
ANNALS OF THE TRANSVAAL MUSEUM
ANNALE VAN DIE TRANSVAAL-MUSEUM

MAY 1984 MEI

VOLUME 33 BAND

PART 24 DEEL

TWO NEW SPECIES OF STIZOPINA
(COLEOPTERA: TENEBRIONIDAE: OPATRINI)
FROM NAMAQUALAND, SOUTHERN AFRICA, AND THE
RELATIONSHIPS BETWEEN THE PSAMMOPHILOUS
GENERA

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ABSTRACT

PENRITH, M.-L., 1984. Two new species of Stizopina (Coleoptera: Tenebrionidae: Opatrini) from Namaqualand, southern Africa, and the relationships between the psammophilous genera. *Annals of the Transvaal Museum* 33 (24): 353-363.

Two new species of psammophilous Stizopina, *Syntyphlus namaquensis* and *Calaharena irishi*, are described from the dunes of the Orange River area in northern Namaqualand. A southern extension of the distribution range of *Sphaerostibes sabulicola* Koch is recorded. The relationships of the psammophilous genera of Stizopina are reviewed.

INTRODUCTION

Recent collecting has produced series of two small species of psammophilous Stizopina from vegetated dunes in the northern Namaqualand and Orange River area. Both, described as new below, are second representatives of hitherto monotypical genera, *Syntyphlus* Koch and *Calaharena* Koch.

The genus *Syntyphlus* was described by Koch (1953) for a small psammophilous species of Stizopina from dunes in the southern central Namib. His description was based on fragments of two specimens; two further, complete specimens have since been collected in the same area, which have enabled me to describe the parts which were missing from the specimens available to Koch. Specimens representing a second species of *Syntyphlus* have been collected from the Holgat River dunes, in northern Namaqualand (Richtersveld).

The genus *Calaharena* is represented by a species *C. dutoiti* Koch which is very widespread throughout the western Kalahari. Koch (1963) described two species which were synonymised by Penrith (1982). In April 1982 Mr J. Irish

of the State Museum, Windhoek, collected a series of a second species of *Calaharena* from a pitfall trap placed at the base of a hummock on the north bank of the Orange River in the vicinity of Oranjemund.

In addition to the descriptions of the two new species, and the revised diagnosis of *Syntypplus subterraneus* Koch, a key to the psammophilous genera and species of Stizopina with rounded bodies and the pronotal and elytral sides fringed with setae is given. These are the genera *Sphaerostibes* Koch, *Periloma* Gebien, *Psammogaster* Koch, *Syntypplus* Koch and *Calaharena* Koch. Their relationships with one another and with the rest of the tribe are briefly reviewed. The revised distribution of *Calaharena*, *Syntypplus*, and *Sphaerostibes* is mapped.

KEY TO THE PSAMMOPHILOUS GENERA OF STIZOPINA

The key includes only those Stizopina which have the body rounded and more or less globose and the lateral margins of the pronotum and the elytra fringed with long setae.

- 1(2). Abdomen not telescoped basally, the first four sternites normal, postcoxal space of basal sternite at least one third of coxal length, second and third sternites of equal length *Sphaerostibes sabuticola* Koch
- 2(1). Abdomen telescoped basally, the first four sternites shortened, postcoxal space of basal sternite very short, much less than one third of coxal length, second sternite shorter than third.
- 3(6). Eyes strongly reduced, difficult to see; antennal club globose (Fig. 1a); size very small, usually less than 2,5 mm total length *Syntypplus* Koch
- 4(5). Vertex and disc of pronotum punctate; outer distal angle of protibia not strongly produced or lobiform (Fig. 1b) *Syntypplus subterraneus* Koch
- 5(4). Vertex and disc of pronotum granular; outer distal angle of protibia strongly produced and lobiform (Fig. 1c) *Syntypplus namaquensis* spec. nov.
- 6(3). Eyes normally developed; antennal club not globose; size variable, total length rarely less than 2,5 mm.
- 7(8). Humeri sharply angulate; elytra with primary rows distinct, impressed at least on disc; metasternum short, not or only slightly longer than basal sternite *Periloma alfkeni* Gebien
- 8(7). Humeri at most bluntly obtuse; elytra with the primary sculpture obsolescent or obliterated, at most present as faint traces.
- 9(12). Elytra at most with fine, scattered, inconspicuous granules; size small, under 4 mm; posterior face of protibia flat *Calaharena* Koch
- 10(11). Sides of elytra with fine punctures; metatibia slender, weakly expanded apically, anterior surface not carinate (Fig. 2d) *Calaharena dutoiti* Koch
- 11(10). Sides of elytra with fine granules; metatibia stout, strongly expanded apically, anterior surface with an oblique carina (Fig. 2c) *Calaharena irishi* spec. nov.
- 12(9). Elytra entirely coarsely granular; size larger, more than 4 mm; posterior face of protibia concave *Psammogaster malani* Koch

DIAGNOSES AND DESCRIPTIONS

GENUS *SYNTYPPLUS* KOCH

Syntypplus Koch, 1953: 243; 1962: 92; 1963: 66.

Type species: *Syntypplus subterraneus* Koch, 1953 (by monotypy).

DIAGNOSIS. Size small, length under 3,0 mm. Integument reddish brown. Shape inflated, globose. Eye strongly reduced. Antennae with the five apical segments strongly expanded, forming a club (Fig. 1a). Pronotum transverse, sides rounded, margins with a fringe of long setae; sides of disc with scattered

setae; posterior angles broadly rounded. Elytral base carinate laterally. Humeri broadly rounded. Lateral margin of elytra with a fringe of long setae; entire disc of elytra with scattered setae. Prosternal apophysis prominent; prosternal antecoxal space shorter than coxa. Mesosternum short. Metasternum large, antecoxal space one and a half times length of metacoxa. Sternites setose. First four abdominal sternites short, telescoped; basal abdominal sternite with postcoxal space extremely narrow. Legs short, setose. Protibia expanded and modified. Mesotibia slender, compressed, straight or slightly curved; metatibia straight, strongly expanded apically. Tibial calcaria long.

Syntyphlus subterraneus Koch

Syntyphlus subterraneus Koch, 1953: 244; 1962: 92; 1963: 66.

DIAGNOSIS. Vertex with scattered punctures. Disc of pronotum with coarse, scattered to rather dense punctures; sides with large granules. Elytra tuberculate, with rather short, semi-recumbent setae arranged in longitudinal rows. Protibia (Fig. 1b) expanded apically, outer distal angle bluntly rounded, not produced; outer edge undulate. Mesotibia weakly curved, outer edge denticulate. Metatibia strongly expanded apically, outer edge with prominent denticles (Fig. 1d).

MATERIAL. SYNTYPES: Fragments from two specimens (cadavers) on which the original description was based. They comprise a head, without antennae or trophi; a forebody, consisting of pronotum and prosternum, without appendages; and two hindbodies, consisting of elytra, meso- and metasterna, and abdominal sternites. One hindbody bears two intermediate legs, one more or less concealed in the mounting, and a complete posterior leg including the metatarsus; the other bears the right mesofemur and mesotibia, both metafemora, and the right metatibia. The fragments are mounted on one pin, on three separate cards; one bearing a hind- and forebody, one a hindbody, and the third the head. Transvaal Museum: Namtib, 70 mi NW Aus, Gt Namaqualand, C. Koch, G. van Son. The original description was based on all the fragments, which were collected together, and for this reason I regard them as syntypes. Koch (1953) referred to a holotype and paratype, but the fragments were mounted together with no indication of which he considered to be the holotype.

OTHER MATERIAL EXAMINED. 1 ex. (State Museum, Windhoek), dunes SW of Kanaän, at 25° 58' S., 16° 02' E., 21 October 1976, coll. S. Louw, M.-L. Penrith, in pitfall trap left overnight on sparsely vegetated dune slope at base of large clump of dune grass. I believe this to be very close to the type-locality, as these dunes are situated opposite the farm Namtib, which itself has no dunes. 1 ex. (Transvaal Museum), St Francis Bay, SE 2414 Dd, 8.vii.1976, Dept of Entomology, University of Pretoria. At nearly 3 mm this is the largest specimen of *Syntyphlus* so far collected.

Syntyphlus namaquensis spec. nov., Fig. 1a, c, e

DESCRIPTION. Size small, length 2.0–2.5 mm. Integument reddish brown, microshagreened. Shape rounded ovate, inflated.

Epistome with very deep, broad median crescentic apical emargination; with large, dense tuberculate granules. Clypeal sulcus deeply impressed, complete. Genae broadly obtuse. Eye consists of a small group of unpigmented facets. Vertex with dense, coarse tuberculate granules, as epistome. Sides of head setose. Head amplexed in thorax. Mentum inermous. Apical segment of maxillary palpi rather large.

Antennae short, scarcely projecting from sides of head; five apical segments strongly expanded, forming a globose club (Fig. 1a).

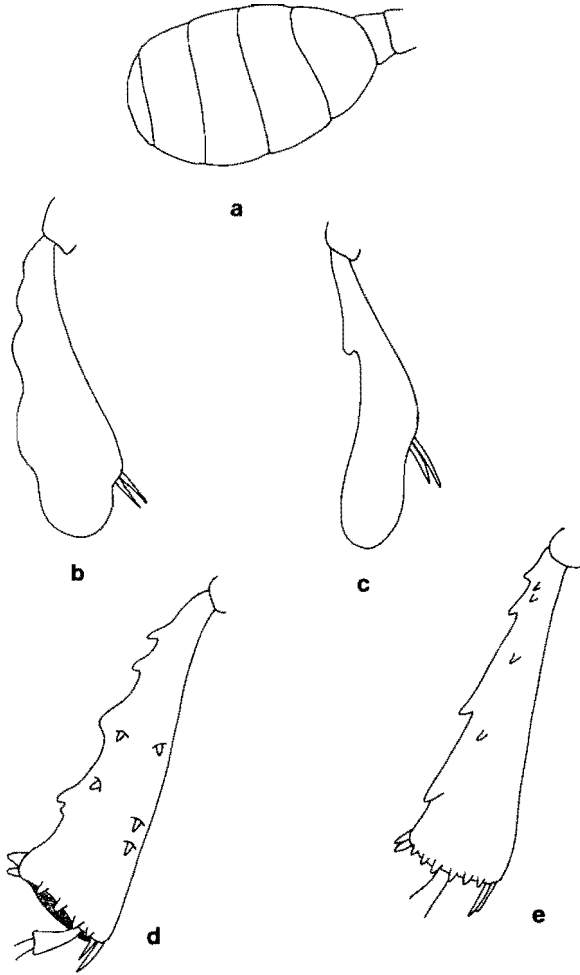


FIG. 1. a. Apical segments of antenna, *Syntyphlus namaquensis* spec. nov. b. Protibia, *Syntyphlus subterraneus* Koch. c. Protibia, *S. namaquensis*. d. Metatibia, *S. subterraneus*. e. Metatibia, *S. namaquensis*.

Pronotum transverse, sides rounded, bearing a fringe of long setae; lateral margin evanescent. Posterior angles very broadly rounded. Disc with scattered, rather large granules; sides with larger, dense granules, and with long setae, area in front of hind margin with long, backwardly directed setae.

Elytra globose; humeri broadly rounded; covered with large abraded tubercular granules, which are evanescent anterolaterally, and smaller, sharp and separated but dense on apical declivity. Pseudopleura rather broad, densely setose. Pseudopleural crest mainly concealed in dorsal view, almost smooth, bearing a fringe of long setae. Disc of elytra with long setae arranged in longitudinal rows.

Anteprocoxal space shorter than coxa. Prosternal apophysis prominent, projecting between coxae. Antemesocoxal space shorter than mesocoxa; mesosternum almost flat; intercoxal process very narrow, narrower than prosternal apophysis. Metasternum large, flat, antemetacoxal space about one and a half times length of metacoxa. All sternites with dense, long, coarse setae.

Abdomen with the four proximal sternites short, together not much longer than fifth sternite, postcoxal space of basal sternite very narrow; all sternites with long setae.

Femora stout, setose. Protibia moderately expanded, outer distal angle very strongly produced and lobiform (Fig. 1c). Calcaria surpassing apex of first protarsal segment. Mesotibia almost straight, compressed, weakly expanded apically, outer margin bearing short spines. Calcaria surpassing apex of first mesotarsal segment. Metatibia (Fig. 1e) straight, compressed, strongly expanded apically, outer edge bearing spines, anterior surface with a few short, scattered spines; calcaria reaching or almost reaching apex of first metatarsal segment. Tarsi incomplete in all specimens examined.

MATERIAL. HOLOTYPE: Sex not determined, length 2,2 mm (Transvaal Museum), S. Afr. Richtersveld, Holgat Mouth, 28° 58' S., 16° 43' E., 6.10.1976, E-Y: 1262, singled on dunes, leg. Endrödy-Younga. **PARATYPES:** 47 ex., length 2,0–2,5 mm (State Museum, Windhoek; Transvaal Museum), Jakkalsputs, Cape, R.S.A., 28° 38' S., 16° 54' E., 9–11 Sept. 1982, coll. M.-L. Penrith, SM H54396, collected at base of plants on vegetated dunes; 24 ex. (National Museum, Bloemfontein), data as above, coll. S. Louw.

REMARKS: The new species is easily distinguished from *Syntyphlus subterraneus* by the shape of the protibia (Fig. 1b, c), the granular sculpture of the vertex and pronotal disc, the more slender and less strongly spinose metatibia (Fig. 1d, e), and the longer body setation.

Calaharena irishi spec. nov., Fig. 2a, c

DESCRIPTION. Length 2,8–3,2 mm. Integument dark reddish brown, shagreened. Shape rounded, inflated.

Epistome with deep crescentic median apical emargination; with rather large, dense granules. Clypeal sulcus fine, complete. Vertex finely and densely granular. Genae obtuse. Eye large, emarginated anteriorly by genal canthus. Mentum inermous. Apical segment of maxillary palpi rather large.

Antennae short, apical five segments moderately expanded, forming a distinct club.

Pronotum transverse, narrowing anteriorly, sides rounded; lateral margin carinate, bearing a fringe of long setae; posterior angles broadly obtuse. Disc

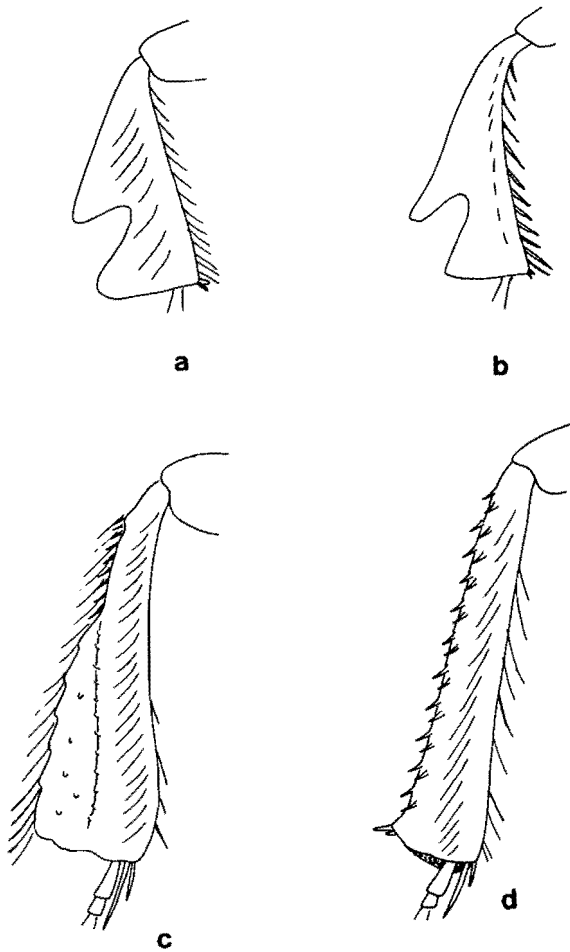


FIG. 2. **a.** Protibia, *Calaharena irishi* spec. nov. **b.** Protibia, *Calaharena dutoiti* Koch. **c.** Metatibia, *C. irishi*. **d.** Metatibia, *C. dutoiti*.

with fine, elongate, scattered punctures; sides with slightly larger, longitudinally confluent punctures. Base weakly trisinate, immarginate.

Elytra without distinct longitudinal sculpture, but with nine punctate primary rows visible by transparency; not impressed. Pseudopleural crest just concealed in dorsal view; with a fringe of long setae. Humeri broadly and bluntly obtuse. Elytra with fine, obscure granules, denser and more distinct posteriorly.

Anteprocoxal space short, much shorter than coxa. Prosternal apophysis prominent, projecting between coxae. Mesosternum strongly bilevelled, intercoxal process abruptly sloping up to level of coxae; with basal median carina; antemescoxal space shorter than mesocoxa; intercoxal process a little wider

than, prosternal apophysis. Metasternum short, antemetacoxal space a little shorter than metacoxa. All sternites setose.

Abdomen telescoped basally, first three sternites strongly shortened, basal sternite without distinct postcoxal space and second sternite very narrow, metacoxa posteriorly almost in contact with third abdominal sternite. First four abdominal sternites together not or scarcely longer than fifth sternite. All sternites setose.

Femora stout, setose. Protibia very strongly expanded apically; outer margin with two large processes, one submedian and the other formed by the laterally produced outer distal angle (Fig. 1a); calcaria short. Mesotibia almost straight, slender, compressed, not expanded apically, outer edge spinose; calcaria short. Metatibia stout, compressed, strongly expanded apically, outer edge denticulate; anterior surface with an oblique carina on distal half (Fig. 2c); calcaria very unequal, longer one surpassing apex of first metatarsal segment. Undersides of tarsi with long setae.

MATERIAL. HOLOTYPE: Sex not determined, length 3.1 mm (State Museum, Windhoek), Oranjemund at 28° 35' S., 16° 27' E., Diamond Area 1, 10–11 Apr. 1982, coll. J. Irish, SM H53904. **PARATYPES:** 24 ex. + 1 hindbody, length 2.8–3.2 mm (State Museum & Transvaal Museum), data as holotype; 4 ex. (Transvaal Museum), Oranjemund, SE 2816 Cb, 20.III.1980, coll. J. Irish.

REMARKS. *Calaharena irishi* differs from *C. dutoiti* (Koch, 1963, pl. VII, fig. 2) in the shape of the metatibia (Fig. 2c, d), the slightly more expanded protibia, and the granular sculpture of elytra (punctate in *C. dutoiti*). The new species appears to be slightly larger than *C. dutoiti*.

It is named in honour of Mr John Irish, entomologist at the State Museum, Windhoek, who collected the specimens.

RANGE EXTENSION

Sphaerostibes sabulicola Koch was previously known only from the type locality, Kleinsee, on the northern Namaqualand coast. In September 1982 two specimens were collected under a plant on vegetated dunes some distance further south, at Graskom, 30° 18' S., 17° 23' E. (State Museum, SM H54615, coll. M.-L. Penrith) (Fig. 5).

DISCUSSION

The discovery of two further highly psammophilous species of Stizopina in vegetated dune areas of northern Namaqualand is of considerable interest. Until the phylogeny of the Stizopina has been elucidated it will probably not be fruitful to speculate very much further on the origins and broader relationships of the ultrapsammophilous taxa. Koch (1953) pointed out the difficulties of a phylogenetic investigation into the Stizopina; these include repetition of character states in what appear to be widely differing taxa. The cladogram presented by Penrith (1982) is possibly an oversimplification of the phylogenetic relationships of these psammophilous species, as their shared apomorphies involve adaptations to their specialized habitat that are common in Tenebrionidae in general and may have evolved separately several times. Increased setation, the globose body shape, expansion of the tibiae for digging, loss of the primary rows of the elytra, increase in the size of the metasternum,

and contraction of the proximal abdominal sternites, are all paralleled in not only Saharan and Asiatic psammophilous Opatrini, but in psammophilous members of quite unrelated tribes such as Zophosini, where even the reduction of the eye observed in *Syntyphlus* is paralleled in the sympatrically occurring *Zophosis* (*Dactylocar*) *caecus* (Gebien). It is nevertheless parsimonious to assume that as many as possible of the characteristics did not arise more than once in Stizopina in the Namaqua area. The results of this reasoning are shown in a revised cladogram (Fig. 3). The tabulated character sequence on which it is based is shown in Fig. 4. The species *Planostibes dentipes* Koch, which shows the same protibial development as the psammophilous genera and has the pronotum and elytra fringed with extremely short setae, is included, since it indicates what a possible ancestor may have looked like. It must, however, be emphasized that this is only one of the possible phylogenetic pictures at the present stage. Since all the characters on which it is based are adaptive, it would not surprise me greatly if *Periloma* and *Psammogaster*, *Syntyphlus*, and *Calaharena* did not in fact have a common origin except in the broadest

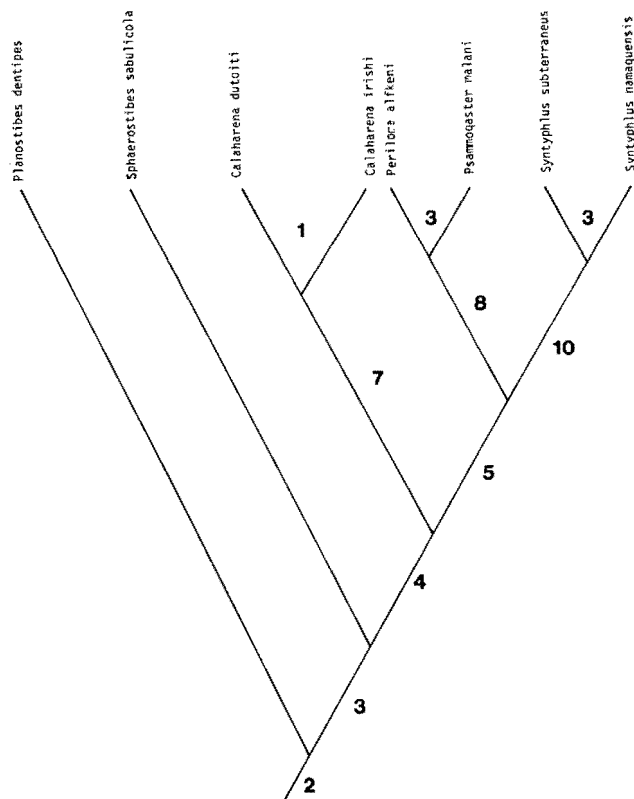


FIG. 3. Cladogram showing the relationships (hypothetical) of the psammophilous genera of Stizopina and *Planostibes dentipes* Koch. The numbers on the branches indicate the number of synapomorphies; those between the uppermost branches autapomorphies of genera.

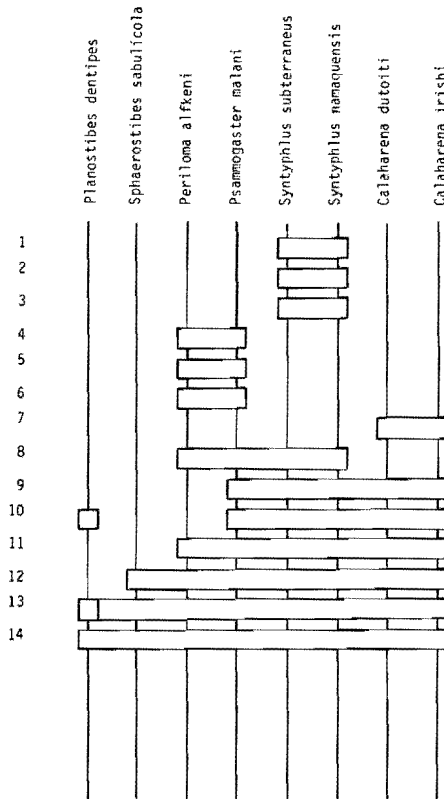


FIG. 4. Tabulated sequence of characters on which Fig. 3 is based. Characters used (apomorphic states): 1. Eye reduced. 2. Antennal apical segments forming a globose club. 3. Size reduced. 4. Size increased. 5. Outer margin of metatibia with a dentiform submedian process. 6. Outer margin of mesotibia with a dentiform submedian process. 7. Elytral sculpture smoothed and reduced. 8. Elytral sculpture much coarsened and exaggerated. 9. Primary rows of elytra strongly reduced or absent. 10. Metasternum enlarged. 11. Abdomen with proximal sternites telescoped. 12. Shape rounded to globose. 13. Sides of pronotum and elytra ciliate (this condition is weakly developed in *Planostibes dentipes*). 14. Outer margin of protibia with dentiform submedian process.

sense of the undoubted monophyly of the Stizopina. For example, *Periloma* does not share the enlarged metasternum of the other psammophilous genera, and *Periloma* and *Psammogaster* have large median processes on the meso- and metatibiae as well as on the protibiae, as does *Eremostibes* Koch, a fairly psammophilous genus which lacks the lateral ciliate fringes, and also *Microstizopus* Koch, not normally psammophilous but with some members with lateral fringes of setae.

The geographical evidence is also somewhat indecisive with regard to a common origin for the psammophilous genera. The revised distribution of *Calaharena*, *Syntyphlus*, and *Sphaerostibes* is shown in Fig. 5. The discovery of a second species of *Syntyphlus* far to the south in Namaqualand supports a southern

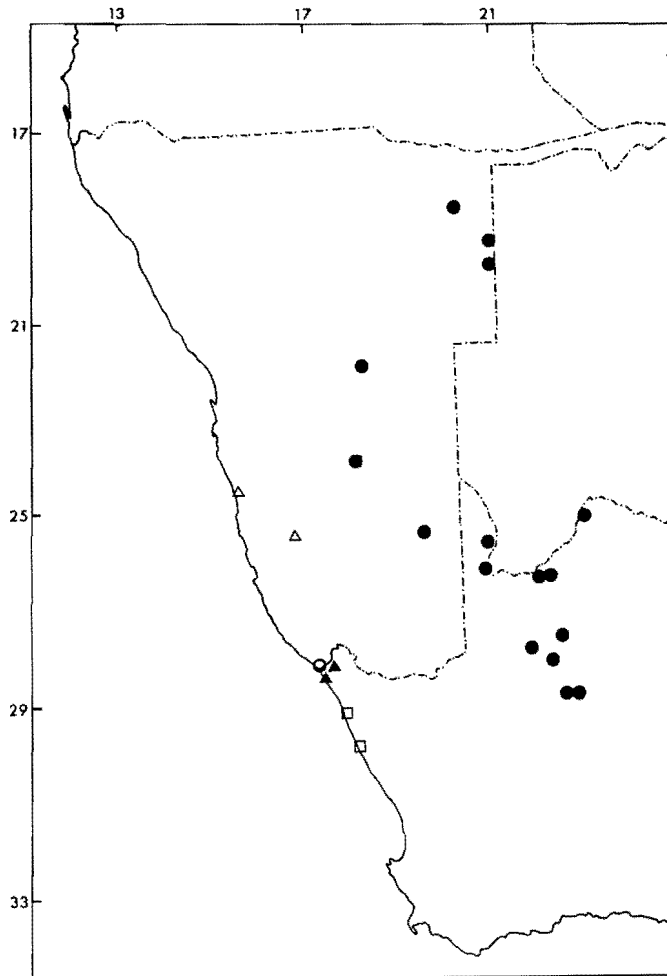


FIG. 5. Distribution of the genera *Sphaerostibes*, *Calaharena*, and *Syntyphlus*: *Sphaerostibes sabulicola* (□), *Calaharena dutoiti* (●), *C. irishi* (○), *Syntyphlus subterraneus* (△), *S. namaquensis* (▲).

origin for this genus. The situation in *Calaharena* is more complicated. The second species provides a decided westward extension for the genus such as I predicted might occur (Penrith, 1982), but its distinctness from the widespread *Calaharena dutoiti* suggests that the gap between them is real. The new species appears to be the more derived of the two, according to the expansion and development of the metatibia. It seems likely that *Calaharena* originated in inland sands, most likely along the Orange River, from *Sphaerostibes*-like ancestors, while *Syntyphlus*, *Periloma* and with it *Psammogaster*, probably originated in coastal or subcoastal sands. The distribution and probable origin of *Calaharena* may be clarified when the relationships of genera with similar distribution of a species pair, such as *Cimicichora* Koch of the Eurychorini, have been studied.

ACKNOWLEDGEMENTS

I am grateful to Miss Ruth Müller of the Transvaal Museum who sent me the first specimen of *Syntyphlus* that drew my attention to the existence of a second species; to Mr John Irish of the State Museum, Windhoek, who collected all the known specimens of the new species of *Calaharena*, and has subsequently lent them to me; and to Mr Schalk Louw of the National Museum, Bloemfontein, who made it possible for me to collect further specimens of the new species of *Syntyphlus*. I thank his Director and Board of Trustees for their permission for me to accompany him.

To Dr S. Endrödy-Younga of the Transvaal Museum, who collected the first specimen of *Syntyphlus namaquensis*, encouraged and advised me throughout the project, and commented on the manuscript, I am, as always, deeply indebted.

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