

# THE MYRIAPODA OF THE KRUGER NATIONAL PARK

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## INTRODUCTION

The extensive material upon which this study is based has been collected over the last four or five years by Dr. U. de V. Pienaar, Biologist to the National Parks Board, and his staff at Skukuza; during the last three years of this period the writer has spent some weeks of each year observing and collecting Myriapoda at various camps and outposts so that the total area of the Park has been fairly completely covered, though not in great detail. The faunal list provided in this paper, though it can by no means be claimed to be comprehensive, does give a fairly accurate approximation of the families and genera which can be expected to occur within the boundaries of the Kruger National Park; it is at the same time the first systematic survey of any subregion of the Transvaal Province.

The authors, which have made the chief contributions to our previous knowledge of the Transvaal fauna are: C. Attems in his fundamental study of the South African fauna as a whole, "The Myriapoda of South Africa", 1928; O. Schubart in his three papers *Diplopoda I-III* (1956-1966), in "South African Animal Life—The Results of the Lund University Expedition in 1950-1951"; a monograph on the Chilopoda of South Africa in the same series (1955) and a number of shorter descriptive papers from 1955-1964 by the present author; individual papers by J. Carl (1917), C. A. W. Jeekel (1956) and R. V. Chamberlin (1927), each with a single contribution.

The list of the Pselaphognatha is entirely the work of Professor B. Condé, University of Nancy, the chief specialist of this group, who indentified or described all the material from the Park (1949-1954). Similarly the Odontopygidae identifications are entirely due to Dr. Otto Kraus of the Senckenberg Forschungs-Institut, Frankfurt, who is the authority on this family of Diplopoda; the known fauna of the Park is based on his "Monographie der Odontopygidae (1960)" and on later additions to this work, which is still in progress (1966).

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## GENERAL REMARKS

The Transvaal has until recently been one of the least known of the five South African provinces with regard to its myriapod fauna; when Attems published his monograph in 1928, 47 species were known as compared with 116 at the present time.

The fauna of the Kruger National Park is typical of a fauna inhabiting open park-like country, consisting of either grassy steppe, bushveld or thornveld in which groups of acacia trees are typical features of the vegetational landscape as described in the introduction to U. de V. Pienaar's paper of 1963 on the larger mammals of the Kruger Park; there are only a few strips of rather open riverine forest along the larger river banks. In most of its features it is very different from a high rainfall area such as Natal-Zululand with its abundance of both coastal and montane mist-belt forest on the one hand and on the other from a semi-arid region such as South West Africa, consisting of large sand covered areas or exposed rock and where indigenous forest is entirely absent.

The chilopod orders, being all predatory carnivores, differ less from the faunas of other South African regions than do the Diplopoda, which are all herbivores, dependant on the vegetation by which they are surrounded and more affected by changes of humidity and temperature.

Sandy regions are never favoured by Myriapoda and not a single species is known from the sandy Namib region, which occupies a considerable percentage of the total area of S.W. Africa. In arid or desert regions a number of Chilopoda can survive beneath superficial boulders, especially of limestone strata, but the falling off of diplopod species is very marked as can be seen from the following table which gives the approximate number of chilopod and diplopod species known at the present date from South West Africa, the Transvaal and Natal-Zululand.

					<i>S.W. Africa</i>	<i>Transvaal</i>	<i>Natal-Zululand</i>
Chilopoda	..	..	..	..	27	47	42
Diplopoda	..	..	..	..	17	69	187

When such a comparison is made, it is seen that the Chilopoda do not differ so greatly in the three regions, either as regards the composition of the fauna or in the numbers of species which inhabit them. The Natal-Zululand region thus contains less than twice as many species of Chilopoda as S.W. Africa, but eleven times as many Diplopoda. In both groups of Myriapoda the fauna of the Transvaal occupies an intermediate position with regard to numbers, but stands nearer to Natal-Zululand than to S.W. Africa.

*The Chilopoda of the Transvaal*

The centipedes of the southern third of the Kruger Park, which has a considerably higher rainfall than the central and northern regions, have their faunal relationships with Zululand and Natal; in the northern third these tend to be with Moçambique and tropical East Africa on the one hand, Rhodesia and the Kalahari on the other. The larger centipedes of the genus *Cormocephalus*, *Trachycormocephalus*, *Rhysida* and *Alipes* occur mostly in the southern half

and illustrate this relationship with Natal-Zululand most clearly. *Trachycormocephalus zuluanus*, an uncommon form represented by only a few specimens in museum collections, has a most peculiar distribution; discovered originally at Ingwavuma in Zululand it has since been found in widely separated localities, the Valley of a Thousand Hills in Natal and a number of places both in the north and south of the Kruger National Park. *Asanada*, a genus thriving in sandy plains, is probably centralised in the Kalahari; it is most common in the northern districts of the Park but is also found in isolated sandveld areas towards the south of it.

### *The Diplopoda of the Transvaal*

The composition of the Transvaal Diplopoda, when tabulated in subgroups, show many differences from the fauna of the Natal-Zululand region. The genera which they have in common are for the most part found among the Polydesmoidea, a suborder consisting almost entirely of forest-inhabiting millipedes; a few species of *Ulodesmus* and *Gnomeskelus*, genera centred in Natal-Zululand, extend to the eastern Transvaal but are only found in riverine forest along the banks of rivers or in the montane forest on the slopes of the eastern escarpment of the Drakensberg, a continuation of the mist-belt forests of Natal; as this elevated area of the Transvaal does not come within the boundaries of the Park, the fauna of the latter has distinctly fewer relationships with that of Natal-Zululand than has the fauna of the Transvaal as a whole. Forest genera such as *Ulodesmus* and *Gnomeskelus* are limited to the eastern borders of the Transvaal and include some species from the southern extremity of the Park but are completely absent from the western Transvaal and Bechuanaland. The very limited number of species found in the Park usually shelter under fallen logs in situations where a certain amount of leaf mould has accumulated or under the bark of larger trees such as *Ficus* and *Azalia* along the river banks.

The Oniscomorpha, represented in the Transvaal and Natal by a single genus, the pill millipede *Sphaerotherium*, are fairly well represented in the Park, but only by rupicolous species of small size. In Natal these millipedes are very numerous and reach their greatest size in the species *S. giganteum*; many of them are tree climbers and live in forest humus.

The only Diplopoda which are represented by a larger number of species in the Transvaal than in Natal-Zululand, are members of the Spirostreptidae-Harpagophoridae group. These are the large-bodied juliform Diplopoda with a powerful armour of chitinous rings; some of the largest, such as species of the genus *Triaenostreptus*, may reach a length of more than 10 inches and a width of nearly half an inch. These robust millipedes can endure extremes of humidity and temperature which are prohibitive for such a group as the small-bodied Polydesmoidea; they are often found in the open during the hotter times of the day. As will be seen from the accompanying table the proportion of species in the Transvaal: Natal-Zululand regions is 22 : 14, while in the case of the Polydesmoidea the number is reversed, being 13 : 87.

<i>Number of species of</i>	<i>S.W. Africa</i>	<i>Transvaal</i>	<i>Natal-Zululand</i>
Oniscomorpha .. .. .	0	10	12
Spirostreptidae-Harpagophoridae .. .. .	6	22	14
Spirobolidae .. .. .	0	0	10
Polydesmoidea .. .. .	3	13	87
Odontopygidae .. .. .	8	24	65
Total .. .. .	17	69	188

Forest living genera such as *Chersastus* (Spirobolidae), *Ulodesmus*, *Gnomeskelus* (Polydesmoidea) and *Sphaerotherium* (Oniscomorpha), while either absent or poorly represented in the fauna of the Park, are either entirely absent in S.W. Africa or represented by a remnant consisting of a few species of Polydesmoidea, which still survive under stones.

The Odontopygidae are a family of small sized millipedes, peculiar in respect to their distribution. Being endemic in Africa and entirely absent from Madagascar they have, according to Kraus (1960), migrated towards the southern extremity of Africa in a general north-south direction. There are a large number of genera in central Africa, each consisting of a few species, some of only a single species and Kraus (1960) regards this region as the centre of origin of the family. The few genera that have reached South Africa consist on the other hand of a large number of species, one *Spinotarsus*, far surpassing all others of the family in this respect; *Spinotarsus*, which has migrated the furthest of all the genera from the centre of origin, consists of about 100 species known at present from the Republic and this is probably a very conservative estimate since from the forests of Natal-Zululand alone 65 species have been described.

I will not refer in more detail to this family as I should be anticipating what Dr. Kraus, the authority on the ecology and distribution of the Odontopygidae, will have to say in a monograph which is at the moment unfinished. It is, however, clear that the family has occupied a much larger extent of territory than the groups which are confined to forests; ecologically it has successfully occupied a number of different habitats with very different conditions of humidity; it has been found in open, semi-arid lands where only rupicolous habitats are available and has adapted itself with equal success to grass prairie and thornveld; finally it has invaded the southern forests of South Africa where a more intensive speciation has resulted than anywhere else; in the richly forested coastal areas separate species may be found in the same type of forest only a few miles apart, as at Sheffield Beach (*S. cuspidosus*) and Compensation Beach (*S. lobatus*) on the north coast of Natal; two species live in the small patch of indigenous forest (Town Bush) just above Pietermaritzburg.

Such speciation is unknown in the Transvaal region; in the Park itself only 8 species are known, these being on an average considerably larger than those of the Natal forests; a few species are also found in South West Africa, which is however far less well explored for millipedes than the other two provinces with which it has been compared.

#### *Ecology and habits*

Comparatively little is known of the ecology and habits of the Myriapoda of the Park and this knowledge is limited to some observations on two of the larger sized diplopod groups,

the Spirostreptidae and Odontopygidae, which in number of species and individuals constitute a notable section of the myriapod fauna.

The two large-bodied groups referred to above, though superficially alike, are very different in many anatomical characters, especially the structure of the gonopods, which in the Odontopygidae attain a very high degree of complexity and individual variability. There is also a considerable difference in size, the Odontopygidae being much smaller and usually very slender; though little definite is known, there are in all probability considerable differences in the feeding habits of the two families and the Odontopygidae seem to be more strictly nocturnal than the Spirostreptidae.

The defensive reactions of the two groups are also very different. While the Spirostreptidae may react to a foreign stimulus in two ways, forming a clockwork spiral and exuding liquid faeces from the anal valves, the Odontopygidae practise a third and very effective means of escape. When an attempt is made to seize them with the fingers or a forceps they will bite or nibble at the fingers with their mouth-parts; if this fails they may suddenly commence violent snake-like contortions, trying to escape with S-like undulations of the body; a smooth species like *Spinotarsus krugeri* turns over on its back and, with the smooth part of the body undermost, undulates or worms its way through grass and between obstacles. It is as difficult to hold the smooth wriggling body as the small earth-snake *Typhlops* and the movements are much more vigorous and rapid than any defensive reactions of the more slow moving Spirostreptidae.

Many Spirostreptidae take advantage of damp or rainy weather to walk abroad during daylight; if this is practised at all by the Odontopygidae it is only in the case of some of the more robust species of *Spinotarsus* (*colosseus*, *krugeri* and *tshokwensis*).

During summer months or in periods of drought Odontopygidae congregate in fairly large numbers under logs and fallen trees as well as larger stones in more or less sheltered situations; though not gregarious they occur in two's and three's in hollows and concavities of the sheltering structure.

The large Spirostreptids may aestivate in the deep interiors of termite nests, a habit practised more by the females than the males. *Poratophilus similis* has been found in such situations near Skukuza during November and December.

### *Predators*

The skeletons of innumerable specimens of *Doratogonus flavifilis*, especially immature ones, are often seen outside the burrows of scorpions and thus serve as indicators for these scorpions. *Opisthacanthus laevipes*, a fairly large rock scorpion, was observed at Krokodilbrug holding one of these with the claws of one pedipalp while an injection with the sting was being used to quieten the movements of the millipede; the scorpion appeared quite undeterred by the copious secretions from the odoriferous glands of the prey, which were clearly visible on the body.

The forest dormouse *Graphiurus murinus* appears also to live largely on this millipede and may accumulate large midden heaps of the disarticulated calcareous body rings.

The number of birds which feed sporadically on millipedes must be very great though few or none live exclusively on this class of the Myriapoda to the same degree that the centipede snake *Aparallactus capensis* subsists entirely on a diet of centipedes.

The following birds are known to consume millipedes, perhaps fortuitously in a mixed diet of insects and other arthropods: The Francolin (*Pternistis swainsoni*); guinea-fowl (*Numida meleagris*); the Hadedah Ibis; African robins of the genera *Erythropygia*, *Cossypha*, *Bessonornis*, *Sheppardia*, *Pogonocichla*, *Swynnertonia*; the crowned horn-bill (*Lophoceros alboterminatus*). Dr. J. M. Winterbottom has given me a list of the following birds, but thinks they are not important predators: the Cape robin, purple heron, little sparrowhawk, common sandpiper, chorister robin and Natal thrush.

Among reptiles it is probable that they are eaten by the common leguaan and the remains of a species of *Poratophilus* have been found in the excreta of the hinged tortoise *Kinixys belliana* by R. B. Copley.

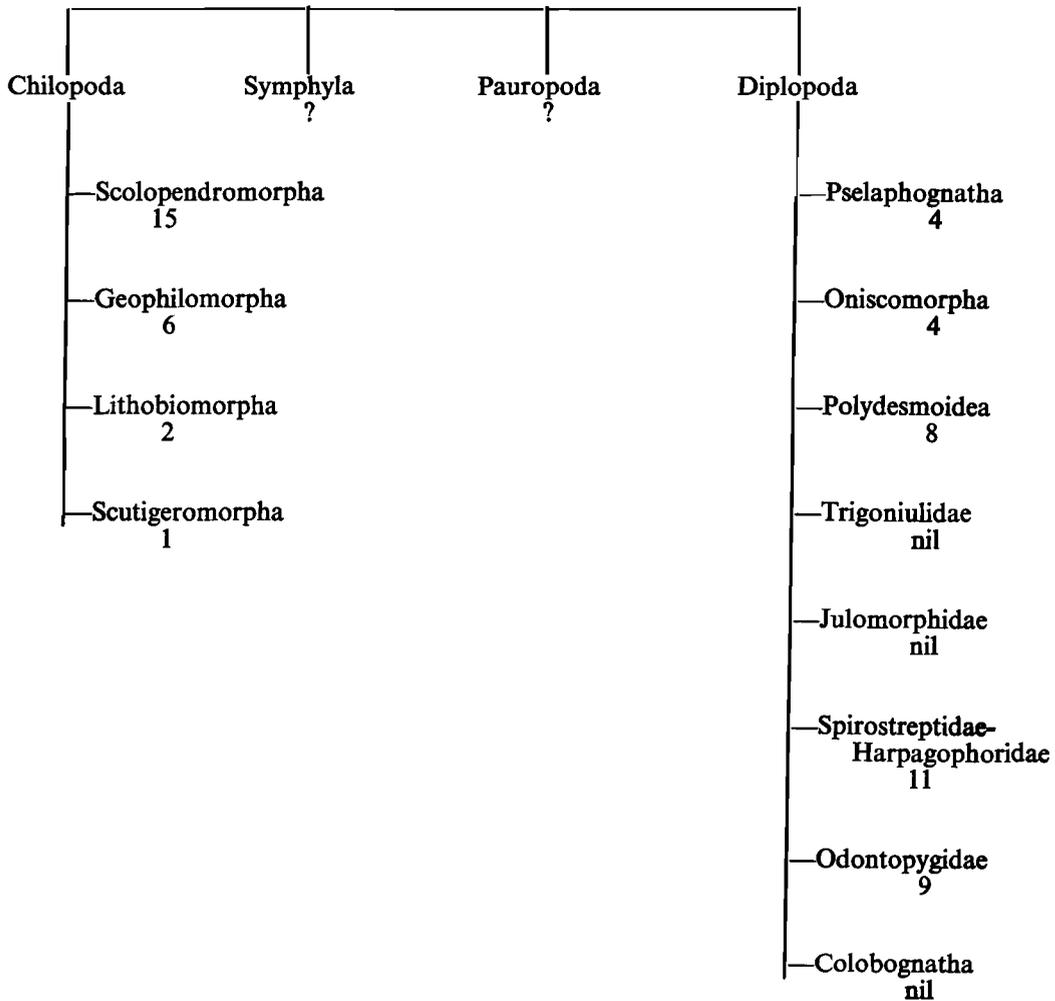
Finally the nymphs of certain reduviid bugs are important insect enemies of Diplopoda; nymphs and even younger stages of reduviids of the genera *Glymmatophora* and *Cleptria* feed upon both large and small millipedes; groups of these bugs will attack a single millipede one at a time and weaken it by piercing between the rings of the body with their long needle-like mouth parts; the millipede is very soon immobilised and in its helpless state its body juices are sucked out by the bugs, leaving only a dry and empty husk.

A few Diplopoda are themselves scavengers and in part coprophilic, as for instance *Gymnostreptus pyrocephalus* in Natal (Lawrence 1952). The dung of ruminants and other large herbivores is often used as a suitable place for egg-laying and sheltering the early larval stages after hatching; in this way also a wider distribution of a given species may be achieved although such a habit has not yet been established in the case of any of the Diplopoda of the Kruger National Park.

## SYSTEMATICS

### AN ANALYSIS OF THE MYRIAPOD GROUPS REPRESENTED IN THE PARK

The 60 species of Myriapoda found in the Park can be arranged in the taxa given below with regard to numbers. No Symphyla or Pauropoda have been recorded from the area, though it is extremely unlikely that these groups do not occur there. The Symphyla especially is a universally distributed group and may even be considered as not uncommon. Attems, who assigned the rank of a Class to both groups, does not mention the Pauropoda in his monograph of the South African fauna since none of these extremely small and obscure Myriapoda had been collected in South Africa previous to 1928.



A LIST OF THE SPECIES WITH DESCRIPTION OF NEW FORMS

CHILOPODA

**Scolopendromorpha**

Genus *Scolopendra*

*Scolopendra morsitans* Linn.

*S. morsitans* Linnaeus, Syst. Nat. Ed. 10, p. 638, 1758.

Talamati (C.100); Hapi area, Pafuri (N.5); Letaba camp (N.247, Vari & Rorke); Hlangulene

(C.125); Nyanda sandveld (N.46); Machuluane Hills (S.101); Dongatziba (N.29); Punda Milia area (N.31); between Mahlakuza and Malonga (N.28); between Saselandongapoort and Pafuri (N.36); between Saselandonga and Mahlakuza (N.36).

The species is found throughout Africa, being common in southern Africa except Natal and the extreme South-West Cape.

Genus *Ethmostigmus* Pocock

*Ethmostigmus trigonopodus* (Leach)

*Scolopendra trigonopoda* Leach 1817, Zool. Misc., 3, p. 36.

Klopperfontein, N.E. of Punda Milia (N.25); Skukuza camp (S.7); Shingwedzi (N.118); Malelane rest camp (S.68); Pretoriuskop (S.35); Between Saselandongapoort and Mahlakuza, eastern boundary (N.36).

The largest of the Scolopendromorpha and a common tropical form which is found in Rhodesia and the N.E. Transvaal but seldom south of these regions.

Genus *Cormocephalus* Newport

*Cormocephalus nitidus nitidus* Porat

*C. nitidus* Porat 1871, Ofvers. Vet. Ak. Forh., 28, p. 1154.

Talamati (C.100); Skabenskap (S.35); Ship Mountain near Pretoriuskop (S.51); Godleni, near Krokodilbrug (S.74).

*Cormocephalus anceps* Porat

*C. anceps* Porat 1871, Ofvers. Vet. Ak. Förh., 28, p. 1157.

Dongatziba (N.29); Punda Milia area (N.31); Pumbe picket (C.52); Olifantspoort area (C.3).

*Cormocephalus cupipes* Pocock

*C. cupipes* Pocock 1891, Ann. Mag. Nat. Hist. (6), 7, p. 64.

Sabi and Sand river confluence, near Skukuza (C.162).

*Cormocephalus westwoodi dispar* Porat

*C. dispar* Porat 1893, Bih. Svensk. Ak. Handl., 18, p. 7.

Skukuza koppies (S.28).

*Cormocephalus punctatus* Attems

*C. punctatus* Attems 1928, Ann. S. Afr. Mus., 26, p. 96.

Skukuza koppies (S.28); Godleni (S.74).

*Cormocephalus rhodesianus* Lawrence

*C. rhodesianus* Lawrence 1955, S. Afr. Anim. Life, 2, p. 14.

Hapi area, Pafuri (N.5); Makangelafontein (N.12); Pafuri, near boundary of reserve (N.5); near Madziringwe mouth (N.9).

The specimens from Pafuri agree closely with *rhodesianus* except that the lateral margina-

tion of the tergites usually begins on segment XVIII, in one specimen on XII, in another XVI, in a third on XVII; antennae reaching well beyond tergite II. End-legs long and slender, the segments long, subparallel; at least the last segment with minute whitish hairs, rather more dense than on the other segments; in many specimens the last 4 segments with a distinct fringe of very short fine hairs which are however not very dense; even the prefemur, especially on the inner margin, with a distinct fringe of hairs; lateral margin of prefemur with a double row of minute spines inferiorly, 5·6, 6·6, 6·7 or 7·7 but usually 6·6. Second tarsus half the length of the first.

In the character of the tergite emargination these specimens represent a connecting form between *multispinus* of Natal and Zululand, and *rhodesianus* from Rhodesia, but in all other respects are no different from the latter species.

Genus *Trachycormocephalus* Kraepelin

*Trachycormocephalus afer* (Mein.)

*Cormocephalus afer* Meinert 1886, Proc. Amer. Phil. Soc., 23, p. 205.

Specimens from Madziringwepoort (N.16); Nhlanganinespruit (C.246); Shalungwe Springs (N. 16); Saselandongapoort (N.20); Wamantse (N.281); Malelane rest camp (S.68); Maseya sandveld (N.15); Nwambiya pan (N.46); Sabipoort (S.47); Mlondozi river mouth (C.176).

*Trachycormocephalus zuluanus* Lawrence

*T. zuluanus* Lawrence 1958, Ann. Natal Mus., XIV (2), p. 297, fig. 6.

Pafuri, near boundary (N.5); Tshokwane (C.136); Skukuza, Napi road (S.17); Saselandongapoort (N.20); Malelane rest camp (S.68); Krokodilbrug (S.97).

There can be no doubt that this distinct species is the same as that which has been described from Zululand and Natal.

Genus *Asanada* Meinert

*Asanada kalaharinus* Lawrence

*A. socotrana kalaharinus* Lawrence 1936, Ann. Trans. Mus., 17, p. 160.

Matukwane, W. of Punda Milia (N.29); Shipadze, Punda Milia area (N.38); Makangela-fontein (N.12); between Pakwani and Mafayenifontein (N.94); Nyandu sandveld (N.46); Napi road, Skukuza (S.17); Shingwedzi (N.118, Vari and Rorke, xi. 61); Punda Milia (N.31). Wamantse (N.281); Malelane rest camp (S.68); Nwambiya pan (N.46); Pretoriuskop (S.35).

Most of the specimens were found under stones.

Genus *Alipes* Imhoff

*Alipes crotalus* (Gerst.)

*Eucorybas crotalus* Gerstaecker 1854, Stett. Ent. Zeit., 15, p. 312.

Matukwane, W. of Punda Milia (N.29); Dimbo, W. of Punda Milia (N.30); Godleni (S.74); Eastern boundary (S.107); Gomondwane (S.71).

All under stones.

*Alipes calcipes* Cook

1 large specimen, Shipadze (N.12), under stones.

Genus *Rhysida* Wood*Rhysida afra afra* (Peters)

*Ptychotrema afra* Peters 1855, Monber. Ak. Berlin, p. 82.  
Skabenkop, near Pretoriuskop (S.35).

Genus *Cryptops* Leach*Cryptops peringueyi* Attems

*C. peringueyi* Attems 1928, An. S. Afr. Mus., 26, p. 86.  
Skukuza koppies (S.28); Pretoriuskop (S.35); Godleni (S.74).

**Geophilomorpha**Genus *Orphnaeus* Meinert*Orphnaeus brevilabiatus* (Newport)

*Geophilus brevilabiatus* Newport 1845, Trans. Linn. Soc. Lond., 19, p. 436.

Confluence of the Sand and Sabi rivers (C.162); Hapi dam area, Pafuri (N.5); Shingwedzi (N.118, Vari & Rorke, xi. 61); Matukwane, W. of Punda Milia (N.29); Olifantspoort area in Msimbit forest (C.3); Malelane camp (S.68); Nhlanganinespruit (C.246); Mahlakuza pan (N.28); Pretoriuskop (S.35); Godleni (S.74); Eastern boundary (S.107); Sabipoort (S.47); Lower Sabi (S.33); Malelane camp (S.104).

The majority of specimens had 67 pairs of legs in the males. The species is widespread in all warmer regions of the world; in southern Africa it is known from Rhodesia and the N.E. Transvaal.

Genus *Mesoschendyla* Attems*Mesoschendyla picturata* n.sp. (Text-Figs. 1c-k)

**Holotypes**, 1 ♂, 1 ♀, cotype 1 ♀ (NM.9030), Nhlanganinespruit (N.246) near Letaba, Kruger National Park, collected U. de V. Pienaar, Nov. 1963.

♂ **Colour**: Pale straw yellow with a variegated darker pattern as follows: tergites indistinctly darkened on their anterior and posterior margins, the darkened area becoming larger posteriorly, forming an ill-defined, more or less rounded marking in the middle and posterior segments in which there are two narrow, fairly distinct, parallel bars in the middle of the segment occupying most of its length, very distinct on the last 10 tergites; pleurites also with some ill-defined small spots and mottling; anterior segments of ventral surface with a few indistinct markings, middle sternites with a short anterior median bar, a diffused larger marking posteriorly in the middle, a small round spot at each antero- and posterolateral angle, these more distinct than on dorsal surface but disappearing on the last 10 sternites.

**Headplate** shaped as in Fig. 1c, with a few scattered short setae, only the basal segment of the antennae with very distinct tessellated reticulation, the remaining segments appearing quite smooth in contrast but with very faint reticulation, smaller short bristles beginning only on segment VI, becoming progressively more numerous distally, of uniform length in distal

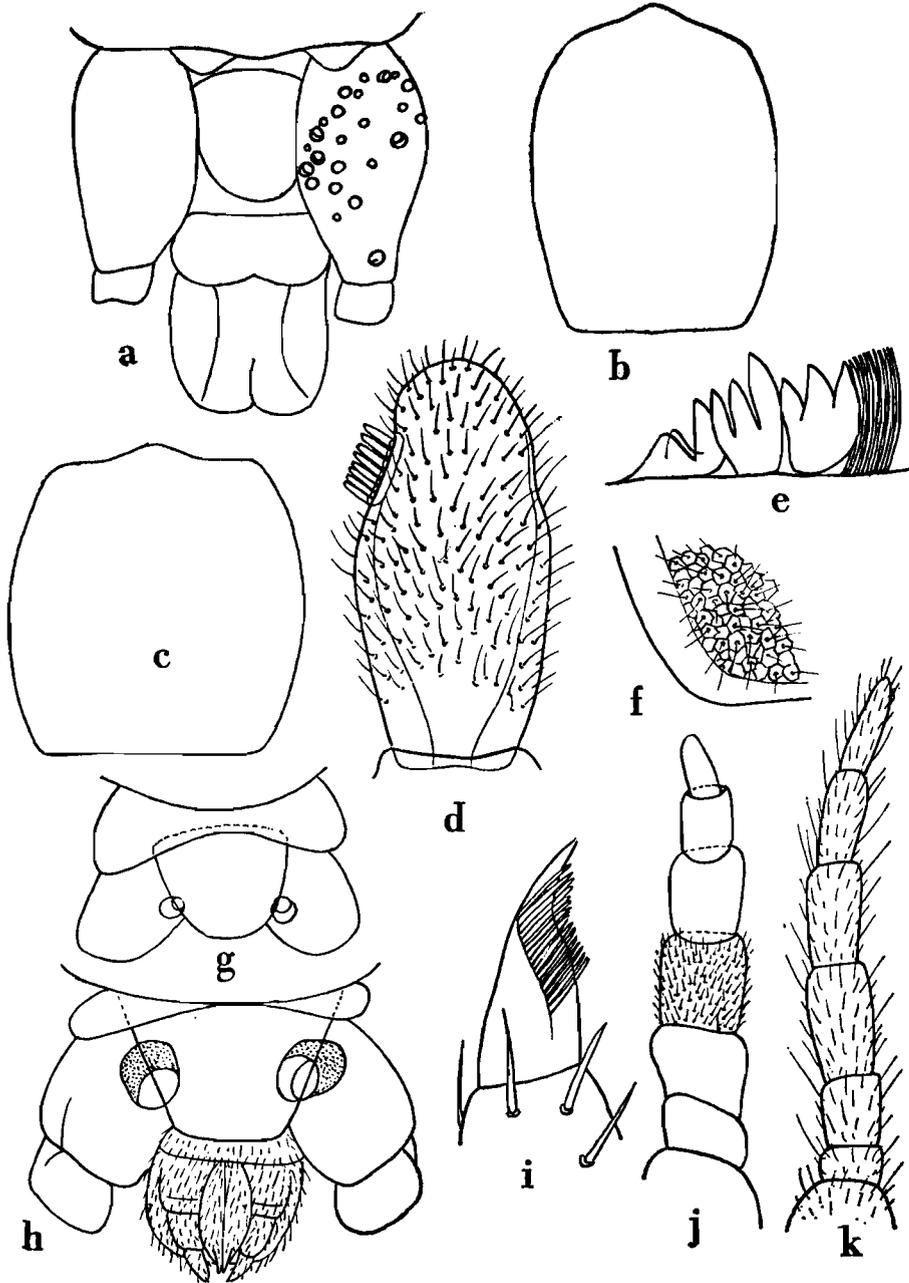


Figure 1. *Eurytion transvaalicus* n. sp. ♂. a, genital sternite; b, outline of headplate. *Mesoschendyla picturata* n. sp. ♂. c, outline of headplate; d, apical segment of antenna; e, mandible; f, postero-lateral angle of genital sternite, enlarged; g and h, genital sternites of ♀ and ♂ respectively; i, claw of telepodite, second maxilla, oral view; j and k, end-legs of ♂ and ♀ respectively.

segments; apical segment with sense organs as in Fig. 1*d*, 11–12 elongate papillae in an irregularly duplicated row, 3–4 similar ones on the opposite side, all situated in a small grooved depression.

**Mouth parts.** Maxillipedes without inner teeth; margin of labrum with a row of 19 stout triangular teeth; between the labrum and anterior margins of headplate 10 setae on each side, and a pair in the middle on the labral margin itself. Mandibles with 8 teeth as in Fig. 1*e*. First maxillae seen from oral side, apical segment of telepodite with 4, coxal process with 2 spiniform setae, no lateral processes. Second maxilla seen from oral side with claw of telepodite as in Fig. 1*i*, about 12 comb setae on each side of claw; apical segment with 8 spines in all (5 on oral side), middle with 2 on each surface, basal with 3 on oral surface, each segment in addition with 2 minute peglike spines (sense organs) on its lateral edge; apical segment of telepodite of first maxilla with a transversely curved row of similar spines near its base. **Tergites** with distinct median sulci dividing the surface into three parts, the middle a little narrower than the lateral areas. Sternite I without, II with a small round area of 12–13 pores, the areas becoming progressively larger to sternite XXXVII or XXXVIII where they cease; area of V a little longer than wide, of VII wider than long, arranged in a group of which the anterior margin is straight, the posterior convex; from IX onwards the areas are roughly quadrate, a little wider behind than in front.

**Legs.** End-legs as in Fig. 1*h*; the single pore very large, the sternite resembling that of *monoporus*, its length about two-thirds its greatest (anterior) width, covered fairly closely with uniformly short setae (Fig. 1*f*); no terminal pores; segments of end-legs incrassate, Fig. 1*j*, with fairly dense short setae (only that of fourth segment shown), terminal segment short and about half width of penultimate; 63 pairs of legs.

♀. Not differing from the ♂, except in the end-legs which are not incrassate, Fig. 1*k*, and clothed with considerably fewer and distinctly longer setae; genital sternite, Fig. 1*g*, smaller, with posterior and lateral margins much more rounded, the pores much smaller; 63 pairs of legs.

**Dimensions.** Total length of ♂ 37.5 mm, of ♀ 40 mm.

The species is undoubtedly related to *monoporus* Attems from S.W. Africa, but differs in a number of details. Unfortunately Attems does not say how many of the basal segments of the antenna have basal reticulation though the first 6 have it in *caledonica* which thus differs markedly from *picturata* in this as well as in other characters.

Genus *Ballophilus* Cook

*Ballophilus braunsi* Silvestri

*B. braunsi* Silvestri 1907, Mitt. Nat. Mus. Hamb., 24, p. 244.

Skukuza camp (S.7).

Genus *Eurytion* Attems

*Eurytion transvaalicus* n.sp. (Text-Figs. 1*a*, *b*)

**Holotype:** 1 ♂ (NM.9032), Pumbe picket, Olifantspoort area (C.52), Kruger National Park,

collected Nov. 1964. Cotype, 1 ♂ with the same data. Paratype 1 ♂, Saselandongapoort (N.20) Kruger National Park, collected Nov. 1964.

**Colour.** Pale yellow.

**Headplate** as in Fig. 1*b*,  $1\frac{1}{2}$  as long as wide, with several transverse rows of 4–6 short setae. Antennae with end-segment as in Attems' figure of *E. trichopus* (1928, p. 165, Pl. XX, Fig. 488); segments I–VI with a subbasal and subapical whorl of setae, the space between them more or less smooth, segment VII and distally with numerous short bristles.

**Mouth parts.** Maxillipedes with a short subapical tooth on inner margin of prefemur, tarsus at base with a little larger distinct black tooth (as in *dolichocephalus*), distal margin of coxa with 2 large tubercles (as in *trichopus*); pleural suture as in *trichopus*. Clypeal area small, long oval, finely granular, without setae (2 in paratype), 10–12 long stout setae on each side of it. Median piece of labrum with a number of blunt processes resembling those which fringe the lateral pieces but shorter and wider, teeth or tubercles absent. Mandibles with 15 large comb teeth. First maxilla lacking lateral lobes on the syncoxite, that of segment I of telepodite well developed, passing beyond the apex of segment II, resembling in general those of *dolichocephalus*; median suture of coxae of second maxilla indistinct but present, claw of telepodite subequal to the length of terminal segment on inner side, basal and middle segments with 3 and 4 setae respectively, terminal one with 10.

**Sternites.** First sternite with a small round group of pores, this in segments VIII–XII becoming progressively more transversely ovate, commencing to divide on XVIII, completely separate on XIX, by XXIV more than their own diameter apart, in two round groups becoming progressively further apart; very indistinct in the last 4 sternites where the areas are larger and approach each other again, in contact on the penultimate segment. Last sternite with anterior and posterior borders distinctly convex, Fig. 1*a*, a little wider than long. Coxa of end-legs with 25–27 pores, one isolated at posterior apex; pores mostly of a uniformly moderate size, about 5 however smaller; terminal pores absent; 65 pairs of legs, the last pair with the last and penultimate segments subequal, ending in a strong but slender claw.

**Dimensions:** Total length 43 mm.

#### Genus *Polygonarea* Attems

##### *Polygonarea anonyx* n.sp. (Text-Fig. 2)

**Holotype** 1: ♂, Olifantspoort area (C.3) Kruger National Park (NM.9031), collected R. F. Lawrence, Nov. 1963.

**Colour** very light yellow, head-plate light orange or reddish.

**Headplate**  $1\frac{2}{3}$  as long as wide, as in Fig. 2*a* seen from above, 2 or 3 fairly long setae on each lateral margin, dorsal surface with sparse short setae. Antennae with sharply defined band of polygonal reticulation on apical third of basal segment, the width of the band decreasing progressively on the distal segments; segments I and II with a subbasal and very irregular subapical whorl of setae, III with 2 regular whorls, IV–VI with only the subbasal regular whorl, VII with a weak subbasal whorl, the remainder of the segment beset with numerous short bristles, VIII and distal segments thickly covered with short bristles only.

**Mouth parts.** Maxillipedes with coxal plate as in *P. transvaalica*, with very distinct regular pits

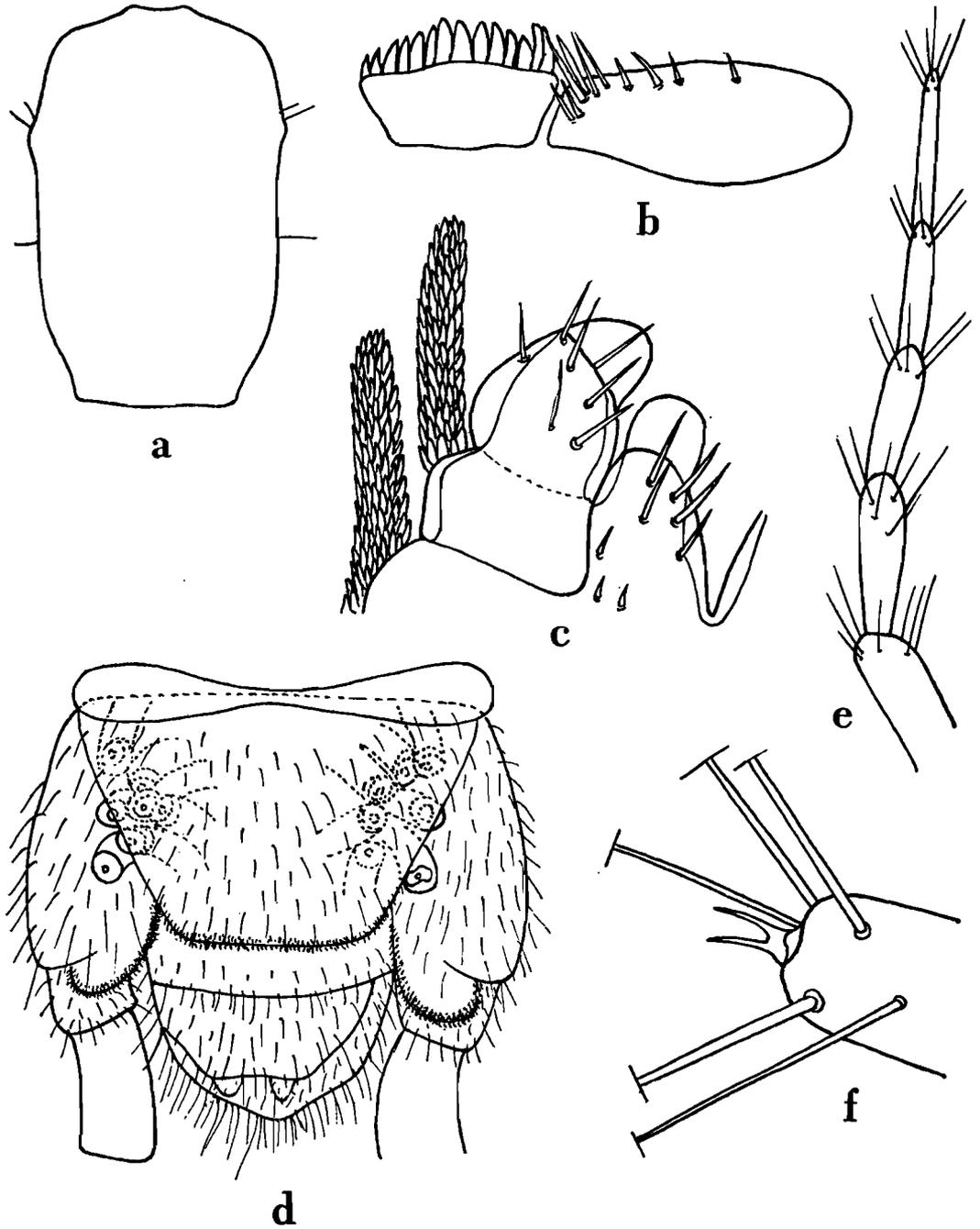


Figure 2. *Polygonarea anonyx* n. sp. ♂. *a*, outline of headplate; *b*, labrum; *c*, first maxilla; *d*, genital sternite; *e*, end-leg; *f*, apex of last segment of end-leg, enlarged.

and a shallow median groove, two distinct, abruptly truncate teeth in the middle of its anterior margin, surmounted by a minute seta. Inner apex of prefemur and femur with a blunt triangular projection but no teeth, tarsus below claw with a small but very distinct sharp black tooth. Clypeal area long-oval, with 4 large setae and 2 others on each side below it; labrum as in Fig. 2*b*, the median piece with 11 or 12 strong, rather blunt teeth. Mandibles with 25–27 comb teeth; first maxilla as in Fig. 2*c*, the lateral lobe of the syncoxite unusually long, equal to that of segment I of telepodite, easily surpassing the apex of segment II. Second maxilla with claw equal to length of middle segment on inner side, inner basal process of coxa reaching only a third of basal segment, the distal margin with an irregular row of 5 spines on each side; ventral surfaces of the basal and middle segments of telepodite with 1 spine each, 18 on both surfaces of apical segment.

**Tergites** with well defined paramedian sulci, between them a few minute scattered punctures; sternites with a deep narrow longitudinal furrow in the middle bisected by a much shorter and more pit like cross furrow; no pores visible.

**Legs** 65 in number, with some long setae on the dorsal segments; genital sternite very large, trapezoidal, Fig. 2*d*, much wider than long, with 7 or 8 very large pores, only 1 or 2 opening freely near the lateral margin on each side; end-legs with a subapical whorl of 5–6 slender setae on each segment, Fig. 2*e*; last segment equal to or slightly longer than the penultimate, with 2 minute, basally united setae instead of a claw, Fig. 2*f*.

**Dimensions:** Total length 44 mm.

*Polygonarea transvaalica* Lawrence

*P. transvaalica* Lawrence 1959, Ann. Transv. Mus., 23, p. 364, fig. 1*a–e*.  
Skukuza koppies (S.28).

**Lithobiomorpha**

Genus *Lamyctes* Meinert

*Lamyctes castanea* Attems

*L. castanea* Attems 1909, Denk. med. naturw. Ges. Jena, 14, p. 10.

Olifantspoort area, in Msimbit forest (C.3), under stones; Pafuri (N.5); Pretoriuskop (S.35).

*Lamyctes setigera* Lawrence

*L. setigera* Lawrence 1955, Anim. Life in S. Africa, 2, p. 21.

Olifantspoort area, in Msimbit forest (C.3).

**Scutigermorpha**

Genus *Scutigera* Silvestri

*Scutigera weberi* Silvestri

*S. weberi* Silvestri 1903, Redia I, p. 254.

Olifantspoort area in Msimbit forest (C.3), under stones; Leeupan, near Tshokwane (C.142); Pretoriuskop (S.35).

## DIPLOPODA

Subclass **Pselaphognatha**

## Family SYNXENIDAE Silvestri

Genus *Phryssonotus* Scudder 1885*Phryssonotus capensis* Silvestri

*P. capensis* Silvestri 1923, Treb. Mus. Cien. nat. Barcelona, 4 (5), 5–16.

1 adult ♀ with 17 pairs of legs from Malelane camp (S.104).

The types were captured near Stellenbosch, Cape, and the species has been taken at Port Shepstone and Estcourt, Natal, the Hluhluwe Game Reserve in Zululand. It has also been recorded from Madagascar.

## Family POLYXENIIDAE Gray and Jones 1842

Genus *Saroxenus* Cook, 896*Saroxenus* cf. *alluaudi* Brölemann 1920

*S. alluaudi* Brölemann 1920, Voy. Ch. Alluaud et Jeannel en Afr. Orient. (1911–1912), Myriapoda III, 49–298.

Confluence of the Sabi and Sand rivers near Skukuza (C.162), represented by two specimens of which the ♂ was not quite adult, the ♀ adult with 13 pairs of legs.

Genus *Propolyxenus* Silvestri 1948*Propolyxenus lawrencei* Condé

*P. lawrencei* Condé 1949, Bull. Soc. ent. Fr. 54, p. 124.

The confluence of the Sabi and Sand rivers, 2½ miles from Skukuza (C.162).

The types of the species were described from Champagne Castle Hotel, Drakensberg Mts., Natal, alt. 5,800 ft.

Genus *Monographis* Attems*Monographis schultzei* Attems

*M. schultzei* Attems 1909, in Schultze's Forsch. Reise in D. Sudwest-Afrika, 14, p. 1–52.

1 adult ♀ from Mahlakuza pan (N.28) with 13 pairs of legs. The species and genus *Macroxenodes hullei*, a name suggested by Condé (*in lit*) for specimens from Port Alfred, Cape, is now regarded by him as synonymous with *M. schultzei*. The distribution of the form is peculiar: Steinkopf and Prince Albert in the Cape Province, the Kalahari and the Kruger National Park.

Order **Oniscomorpha**

## Family SPHAEROTHERIIDAE

Genus *Sphaerotherium* Brandt*Sphaerotherium modestum* Attems

*S. modestum* Attems 1928, Ann. S. Afr. Mus., 26, p. 230, Pl. III, Figs. 75–77.

Makutwanine koppies (S.6); Skukuza rest camp (S.7); Saselandongapoort (N.20); Msimbit forest, 2 miles S. of Pafuri (N.6).

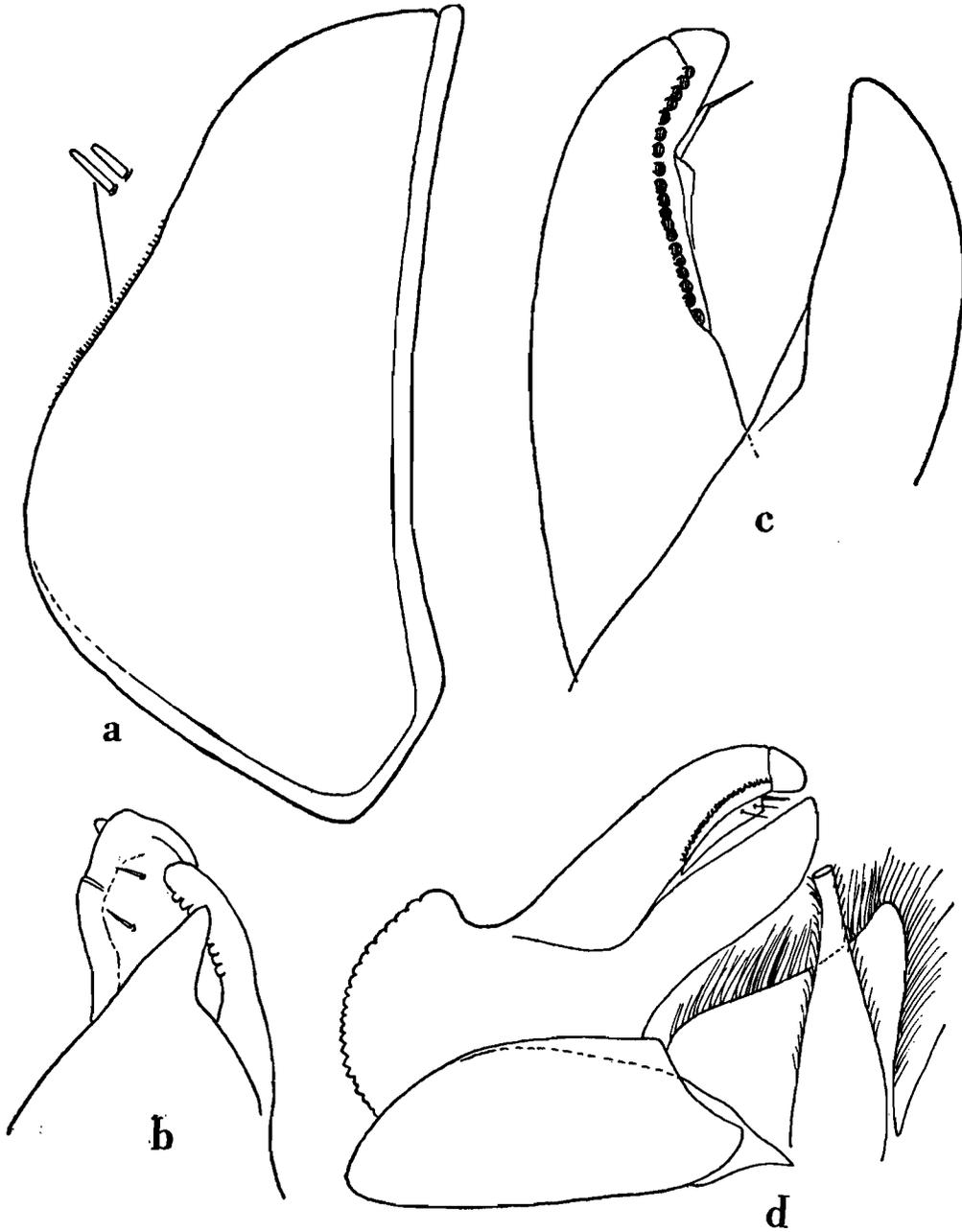


Figure 3. *Sphaerotherium krugeri* n. sp. ♂. *a*, profile of pygidium with two of the cylindrical hairs enlarged; *b*, tarsus of anterior gonopod, aboral view; *c*, posterior gonopod enlarged, aboral view; *d*, posterior gonopod, oral view.

*Sphaerotherium solitarium* Attems

1 ♀, Hippo pool near Krokodilbrug (S.97).

*Sphaerotherium krugeri* n.sp. (Text-Figs. 3, 4)

**Holotypes**, 2 ♂♂, 3 ♀♀, Gomondwane (S.71), Kruger National Park, collected R. F. Lawrence, November 1964 (NM.9315).

♂. **Colour** dark brown to black with a greenish tinge, the tergites with a narrow darker posterior margination.

**Head** thickly covered with rather long setae in anterior half, posterior half smooth and shiny with a few large deep pits, these fairly numerous in the middle; antennae with 4 papillae on apical segment; collum smooth and shiny, without pits except for a regular row along entire anterior border, each with a seta of moderate length; shield smooth, shiny, without even small setiferous pits, brim very wide, with a rather irregular single row of setae, the slope long, with 6 distinct keels.

**Tergites** smooth without pits or keels, the dorsal surfaces more than usually convex, not flat, so that, seen from the side, there is a distinct step at the junctions of the tergites; last three tergites with a row of 4–6 macrochaetae on the posterior margin, as long as half the length of the tergites; under surfaces laterally with a distinct keel, but represented on the last tergite and pygidium by a low, rounded, blackish tubercle.

**Pygidium** seen in profile, Fig. 3a, with a slight concavity in the middle of its posterior margin, most of its surface roughened with a mixture of minute granules and minute pits diminishing dorsally and laterally where the segment is almost smooth; in the middle of the segment, occupying the shallow concavity but not elsewhere, a few very short cylindrical hairs, Fig. 3a (enlarged); on under surface of pygidium the stridulatory area on each side consisting of 55–60 keeled tubercles, Fig. 4d, differing markedly in size, arranged almost in regular rows.

**Legs.** Tibiae at dorsal apex with 2 spines, tarsus with 5–7 ventral spines, 1 dorsal at base of claw. Coxae with outer margins normally convex, no conical projections dorso-laterally or spicules, no segments of legs with sense cones.

**Gonopods.** Anterior gonopod as in Fig. 4c, oral view, Fig. 3b, aboral view, the tarsus 2-segmented, the basal one with a longitudinal row of about 7 round tubercles. Posterior gonopod as in Fig. 3d, oral view, with the tarsus 2-segmented, the anterior “horns” longer than the posterior bristle lobes, slightly trumpet shaped apically; in aboral view the tarsus, Fig. 3c, enlarged, with a row of about 20 round papillae, one large papilliform spine near apex; stridulatory surface on outer margin of tibia as in Fig. 4a, enlarged, with about 20 strong ridges.

**Dimensions:** Total length 16.5, width 9 mm.

♀. Similar in colouring to the ♂; macrochaetae less developed and apparently only 2–4 present on the last tergite alone; pygidium in profile straight in the middle, not concave, smooth and shiny throughout or with a few scattered microscopic pits, a subtriangular, more or less flattened area in the middle of the posterior border, however, is distinctly roughened with mixed granules and pits.

**Dimensions:** Total length 13.5, width 7.5 mm.

The species falls into group II of Schubart's scheme of classification and lies somewhere

between *hanströmi* from Pietermaritzburg and *steppense* from Middleton, Cape. It agrees with the former in having tergal macrochaetae but differs in the wide brim of the shield and in lacking sense cones on the legs; in the last two characters it agrees with *steppense* and also in the general shape of the gonopods. The macrochaetae seem to be variable in number, one specimen having 6–10 on each tergite; in others there are none at all although the sockets from which they originate are present on the posterior margins of the tergites.

**Further material:** 1 ♂, south-east boundary opposite Ressano Garcia (S.107); 1 ♂, 1 ♀, Nwanetzi dam area (C.85); 1 ♀, 4 juv. Olifantspoort area (C.3), under stones in Msimbit forest; 1 ♀ from the same locality; 2 ♂♂, Pretoriuskop (S.35); 1 ♀, Lindanda (C.123); 1 ♀, Sabipoort (S.47).

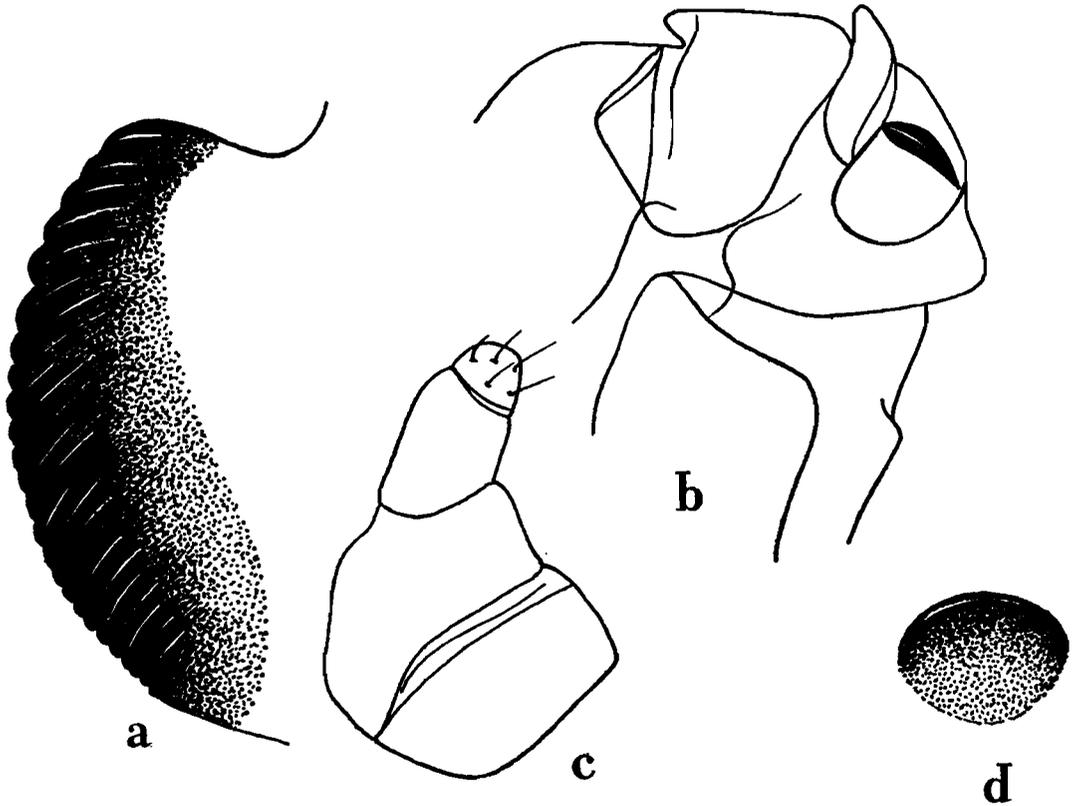


Figure 4. *Sphaerotherium krugeri* n. sp. ♂. *a*, stridulatory area of posterior gonopod, aboral view, enlarged; *b*, base of second leg of ♀; *c*, anterior gonopod of ♂, oral view; *d*, a keeled tubercle of stridulatory area of pygidium of ♂, enlarged.

*Sphaerotherium apicale* Silvestri

*S. apicale* Silvestri 1910, Redia IV, p. 217, Fig. XXI.

The type ♂ was described from Lourenço Marques. The species has been taken at the following

localities: 1 ♂, Mahlakuza pan (N.28); 1 ♂, 1 ♀, Pafuri (N.5); 1 ♂, 1 ♀, Madziringwe-poort (N.16); 2 ♀♀, Letaba (N.247) in Transvaal Museum collection, Vari and Rorke, 14-XI-1961; 1 ♂, 1 ♀, Saselandongapoort (N.20); 1 ♂, Gumbandevu (N.32); 1 ♀, Godleni (S.74).

### Order Polydesmoidea

Family STRONGYLOSOMIDAE

Genus *Orthomorpha* Attems

*Orthomorpha* sp.

1 ♀, Skukuza rest camp (S.7).

### Genus *Phaeodesmus* Cook

*Phaeodesmus subtropicus* n.sp (Text-Figs. 5a-f)

**Holotypes**, 1 ♂, 1 ♀, paratypes, 2 ♀♀ (NM.8988), confluence of the Levubu and Limpopo rivers, Pafuri area (N.5), collected Dec. 1962, under rotting logs.

♂. **Colour** of trunk in general rich dark brown, a narrow posterior margination of the metasomites, apex of caudal process and the tooth of each keel, light cream; antennae dark brown; legs brown, a little darker in the distal segments, the under surfaces distinctly lighter; ventral surface of body segments cream to yellow.

**Dorsal surface.** Antennae fairly long and slender, reaching to about the posterior margin of segment V; keels as in *P. alatus* (Attems 1928, p. 244).

**Ventral surface.** Sternite V with a lamelliform plate differing somewhat from that of *P. alatus* (cf. fig. 5c with Attems fig. 515, loc. cit. 1928) in shape and size; sternite VIII with a small pointed conical tubercle at the postero-lateral angles, these becoming progressively smaller and less distinct in segment IX and backwards.

**Legs.** The two terminal segments of second leg as in Fig. 5b, tibia with a triangular tuft of modified hairs which when enlarged appear blade-shaped, Fig. 5d; leg III with a brush of similar hairs on tarsus and tibia as in Fig. 5a, the post-gonopodial legs without these brushes; femora of legs III-V with a small truncated tubercle just anterior to the middle of the segment ventrally, Fig. 5a. Legs of the last few segments very long and slender.

**Gonopods** as in Fig. 5e seen from the side, similar to but in general shorter and thicker than those of *alatus*, the tubercles and processes differently shaped; the tibial process long, slender and sinuously coiled, not looped over the tarsus as in *alatus* but continuing more or less parallel to it throughout its length; apex of tarsus indistinctly divided, enlarged as in Fig. 5f.

**Dimensions:** Greatest width 2.1, total length about 22 mm (holotype broken).

♀. **Colour** much darker than in ♂, very deep brown, the posterior margination of the metasomites and teeth of the keels only a little lighter than the rest, caudal segment uniform dark brown; legs with ventral surfaces of coxa and prefemur blackish brown, contrasting with the remaining segments, some sternites with darker infuscation, especially the last, anal valves darkened.

Antennae long and slender, reaching to the middle of segment V, legs long and slender but relatively shorter than in the ♂; keels of metasomites only pointed from segments XI or XII backwards, then not sharply.

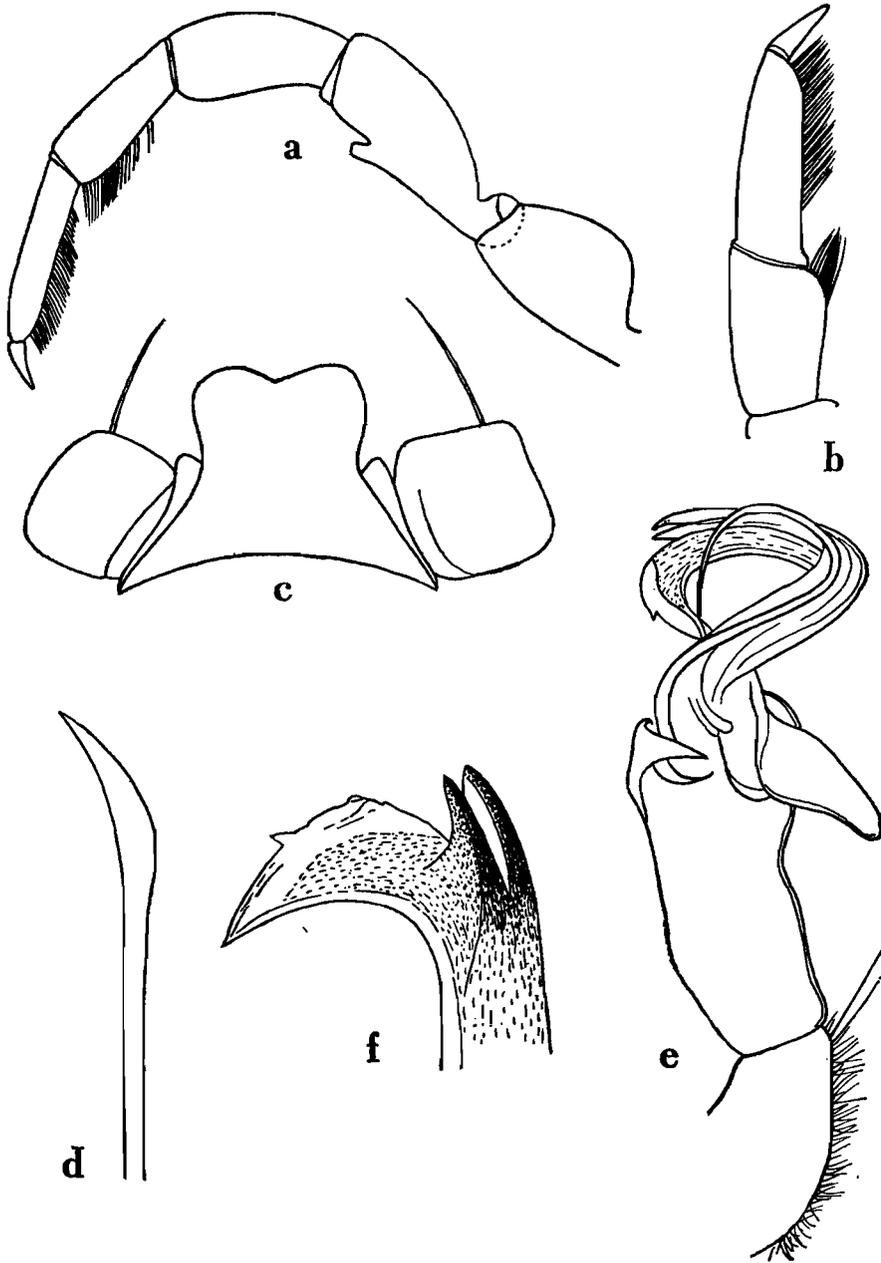


Figure 5. *Phaeodesmus subtropicus* n. sp. ♂. *a*, leg III; *b*, two terminal segments of leg II; *c*, sternite V; *d*, modified hair of tarsal brush, leg IV; *e*, gonopod, lateral view; *f*, apex of gonopod tarsus enlarged.

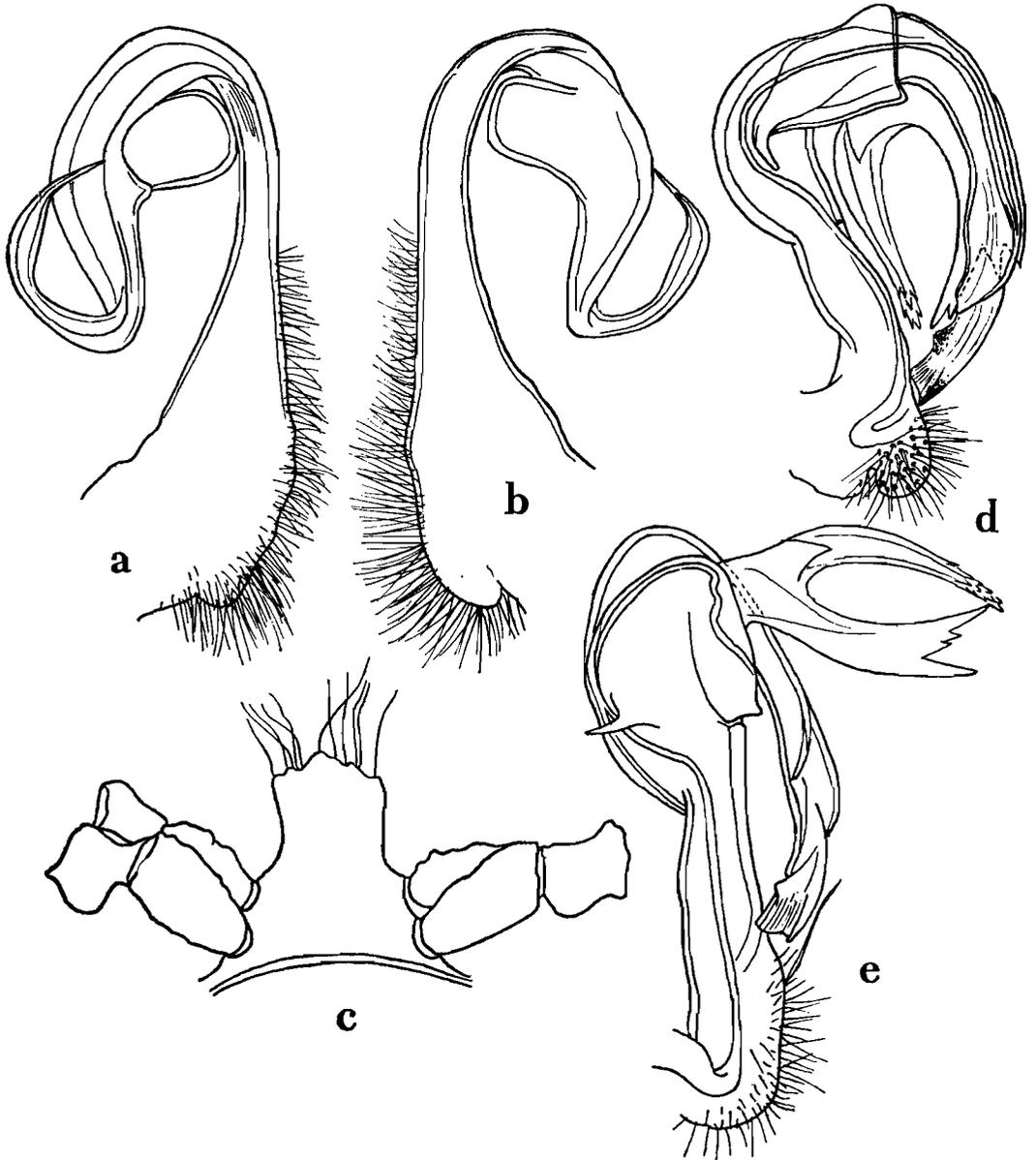


Figure 6. *Ulodesmus pretorianus* n. sp. ♂. *a, b*, gonopods, medial and lateral views, respectively; *c*, sternite of segment VI. *Habrodesmus perexiguus* n. sp. ♂. *d, e*, gonopod, medial and lateral views respectively.

**Dimensions:** Greatest width 3, total length 23 mm.

The species closely resembles *P. alatus* (Attems), described originally as a member of the genus *Podochresimus*, in the general structure of the gonopods, colouring etc; *alatus* was

collected at Inhambane, P.E. Africa and transferred later by Attems to the genus *Phaeodesmus*, reserving *Podochresimus* for the more southerly temperate species of the South West Cape.

Genus *Habrodesmus* Cook

*Habrodesmus perexiguus* n.sp. (Text-Fig. 6*d, e*)

**Holotype**, 1 ♂, allotype 1 ♀, cotypes 6 ♂♂, 12 ♀♀ (NM.9033), Pretoriuskop, Kruger National Park, collected R. F. Lawrence, Dec. 1963.

♂. **Colour**. Yellow brown above becoming lighter towards the sides; a large circular black spot anterior to each pore on the pore-bearing segments; ventral surface and legs yellow white, contrasting with the dorsal surface; head blackish-brown anteriorly; posterior halves of tergites a little darker than anterior halves.

**Dorsal surface**. Body somites smooth, entirely without keels, metasomites and prosomites of almost equal width in posterior half of body, the prosomites a little narrower in anterior half of body. Metasomites of first three tergites of approximately equal width (back to front measurement) which is less than that of the collum and almost half that of metasomite IV and following segments. Tergite I (second segment) with keel passing laterally far beyond those of the collum and the second and following tergites, those of collum and second tergite about equal; tergites quite smooth and shiny, metasomites and collum with a short transverse row of 4-5 very fine setae near their anterior margins, otherwise quite without setation. Caudal process with 4-5 rather long setae at extreme apex, posterior to these dorsally two more, one behind the other.

**Legs** short and weak, femora of legs I-VI without a ventral digitiform process.

**Gonopods** as in Fig. 6*d* seen from inner, as in Fig. 6*e* seen from outer side.

**Dimensions**: Total length 7.2, greatest width 0.7 mm.

♀. Not differing from the ♂ except in being slightly more robust and with even shorter legs.

**Dimensions**: Total length 8.2, mm, greatest width 0.8 mm.

The species differs from all other known African species in at least its minute size and the detailed structure of the gonopods.

Family SPHAEROTRICHOPIDAE

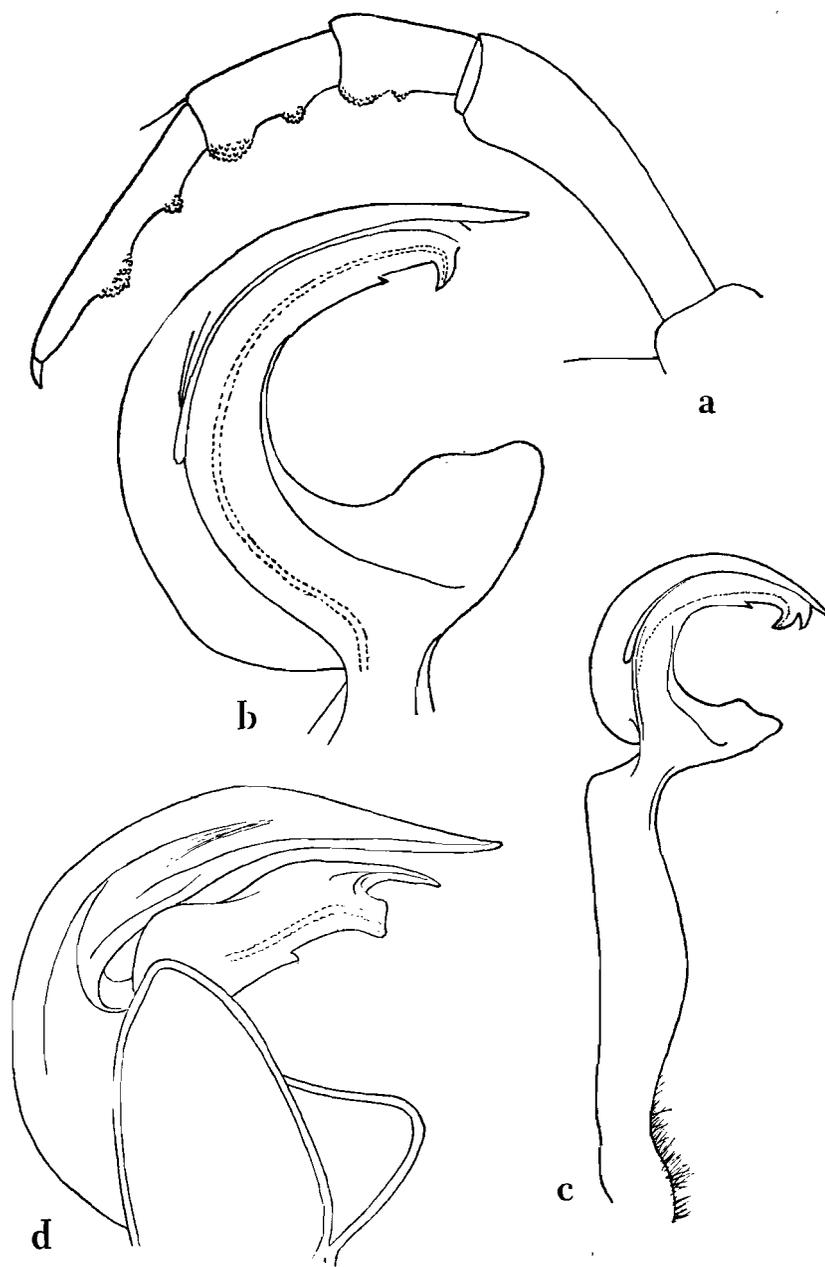
Genus *Gnomeskelus* Attems

*Gnomeskelus krugeri* n.sp. (Text-Fig. 7*a-c*)

**Holotype**, 1 ♂ (NM.8984), Dongadziba, Punda Milia area (Block N.29); collected Dec. 1962.

**Colour** very light brown with a slight reddish tinge, antennae a little darkened at the apices of the segments, most tergites with an ill-defined posterior marginal strip; legs cream to dirty white.

**Dorsal surface**. Anterior tergites not representing a neck-like constriction but I-IV subequal in width, V considerably wider seen from above. Keels well developed and strong, projecting well beyond the posterior margins of the metasomites, the posterior apices not sharply or narrowly pointed, in the pore-bearing segments represented by two subgeminant blunt teeth; no minute inner accessory tooth on the posterior margins of tergites; pleural keels strong and



**Figure 7.** *Gnomeskelus krugeri* n. sp. ♂. *a*, leg XIII; *b*, apex of gonopod enlarged, aboral view; *c*, gonopod, aboral view. *Gnomeskelus skukuzae* n. sp. ♂. *d*, apex of gonopod enlarged, aboral view.

comparatively well developed, projecting a little beyond the posterior margin of tergites.

Frons and clypeus of head with numerous fine bristles, collum with 4–5 irregular transverse rows, tergites with 2 rows, a middle and post-marginal row on the metasomites, more on the last 4 or 5 tergites.

**Legs.** Middle and posterior legs long and slender, strongly tuberculate as in Fig. 7a (leg XIII), the small spherical nodules grouped on these elevations in clusters but not present in the intervening spaces which are smooth in outline. Anterior legs (I–VI) different, completely without raised tubercles, tarsus and tibia straight ventrally with a uniform covering of numerous contiguous spherical nodules except apical fifth of tarsus and a small basal portion of tibia and post-femur; femur ventrally with a row of much less numerous conical triangular or sharply pointed nodules, the posterior ones narrower and more pointed than the anterior; in the three distal segments also the spherical nodules become progressively more pointed towards the base of the segment; trochanter with a row of conical nodules in distal half, more numerous but less pointed than those of femur.

Legs of sternite VI with an indistinctly bifid, large tubercle at the base of the coxae. **Gonopods** as in Figs. 7c and 7b (enlarged) seen from aboral side, strongly constricted at the apex of the femur as in some species of Schubart's subgenus *Pristomeskelus* (1956, p. 68, Fig. 42); short spiniform setae present only at the base of femur on inner side.

**Dimensions:** Total length about 22 mm (the type broken).

The species is very closely related to *Gnomeskelus* (*Cyphomeskelus*) *dentipes* (Attems) from Inhambane, P.E. Africa but differs in the shape of the distal structures of the gonopods. Schubart's inclusion of some of the species of *Gnomeskelus* in his new subgenus *Pristomeskelus* (1956, p. 68) seems to have little basis in fact since *globulatus*, *falcifer*, *tristriatus*, *serratus* and *hamuliger* are clearly rather closely related to *tuberosus* of which there are a number of varietal forms in Natal and the Eastern Cape (Lawrence 1962, p. 158); *pugnifer*, which he also included in the subgenus, is not very different to many other species of *Gnomeskelus* while *spiculifer* is very different from any other including those listed by Schubart under the genus *Pristomeskelus*. Schubart seems to have attached a rather unreal significance to serrations, which may be found on almost any part of the distal divisions of the telepodite. On the other hand if *Pristomeskelus* were to be retained, with *armiger* as the type, the other most closely related species would seem to be *penicillatus* and *ceresinus* and also perhaps *clavatus*, but more on account of the deep constriction separating the femur from the more distal parts of the telepodite than the serrated condition of the parsolanomerit, on which the subgenus is mainly based.

In actual fact it is very difficult at the present time to find characters based on the extremely variable and subtly differing structures of the gonopods that will hold good when breaking up the genus into smaller taxa, without finding the inevitable exception.

*Gnomeskelus skukuzae* n. sp. (Text-Figs. 7d, 8a)

**Holotypes**, 1 ♂, 1 ♀, paratypes 3 ♂♂, 3 ♀♀, confluence of the Sabi and Sand rivers, 2½ miles from Skukuza, collected R. F. Lawrence, Oct. 1962.

♂. **Colour** of body in general cream to dirty yellow without darker markings, the head and

anterior segments a little darker, yellow-brown; legs except the basal segments with a distinct pinkish tinge; antennae contrasting strongly with the body segments, blackish brown, the segments becoming progressively darker distally.

**Dorsal surface.** Antennae with long slender segments, the penultimate little wider than the others, reaching to a little beyond segment V. Keels as in the previous species, strong, ending in a single point posteriorly except in the pore-bearing segments where it is bifid or with two subgeminant teeth. Setation of tergites as in *krugeri*.

**Legs.** Those of posterior half with tubercles almost exactly as in *krugeri*, I–VI without these as in the description of *krugeri*. Legs of sternite VI with a triangular or pointed cone at the base of the coxae.

**Gonopods** as in Fig. 8a, seen from aboral side, the terminal portion of the telepodite as in Fig. 7d enlarged, resembling those of *krugeri* in its general shape but differing markedly in the details, especially the size and shape of the parsolanomerit, the constriction at the apex of the femur.

♀. Not differing from the ♂ in colour. Antennae a little shorter, reaching to about the middle of tergite V; legs shorter and without tubercles, keels and setation as in the ♂.

**Dimensions:** ♂: greatest width in middle of body 2.6, total length 22 mm; ♀: greatest width 3.1 mm, total length 19 mm.

This species should also be included in the group separated by Verhoeff (1939, p. 176) under the name of *Cyphomeskelus* as it is certainly quite closely related to *krugeri* and *dentipes*. Verhoeff does not mention anywhere the name of the type species for his subgenus and it would have been better if Schubart had chosen *dentipes* rather than *rhodobates* as the type (1956, p. 70); *rhodobates* seems to show little real relationship to *dentipes* in the structure of the gonopods while *dentipes* and the two species described above have a very distinct rounded and cushion-like parsolanomerit, the chief distinguishing character of the subgenus (Verhoeff, *loc. cit.*).

#### Family GOMPHODESMIDAE

##### Genus *Ulodesmus* Cook

##### *Ulodesmus singulus* n.sp. (Text-Fig. 8b)

**Holotype**, 1 ♂, Malelane (S.68), near Nbyamite causeway (N.M.8986), November 1963.

**Colour.** Metasomites light brown to yellow, the laterally projecting portions and a narrow anterior margination, cream; antennae light brown, legs a little lighter than metasomites.

**Dorsal surface.** Collum and tergites shiny, without or with microscopic creases, these a little more distinct towards the sides; collum with the sides forming the apex of a bluntly pointed triangle; lateral margin of V lying only a little below those of I–IV; V not much wider than IV seen from above, VI not much wider than V; thickened rim (keel) of V much thicker and a little longer than those of I–IV, thicker than in VI; none of the keels pointed posteriorly except slightly in the last 2 or 3 segments, segment XI with a pore.

**Ventral surface.** Sternite VIII without a pair of tubercles at the base of the legs; sternite VI with a small subquadrate plate not projecting far forwards, distinctly wider than long, its anterior margin weakly convexly curved, without a notch in the middle, a cluster of long bristles at each side.

**Legs.** Tarsi of segments I–VI with a small but distinct pad below the claw, these absent in all the post-gonopodial legs; prefemur (trochanter) of legs I–VI with a long slender sinuous seta on inner side in apical half, equal in length to the femur.

**Gonopods** as in Fig. 8*b* seen from the inner side, sinuous, describing two incomplete curves, a large bifid tooth rising from the outer inferior margin of the first curve, the two branches of this tooth diverging.

**Dimensions:** Width of metasomite in middle segments 3·4, of prosomite 2·4; total length 17–18 mm.

The species differs from most others of the genus in the telepodite ending in a simple sinuous whip-like point, narrowing progressively to its apex, and the incomplete spirals described in its curvature.

**Further material:** 1 ♂, 3 ♀, Nwanetzi dam area (C.85), collected Dec. 1962.

*Ulodesmus macrodontus* n.sp. (Text-Fig. 8*c–f*)

**Holotype,** 1 ♂ (N.M.8989), Klawerpan, Block N.27, Kruger National Park, collected Dec. 1962.

**Colour** in general brown, collum with narrow anterior and posterior darker margination, tergites with posterior margination only; in addition some symmetrical rounded blotches on each side of the tergites darker brown, keels much lighter, dirty yellow; a black vertebral stripe in the middle of the tergites from VII or VIII backwards, antennae and legs brown, the last 4 segments of the pre-gonopodial legs especially a little darker.

**Dorsal surface** with tergites smooth and shiny, with microscopic creases becoming larger towards the sides, quite distinct in the depressions just mesially to the keels; collum with the sides forming a bluntly pointed cone, the apex and the anterior and posterior lateral margins with a distinct raised rim and thus with a partly formed keel, smaller than but resembling those of the succeeding tergites; seen from above tergites increasing gradually in width from I (collum)–VI, V and VI subequal, all keels bluntly rounded posteriorly except in the last, tergite XVIII, where they are pointed; segment XI with a pore.

**Ventral surface.** Sternite VIII without tubercles at the bases of the legs, VI with a large subquadrate plate shaped as in Fig. 8*f*.

**Legs.** Tarsi of segments I–VI with small but distinct white pads beneath the claw, these absent in the post-gonopodial legs. Femora of legs of segment VI with a serrated ventral edge composed of a row of about 6 small sharp granules, Fig. 8*e*, each with a short spiniform seta, prefemur with similar but fewer granules and setae, including a very long subapical one.

**Gonopods** as in Fig. 8*d* seen from inner side, a very large bifid tooth issuing from the under side of the flattened ribbon-like main canal branch, the two prongs widely diverging, the larger almost as wide as the canal branch (Fig. 8*c* seen from behind, oral view) and directed inwards, the smaller one directed backwards toward the under surface of the canal branch and a little outwards; the telepodite describing  $1\frac{1}{2}$  spirals, the first incomplete; apex of canal branch bent at right angles on itself, without tibio-tarsus or accessory structures, and not sinuous or progressively attenuated distally as in the previous species.

**Dimensions:** Greatest width 2·7, total length 16–17 mm.

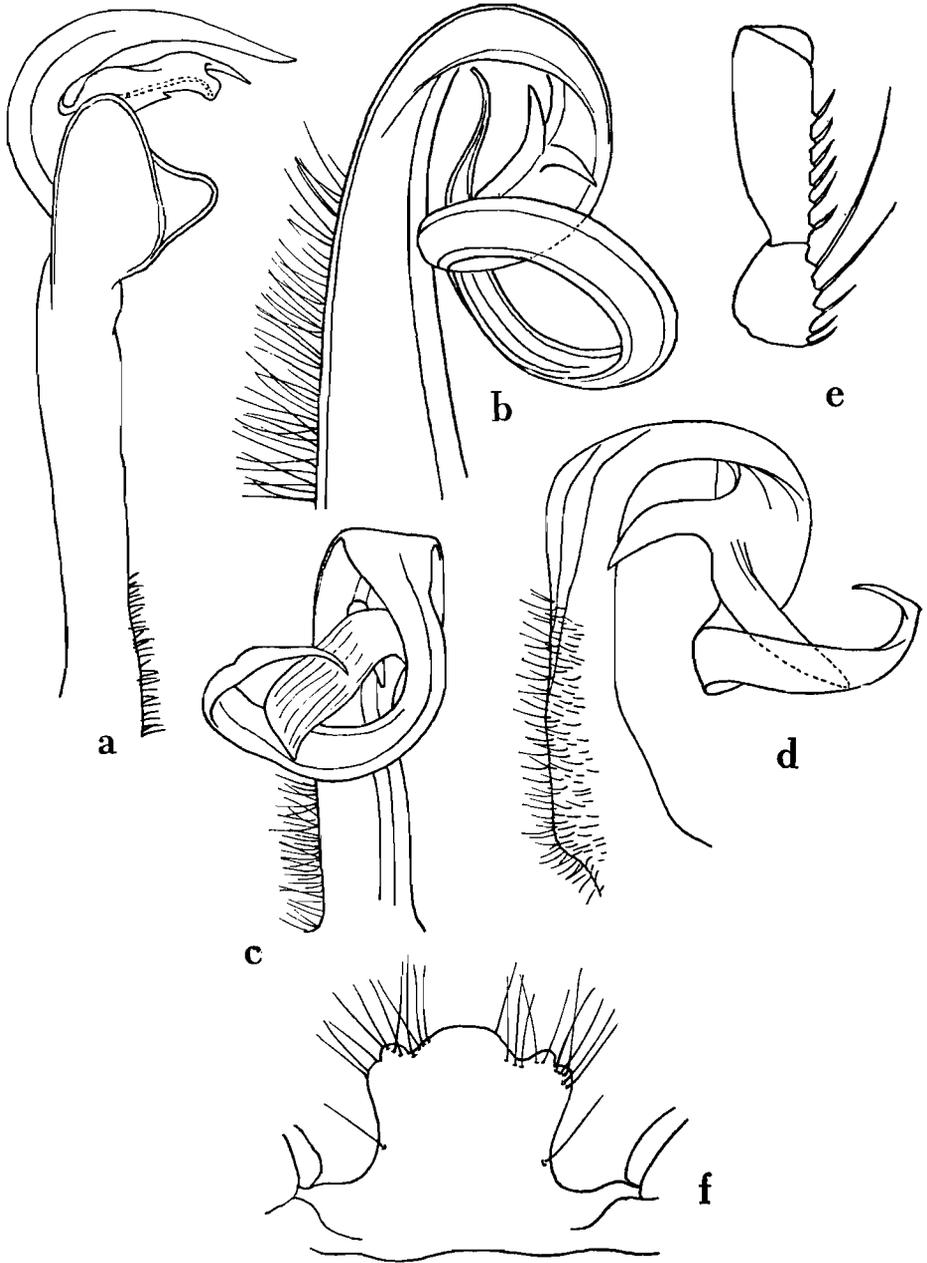


Figure 8. *Gnomeskelus skukuzae* n. sp. ♂. *a*, gonopod, aboral view. *Ulodesmus singulus* n. sp. ♂. *b*, gonopod medial view. *Ulodesmus macrodontus* n. sp. ♂. *c*, gonopod seen from behind (oral view); *d*, gonopod, medial view; *e*, prefemur and femur of leg VI; *f*, sternite VI.

Though evidently related to the previous species in the canal branch being simple without accessory structures, and in having two diverging teeth on the under side of the main branch of the telepodite, the two species are nevertheless quite distinct.

*Ulodesmus pretorianus* n.sp. (Text-Fig. 6a-c)

**Holotype**, 1 ♂, cotypes 2 ♂♂, 2 juveniles (NM.9011), Pretoriuskop, Kruger National Park, collected R. F. Lawrence, Dec. 1963.

**Colour** dirty yellow, a narrow anterior margination of collum distinctly darker, posterior margins of tergites diffused light reddish-brown.

**Dorsal surface.** Posterior border of collum slightly concave in the middle, the anterior border regularly but not strongly convexly curved, the distal lateral apex not surpassing that of the first tergite, its postero-lateral angle bluntly pointed; the pores opening laterally on the posterior third of the raised portion of the keels, these inflated, rounded and raised well above the general level of the tergite; the lateral expansion of the tergites (keels) long and directed horizontally from the body. Tergites shiny and almost entirely smooth or with only microscopic creasings laterally near the rim of the keels.

**Ventral surface.** Sternite VI with an elongate, more or less quadrate plate as in Fig. 6c, only its distal margin with 5-6 rather long, coarse, curved setae on each side.

**Legs.** Anterior legs of segments I-VI without any indications of swollen tarsal pads beneath the claw.

**Gonopods** as in Fig. 6a seen from inner side, Fig. 6b from outer side, the telepodite twice bent back on itself, the middle third just distal to the first bend with a conspicuous subquadrate flattened plate, directed backwards towards the femur, this middle portion of the telepodite much the widest.

**Dimensions.** Total length 16.5 mm, greatest width 3.7 mm.

The species is easily distinguished by the absence of tarsal pads in the pre-gonopodial legs, the general simplicity of the telepodite and the large flattened subquadrate process of the middle portion. In the simple telepodite and the absence of tarsal pads on the anterior legs the species has affinities with the genus *Antiphonus* from the middle and eastern Cape (George to Port St. Johns).

Order Juliformia

Suborder SPIROSTREPTOIDEA

Fam. SPIROSTREPTIDAE

Subfamily SPIROSTREPTINAE

Genus *Bicoxidents* Attems

*Bicoxidents nigerrimus* Attems

*B. nigerrimus* Attems 1928, Ann. S. Afr. Mus., Vol. 26, p. 329, Figs. 279-281.

1 ♂, Hapi dam area, Pafuri (N.5).

The type locality of the species is Salisbury and it has hitherto only been known from Rhodesia.

*Bicoxidens brincki* Schubart

*B. brincki* Schubart 1965, S. Afr. Anim. Life, 12, p. 86, Figs. 84–86.

Between Punda Milia (N.31) and Shingwedzi (N.118). In the work cited above Schubart gives a key to demonstrate how the species differs from the two others of the genus.

Genus *Doratogonus* Attems*Doratogonus flavifilis* (Peters)

*Spirostreptus flavifilis* Peters 1855, Mon. Ber. Ak. wiss., Berlin, p. 77.

Skukuza koppies (S.28); Orpen dam, Tshokwane (C.136); Mlondozi dam (C.166); Olifantskamp (N.272, Vari and Rorke, XI–1961); Napi road, near Skukuza (S.17); Pafuri (N.5); Olifantspoort area (C.3); Letaba camp (N.247); Sabipoort (S. 47).

A widespread subtropical species in south east Africa extending as far south as Zululand. It seems to be used as an article of food by the African Dormouse *Graphiurus murinus*. It is also largely consumed by the rock scorpion *Opisthacanthus laevipes* and the entrance to the shallow retreats of the scorpions under large stones are usually indicated by midden heaps of the disarticulated ring segments of immature specimens of this millipede.

*Doratogonus setosus* (Voges)

*Spirostreptus setosus* Voges 1878, Zeit. f. wiss. Zool. XXI, p. 105, Fig. 26.  
Tshokwane area (C.135).

Genus *Alloporus* Porat*Alloporus castaneus* Attems

*A. castaneus* Attems 1928, Ann. S. Afr. Mus., 26, p. 350, Fig. 302.

Skukuza rest camp (S.7); Pretoriuskop (S.35); Krokodilbrug (S.85).

*Alloporus bilobatus* Schubart

*A. bilobatus* Schubart 1966, Diplopoda III, S. Afr. Anim. Life, 12, p. 79, Figs. 78–80.

Schubart's types, which came from between Skukuza and Pretoriuskop rest camps, are probably the same species as Attem's *A. castaneus*, the type of which was collected at Komatipoort, only about 35 miles distant. The main difference between the two species seems to lie in the small lateral branch near the apex of the telepodite which is subequal to the main branch in *bilobatus* but distinctly shorter in *castaneus* (see Attems, Fig. 302, Pl. XII, *loc. cit.*).

Schubart also records his species from Leeupan (C.142), 15 miles N.E. of Skukuza.

*Alloporus levigatus* Attems

*A. levigatus* Attems 1928, Ann. S. Afr. Mus., 26, p. 351, Fig. 303.

Letaba camp (N.247), collected Vari and Rorke, Nov. 1961; Gomondwane (S.71).

Genus *Camaricoproctus* Attems*Camaricoproctus transvaalicus* n.sp. (Text-Fig. 9a, b)

**Holotype**, 1 ♂ (N.M.8990), Olifantspoort area (Block C.3), under stones in Msimbit forest

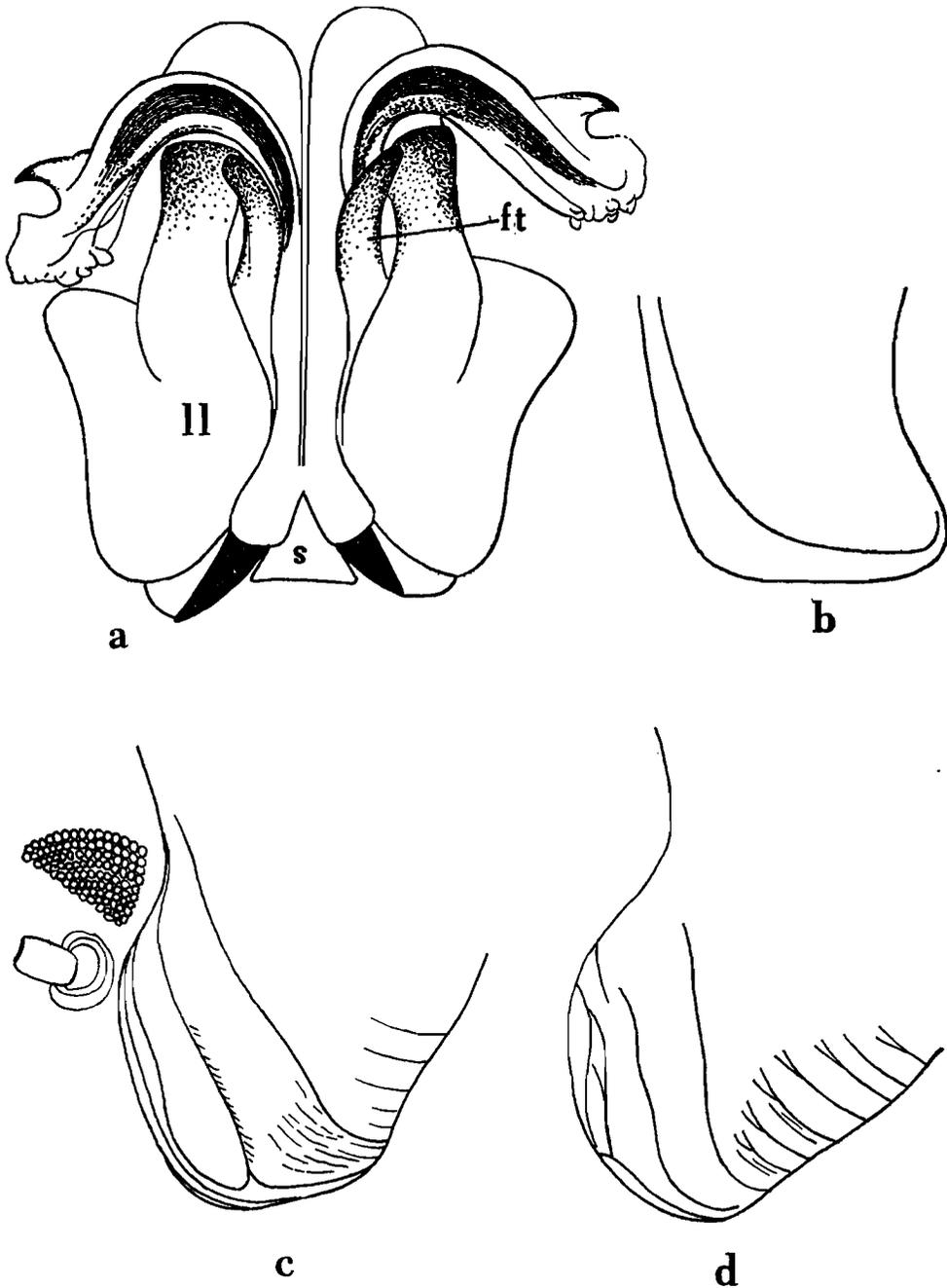


Figure 9. *Camaricoproctus transvaalicus* n. sp. ♂. *a*, gonopods, oral view; *b*, lateral margin of collum. *Lophostreptus rugosostriatus* (Schubart). *c* and *d*, the lateral margin of collum, ♂ and ♀ respectively.

(pure stands of *Androstachys Johnstonii*), collected Dec. 1962.

**Colour.** Head, antennae, whole of anal segment and legs yellow with an earthy-brown tinge, collum the same with a narrow olivaceous margination on anterior and posterior borders; prosomites yellow brown, metasomites for the most part blackish-brown giving a cross-banded effect and in addition a sharply defined but narrow reddish margination on their posterior borders.

**Head** smooth, vertex furrow obsolete, no interocular furrow, 6 supralabral pits, labral sinus deep, subangular; antennae short, not reaching beyond posterior margin of segment III; inner ocular angle acute, its apex falling a little short of the base of the antennae.

**Body somites.** Collum as in Fig. 9*b*, the postero-lateral angle with a weak lobe, anterior margin quite straight, the submarginal furrow very clear and deep. Prosomites with 6 or 7 distinct regular encircling lines, the last (most posterior) nearer to the posterior than to the anterior margin of the prosomite; both posterior half of prosomite and anterior half of metasomite with numerous short, microscopic, longitudinal striae giving the epidermis a dull satin sheen; posterior halves of metasomites shiny and almost quite smooth.

Sternites with very minute polygonal sculpture, no transverse striations or furrows, but the part of the prosomite adjacent to them laterally with 10–11 fine regular transverse lines. Lateral border of stigma forming an obtuse angle with the lateral margin of the sternite, the apex of the stigmatal slit reaching considerably beyond the lateral margin of the sternite.

Dorsal margin of anal segment, transverse, straight, scale transversely truncate; valves moderately convex, with very wide but low, though distinct, inner raised margination, separated from the rest of the surface by a weakly concave depression only, not by a groove; surface of the valves with large distinct scattered punctures, these quite absent from the other parts of the segment which have the usual minute creases and striations.

**Legs**, including the last pair, with moderate sized pads.

**Gonopods.** Telepodites (Fig. 9*a*) short and very thick (the most outstanding character of the genus) ending in an expanded shovel-like lamella; the femoral tooth (*ft*) with a much thicker and blunter apex than in *C. bombycinus* (Attems 1928, p. 345), the telepodites themselves proportionately longer and without the strong blunt basal tooth found in Attems' genotype; sternum (*s*) small, triangular, the lateral leaf (*ll*) somewhat differently shaped and without the pore-like gland openings described and figured by Attems, (*loc. cit.*, Fig. 293), being quite smooth.

**Dimensions:** Width 6 mm, total length approximately 50 mm. Type ♂ with 43 segments.

**Further material:** Mwambiya pan (N.46); Gomondwane (S.71); Krokodilbrug (S.85); Olifantspoort area (C.3); Punda Milia (N.31).

Apart from the differences in the gonopods mentioned above the Transvaal species is obviously much stouter than *bombycinus*, the body being more than twice as wide; further differences are the colouring and the distinct punctuation of the anal valves which also have raised inner borders. *Camaricoproctus* is evidently not a common genus, seldom appearing in Museum collections; its distribution is however a wide one, the type species coming from the S.W. Cape while another undescribed form from Kranskop, Natal, is in the collections of the Natal Museum; it will probably also be found to occur in Rhodesia and P.E. Africa. The

species differs from *pauciannulatus* Jeekel (1956, p. 81) from near Pretoria, in the detailed structure of the gonopods, the larger number of segments and its greater body width (6 as compared with 4 mm) as well as in a large number of lesser details.

Subfamily TRIAENOSTREPTINAE

Genus *Lophostreptus* Cook & Collins

*Lophostreptus rugosostriatus* (Schubart) (Text-Figs. 9c, d, and 10a, b)

*Krugerostreptus rugosostriatus* Schubart 1966, S. Afr. Anim. Life, 12, p. 111, Figs. 98, 99.

3 ♂♂, 7 ♀♀ from Skukuza rest camp (S.7), collected R. F. Lawrence, November 1962.

The Skukuza specimens correspond very well with the description and illustrations of the above species given by Schubart (*loc. cit.* p. 111), especially in the detailed structure of the gonopods (cp. Fig. 10a of this paper and Schubart's Fig. 99), the body size and number of segments.

♂. **Colour** entirely blackish-brown to black, legs and antennae yellow brown with a reddish tinge.

**Dorsal surface.** Except for the anterior third of the prosomites, the whole integument roughened with a sculpture composed of numerous fine keels, close-set striae, punctures and granules. Collum as in Fig. 9c, with 7-9 short keels or grooves on its posterior border, following the two main marginal (lateral) sutures. Keels of metasomites fine, close-set, subparallel, with some shorter intermediate keels between them, more regular at the sides in the posterior half of the body, but in general little raised above the general surface and thus much weaker than in *L. ulopygus* Attems; dorsally the keels of the metasomites reaching as far forward as the suture which is not quite straight but minutely scalloped, the posterior margins of the metasomites distinctly though minutely serrate, resulting from the keels projecting slightly beyond the edge. Pores beginning on segment V, the anterior ones indistinct. Anal segment convex in dorsal profile, roughened with minute dense granulation, no longitudinal keels, large or small, the valves similar; margins of valves distinctly raised, with numerous minute punctures and granules, a narrow furrow on their inner borders; a deep distinct groove on the outer sides of the raised margins, differing in this respect from *L. ulopygus* Attems, the valves thus appearing strongly convex in outline.

**Ventral surface.** Openings of stigmata not projecting laterally beyond the boundaries of the sternite; laterally to the sternites the prosomites with about 20 fine regular and minute encircling lines.

**Legs** with a pad on the post-femur and tibia of the anterior legs, that of tibia much larger, angular distally, that of post-femur ill-defined. Basal structure of first leg as described and figured by Schubart (*loc. cit.* Fig. 98).

**Gonopods** as in Fig. 10a (oral view), differing considerably from those of *L. carli* Attems (Chai-Chai, P.E. Africa), the femoral spine broad at its base, curved and pointed, a smaller spine-like process more distal to this, rising from the oral side of the telepodite, passing downwards and behind the lateral leaf of the gonopod; apex of telepodite and seminal duct as in Fig. 10b enlarged.

♀. Differing somewhat from the ♂ in the sculpture of the collum, Fig. 9d, but the colouring and sculpture of the body somites exactly as in the male. The legs relatively smaller and shorter, the body considerably thicker.

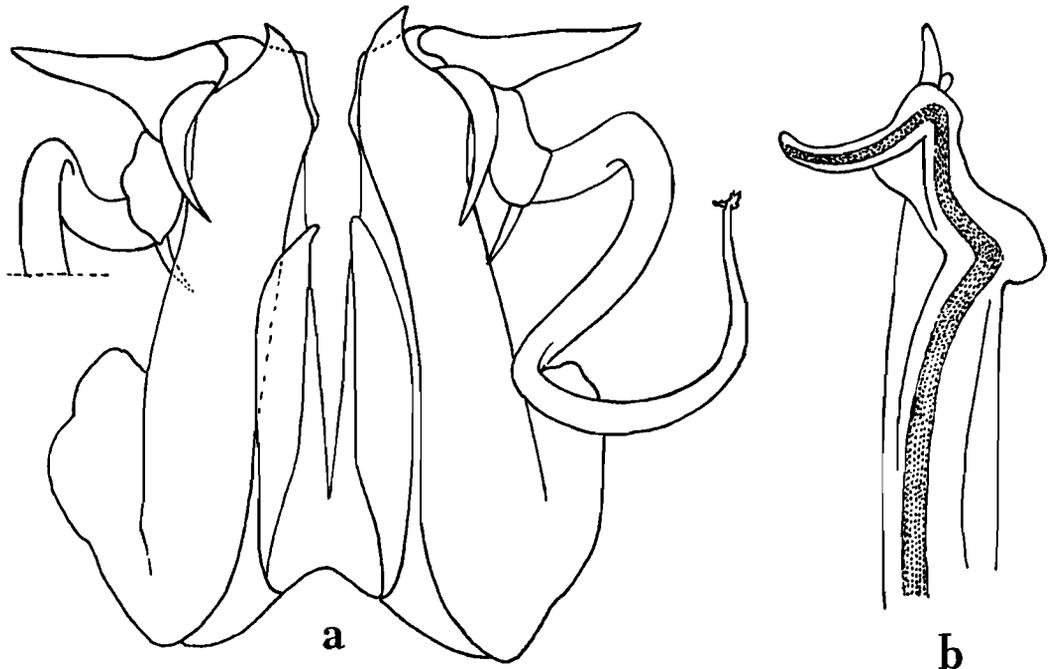


Figure 10. *Lophostreptus rugosostriatus* (Schubart). ♂. a, gonopods in oral view; b, apex of teleopodite enlarged.

**Dimensions:** Width of body: ♂ 5.1–5.3, ♀ 5.3–5.8 mm (in one ♀ specimen only 4.5 mm). Total length of largest ♀ 62 mm. Number of segments in both sexes about 50.

**Remarks.** Schubart's proposal of the genus *Krugerostreptus* for the reception of this species is, I think, unnecessary. The most important character on which he separates the genus from *Lophostreptus* and *Calostreptus* is the position of the first pore which according to him is on the 5th segment in *Krugerostreptus*, on the 6th in the other two genera. I have examined the female types of *Lophostreptus ulopygus* Attems in the South African Museum and there is no doubt that in this species the first pore is also found on segment V. The other characters have chiefly to do with the number and strength of the keels and cannot, I think, be used with confidence for separating genera.

It is unfortunate that Attems based his new species *L. ulopygus* on females only; for the rest, however, it seems a good and quite distinct form differing very markedly from *L. rugosostriatus* (Schubart) although it should be noted that either *ulopygus* is a distinctly smaller species than *rugosostriatus* or that Attems type females are immature and not fully grown.

*Lophostreptus ulopygus* Attems can be easily distinguished from *rugosostriatus* by its much stronger, more regular and more highly raised keels which end sharply and abruptly

at the anterior end of the metasomites, while in *rugosostriatus* they fade out and disappear anteriorly. The two keels on the lateral margin of the collum in *ulopygus* are strongly and conspicuously raised, while in *rugosostriatus* they could be better described as sutures or grooves; the groove lateral to the raised margination of the anal valves is weak, almost absent in *ulopygus*, very deep and strong in *rugosostriatus*. In general the entire body of *rugosostriatus* is much less roughened by keels and granulation than is the case in *ulopygus*.

The type locality was Leeupan, 15 miles N.E. of Skukuza; the Natal Museum has specimens from Leydsdorp and Komatipoort.

SUBFAMILY TRIAENOSTREPTINAE

Genus *Triaenostreptus* Attems

*Triaenostreptus conatus* Attems

*T. conatus* Attems 1928, Ann. S. Afr. Mus. 26, p 368, Figs. 531-533.

A single male from the Nanda sandveld (N.36), XII-1962; 1 ♀, Pumbe picket (C.52), XI-1963, greatest width 15 mm, 64 segments; 2 ♂♂, 1 ♀, between Saselandongapoort and Mahlakuza pan, eastern boundary (N.36), XI-1963, with 63 segments.

The types came from Masiene near Chai-Chai, P.E. Africa; there are a number of specimens in the Natal Museum collections from Mt. Silinda and Chimanmani Mountains, Rhodesia, with an anterior body width of 12, a middle width of 15 mm in the ♂.

FAMILY HARPAGOPHORIDAE

Genus *Poratophilus* Silvestri

*Poratophilus similis* Carl

*P. similis* Carl 1917, Rev. Suisse Zool., 25, p. 387.

Napi road, Skukuza (S.17); Skukuza camp (S.7); Orpen dam, Tshokwane (C.135); Pafuri, near boundary (N.5); Shidzivane, Punda Milia area (N.22); Klawerpan firebreak (N.27); Ship Mountain near Pretoriuskop (S.51); Pretoriuskop (S.35); Sabipoort (S.47); Eastern boundary (S.107); Hippo Pool, Krokodilbrug (S.97).

This species aestivates in the deep interiors of large termite mounds; numerous specimens, mostly females, were dug out of nests near Skukuza in December, 1962.

*Poratophilus junodi* Carl

*P. junodi* Carl 1917, Rev. Suisse Zool., 25, p. 387.

1 ♂, Machuluane Hills (S.101); Olifantspoort area (C.3); Napi road, Skukuza (S.17).

Remarks on the genus *Poratophilus* Silvestri.

Schubart has revived Chamberlin's genus *Zinophora* for a Rhodesian species of *Poratophilus* (1927, p. 211), which differs chiefly in the first pore occurring on segment VI instead of V, but this character seems to me to be of insufficient importance on which to base a genus. Schubart accordingly transfers *Poratophilus similis* to *Zinophora* on the pore character but

not the closely related *P. junodi*.

Of the species of *Poratophilus* in the Natal Museum collections which have been examined only *punctatus* Attems and an undescribed species, *P. brevispina*, recently described by me from Bloemfontein (in press) should remain in the older genus used by Attems, if Schubarts' view is to be accepted.

The pores begin on the sixth segment in the following species of *Poratophilus* (*Philoporatia*): *similis*, *junodi*, *robustus*, *dipodontus* and an inedited species *laminatus*, recently described by me (in press); all these species according to Schubart should therefore be accommodated in the genus *Zinophora* Chamberlin.

I do not think that the pore character can be made the touch-stone of generic separation; at the same time it is not certain how important this character is so that until the question has been settled I have preferred to retain the older classification of Attems.

The type of *Zinophora* Chamberlin, *Z. munda*, came from Rhodesia without precise indication of the locality; Attems species *P. robustus*, of which the Natal Museum has specimens from Rhodesia as well as Beira, P.E. Africa, has gonopods very similar to those of *Z. munda* and is probably a synonym of it.

#### FAMILY ODONTOPYGIDAE

Genus *Chaleponcus* Attems

*Chaleponcus digitatus* Kraus

*C. digitatus* Kraus 1966, Abh. senckenb. naturf. Ges., No. 512, p. 94, Figs. 170-175.

Skukuza koppies (S.28); Skukuza rest camp (S.7), Napi road near Skukuza (S.17), Lower Sabie (S.33); Godleni near Krokodilbrug (S.74), Gondwane near Krokodilbrug (S.71); Krokodilbrug camp (S.85).

*Chaleponcus sataraisis* Kraus

*C. sataraisis* Kraus 1966, Abh. senckenb. naturf. Ges., No. 512, p. 98, Figs. 192-194.

Satara camp (C.71).

Genus *Spinotarsus* Attems

*Spinotarsus colosseus* (Attems)

*Haplothysanus colosseus* Attems 1928, Ann. S. Afr. Mus. 26, 395, Figs. 361-363.

Skukuza, Napi road (S.17); Pumbet picket (C.3). The type was described from Pietersburg, E. Transvaal.

*Spinotarsus kruegeri* Kraus

*S. kruegeri* Kraus 1966, Abh. senckenb. naturf. Ges., No. 512, p. 121, Figs. 283-285.

Ship mountain (S.51); Pretoriuskop (S.35); Maputwine koppies (S.66). Eastern boundary opposite Ressano Garcia (S.107); Godleni near Krokodilbrug (S.74); Gomondwane near Krokodilbrug (S.71).

*Spinotarsus olifantis* Kraus

*S. olifantis* Kraus 1966, Abh. senckenb. naturf. Ges., No. 512, p. 124, Figs. 296-298. Msimbit forest, Olifantspoort area (C.3).

*Spinotarsus viridis* Kraus

*S. viridis* Kraus 1966, Abh. senckenb. naturf. Ges., No. 512, p. 134, Figs. 349-253. Madziringwepoort (N.16).

*Spinotarsus skukuzicus* Kraus

*S. skukuzicus* Kraus 1966, Abh. senckenb. naturf. Ges., No. 512, p. 128, Figs. 312-315. Skukuza camp (S.7); Krokodilbrug camp (S.85); Gomondwane near Krokodilbrug (S.71).

*Spinotarsus tshokwanensis* Kraus

*S. tshokwanensis* Kraus 1966, Abh. senckenb. naturf. Ges., No. 512, p. 132, Figs. 337-340. Orpen dam, Tshokwane (C.135); Skukuza camp (S.7); Napi road near Skukuza (S.17); Gomondwane near Krokodilbrug (S.71); Lower Sabi (S.33).

*Spinotarsus zonatus* Kraus

*S. zonatus* Kraus 1960, Ann. Mus. Roy. Congo Belg. Ser. 8, Sci. Zool., 82, p. 172, Figs. 468-471. Hapi dam near Pafuri (N.5). The holotype and paratype were respectively described from St. Lucia Bay and Richards Bay, Zululand.

## SUMMARY

Some general introductory remarks on the distribution and ecology of the Myriapod fauna of the Kruger National Park are followed by a list of the 60 species which up to the present have been recorded within its boundaries.

Three species of Chilopoda and nine of Diplopoda are new to science and have been described in the paper.

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