THE SOLIFUGAE, SCORPIONS AND PEDIPALPI OF THE KRUGER NATIONAL PARK

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(With 1 Text-figure)

The surprisingly large number of 16 species of Solifuges, 20 of scorpions and one pedipalp have been collected in the Kruger National Park and are listed in this paper. The fauna has its closest affinities with the adjacent parts of Southern Rhodesia and Mozambique rather than with Zululand and Natal or the western parts of the Transvaal, Kalahari and Central Cape. Few of them are widespread, although the scorpions *Hadogenes troglodytes, Opisthacanthus chrysopus* and *Opisthophthalmus glabrifrons,* the large Solifuge *Solpuga monteiroi* and the pedipalp *Damon variegatus* will without doubt be found everywhere throughout the range of the Park. These are all large robust species while the remaining representatives of the orders in question, of small to moderate size, can be said to have a limited or only moderately wide distribution. Among the Solifugae four previously undescribed species have been discovered but none in the two remaining orders. The following species have been recorded in or near the areas bordering the Kruger National Park and as further collecting is carried out some of them will doubtlessly be found within its borders:

Solifugae	Scorpions
Biton rhodesianus	*Uroplectes planimanus*
Zeriassa cuneicornis	*Uroplectes triangulifer tristis*
Solpugyla globicornis	*Cheloctonus intermedius*
Solpuga venosa	
Solpugema hamata	
Solpugema junodi	

The material forming the basis of this paper has been almost entirely collected by Dr. U. de V. Pienaar, Chief Biologist, and his staff of field workers, for the most part during November and December of 1962 and January 1963 although less intensive collecting has been and is being continuously prosecuted. A furiher contribution was made by myself during a 10 days survey visit to the Park in October 1962.

The large collections sent to me for study by Dr. Pienaar thus represent a fine example of co-operative effort; very many localities are represented and the Park has been covered from east to west and from its southern to its northern boundaries. As a result the Kruger National Park is perhaps even now better known in respect of its Arachnid fauna as a whole than any other single region of the Republic, although naturally much still remains to be identified.

My best thanks are due to the Chairman and members of the Parks Board and to Dr. U. de V. Pienaar and his colleagues of the Biological Section.

SOLIFUGAE

Family Solpugidae

Genus *Zeriassa* Pocock

(1) *Zeriassa furcicornis* Lawrence.

Z. furcicornis Lawrence 1929, Ann. S. Afr. Mus. 29, p. 169, Figs. 13a, b. 2 ♀♀, Shingwedzi (N. 118); 2 ♀♀, ♂, Pafuri Picnic place (N. 5), 1 ♀, Nyandu Bush (N. 46); 2 ♀♀, Pafuri (N. 5, Vari and Rorke, xxi.xi. 1961). The type was described from Kaapmuiden, E. Transvaal.

(2) *Zeriassa tuxeni* Lawrence.

Z. tuxeni Lawrence 1964, Proc. Zool. Soc. London. 142, Fig. 1B (in press). 1 ♂, Letaba Camp (N. 247), collected Vari and Rorke, Nov. 1961.

(3) *Zeriassa transvaalensis* n.sp. Fig. 1*a*—*d*.

Holotype 1 ♂, Tshokwane Tea room (C. 136), collected U. de V. Pienaar, Jan. 1963.

Colour. Chelicerae yellow with 3 faint violet longitudinal stripes (medial, dorsal, lateral) indistinctly confluent anteriorly, headplate violet, a little darker laterally, bisected by a narrow yellow line; tergites slightly reddish, a little darker than pleurites which are pale yellow, each tergite bordered laterally by a pair of narrow curved blackish stripes ( ), ventral surface and malleoli entirely yellow, coxa III with 7-9 thickened bacilliform setae darker than surrounding structures, especially at their tips. Pedipalp purple except basal two-thirds of femur; legs II-IV purple except at bases of femora and whole of tarsi-metatarsi (but basal half of metatarsus IV pigmented), tibiae II-IV and metatarsus IV with a dorsal yellow stripe.

Flagellum as in Fig. 1*a* seen from outer side and Fig. 1e seen from above, very wide, strap-like and flattened, tapering progressively in width posteriorly; seen from the side, Fig. 1*a*, very stout and of almost equal thickness throughout its length; apex of flagellum enlarged as in Fig. 1*b* seen from outer side, Fig. 1c from inner side; anterior bend of flagellum where it rises from the dorsal jaw as in Fig. 1*d*, enlarged.

Dentition. A small distinct tooth on dorsal inner margin of dorsal jaw a little nearer fang apex than anterior bend of flagellum; the two intermediate teeth of dorsal jaw small, widely separated; second main tooth followed by 4 teeth, the second and fourth much smaller than the first and third; inner series with 3 teeth, the first large, the second moderate, the third minute.

Spination. Chelicerae and headplate with sparse but stout (especially at their bases) spiniform setae, thoracic and abdominal tergites with similar setae diminishing progressively in thickness posteriorly.

Pedipalp with 2-5 tarsal, 17-19 metatarsal (irregularly arranged but some paired), 7-9 tibial spines; metatarsus with short sparse cylinder bristles, tibia with longer and slightly more numerous cylinder bristles except on basal fourth, tarsus without; metatarsus with a very weak scopular patch of short hairs occupying only a fourth of segment near its base; 7 stridulatory ridges, the inferior ones very short; no smooth incrassate spines below the basal enlargement of flagellum on inner surface but the usual row of long, stout feather bristles.

Dimensions: Chelicera 5.5, width of headplate 5.2 pedipalps 21, total length 21.5 mm.

Further material: 6 ♂♂, 1 ♀, Mahlakuza Pan (N. 36); 1 ♀, Malanga (N. 28).

The ♀ recorded by me from Leeupan, 15 miles N.E. of Skukuza (1955, p. 164) must undoubtedly belong to this species rather than to *purcelli* as stated (*loc. cit.*), this locality being very close to Tshokwane. Two further females from Tshokwane are included in the material from the Park, collected R. F. Lawrence, Oct. 1962; one female from Orpen Camp (C. 86). The colouring of these females is similar to but much darker than that of the males.

The species is related to both *purcelli* Hewitt and *furcicornis* Lawrence in the thickness and brevity of the flagellum. It differs in the dentition of both jaws and the detailed structure of the flagellum from *purcelli*. From *furcicornis* it differs in having a small tooth on the dorsal jaw anterior to the flagellar bend, the larger number of spines on the pedipalp, and the apical structure of the flagellum; there also seems to be a less close relationship with *Z. spiralis* Roewer from Katanga in the former Belgian Congo.

Genus *Solpuga* Licht.

(4) *Solpuga celeripes* Hirst.

S. celeripes Hirst 1911, Mem. Lit. Phil. Soc. Manchester, 56, p. 10, Fig. 2. 1 ♂, Tswiriri Dam (C. 146) and 1 ♀ from Nwanetsani Dam (C. 147); 1 ♂, Kamban Experimental plots, Pretoriuskop area (S. 35); 2 ♀♀, between Saselandonga and Mahlakuza pan.

Additions to the description and notes on this species have been given

by Lawrence (Proc. Zool. Soc. London. 142, Fig. 1A, 1964, in press). The type (♂) was described from Salisbury, S. Rhodesia.

(5) *Solpuga sericea* Pocock.

S. *sericea* Pocock 1897, Ann. Mag. Nat. Hist. (6) 20, p. 260, Fig. 4.
1 ♂, Madziringwe Poort, Punda Milia area (N. 16). The type male was described from the Umfuli river, S. Rhodesia.

(6) *Solpuga monteiroi* Pocock.

S. *monteiroi* Pocock 1895, Ann. Mag. Nat. Hist. (6), 16, p. 87, Pl. IV, Fig. 6.
1 ♀, Shingwedzi (N. 118); 1 ♂, 1 ♀, Letaba Camp (N. 247); 1 ♂, Skukuza (S. 9).
The type (♂) came from Lourenco Marques.

(7) *Solpuga spiralicornis* Purcell.

S. *spiralicornis* Purcell 1903, Nov. Zool. 10, p. 304, Fig. I.
1 ♂, Nuwe Olifants Kamp (N. 272); 1 ♂, Skukuza (S. 7); 1 ♂, Shingwedzi (N. 118); (Vari and Rorke, Nov. 1961). The type (♂) came from Shilowane near Leydsdorp.

(8) *Solpuga strepsiceros nocturna* Lawrence.

S. *strepsiceros nocturna* Lawrence 1964, Proc. Zool. Soc. London. 142, Fig. 1D (in press).
1 ♂, Orpen Camp (C. 86).

Genus *Solpugema* Roewer.

(9) *Solpugema krugeri* Lawrence.

S. *krugeri* Lawrence 1964, Jour. Ent. Soc. S.Afr., 26, Figs. 1, 2 (in press).
1 ♂, Banks of the Sabie river, near Skukuza (S. 9) (Type); 1 ♂, Sabie pad (S. 9).

(10) *Solpugema conservatorum* Lawrence.

S. *conservatorum* Lawrence 1964, Ann. Mag. Nat. Hist. (13), 7, Fig. 1 (in press).
1 ♂, between Saselandonga and Malanga (N. 36); 1 ♂, between Mahlakuza and Malanga (N. 28).

Genus *Solpugiba* Roewer.

(11) *Solpugiba* sp.

A very young specimen from Lindanda plots (C. 123), collected Dec. 1962, with the pattern markings of S. *lineata* Koch but the longitudinal stripes of the chelicerae and headplate much wider, together occupying far more space than the yellow background; abdomen dorsally with a wide black band on each side divided in the anterior segments by a narrow yellow stripe.

(12) *Solpugiba arenicola* Lawrence.

S. *arenicola* Lawrence 1964, Ann. Mag. Nat. Hist. (13), 7, Fig. 2 (in press).
1 ♂, Sandveld between Shalungwa and Maseya (N. 16); preyed on by the Lacertid, *Ichnotropis squamulosa*.

Family Daesiidae.

Genus *Blossiola* Roewer.

(13) *Blossiola laticosta* (Hewitt).

Blossia laticosta Hewitt 1919, Ann. Transv. Mus., 6, p. 64, Fig. 1 a-c.
1 ♂, Orpen Camp (C. 86). The type ♂ was described from Bloukop, Soutpansberg district; 1 ♂, Mahlakuza pan (N. 36).

(14) *Blossiola singularis* Lawrence.

B. singularis Lawrence 1964, Proc. Zool. Soc. London, 142, Figs. 2, 3 (in press).
1 ♂, Shipale, Punda Milia (N. 7).

Genus *Biton* Karsch.

(15) *Biton transvaalensis* Lawrence.

B. transvaalensis Lawrence 1949, Ann. Transv. Mus. 21, p. 204, Figs. 3a, b.
1 ♀, Letaba Rest Camp (N. 247); 3 ♂♂, Shingwedzi (N. 118), Vari and Rorke, Nov. 1961); 1 ♂, Mahlakuza pan (N. 36).
The type was described from Great Salt Pan, Soutpansberg district.

Genus *Hemiblossia* Kraepelin.

(16) *Hemiblossia bouvieri* Kraepelin.

H. bouvieri Kraepelin 1899, Mitt. Mus. Hamburg 16, p. 233.
2 ♀♀, Hapi pool area, Pafuri (N. 5) under the bark of rotting *Acacia* trunks, October and December, 1962. The type female was described from the Upper Zambesi.

SCORPIONS

Family Buthidae

Genus *Buthus* Leach

(1) *Buthus trilineatus* (Peters).

Centrurus trilineatus Peters 1962, Monatber. Ak. wiss. Berlin, p. 515.
A number of specimens from Hapi pool area, Pafuri (N. 5); Bangu poort (C. 12); Makangela fontein, under stones (N. 18); Malanga (N. 28).
The ♂ type was described from Tette, Portuguese E. Africa.

Genus *Parabuthus*

(2) *Parabuthus triradulatus* Hewitt.

P. triradulatus Hewitt 1914, Rec. Alb. Mus., 3, p. 1, Fig. 1.
Hapi pool area, Pafuri (N. 5); Klawer pan firebreak (N. 27); Olifants Kamp (Vari and Rorke, Nov. 1961); Mahlakuza Pan (N. 36); between Mahlakuza and Malanga (N. 28); between Saselandonga poort and Mahlakuza (N. 36). The types were described from north of the Soutpansberg.

(3) *Parabuthus transvaalicus* Purcell.

Parabuthus transvaalicus Purcell 1899, Ann. S.Afr. Mus., I, p. 434.
Letaba Camp (N. 247, Vari and Rorke XI- 1961); Nuwe Olifants Kamp

(N. 272); Tshokwane (C. 135); Hapi pool area, Pafuri (N. 5); Olifantspoort area in Msimbit forest (C. 3); Shingwedzi (N. 118); Mahlakuza pan (N. 36); Shalungwa spring in Msimbit forest (N. 16); Malonga (N. 28) The type was indefinitely located in the Lowveld, Transvaal.

Genus *Lychas* C. L. Koch

(4) *Lychas burdoi* (Simon).

Isometrus burdoi Simon 1882, Bull. Soc. ent. Belg. 26, p. 58.
Pafuri near boundary (N. 5); Shingwedzi drift, under bark of *Ficus sycomorus* (N. 118); Pafuri, under bark of *Ficus sycomorus* (N. 5).

Genus *Pseudolychas* Kraepelin

(5) *Pseudolychas pegleri pegleri* (Purcell).

Lychas pegleri Purcell 1901, Ann. S.Afr. Mus. 2, p. 173.
2 ♀♀, Olifantspoort area in Msimbit forest (C. 3), under stones; 1 ♀, Ramiti pan area, under stones (N. 250).

(6) *Pseudolychas pegleri nigrimanus* Kraepelin.

P. pegleri nigrimanus Kraepelin 1911, Mitt. Mus. Hamburg, 28, p. 60.
3 ♀♀, Ships mountain.

Genus *Uroplectes*

(7) *Uroplectes olivaceus* Pocock.

U. olivaceus Pocock 1896, Ann. Mag. Nat. Hist. (6), 17, p. 385.
Sabie river bank near Skukuza (C. 162); Pafuri near boundary (N. 5); Nyandu sandveld under fallen tree trunks (N. 46); Timisini fontein (6. 215); Tshokwane area (C. 136); Olifantspoort area, Msimbit forest (C. 3). The Lund University Expedition of 1950-1951 recorded it from Leeupan (C. 142), between Tshokwane and Letaba and from Satara Camp (C. 71). The type was described from the Murchison range, Transvaal.

(8) *Uroplectes flavoviridis* Peters.

U. flavoviridis Peters 1962, Monatber, Ak. wiss. Berlin, p. 516.
Punda Milia (N. 5, Vari and Rorke, XI-1961); Olifantspoort area, Msimbit forest (C. 3); Madziringwe Poort (N. 16); Matukwane, W. of Punda Milia (N. 29); Mahlakuza pan (N. 36); between Saselondonga and Mahlakuza (N. 36). The type was described from Tette, Portuguese E. Africa.

The two last-named species of *Uroplectes* are very similar in colouring but can be easily distinguished by the absence of keels or granules from the under side of the tail which in *flavoviridis* is smooth and shiny whereas all the tail segments of *olivaceus* are granular below or with incipient crests of granules; *olivaceus* is also a more robust species, with a thicker tail.

In the Kruger Park *flavoviridis* is much more prevalent in the northern half, *olivaceus* in the southern half, although they may be found together in such central localities as the Olifantspoort area where both species have

been collected under stones in the Msimbit forest; the distribution of *flavoviridis* extends well to the north of the Transvaal and is thus a fairly common species along the eastern boundaries of Southern Rhodesia and in subtropical Mozambique while *olivaceus* does not seem to be found outside the north-eastern districts of the Transvaal at all.

(9) *Uroplectes formosus formosus* Pocock.

U. formosus Pocock 1890, Proc. Zool. Soc. London, p. 134, Fig. 3.
(N. 118, Vari and Rorke, Nov. 1961); Makangela fontein, under stones (N. 18). The type was described from Durban, Natal.

(10) *Uroplectes vittatus* (Thorell).

Leprus vittatus Thorell 1877, Act. Soc. Ital. Nat. *19*, p. 121.
Shingwedzi (N. 118); between Saselandonga poort and Mahlakuza (N. 36).

(11) *Uroplectes carinatus* (Pocock).

Lepreus carinatus Pocock, Proc. Zool. Soc. London, p. 129, Figs. 3, 3a.
Shaben Kop (S. 35).
The three female specimens collected in the Park should probably be referred to Kraepelin's subspecies *mediostriatus*.

(12) *Uroplectes chubbi* Hirst.

U. chubbi Hirst 1911, Mem. Lit. Phil. Soc. Manchester, *56*, p. 5.
1 ♀, Matukwane, west of Punda Milia (N. 29). The type was indefinitely located in Rhodesia.

Family Scorpionidae

Genus *Opisthophthalmus* C. L. Koch

(13) *Opisthophthalmus glabrifrons* Peters.

O. glabrifrons Peters 1861, Monatber. Ak. wiss. Berlin, p. 514.
Napi road, Skukuza (S. 17); Dongadziba (N. 29); Lower Sabie river road (S. 33); Shingwedzi (N. 118); between Saselandonga poort and Mahlakuza (N. 36). The type was described from Tette, Portuguese E. Africa.

(14) *Opisthophthalmus ecristatus* Pocock.

O. ecristatus Pocock 1899, Ann. Mag. Nat. Hist. (7) 3, p. 411.
1 ♂, 1 ♀, from Tambye drift, Pafuri (N. 6); 1 immature ♀, Maseya Sandveld (N. 15); 1 large ♀, Maseya Sandveld (N. 23), dug out of the sand.

This species was described by Pocock more than 64 years ago and does not seem to have been again observed or recorded since 1899; consequently the ♂ type in the British Museum of Natural History has up to the present day been the only specimen extant. For this and other reasons (see below) Hewitt (1919, p. 130) regarded the locality of the type, which was simply given as "the Transvaal", with some suspicion.

An examination of the material before us leaves no doubt that this

quite individual and in some ways peculiar species has as its area of distribution a probably very restricted region in the north-eastern corner of the Transvaal. Both the ♂ and to a slightly less extent the ♀ agree closely with Pocock's excellent description, except that while the ventral surfaces of tarsi III and IV have only one row of (inner) spines, as in the type, this row in our specimens consists of 4 or 5 spines rather than 3, in addition to the 4 on the end lobes.

The following is a description of the female specimen:

Colour pattern of body segments and the blackish marking on the tail more or less resembling those of O. *carinatus*. The remaining structures approximate very closely to those of the type as described by Pocock and of the male from Pafuri except that the hand is much wider, the length of hand-back being about three-fourths its width instead of equal to it as in the male; upper surface of the hand not so continuously or regularly curved as in the male since the finger keel is not entirely absent (completely absent in the male specimen), being represented by a weak row of granules which in its distal third forms a regular row; all the granules, which are very numerous and dense, consisting of small, more or less round tubercles with their tops flattened, intermingled with still smaller more pointed granules but no punctures; the whole dorsal surface of the hand with a matt or shagreened appearance due to the uniform distribution of these numerous minute granules; fingers of equal length or the movable one slightly longer. The 4 inferior keels of sternite V and caudal segments I and II very strongly raised and sharply defined, the surfaces between them deeply grooved; lateral keel of caudal segment V weak, straight, ending abruptly in the middle of the lateral surface; caudal segment III distinctly longer than wide, II as long as wide. Tarsi III and IV with 9 inner and 3 outer spines including those on the endlobes, basal spine of the inner row distinctly smaller than the others.

Pectines: 17 (25 in the ♂), the basal fifth or sixth of the scape oblique, not rectangular, and free of teeth.

Dimensions: Tail 36, carapace 12, total length 72, hand-back 7.5, width of hand 9:5 mm.

Hewitt suggests that this species is identical with *Scorpio boehmi* (Kraepelin) from Tanganyika; while it undoubtedly has marked affinities with *Scorpio* in the powerful raised keels of the last sternite and ventral surfaces of the anterior tail segments, I do not think that this can be the case. It differs from S. *boehmi* at least in the larger number of pectinal teeth and the presence of well developed keels on the dorsal and ventral anterior edges of the pedipalp femur, as in typical *Opisthophthalmus*. If this were indeed *Scorpio boehmi* its occurrence in the Transvaal would represent an unusual case of discontinuous distribution as it does not seem to be found at all in the large area between Lake Tanganyika and the Transvaal where on the other hand at least two species of *Opisthophthalmus* are common.

In colouring it resembles *carinatus* Peters and is perhaps most nearly related to this species. At the same time it possesses a number of characters in common with both *wahlbergi* Thorell and *opinatus* Simon to which two species Pocock considered it to be closely allied.

Genus *Opisthacanthus* Peters.

(15) *Opisthacanthus chrysopus* Peters.

O. chrysopus Peters 1861, Monatber. Ak. wiss Berlin, p. 513.
Napi road, Skukuza (S. 17); Banks of Sabie River, near Skukuza (C. 162); Sukuza koppies (S. 28); Hapi pool area, Pafuri (N. 5). The type was described from Natal.

(16) *Opisthacanthus chrysopus pauci-spinulatus* Hewitt.

O. c. pauci-spinulatus Hewitt 1919, Trans. R.soc. S.Africa, VI, p. 184.
1 ♂ from Ramiti area (N. 250). This subspecies is smaller and more slender than the typical form, with much weaker granulation on the carapace and tergites, with smaller tubercles on the hands. The vesicle is quite smooth. Pectinal teeth 6-7. Hewitt's type came from the Niwanedli River, Soutpansberg district.

(17) *Opisthacanthas laevipes* Pocock.

O. laevipes Pocock 1893, Ann.Mag.Nat. Hist.(6), 12, p. 319.
Napi road, Skukuza (S. 17); Skukuza koppies (S. 28); Tshokwane (C. 135); Macili kop (S. 101); Nsikazi picket (S. 108); Mbyamiti (S. 36). The type was described from Sheba mine, Transvaal.

Although both *chrysopus* and *laevipes* are found together in a number of localities in the Park, *chrysopus* is on the whole more a low altitude form with a wider distribution, as it has been taken at near sea-level as well as from higher lying inland localities, while *laevipes* is more restricted to higher altitudes; *chrysopus* also appears to favour a sandy substratum while *laevipes* is more a montane and rupicolous species.

Genus *Cheloctonus*.

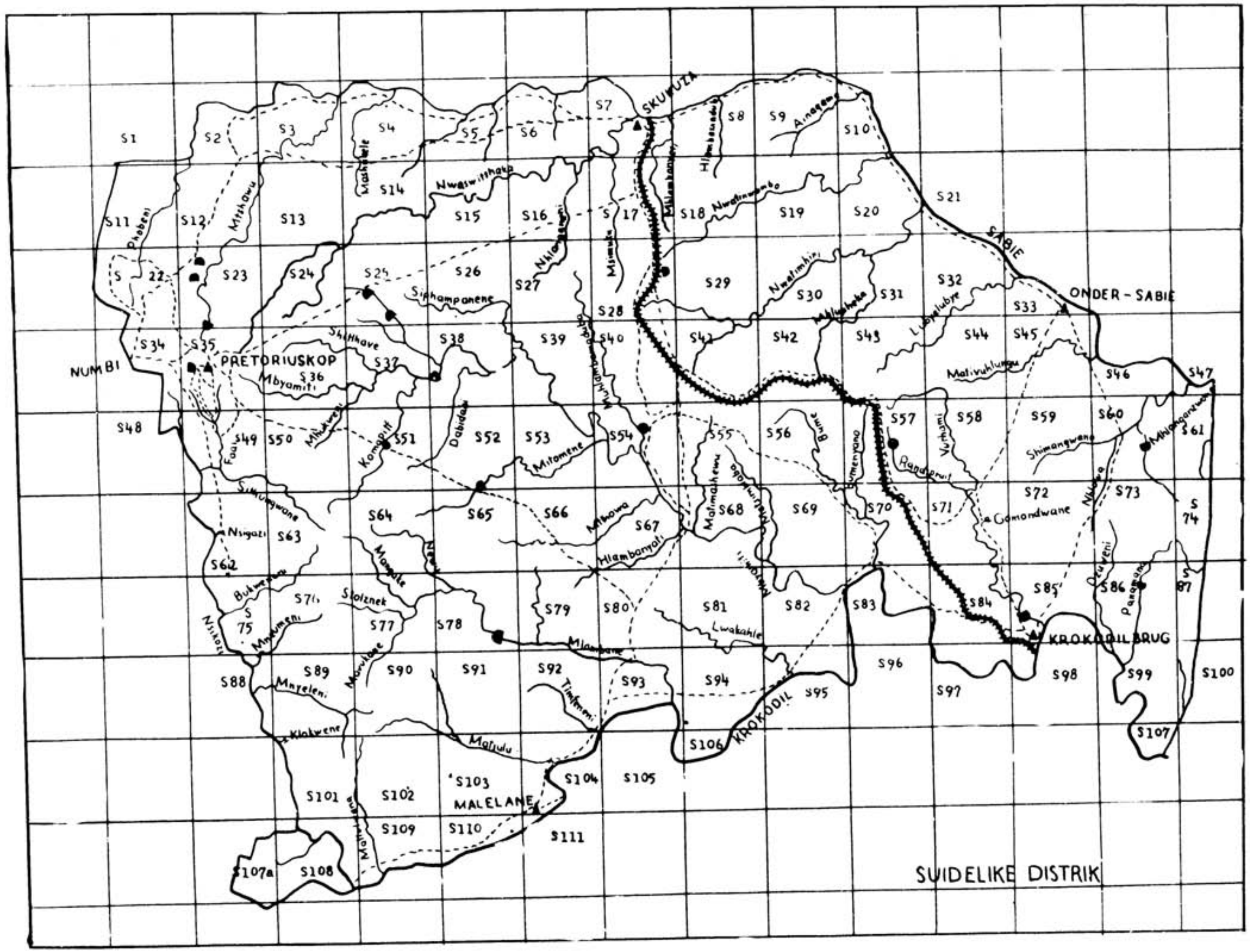
(18) *Cheloctonus jonesi* Pocock.

C. jonesi Pocock 1892, Ann.Mag.Nat.Hist.(6), 9, p. 44.
Near Madziringwe mouth (N. 9); Faai plots (S. 49).

Genus *Hadogenes* Kraepelin.

(19) *Hadogenes troglodytes* (Peters).

Ischnurus troglodytes Peters 1861, Monatber,Ak.wiss.Berlin, p. 13.
Napi Dam (S. 25) and Hapi kop, Pafuri area (N. 5); Olifantspoort area (C. 3); Timisini fontein (N. 215); Balule Kamp (C. 10); Nuwe Olifants Kamp (N. 272) ; Matilolo (N. 246). The type was stated to have come from Tette, Portuguese E.Africa.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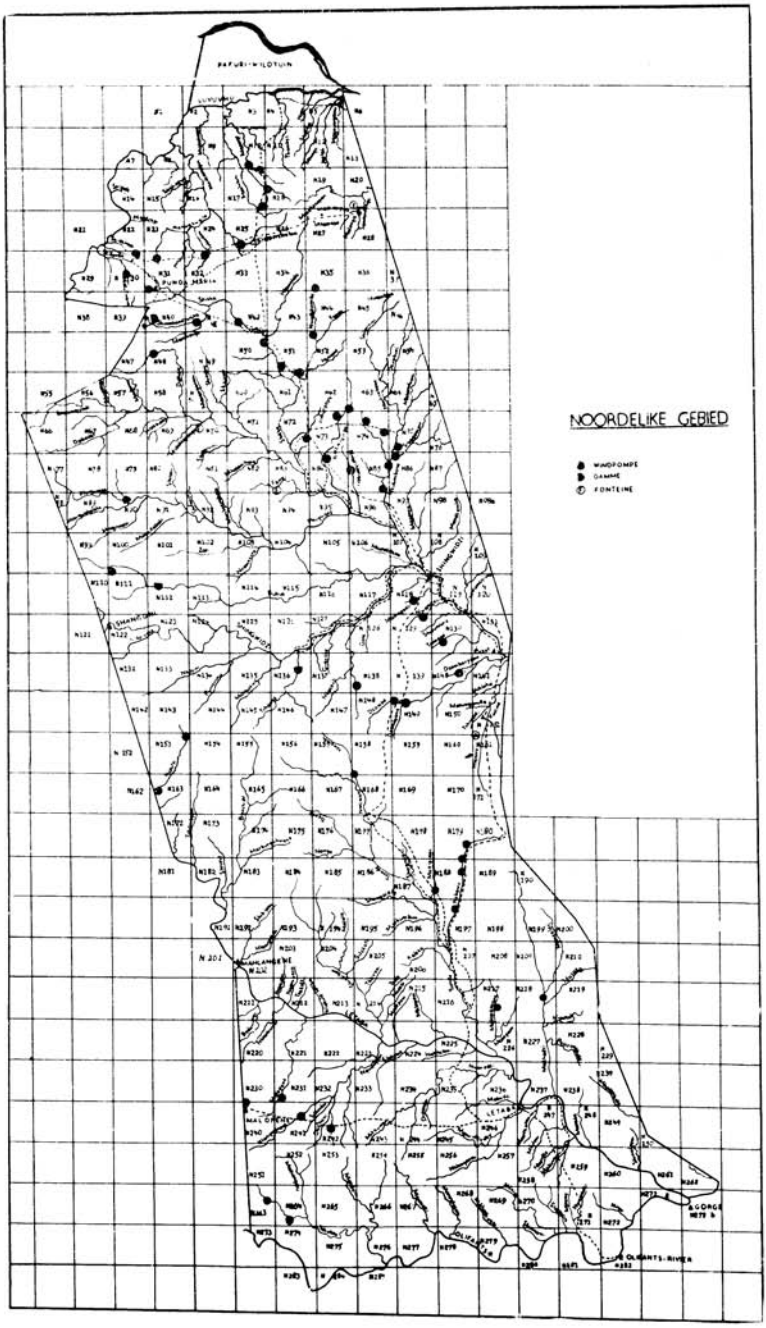
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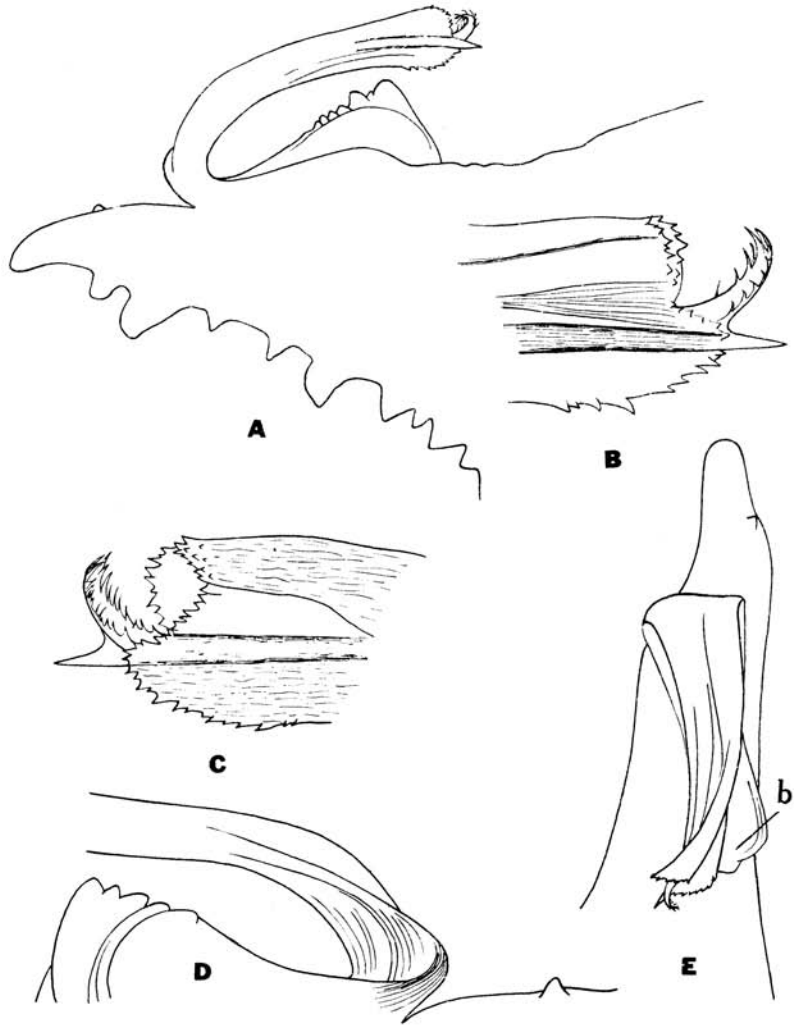

Zeriassa transvaalensis n.sp. ♂. *a*, dorsal jaw from outer side; *b*, apex of flagellum enlarged; *c*, the same viewed from inner side; *d*, basal portion of flagellum enlarged; *e*, flagellum seen from above (b, basal enlargement).

(20) *Hadogenes troglodytes letabensis* Werner.

H. troglodytes letabensis Werner 1933, Senckenbergiana *15*, p. 323, Abt. 1-3.

The type was described from Letaba Camp (N. 247).

PEDIPALPI (AMBLYPYGI)

Genus *Damon* C. L. Koch

Damon variegatus (Perty).

Phrynus variegatus Perty 1834, Delect.An.Artic., p. 200, Pl. 39, Fig. 10.

Nuwe Olifants Kamp (N. 272); Hapi Kop, Pafuri (N. 5); Shingwedzi (N. 118). This widely distributed Pedipalp in Southern Africa (see Lawrence, 1949, p. 2, fig. 1, for the distribution) is very probably found throughout the reserve.

A REFERENCE LIST OF GENERAL WORKS

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