

TWO NEW GENERA OF THE FAMILY PARATYDEIDAE
(ACARI : PROSTIGMATA) FROM SOUTH AFRICAN SOILS

BY

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ABSTRACT.

Notes on the family Paratydeidae are given together with the descriptions of two new genera, viz. *Sacotydeus* gen. nov. and *Tanytydeus* gen. nov. Both genera are based on one species each viz. *S. lootsi* spec. nov. and *T. cristatus* spec. nov., the descriptions of which are given. Additional data on *Scolotydaeus bacillus* Berlese are furnished.

INTRODUCTION.

Recent soil ecological studies in South Africa proved that the Prostigmata constitute the dominant group of soil inhabiting Acari as concerns numbers. Not only do they occur in vast numbers in these biotopes, but also in a wide diversity of forms. Practically nothing is known about their taxonomy, biology and ecology. The present paper is a contribution to the taxonomy of the edaphic genera of one of the families of the Prostigmata viz. the Paratydeidae.

This family occurs in most of the soil types investigated and are present in fairly large numbers. It was impossible to accommodate the two species in any one of the three existing genera viz. *Paratydeus* Baker, *Scolotydaeus* Berlese and *Neotydeus* Baker. No males of these genera were described as such. In the present study, however, it was found that some of the specimens possess an internal structure which probably represents a male copulatory organ. These particular specimens occur in very small numbers, even in fairly large populations, and they tend to be smaller than those without the internal organ. The present authors

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regard them as males. The only specimen of *Paratydeus alexanderi* described by BAKER (1949) contains an egg but no indication of an internal structure.

The type materials of the two new species are deposited in the collection of the Institute for Zoological Research, Potchefstroom University.

FAM. PARATYDEIDAE BAKER, 1949.

Paratydeidae Baker, 1949, Proc. Ent. Soc. Wash. 51 (3) : 119-120; BAKER & WHARTON, 1952, An introduction to Acarology, New York, Macmillan Co. : 188-189.

This family was erected by BAKER (1949) to accommodate a new genus, *Paratydeus*. A previously described genus, *Scolotydaeus* Berlese, was also referred to this family by BAKER (1950) and he also defined the new genus *Neotydeus*.

The characteristics of this family are : prostigmatic with distinct peritremes and stigmata ; palpi four-segmented, without a thumb-claw complex ; cheliceral bases not fused, movable chela strongly curved, fixed chela degenerate ; body elongate and divided by two to four transverse sutures ; propodosoma with or without plates, with one pair of sensory, two pairs of simple shorter setae and two pairs of lateral peglike setae ; with or without eyes ; female genital opening behind coxae IV, contiguous with anal opening and with two pairs of genital suckers and two to four pairs (or ten pairs in *Scolotydaeus*) of genital setae ; male genital opening separate from anal opening, with two pairs of suckers and nine pairs of genital setae (except in *Scolotydaeus* which has ten pairs) ; coxae I-II and III-IV in two widely separated groups ; coxae of legs fused to body ; legs sparsely haired ; tarsi with two claws and a small clawlike empodium ; skin with fine longitudinal striae.

Key to the genera of *Paratydeidae*.

- | | |
|---|---------------------|
| 1. With eyes..... | 2 |
| — Without eyes..... | 4 |
| 2. Propodosoma with a triangular plate..... | <i>Sacotydeus</i> |
| — Propodosoma without any plates..... | 3 |
| 3. With two pairs of prominent lenslike eyes..... | <i>Paratydeus</i> |
| — With one pair of ill-defined eyes..... | <i>Scolotydaeus</i> |
| 4. Body divided by three transverse sutures ; propodosoma without plates..... | <i>Neotydeus</i> |
| — Body divided by four transverse sutures ; propodosoma provided with a crista-like plate | <i>Tanytydeus</i> |

Genus *Sacotydeus*, gen. nov.

This genus can be differentiated from the other known genera on the basis of the following characteristics : the body is divided into three portions by two trans-

verse sutures ; one pair of eyes and one pair of ill-defined post-ocular bodies are present on the propodosoma which is also provided with a triangular plate with reticulated pattern. Type species : *Sacotydeus lootsi*, spec. nov.

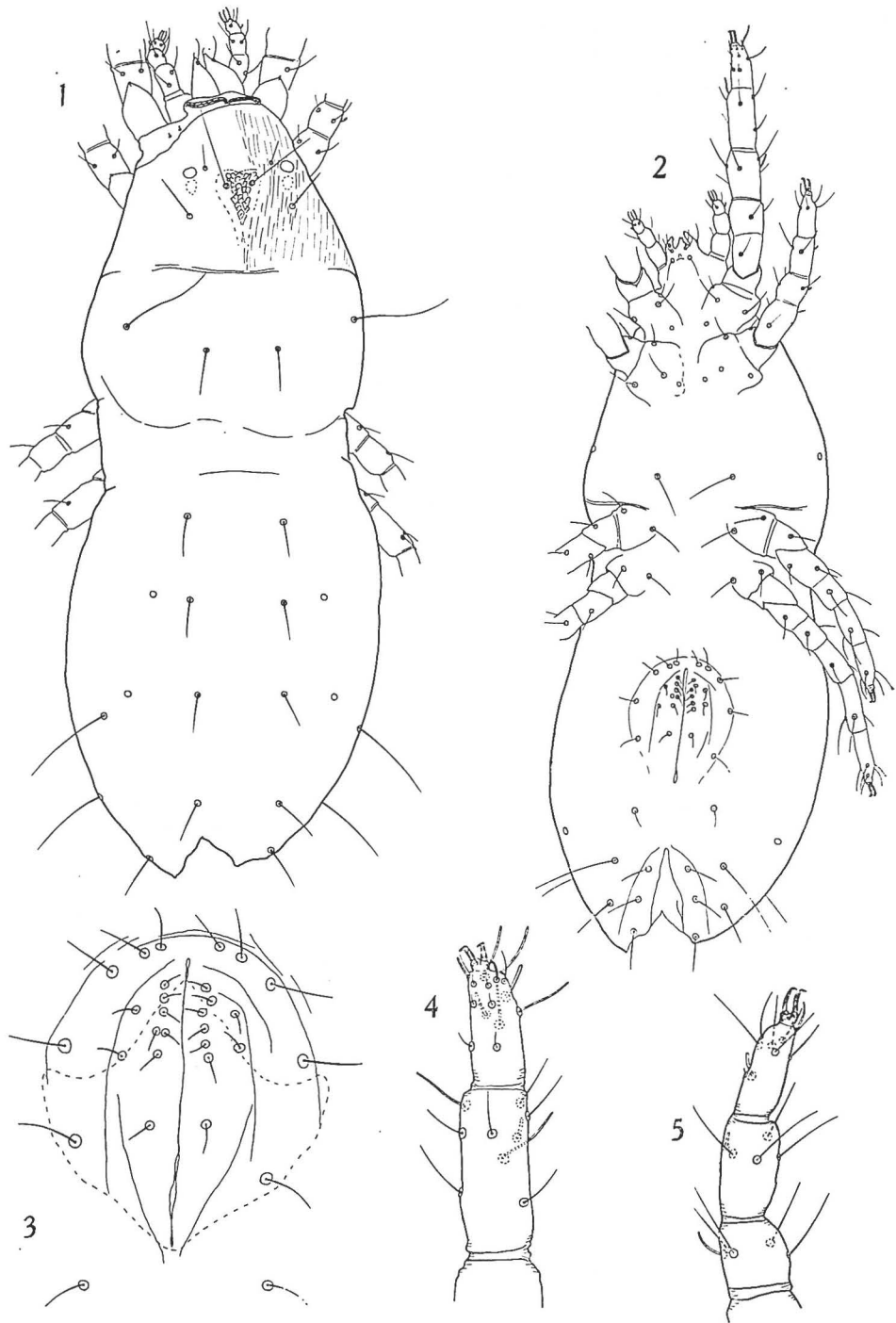
***Sacotydeus lootsi*, spec. nov.**

MALE (figs. 1-6) : Dimensions of holotype : length (incl. gnathosoma) 566 μ ; length (excl. gnathosoma) 523 μ ; breadth of body 204 μ ; length of leg I 220 μ ; leg II 172 μ ; leg III 167 μ ; leg IV 199 μ ; palpi 61 μ .

Dorsum (fig. 1) : The integumental striae are mostly longitudinal. The clearly visible peritremes are not smooth but simulate a reticulated pattern along their entire lengths. The body is divided into three portions by two inconspicuous transverse sutures. The propodosoma bears a pair of long fine sensory setae on a triangular, reticulated plate. Immediately anterior to the pair of eyes is a pair of short simple setae. A pair of setae which is about half the length of the sensory setae is situated on the posterior part of the propodosoma. Dorsal to trochanter I are two pairs of short, peglike setae which are a little shorter than those of the other species. One pair of ill-defined post-ocular bodies is situated posterior to the eyes. The hysterosoma is divided into two portions by a transverse suture between coxae III and IV. The anterior portion bears a transverse row of four setae the lateral pair of which is about twice as long as the median pair. The posterior section bears five median pairs of setae and two lateral pairs which are about twice as long as the median pairs. Lateral to the second and third pairs of median setae are four small round areas of unknown function. When observed from the side these areas appear as cavities in the integument.

Venter (fig. 2) : Ventrally, the sutures are indistinct. Anterior to coxae III a single pair of setae is located. Transversely in line with these setae is another pair of round cavities ; similar cavities occur laterally more or less on the level of the posterior pair of para-genital setae. The prominent genital opening (fig. 3) can be seen as a longitudinal slit, well separated from the anal opening. The genital covers are provided with nine pairs of short setae, seven pairs of which are situated in a row next to the genital opening while the remaining two pairs are located further away. The six pairs of para-genital setae are about twice as long as the genital setae and are arranged in a circle around the genital opening. An internal structure (probably the male copulatory organ) bearing at least eight setae, is visible. The anal opening is situated at the rear and is provided with three pairs of anal and two pairs of para-anal setae the anterior pair of which is about one and a half times as long as the others.

Legs (figs. 4-5) : Coxae I-II and III-IV are separated into two groups and are, to all appearances not movable. Ventrally, coxa I bears four setae, coxa II four, coxa III two and coxa IV two. All the legs comprise the normal six segments ;



FIGS. 1-5 : *Sacotydeus lootsi* spec. nov., male.
1. — Dorsum. 2. — Venter. 3. — Genital area. 4. — Tibia and tarsus I. 5. — Leg II.

femora I and IV are both divided into a basi- and telofemur. Legs I and IV are longer than II and III. All tarsi have two claws and a small clawlike empodium. The legs are sparsely covered with relatively long setae. The formulae for the leg setae, with the sensory setae in parentheses, are : tarsi 14 (2) — 7 (2) — 6 — 5 ; tibiae 9 — 5 — 4 — 3 ; genua 8 — 5 — 2 — 3 ; femora 8 — 3 — 4 — 3 ; trochanters 0 — 1 — 1 — 0.

The setae consist of two types. One type is rodlike and of different lengths while the other is simple and thin. Tarsus I (fig. 4) bears six rodlike and eight simple setae, tibia I three rodlike and six simple setae, genu I one rodlike and seven simple setae, tarsus II (fig. 5) one rodlike and six simple setae, tibia II and genu II one rodlike and four simple setae each, and tibia III one rodlike and three simple setae.

Gnathosoma : The palpi (fig. 6) are four segmented and reach as far as the distal part of femur I. The palpal femur is the longest segment and is provided with two relatively long dorsal setae. The tibia bears one lateral and two dorsal setae. Distally, the tarsus bears three rodlike setae with protruding bases ; four simple setae and a short rodlike sensillum are present proximally.

The cheliceral bases are not fused and each chelicera is provided with a simple dorsal seta. The digits could not be observed. The venter of the gnathosoma is provided with three pairs of setae medially and a pair of lateral setae. The posterior and lateral pairs are about twice as long as the others.

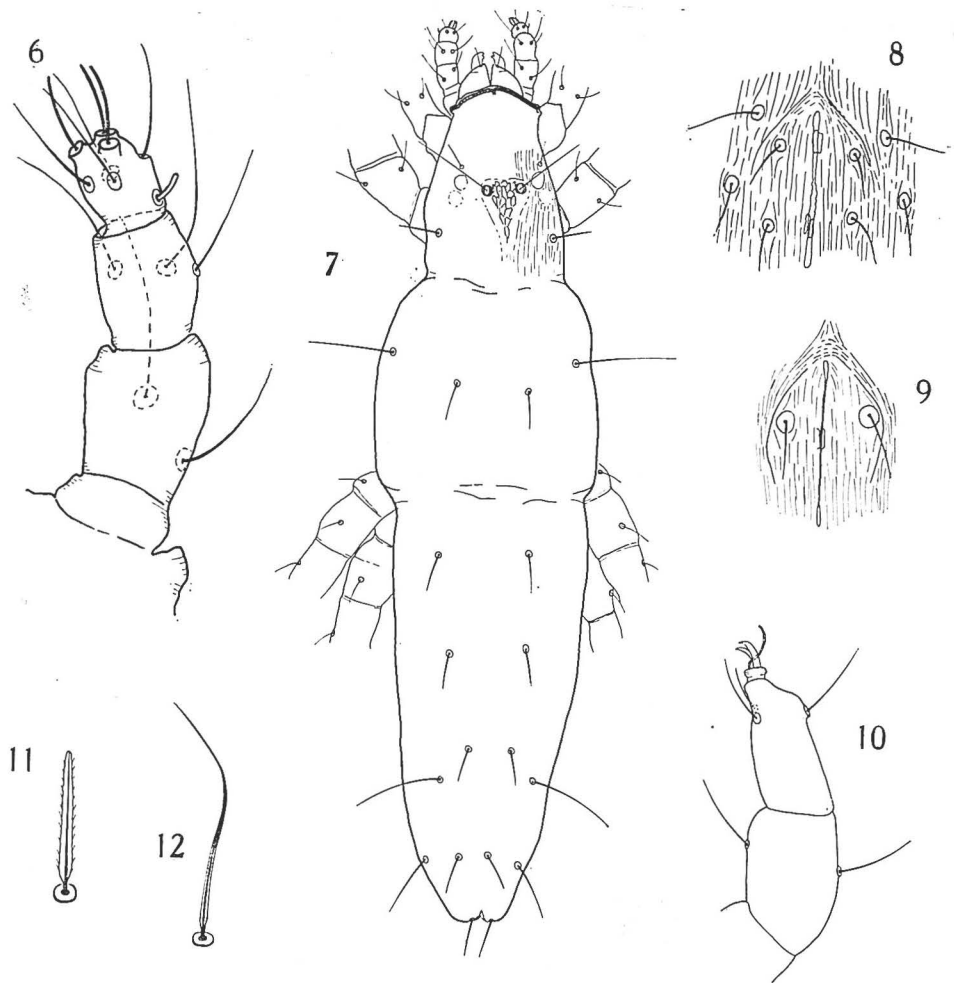
FEMALE (figs. 7-8) : One specimen, which seems to be a young female, was found in the same soil sample as the male.

Dimensions : Length of body (incl. gnathosoma) 425 μ ; length of body (excl. gnathosoma) 392 μ ; breadth of body 103 μ .

The body (fig. 7) is smaller and narrower than that of the male. Except for the genital opening the female is essentially similar to the male. The genital opening (fig. 8) lies halfway between coxae IV and the anus and does not approach the anal opening. The genital opening is flanked by two genital and two paragenital setae. Two pairs of small genital suckers are present. The leg chaetotaxy is the same as that of the male. Ventrally, coxa I bears four setae, coxa II two setae, coxa III two setae and coxa IV one seta.

NYMPH (figs. 9-10) : Dimensions of morphotype : length of body (incl. gnathosoma) 345 μ ; length (excl. gnathosoma) 332 μ ; breadth of body 101 μ .

The nymph is essentially similar to, but somewhat smaller than the female. The genital opening (fig. 9) is only a small slit, with one pair of small suckers and flanked by one pair of setae. The leg chaetotaxy differs slightly from that of the adult and is as follow : tarsi 14 (1) — 6 (2) — 6 — 3 ; tibiae 9 — 5 — 4 — 2 ; genua 8 — 5 — 2 — 3 ; femora 7 — 3 — 3 — 0 ; trochanters 0 — 0 — 0 — 0 ; coxae 4 — 2 — 2 — 0. As in the adult, the setae are either rodlike or simple. Tarsus I bears six rodlike and eight simple setae, tibia I two rodlike and seven



FIGS. 6-12 : *Sacotydeus lootsi* spec. nov.

6. — Palp, male. 7. — Dorsum, female. 8. — Genital area, female. 9. — Genital area, nymph. 10. — Tarsus IV, nymph. 11. — Median hysterosomal seta, larva. 12. — Lateral hysterosomal seta, larva.

simple setae, genu I one rodlike and seven simple setae, tarsus II one rodlike and five simple setae, tibia and genu II one rodlike and four simple setae each and tibia III one rodlike and three simple setae.

Tarsus IV (fig. 10) bears a pair of claws and a long clawlike empodium. The chaetotaxy of the palpi is as in the holotype.

LARVA (figs. 11-12) : Dimensions : length (incl. gnathosoma) 277 μ ; length (excl. gnathosoma) 266 μ ; breadth 74 μ .

The larva resembles the female in many respects but is much smaller and has three pairs of legs. The body setae are more robust than those of the female or

nymph. The triangular plate on the propodosoma is not as clearly defined as in the holotype male and the pair of sensory setae is very long. The hysterosoma is divided into two sections by a transverse suture just posterior to coxae III. The median setae on the hysterosoma (fig. 11) are serrated; the three pairs of lateral hysterosomal setae (fig. 12) are much longer than the median setae. The anal opening is devoid of any anal setae but two pairs of para-anals are located near the anal opening.

The formulae for the leg setae are : tarsi 12 (1) — 5 (2) — 4 ; tibiae 9 — 5 — 4 ; genua 8 — 5 — 2 ; femora 7 — 4 — 3 ; trochanters 0 — 0 — 0 ; coxae 2 — 1 — 1. As in the adult the leg setae are of two types but in the larva there is a tendency for some rodlike setae to be replaced by simple setae. Tarsus I bears two rodlike and ten simple setae ; tibia I one rodlike and eight simple setae ; genu I one rodlike and seven simple setae ; tarsus II, tibia II and genu II one rodlike and four simple setae each ; tibia III one rodlike and three simple setae. All the tarsi bear claws and a long clawlike empodium. The palpi have the normal number of setae as in the adult but one of the terminal rodlike setae on the tarsus is replaced by a simple seta.

The venter of the gnathosoma bears two pairs of median and one pair of lateral setae.

MATERIAL STUDIED :

Holotype male, allotype female, morphotype nymph and larva from pasture soil, Agricultural Research Institute, Potchefstroom ; collected by Dr. G. C. Loots between September and December 1962 by means of Berlese funnels.

Genus *Tanytydeus*, gen. nov.

In general appearance this genus is very similar to the genus *Neotydeus* Baker, but on closer observation it proves to be quite different. The body is small, elongated and in contrast to *Neotydeus*, is divided into five sections by four transverse sutures and not into four. The propodosoma is provided with a narrow cristalike plate which is slightly sclerotised. Eyes are absent.

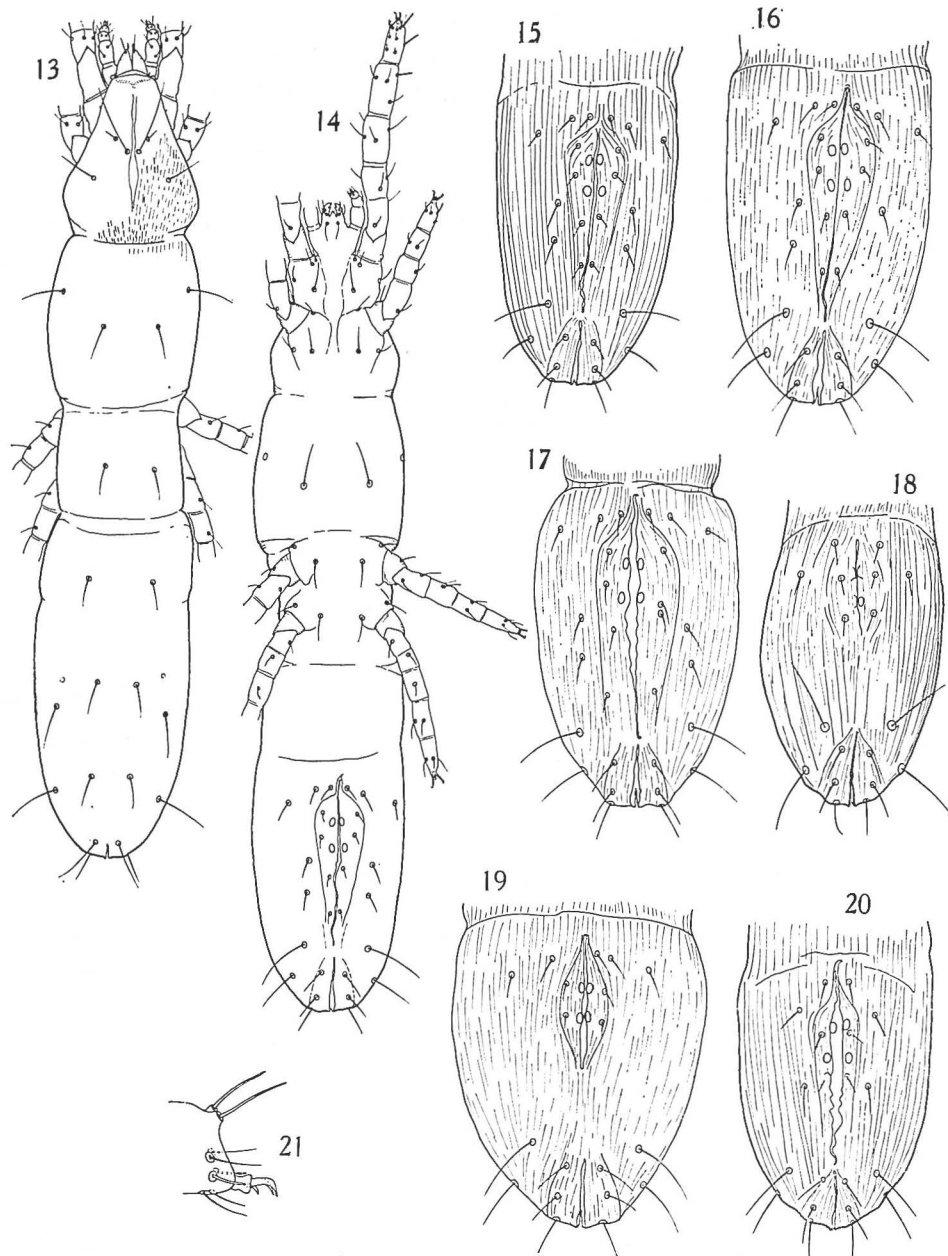
Type species : *Tanytydeus cristatus*.

Tanytydeus cristatus, spec. nov.

FEMALE (figs. 13-24) :

Dimensions of holotype : length of body (incl. gnathosoma) 452 μ ; length (excl. gnathosoma) 425 μ ; breadth of body 83 μ ; length of leg I 159 μ ; length of leg II 106 μ ; length of leg III 103 μ ; length of leg IV 111 μ ; palpi 34 μ .

Dorsum (fig. 13) : Dorsally, the body is divided into five sections by four transverse sutures with the fourth suture less distinct. In the adult female the fourth suture can best be seen on the venter (fig. 14).



FIGS. 13-21 : *Tanytydeus cristatus* spec. nov., female.

13. — Dorsum. 14. — Venter. 15. — Genital area of type specimen. 16-17. — Variations in setal pattern of genital area. 18-20. — Variation in genital area of young females. 21. — Anterior tip of tarsus I.

The propodosoma is 92 μ long, without eyes and bears the normal number of setae, that is : a pair of relatively long sensory setae, an anterior pair of relatively short simple setae, a pair of postero-lateral setae which is more than twice as long as the anterior pair and two pairs of short peglike setae, the anterior pair of which is located next to the chelicerae and the posterior pair which is dorsally to coxae I. The peritremes are smooth and extend laterally into two knob-like stigmata. A narrow crista-like plate which is slightly sclerotised extends almost along the whole length of the propodosoma.

The hysterosoma is divided into four portions by three transverse sutures, the first being immediately anterior to coxae III and the second immediately posterior to coxae IV. The anterior portion of the hysterosoma is slightly rounded and bears a transverse row of four setae, the lateral ones being the longest. The second and third sections each bear one pair of setae. The posterior section carries five pairs of setae with the lateral and posterior pairs slightly longer than the median ones.

The integument has fine longitudinal striae.

Venter (figs. 14-20) : The venter is also provided with fine longitudinal striae. Coxae I and II form slightly sclerotised apodemes. Ventrally, the body is also divided into five sections by four transverse sutures. The fourth suture can easily be observed in the adult female. On section two there is a pair of median setae flanked by a pair of rounded areas of uncertain function. The genital opening is situated on the posterior section and reaches from near the fourth suture to the anal opening (fig. 15). The genital covers are provided with four pairs of genitals and two pairs of genital suckers. Five pairs of para-genital setae are located around the genital opening. Two exceptions to this pattern were encountered. In the first one (fig. 16) only four para-genital setae are present on the one side while the other side bears the normal five. In the second one (fig. 17) the second and third pairs of genitals on the one side are situated close to each other but they are normally distributed on the other side. The anal opening is situated posteriorly and is flanked by three pairs of setae. The two pairs of para-anals are about one and a half times as long as the anal setae.

While studying this species the authors found some specimens in which the genital opening differs somewhat from that of the holotype female which is considered to be an adult. These forms can be divided into two groups. In the first group the small genital opening (fig. 18) does not approach the anal opening. It bears two pairs of genital setae, two pairs of genital suckers and has two pairs of para-genital setae, except in one specimen (fig. 19) where three para-genital setae are present on the one side. The fourth suture is better defined than in the adult female and can also be observed dorsally. The members of this group are much smaller than the adults and measure 337-351 μ in length (gnathosoma included) and 69-77 μ in breadth. They also differ from the adult female in that tibia I bears only one rodlike seta. In the second group the genital opening approaches

the anal opening (fig. 20) and it is provided with two pairs of genital and three pairs of para-genital setae. Two pairs of genital suckers are present. In this group the fourth suture is visible both dorsally and ventrally. They are bigger than the first group and measure 373-414 μ in length (gnathosoma included) and 90-95 μ in breadth. In this group tibia I bears two rodlike setae.

Whether the latter two stages are representing young females or nymphal stages is uncertain because of a lack of information on the morphology of the developmental stages of this relatively unknown family.

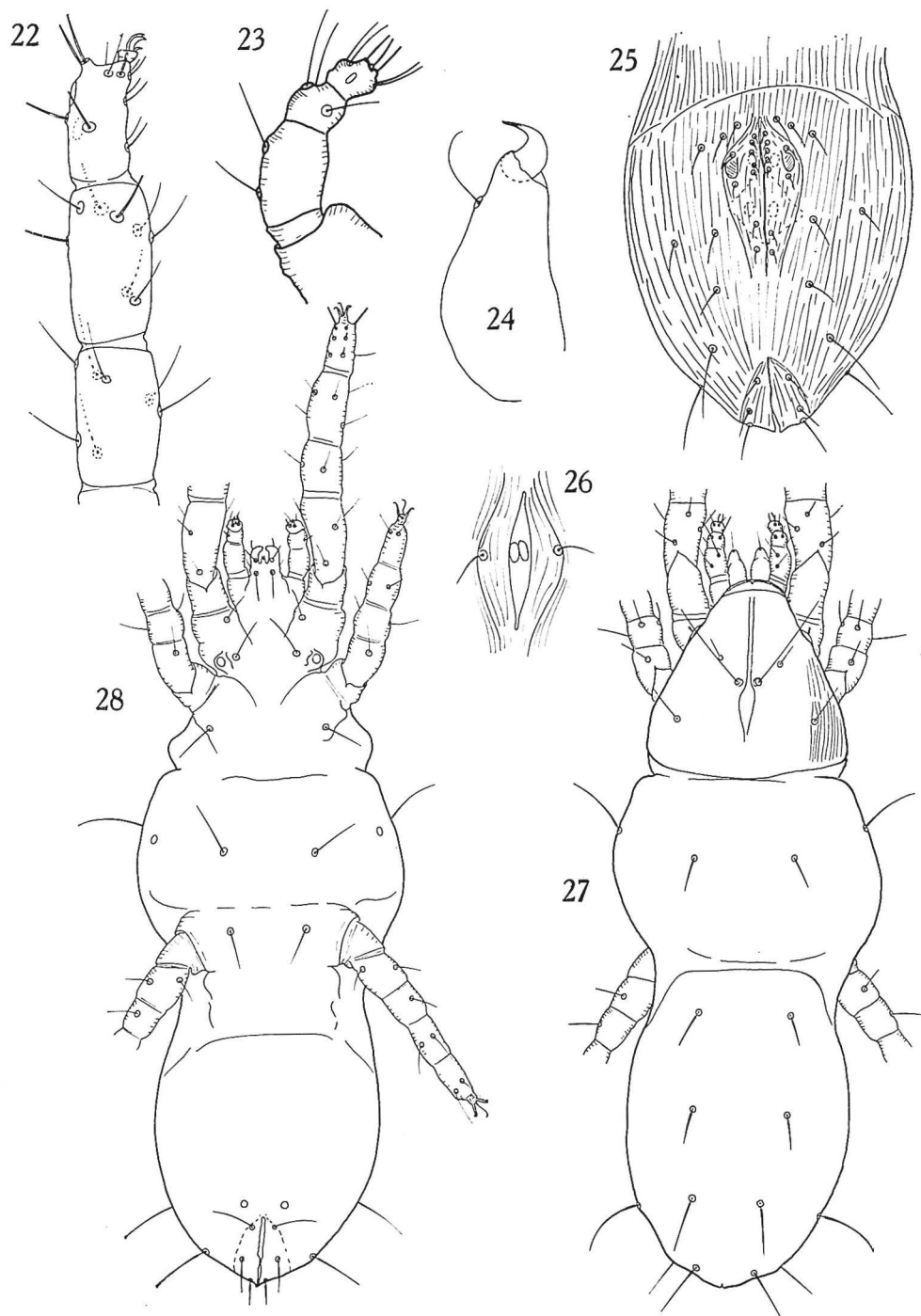
Legs (figs. 21-22) : The coxae are arranged into two widely separated groups with coxae III and IV between the second and third transverse sutures. All the legs consist of six segments. Femora I and IV are divided into a basi- and telofemur. Leg I is nearly one and a half times as long as the others. All tarsi are provided with two claws and a small clawlike empodium (fig. 21). Two differentiated areas of unknown (probably sensory) function are present on tarsus I (fig. 22), with one such area on tarsus II. In a lateral view these areas can be seen above the normal silhouette of the leg. The legs are sparsely haired and except tarsus II, which bears a short sensillum, the other setae are either simple or rodlike. With the rodlike setae in parentheses, the formulae for the leg setae are : tarsi 8 (6) — 6 — 6 — 5 ; tibiae 5 (3) — 4 — 3 — 3 ; genua 7 — 3 — 2 — 2 ; femora 9 — 3 — 3 — 3 ; trochanters 0 — 1 — 1 — 0 ; coxae 4 — 3 — 2 — 2.

Gnathosoma (figs. 23-24) : The palpi (fig. 23) are four segmented. Terminally the palpal tarsus bears four simple setae, three rodlike setae and a lateral protuberance. The venter of the gnathosoma is provided with three pairs of simple setae and another pair laterally. The cheliceral bases are not fused. The movable digit is strongly curved (fig. 24).

MALE (fig. 25) : Dimensions of allotype : length of body (incl. gnathosoma) 433 μ ; length (excl. gnathosoma) 406 μ ; breadth of body 114 μ ; length of leg I 156 μ ; leg II 95 μ ; leg III 98 μ ; leg IV 109 μ .

The hysterosoma is more pointed posteriorly than in the female. Both the body and legs have the same number of setae as in the adult female. The fourth suture is distinct ventrally but not dorsally. The genital opening (fig. 25) is well separated from the anal opening and is provided with nine pairs of genital and six pairs of para-genital setae. Two pairs of genital suckers are present with, lateral to the anterior pair of suckers, a pair of round differentiated areas. An internal structure (probably a copulatory organ) is present on the inside of the genital opening. As in the female three pairs of anal- and two pairs of para-anal setae are located near the anal opening.

NYMPH (fig. 26) : Dimensions : length of body (incl. gnathosoma) 294 μ ; length of body (excl. gnathosoma) 272 μ ; breadth of body 77 μ . The nymph is much smaller than the adult, with the hysterosoma more rounded and the posterior hysterosomal setae slightly stouter. The propodosomal plate is indistinct. The



FIGS. 22-28 : *Tanytydeus cristatus* spec. nov.

22. — Leg I, female. 23. — Palp, female. 24. — Chelicera, female. 25. — Genital area, male.
26. — Genital area, nymph. 27. — Dorsum, larva. 28. — Venter, larva.

fourth suture is indistinct and only visible ventrally at the lateral margins. The genital aperture (fig. 26) is a short slit with one pair of suckers and is flanked by one pair of setae. Empodium IV is long and clawlike whilst the others are short as in the adult. The rounded differentiated areas on tarsus I are prominent. Tarsus II bears a short sensillum. The formulae for the rest of the leg setae are : tarsi 8 (6) — 6 — 6 — 3 ; tibiae 8 — 4 — 3 — 2 ; genua 7 — 3 — 2 — 2 ; femora 7 — 2 — 3 — 0 ; trochanters 0 — 1 — 1 — 0 ; coxae 4 — 2 — 2 — 0.

LARVA (figs. 27-28) : Dimensions of morphotype : length of body (incl. gnathosoma) 258 μ ; length (excl. gnathosoma) 236 μ ; breadth of body 89 μ .

The body is proportionately less elongate than that of the adult ; dorsally it has two and ventrally three transverse sutures. The propodosoma bears the normal number of setae and the sclerotised plate is clearly defined. The anterior section of the hysterosoma is provided with four setae placed in a transverse row. Dorsally the posterior section of the hysterosoma has five pairs of setae which are stouter than those of the adult. The anal opening is surrounded by three pairs of setae, the anterior pair of which is the longest. Anterior to the anal opening are two round areas. A pair of structures, probably larval suckers, are situated on coxae I. All three tarsi bear a pair of claws and a long clawlike empodium. Tarsus II bears a short sensillum. The formulae for the rest of the leg setae are : tarsi 10 (2) — 5 — 4 ; tibiae 8 — 4 — 3 ; genua 7 — 3 — 2 ; femora 7 — 2 — 3 ; trochanters 0 — 0 — 0 ; coxae 2 — 1 — 1. The palpi are as in the adult but with only two rodlike setae on the palpal tarsus.

MATERIAL STUDIED : Holotype female and five paratype females from pasture soil, Potchefstroom, Transvaal, March 1967 (P. F. S. MULDER) ; two paratype females, one allotype male, two deutonymphs and three larvae from pasture soil, Potchefstroom, August 1967 (P. D. THERON) ; one paratype male from Durban, Natal, Feb. 1965 (C. A. J. van Rensburg).

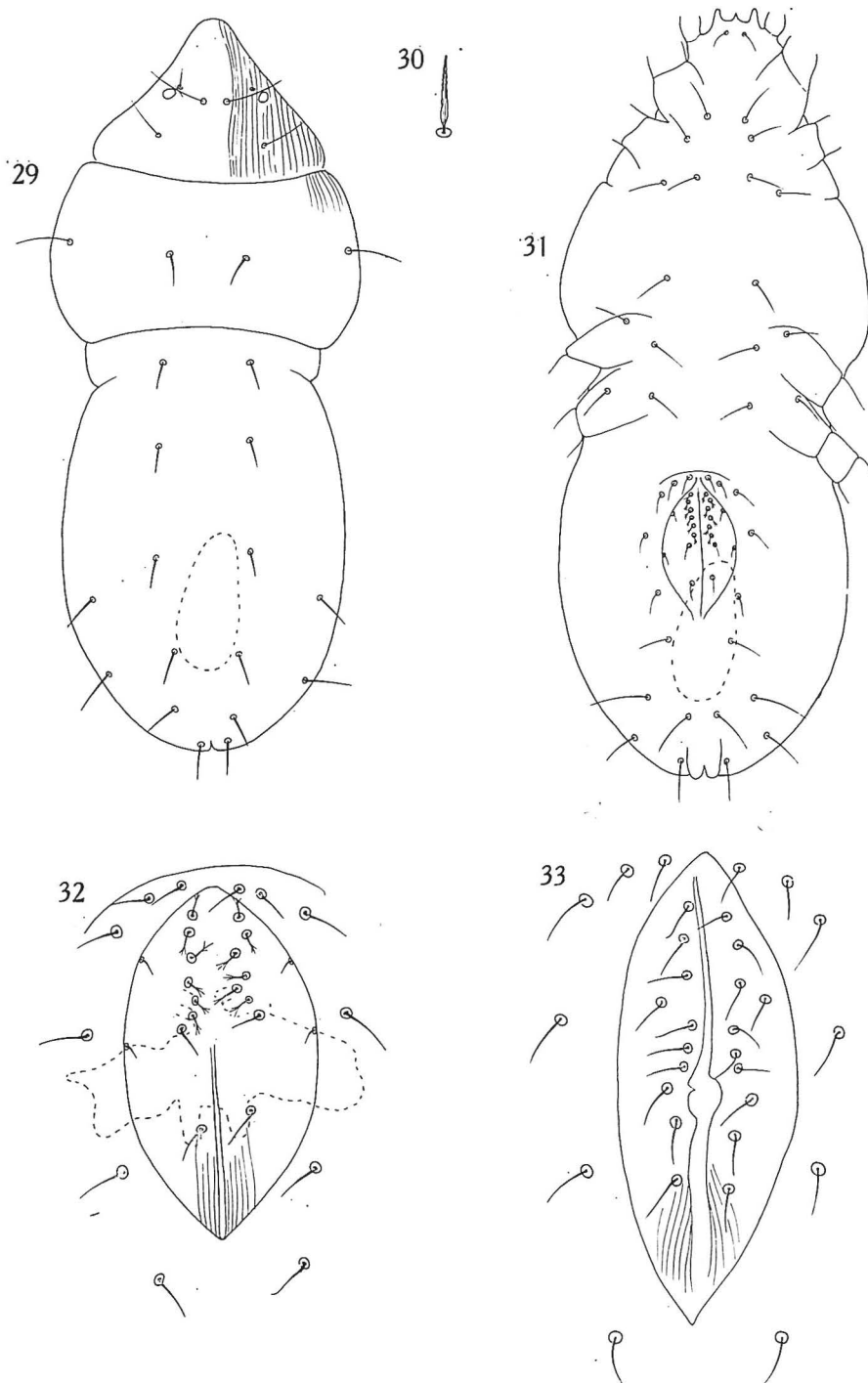
Genus *Scolotydaeus*, Berlese.

Scolotydaeus bacillus Berlese, 1910, Redia 6, p. 214, pl. 18, fig. 13 ; Thor, 1932, Zool. Anz. 98 : 90 ; Thor, 1933, Das Tierreich 60 : 44-45.

The following redescription of *Scolotydaeus bacillus* is based on a few drawings and brief notes made by a colleague, Dr. G. C. LOOTS, during a recent study of the Berlese Collections in Florence.

MALE (figs. 29-32) :

Dorsum (fig. 29) : The body is elongated and divided into three sections by two transverse sutures. The propodosoma has a triangular shape and bears one pair of relatively long sensory setae and two pairs of shorter setae. One pair of



FIGS. 29-33 : *Scolotydaeus bacillus* Berlese.

29. — Dorsum, male. 30. — Dorsal seta, male. 31. — Venter, male. 32. — Genital area, male.
33. — Genital area, female.

ill-defined eyes could be observed. The middle section bears a transverse row of four setae with the lateral ones longer and finer than the medial ones. The posterior section bears five pairs of medially situated lanceolate setae (fig. 30) and two pairs of lateral setae which are longer than the medial ones. The longitudinal integumental striae are fine.

Venter (fig. 31) : The transverse sutures are not visible ventrally. The coxae are arranged into two groups and all bear two setae each. The posteriorly situated anal opening is flanked by three pairs of setae. The genital opening (fig. 32) is separated from the anal opening and is surrounded by six pairs of para-genital setae. The genital covers are provided with ten pairs of setae, two pairs of which are situated on the outer margin of the covers and eight pairs being placed in a row next to the genital slit. The anterior six pairs are slightly feathered. Two pairs of genital suckers are present. Internal to the genital opening the male copulatory organ could be seen as well as an egglike structure which probably is not an egg.

FEMALE (fig. 33) : The female is a little bigger than the male but, except for details of the genital area, it is basically similar to the male. The genital opening (fig. 33) is separated from the anal opening and is surrounded by six pairs of para-genital setae. The genital covers are provided with ten pairs of simple setae. No genital suckers could be observed although such fine structures could easily have been overlooked.

ACKNOWLEDGEMENTS

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