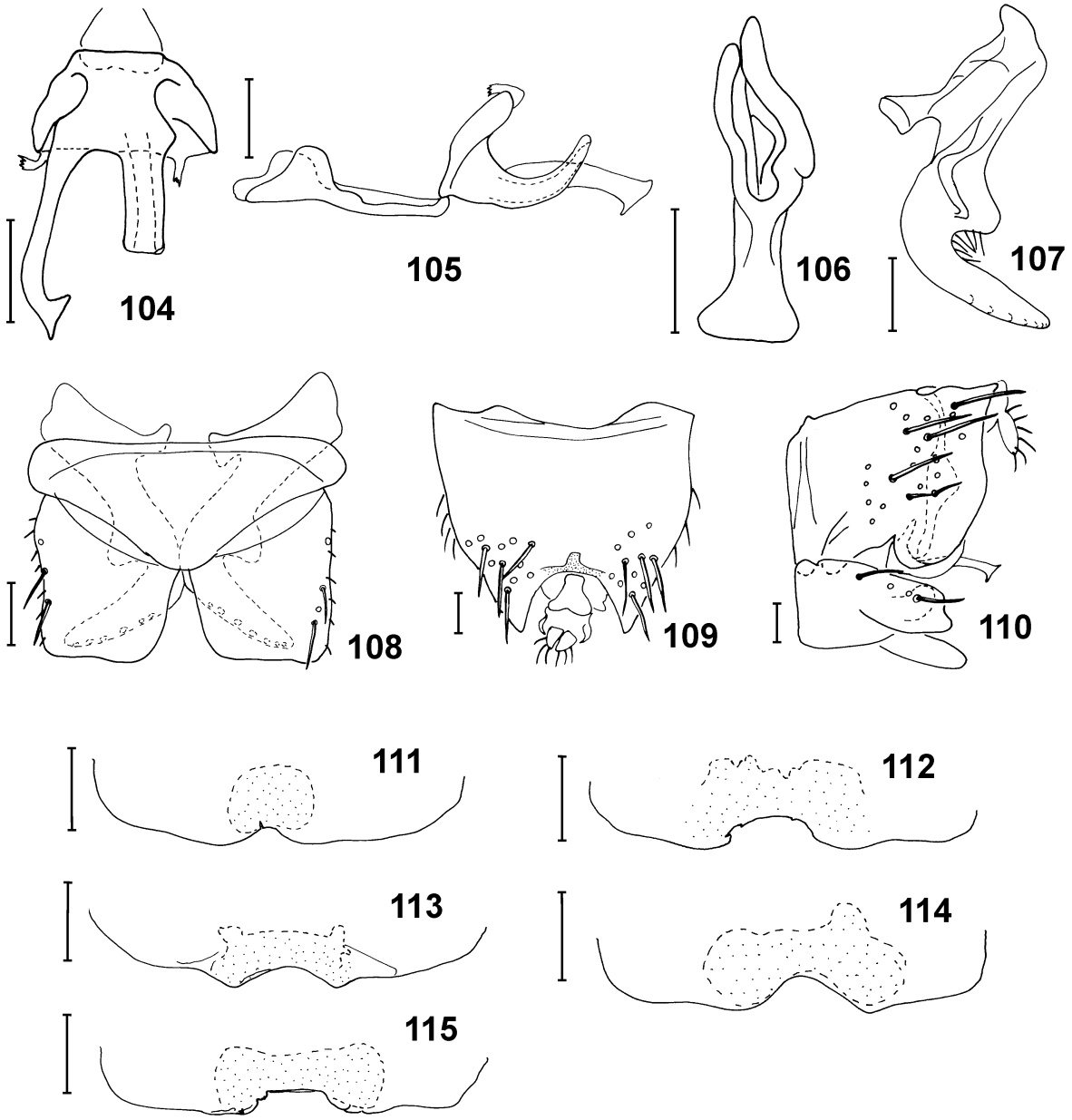


FIGURES 92–103. *Vilargus triquetricans* **sp. n.** Male and female genitalia. 92, aedeagus, ventrally; 93, aedeagus, laterally; 94, connective; 95, style; 96, aedeagus, ventrally; 97, aedeagus, laterally; 98, aedeagus, laterally; 99, plate; 100, pygofer, dorsally; 101, pygofer, laterally; 103, pygofer, laterally; 103, female, sternite 7 (scale = 0.1 mm).

Material examined. Holotype male. South Africa. **Mpumalanga Province**. Steenkoolspruit Farm, Diepspruit near Kriel, 26°09′S, 29°15′E, 20.xii.2006, M. Stiller (SANC). Paratypes. 53♂, 27♀, 1 nymph. **Free State Province**. 1♂, Reitz, 22°25′S, 30°16′E, 22.i.1975, J.G. Theron; 1♂, Warden, 27°56′S, 29°00′E, 30.i.1981, J.G. Theron; 3♂, Koloniesplaas, Memel, 27°42′S, 28°36′E, 1850 m, 14.xi.2003, M. Stiller, sweeping short grazed grass (less than 5cm in length). **KwaZulu-Natal Province**. 1♂, Van Reenen, 28°22′S,

29°24′E, 19.xii.1978, J.G. Theron; 3♂, Groenvlei, 16.5 km SE Wakkerstroom, 27°29′S, 30°14′E, 1907 m, 2.ii.2007, DVac, grass and forbs on road verge. **Mpumalanga Province**. 1♂, 1♀, Suikerboschfontein Farm, 25°56′S, 30°19′E, 1700 m, 3.ii.2001, sweeping, grass and forbs; 11♂, 6♀, Ossewakop, Wakkerstroom, 27°23′S, 30°09′E, 2160 m, 7.iii.2002, DVac, tall grass in deep soil, and shorter, sparse grass on rocky outcrop; 6♂, 8♀, Volksrust, 5 km W route R543, 27°20′S, 29°50′E, 1700 m, 9.x.2004, sweeping, dry grazed grass; 2♂, 2♀, Belfast, 1 km W, 25°41′S, 29°58′E, 1900 m, 17.ii.2005, DVac, grass and forbs, grazed pasture; 3♂, 1♀, Longtom rail siding, 25°32′S, 30°03′E, 1957 m, 16.xi.2005, DVac, moribund grassland with *Themeda triandra* common; 21♂, 9♀, 1 nymph, *ibid.*, holotype; all collected by M. Stiller (BMNH, INHS, SANC).

Remarks. *Vilargus trunculicans* and *V. simulans* have similar plates (Figs 108, 90, respectively), but the structure of the aedeagus is distinctly different (Figs 104, 86, respectively). In *V. trunculicans* the shaft is offset from the midline, with a long, curved process arsing from the opposite side of the preatrium (Fig. 104). The shaft of the aedeagus in *V. simulans* arises from the midline with a short, straight spine-like process arising lateromedially and subbasally from the shaft (Fig. 86).



FIGURES 104–115. *Vilargus trunculicans* **sp. n.** Male and female genitalia. 104, aedeagus, ventrally; 105, aedeagus, laterally; 106, connective; 107, style; 108, plate; 109, pygofer, dorsally; 110, pygofer, laterally; 111–115, female, sternite 7 (scale = 0.1 mm).

One parasitized specimen has the connective symmetrical, Y-shaped with arms widely separated and a short stem. The style of this specimen is deformed, with the apophysis without teeth, directed posteriad and its anterior medial and lateral arms reduced. The aedeagus is also more compact, with the shaft and process shortened. The plate of this specimen has no macrosetae, but of similar shape to the other specimens. This is the only deformed specimen out of 16 dissected specimens.

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