

COLEOSCIRINAE, A NEW CUNAXID SUBFAMILY
AND TWO NEW SOUTH AFRICAN SPECIES
OF *COLEOSCIRUS* BERLESE, 1916 (PROSTIGMATA : ACARI)

BY

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ABSTRACT

The subfamily characteristics of the Coleoscirinae subfam. nov. as well as the generic characteristics of *Coleoscirus* Berlese, 1916 are given. A key to the genera of the subfamily is supplied. Two new species of the latter genus, viz. *Coleoscirus tuberculatus* and *C. magdalenae* are keyed, described and figured.

RÉSUMÉ

Les caractères du genre *Coleoscirus* Berl. et de la nouvelle sous-famille des Coleoscirinae sont étudiés. Une clé des genres de cette sous famille est donnée. Deux nouvelles espèces de *Coleoscirus*, *C. tuberculatus* et *C. magdalenae* sont décrits et figurés.

INTRODUCTION

In a recent revision of the cunaxid taxonomy SMILEY (1975) described the generic characteristics of *Pseudobonzia* and *Pseudocunaxa*. In a similar revision of the cunaxids of the Ethiopian region I (DEN HEYER, 1976 ; 1977 a & b) described the generic features of *Neoscirula* and *Scutascirus* and also redescribed the genus *Pseudobonzia* Smiley. In the present paper the genus *Coleoscirus* Berlese is redescribed ; these genera are also included in the new subfamily Coleoscirinae. Very little is known about the members of the latter genus. They are regarded as predaceous. They are also cosmopolitan because records are known from widely separated localities, e.g. Argentine (BERLESE, 1888 & 1916), Italy (BERLESE, 1905), Java (BERLESE, 1916), Illinois, U.S.A. (EWING, 1917, Smiley, 1975), Mexico (BAKER & HOFFMANN, 1948), Florida (MUMA, 1960), SPAIN (Cooreman, 1954) and the new records from South Africa.

They seem to be mainly litter-dwellers ; large numbers of specific species have been collected from compost or litter. Studies on seasonal fluctuations in population numbers have not been made but from collecting dates it is evident that they are active throughout the year.

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Subfamily COLEOSCIRINAE subfam. nov.

This new subfamily is erected to include those cunaxid mites of which the five-jointed palps reach past the apex of the hypostome with at most the length of the palp tibiotarsus ; the latter terminates in a claw. The dorsum possesses four pairs of setae in the dorsolateral (dl-) series and six pairs in the dorsocentral (dc-) series ; this means that setae dl 5 are present (fig. 1). Some exceptions occur, for instance, two of the three species of *Neoscirula* lack setae dl 5. Setae dl 1 are spaced closer to the anterior pseudostigmata. All coxae bear three setae but each coxa I possesses an additional peg-like (pe) seta dorsal to the attachment of leg I. A peg-like setae also occurs on each dorsal edge of the coxal region of the hypognathum just lateral to the cheliceral trochanter. Cheliceral setae are present. The leg tarsi terminate varying towards the ambulacra but never in tarsal lobes. The chaetotaxy of telofemora I-IV is 5-5-4-3 simple tactile setae (sts). Duplex and/or triplex setae occur only exceptionally. The occurrence of idiosomal plates varies from few and poorly developed to many and strongly sclerotised.

Type genus : *Coleoscirus* Berlese, 1916.

KEY TO THE GENERA OF THE NEW SUBFAMILY COLEOSCIRINAE

1. Idiosomal plates well developed, varying in number between 6 to 19 ; females with sternal plate and males mostly with a complete ventral plate ; apices of some solenidia on leg segments swollen ; ventral tubercle on palp tibiotarsus present..... 2
- Idiosomal plates either poorly developed or absent ; ventral plates, where present, restricted to coxae and sometimes to genital region ; females usually only with a propodosomal region which may sometimes be poorly sclerotised ; males may possess an additional hysterosomal dorsal plate or less sclerotised region ; solenidia on leg segments usually cylindrical ; ventral tubercle on palp tibiotarsus may be present or absent 3
2. Idiosoma with 15 or 19 plates of which eight are dorsolateral platelets ; dorsal plates two in number ; anal valves clearly sclerotised with three setae each ; palp tibiotarsus with bifurcate tubercle..... *Scutascirus* Den Heyer, 1976
- Idiosoma with not more than eight plates ; no dorsolateral plates ; females with one dorsal idiosomal plate but males with at least two but mostly three dorsal idiosomal plates ; tubercle on palp tibiotarsus plain..... *Coleoscirus* Berlese, 1916
3. Palp tibiotarsus short and nearly cone-like ; hypognathum less than 1,5 times longer than broad ; trochanters of chelicerae broad ; the ratio idiosomal length : idiosomal width varies between 1,35-1,50 ; setae on palp telofemora either spine-like or simple ; ambulacral claws smooth..... *Neoscirula* Den Heyer, 1977
- Palp tibiotarsus long and usually narrow although the base may be broad and S-shaped ; hypognathum more than 1,5 times longer than broad ; trochanters of chelicerae normal ; ratio idiosomal length : idiosomal width from 1,50-1,95 ; except for the possible present tubercle all palp setae are simple tactile setae ; ambulacral claws rippled *Pseudobonzia*, Smiley, 1975

GENUS *COLEOSCIRUS* BERLESE, 1916

Scirus Berlese, 1888 : 188 ; Berlese, 1905 : 231 ; Berlese, 1910 : pl. XIX-25 ; Ewing, 1917 : 150-151.

Coleoscirus Berlese, 1916 : 131, 132 ; Thor & Willmann, 1941 : 175 ; Baker & Hoffmann, 1948 : 252.

Cunaxa Thor & Willmann, 1941 : 170 ; Baker & Hoffmann, 1948 : 233 ; Cooreman, 1954 : 11-13 ; Muma, 1960 : 324.

Pseudocunaxa Smiley, 1975 : 241-242.

Historical review. BERLESE (1888) described a new species *Scirus curtipalpis*, from tree bark in Buenos Aires, Argentine. In the Berlese collection in Florence, Italy, this specimen is marked " *S. curtirostris*, 31/17, tipico." The former species name is regarded as valid. (Attention is drawn to this fact for possible future references). During 1905 BERLESE described a new species, *Scirus brevirostris*, a drawing of which occurs in his work of 1910. The material in the Berlese collection consists of two specimens, viz. a female marked " 28/48 tipico, Sfagno (= sphagnum), Cascine, Firenze " and a male marked 28/47 from the same locality and habitat. In 1916 Berlese erected a new genus to include two species described by him, viz. *Coleoscirus halacaroides* and *C. corniculatus*. The material in the Berlese collection of these two species was examined. The material of *C. halacaroides* comprises three specimens collected by a certain JACOBSON at SAMARANG, Java, Indonesia. The specimens are marked as follows : " 138/3 *Scirula halacaroides* — Juvini (= nymph) ", " 138/2 *Scirula halacaroides* tipico " and " 168/33 *Coleoscirus halacaroides* ". I have determined that specimen 138/3 is a male of the genus *Pseudobonzia* Smiley, 1975 ; this specimen is closely related to *Scirus* (= *Pseudobonzia*) *parvirostris* Berlese, 1910, *Pseudobonzia neoreticulata* Den Heyer, 1977, *P. reticulata* (Heryford, 1965) and *P. saaymani* Den Heyer, 1977. The material of *Coleoscirus corniculatus*, marked " 168/34 tipico " and " 173/2 " collected at La Plata, Argentine by Bruch (no date), has been compared with the specimen of " *Scirus curtipalpis*, 31/17, tipico " mentioned above. The two localities are approximately 50 km apart. These specimens proved to be conspecific, i.e. *Coleoscirus corniculatus* is a synonym of *Scirus* (= *Coleoscirus*) *curtipalpis*. BERLESE (1916) designated *Coleoscirus halacaroides* as type species of this genus, a fact which is accepted in spite of an earlier described species, viz. *Coleoscirus curtipalpis* (Berlese, 1888), representing the genus. EWING (1917) described a new species from Illinois, U.S.A., viz. *Scirus* (= *Coleoscirus*) *simplex*. THOR & WILLMANN (1941) redescribed and figured *Coleoscirus simplex* (Ewing, 1917), *C. brevicornis* (Berlese, 1905), *C. curtipalpus* (Berlese, 1888), *C. halacaroides* Berlese, 1916, and the synonym of *C. curtipalpus*, viz. *C. corniculatus* Berlese, 1916. BAKER & HOFFMANN (1948) redescribed and figured *C. curtipalpis* (Berlese, 1888), *C. brevicornis* (Berlese, 1905) and *C. simplex* (Ewing, 1917) while a new species, viz. *Cunaxa mexicana* (= *Coleoscirus mexicanus* (Baker & Hoffmann, 1948) comb. nov.), from Mexico and U.S.A. was also described and figured by them. COOREMAN (1954) redescribed and figured *Coleoscirus brevirostris* (Berlese). MUMA (1960) redescribed *Coleoscirus simplex* (Ewing, 1917). SMILEY (1975) provided a new genus name for species related to and including *Coleoscirus simplex*, viz. *Pseudocunaxa*. This new genus name is a junior synonym of *Coleoscirus* Berlese, 1916. What is remarkable in SMILEY's work is that he gave a translation

of BERLESE's (1916) description of *Coleoscirus* and *C. halacaroides* but failed to see the relationship between the former and his *Pseudocunaxa*. As SMILEY (in correspondence) recently informed me that he has visited the Berlese collection during January, 1977, it is clear that he could still have been in doubt as to the true nature of *Coleoscirus* when he redescribed *C. simplex* in 1975.

Characteristics. The colour of these mites varies between shades of pale yellow to pale brown but some show a greyish colour due to the body contents. The gnathosoma is usually darker in colour while the legs possess a colour in between that of the idiosoma and gnathosoma. The body is nearly diamond-shaped. The size varies considerably and the males are appreciably smaller than the females; males range from approximately 350 μm -490 μm and females from 490-650 μm (hypognathum included). All idiosomal plates are provided with papillae. The dorsal chaetotaxy of the idiosoma is as follows: two pairs of setose sensillae PS1 and PS2, four pairs of simple tactile setae (sts) in the dl (dorsolateral) — series and six pairs in the dc (dorsocentral) — series. Setae dl 1 are placed nearer to PS1 than to PS2. The shields of the idiosoma provide one of the distinguishing features of this genus. In the females a single dorsal idiosomal shield occurs bearing all the propodosomal setae as well as a varying number of hysterosomal setae. The latter are never less than four pairs but do not exceed six pairs. Setae dc 6 are always borne on the integument. In the males at least two but mostly three dorsal plates occur. The anterior plate bears all the propodosomal setae while the hysterosomal part bears four pairs of simple setae, viz. setae dl 2 and dc 2-4. The next platelet bears two pairs of setae, viz. dc 5 and dl 5. The posterior platelet, where it does occur, bears setae dc 6. A pair of cupules are present in the vicinity of setae dc 4 or dc 5. Ventrally the females are supplied with a sternal shield which is fused with coxae I and II of both sides while the hysterosomal coxae of each side are fused to a plate. The sternal plate bears eight pairs of setae, viz. associated with coxae I are three pairs of simple tactile setae (sts) borne between the leg attachments while a pair of peg-like setae (pe) occurs immediately dorsad to the attachment of leg I and coxae II bear three pairs of simple tactile setae. The pair of propodogastral setae occurs on the posteromedian region of the sternal shield. Hystergastral setae occur on the integument in front of the genital region but some of these may occur on the median edges of coxal plates IV. The number of these setae varies from species to species and also from individual to individual of the same sex within the species. One pair of hystergastral setae usually occurs laterally to the genital plates. A complete ventral plate, reaching from immediately anterior to coxae I backwards, fusing with all eight coxae and surrounding the anterior half of the genital region, is present in the males. This complete plate bears the following setae: coxae I-IV, 3 sts, 1 pe (peg-like seta) — 3 sts — 3 sts — 3 sts, one pair of propodogastral setae as well as a varying number of hystergastral setae. Two pairs of genital papillae are present. The sclerotised genital plates bear four simple tactile setae (g-setae) each in a nearly straight row on the median edge. The anal setae are always two pairs whereas the para-anal setae vary from nil to one pair. The integument between the plates is supplied by papillae-bearing striae. A pair of cupules occurs in the anal region. Ventrally the hypognathum is supplied with four pairs of simple tactile setae (hg-setae) while on the entomalae two pairs of inconspicuous tactile adoral setae are borne. A peg-like seta (pe) occurs on each dorsal edge of the coxal part of the hypognathum, near the trochanter of the chelicera. The five-jointed palps reach beyond the entomalae by at most the proximal part of the tibiotarsus. The chaetotaxy of the palp is as follows: trochanter (segment I) no setae; basifemur (II), one dorsal simple tactile seta; telofemur (III), one dorsal simple tactile seta; genu (IV), four simple tactile setae round the segment; tibiotarsus (V), one long ventral simple tactile seta, one ventral tubercle, one median, one lateral and two dorsal simple tactile

setae and a terminal, sometimes divided, claw. The chelicerae are normal for the family; cheliceral setae are present.

The legs are all shorter than the idiosoma and their sequence of increasing length is II-I-III-IV. The tarsi end direct in the ambulacra without signs of pretarsi or lobes. The ambulacra consist of two rippled claws enclosing between them a four-rayed empodium. Genua III and IV and tibiae III and IV of the adults are similar with regard to their chaetotaxy.

Type species : *Coleoscirus halacaroides* Berlese, 1916.

KEY TO THE SOUTH AFRICAN SPECIES OF *Coleoscirus*

1. Solenidion formula of genua I-IV, 4-3-1-1 and chaetotaxy of the basifemora I-IV, 5-6-4-2 sts ; number of anal setae two pairs ; no para-anal setae ; number of hysterosomal setae on idiosomal plate of female four pairs..... *C. tuberculatus* spec. nov.
- Solenidion formula of genua I-IV, 4-3-1-2 and chaetotaxy of basifemora I-IV, 5-6-5-2- sts ; anal setae two pairs ; para-anal setae one pair ; number of hysterosomal setae on dorsal plate in female five pairs..... *C. magdalenae* spec. nov.

***Coleoscirus tuberculatus* spec. nov.**

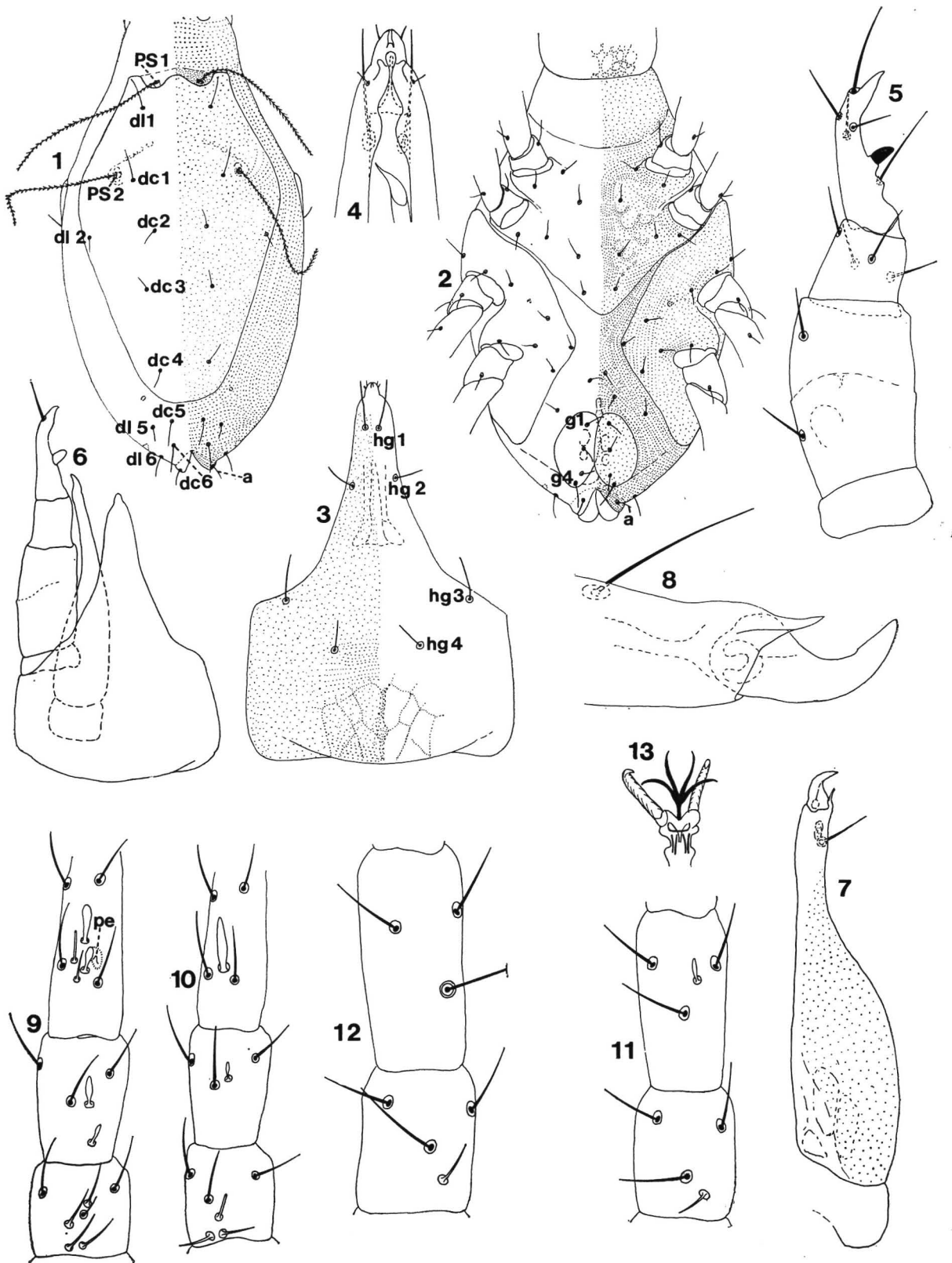
(figs. 1-35)

The most distinguishing structure of this species is the strongly developed tubercle on the palptibiotarsus. When compared with the other species of this genus the gnathosoma is relatively short and broad. The closest related species is *Coleoscirus mexicanus* (Baker & Hoffmann, 1948) because it also possesses a large tubercle ; it differs from *C. tuberculatus*, however, in bearing setae dl 5 on the dorsal plate. The natural body colour is orange-yellow. The natural form is nearly diamond-shaped. The eyes occur as red spots with a gleamy appearance on a line between PS 1 and PS 2 ; they are subcuticular.

FEMALE (figs. 1-22).

Dimensions. Idiosoma : length 390-464 μm ; breadth, 242-282 μm ; length of hypognathum, 169-180 μm ; length of palp, 157-169 μm ; length of chelicera, 153-165 μm ; length of legs : I, 262-285 μm ; II, 262-281 μm ; III, 293-315 μm ; IV, 320-360 μm .

Dorsum. (figs. 1 a-c & 14). The main portion of the dorsum is covered by the dorsal plate. The surface of this plate bears randomly distributed papillae but posteriorly to PS2 these papillae form rows on the lateral edges. This plate bears all the dorsal setae except setae dl 5, dl 6, dc 5 and dc 6 which occur on the integument of the hysterosoma. Setae dc 5 and dc 6 equal setae dl 1 and dc 1 in length (fig. 1a). The propodosomal setae are relatively longer than the hysterosomal setae situated on the plate. External indications of eyes are lacking. The setose sensillae are approximately equal in length (fig. 1 b & c). The integument around the dorsal plate is provided with papillae-bearing striae (fig. 14). The dorsolateral edges of coxae III, which form the prominent shoulders, are sometimes visible in the dorsal view. A pair of cupules occur in the integument near the posterolateral edge of the dorsal shield.



FIGS. 1-13 : *Coleoscyrus tuberculatus* spec. nov., female. 1) Dorsum ; 2) Venter ; 3) Hypognathum, ventral ; 4) Entomalae ; 5) Palp ; 6) Gnathosoma ; 7) Chelicera ; 8) Chela ; 9) Leg I ; 10) Leg II ; 11) Leg III ; 12) Leg IV ; 13) Ambulacrum.

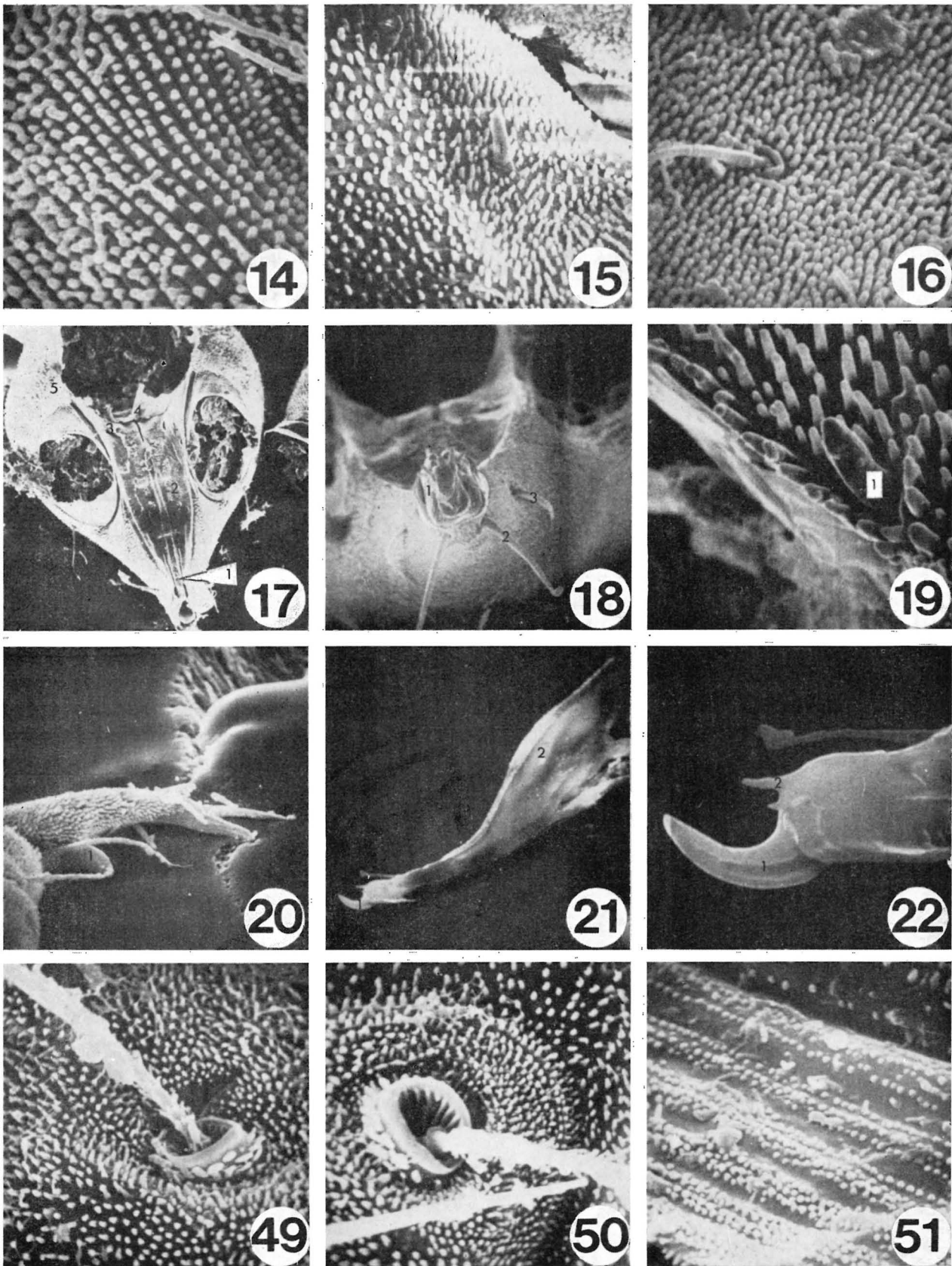
Venter (figs. 2, 15 & 16). The sternal plate is lightly sclerotized and covers the propodosoma. Coxae I and II are delimited by internal apodemes. This plate bears the normal eight pairs of setae, viz. three tactile setae on each coxa, a pair of propodogastral setae on the postero-median part and a pair of peg-like setae on coxae I dorsal to the leg attachment (fig. 15). The sternal plate is provided with subcuticular sculpturings (fig. 2) and external papillae (fig. 16) forming rows on the coxal edges and the median region. Coxae III and IV of each side are fused by means of a lightly sclerotised shield, thus forming two ventrolateral plates. Coxae III form prominent shoulders and in front of the them sejugal grooves. The coxae mentioned are incompletely demarcated by internal apodemes. The hysterosomal coxal plates reach so far medially that each includes two hystergastral setae. Each of these plates bears eight setae, viz. three setae on each coxa and the hystergastral setae already mentioned. The coxal plates are elongated posteriorly to legs IV. The genital plates are provided with randomly placed papillae and four pairs of genital setae of which setae g 4 are the longest. The integument laterally to and in front of the genital region bears from two to four pairs, but never more than five pairs, of hystergastral setae, i.e. the total number of these setae never exceed nine but usually vary between six and eight. The anal region possesses only two pairs of anal setae; para-anal setae are lacking. Cupules occur laterally to setae dl 6. The integument is provided with papillae-bearing striae.

Gnathosoma (figs. 3-8 & 17-22). The hypognathum (figs. 3, 17 & 18) is approximately 1,5 times longer than broad. Its chaetotaxy is normal for the genus, i.e. four pairs of hypognathal (hg) setae and two pairs of small setae on the entomalae (figs. 4 & 18). On the dorsal edge, close to the trochanters of the chelicerae, a pair of peg-like setae occur (fig. 19). The whole external surface of the hypognathum is provided with papillae reaching to the entomalae (figs. 3 & 17). The proximoventral region of the coxal part of the hypognathum is supplied with subcuticular ridges. The labrum-epipharynx is well developed (figs. 4 & 17).

The palp (figs. 5 & 20) and its chaetotaxy is typical of the genus. It projects with almost the length of the tibiotarsus past the apex of the hypostome (fig. 6). Characteristic of the palp is its strongly developed tubercle on the ventral aspect of the tibiotarsus. (figs. 5 & 20). The terminal claw has up to three very small processes on its apex. The whole palp is supplied with papillae.

The chelicerae (figs. 7 & 21) are three-jointed. The trochanter and segment II are dorsally supplied with papillae. The terminal movable digit (figs. 8 & 22) is partly covered by a dorsal double-pointed projection of segment II. A dorsolateral cheliceral seta is present on the subterminal portion of segment II.

Legs (fig. 9-13). All the legs are shorter than the idiosoma. The legs are slender and become gradually narrower distally where the tarsi end in the ambulacra. All femora are completely divided by articulation facets but ventral arthrodial membranes, as they occur in other articulation facets, are lacking. Ambulacral claws are rippled (fig. 13). All leg segments are provided with papillae. The leg chaetotaxy is as follows (figs. 9-12): coxae I-IV, 3 sts, 1 pe — 3 sts — 3 sts — 3 sts; trochanters I-IV, 1-1-2-1 sts; femora I-IV, $\frac{5}{5}$ - $\frac{6}{5}$ - $\frac{4}{4}$ - $\frac{2}{3}$ sts; genua I-IV, 4 asl, 5 sts — 1 bsl, 2 asl, 5 sts — 1 asl, 5 sts — 1 asl, 5 sts; tibia I-IV, 2 bsl, 5 sts — 1 bsl, 5 sts — 1 bsl, 5 sts — 1 T, 4 sts; tarsi I-IV, 4 bsl, 1 pe, 1 dt, 2 tsl, 21 sts — 1 bsl, 1 dt, 1 tsl, 22 sts — 1 tsl, 21 sts — 21 (20) sts.



FIGS. 14-22 : *Coleosceirus tuberculatus* spec. nov., female. 14) Interscutal striae ($\times 2\,550$); 15) Peg-like seta (1) on coxa I ($\times 2\,375$); 16) Papillae on coxae I & II ($\times 2\,850$); 17) Hypognathum with labrum-epipharynx (1), subchelicerar membrane (2), opening of podocephalic canal (3), opening to tracheae (4) and dorsal edge (5) ($\times 450$); 18) Hypostome *en face* with entomalae (1), setae hg 1 (2) and hg 2 (3) ($\times 1\,050$); 19) Peg-like seta (1) on dorsal edge of hypognathum ($\times 5\,125$); 20) Palp tibiotarsus with tubercle (1) ($\times 925$); 21) Chelicera with chela (1) and segment II (2) ($\times 425$); 22) Chela with movable digit (1) and membranous projection (2) ($\times 2\,450$).

FIGS. 49-51 : *Coleosceirus magdalenae* spec. nov., female. 49) Sensilla PS 1 ($\times 2\,500$); 50) Sensilla PS 2 ($\times 2\,950$); 51) Integument behind gnathosoma, dorsal ($\times 2\,850$).

MALE (figs. 23-28).

Dimensions. Idiosoma : length, 245-275 μm ; width, 154-188 μm ; length of hypognathum, 110-123 μm ; length of palp, 100-118 μm ; length of chelicera, 106-115 μm ; length of legs : I, 199-219 μm ; II, 188-211 μm ; III, 206-227 μm ; IV, 218-242 μm .

Dorsum (fig. 23). The dorsum differs from that of the female in that three clearly demarcated dorsal shields are present, viz. a large anterior plate and behind it two smaller plates. The anterior plate bears the full number of propodosomal setae as well as hysterosomal setae dl 2 and dc 2-4. The next plate bears pairs of setae dl 5 and dc 5 of which the former are the longest. The posterior plate bears setae dc 6, which are of approximately equal length to setae dl 1 and dc 1. Setae dl 6 occur laterally to the ventral part of the anal valves (fig. 23). External eyes are lacking. The plates are provided with papillae which form rows on the two posterior platelets and the edges of the anterior plate. Subcuticular sculpturings occur on the anterior plate. The integument bears no setae but is composed of papillae-bearing striae. Shoulders are prominent.

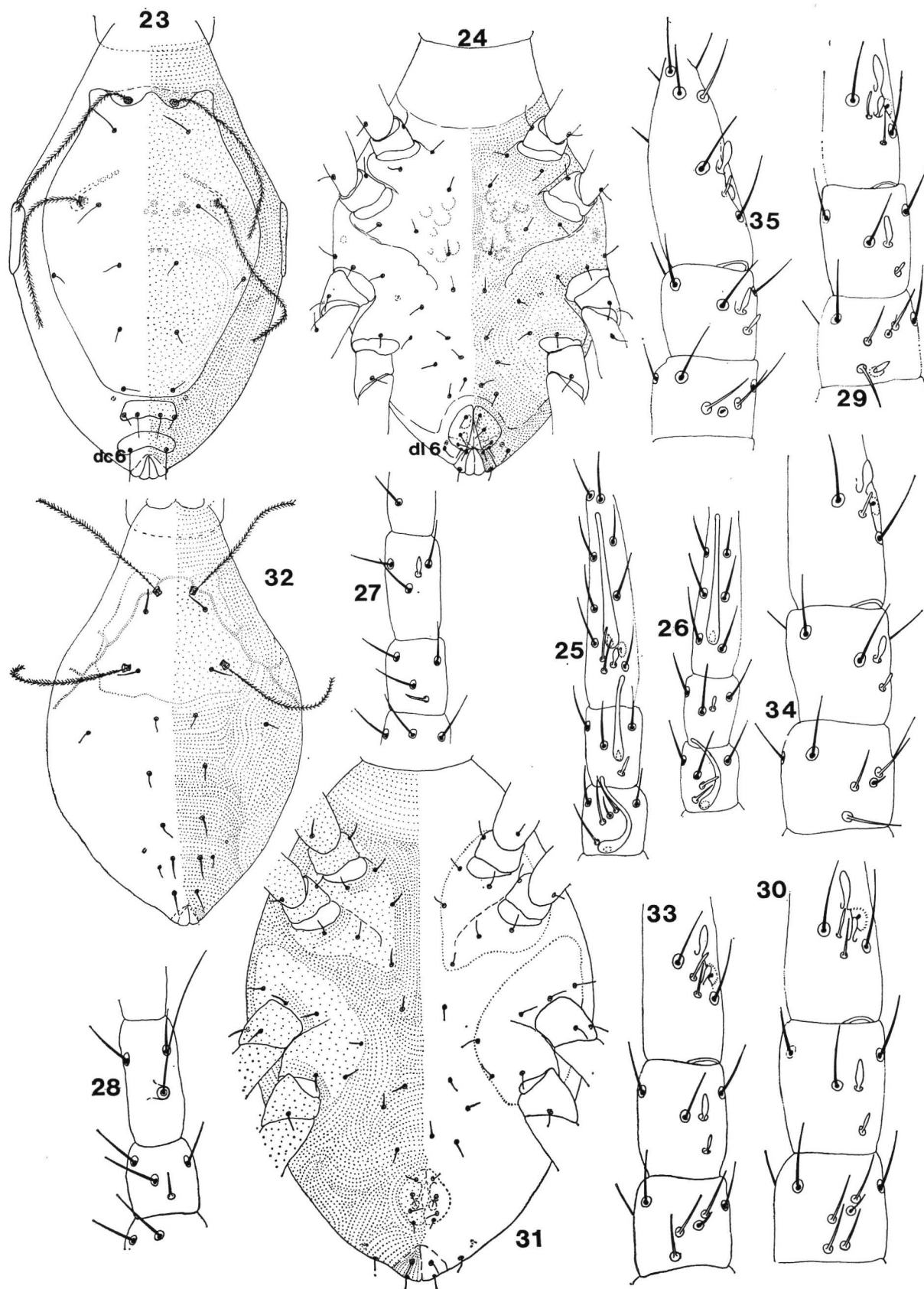
Venter (fig. 24). Except for the area behind the gnathosoma and the small strip of integument around the genital plates, the venter is covered by a complete ventral shield which is fused with the coxae. Laterally this plate reaches so far dorsally that it can be observed in the dorsal view (fig. 24). This plate bears the coxal setae, one pair of propodogastral setae as well as 8 (7-9) hystergastral setae. Two strongly developed subcuticular ridges run from the lateral edge of coxae II diagonally backwards to the vicinity of the ventral hysterosomal setae. This ridge is associated with the presence of the sejugal groove which is formed by the anterior part of coxae III producing the prominent shoulders. Subcuticular sculpturings are present mainly on the propodosomal region. Papillae are arranged in rows of varying lengths in the coxal regions and on the posterior and anterior edges. The genital plates are considerably smaller than those of the female ; each bears four setae and the integumentary papillae form rows on the outside edges. The anal region is similar to that of the female.

Gnathosoma. As in the female.

Legs (figs. 25-28). Except for the chaetotaxy all features of the legs of the female are applicable to those of the male. The differences in form of the solenidia are shown in figs. 25 & 26. The difference in the chaetotaxy is as follows (complete chaetotaxy for leg segments where differences occur) (figs. 25-28) : femur I, $\frac{5 \text{ (4)}}{5}$ sts ; genua I-II, 3 asl, 1 bsl, 5 sts-2 bsl, 1 asl, 5 sts ; tarsus IV, 21 sts.

TRITONYMPH (figs. 29-31)

Dimensions. Idiosoma : length 257-433 μm ; width, 198-256 μm . The tritonymphs resemble the females regarding the gnathosoma, anal region and general form of the legs except for the chaetotaxy. The dorsum is provided with a weakly sclerotised propodosomal plate and an ecdysis line (fig. 31) reaching to coxae III but the chaetotaxy is similar to that of the female or male. Shoulders are not prominent. The coxae are divided into four groups of two each (fig. 31). The genital valves are considerably smaller than those of the female but each bears



FIGS. 23-35 : *Coleoscyrus tuberculatus* spec. nov. 23) Dorsum, male ; 24) Venter, male ; 25) Leg I, male ; 26) Leg II, male ; 27) Leg III, male ; 28) Leg IV, male ; 29) Leg I, " male-like " tritonymph ; 30) Leg I, " female-like " tritonymph ; 31) Venter, tritonymph ; 32) Dorsum, deutonymph ; 33) Leg I, deutonymph ; 34) Leg I, protonymph ; 35) Leg I, larva.

four setae and cover two unequal genital papillae. The hystergastral setae amount to 8 (7-8) in number. The chaetotaxy of the legs (figs. 29 & 30) differs from that of the female only as follows : femora I-IV, $\frac{4}{5} - \frac{6}{5} - \frac{4}{4} - \frac{0}{3}$ sts ; genu II, 1 asl, 1bsl, 5 sts ; tarsi I-IV, 4 bsl, 1 pe, 1 dt, 2 tsl, 17 sts-1 bsl, 1 dt, 1 tsl, 18 sts-1 tsl, 19 (18) sts-17 sts. The femora are completely divided. Concerning the leg chaetotaxy two types of tritonymphs have been observed. These differences are shown in figs. 29 & 30. It is my opinion that sexual difference (dimorphism) is shown by these tritonymphs. This phenomenon is also observed in tritonymphs and deutonymphs of an undescribed species of *Neocunaxoides* Smiley from the Ethiopian region (Den Heyer, unpublished data).

DEUTONYMPH (figs. 32 & 33)

Dimensions. Idiosoma : length, 242-353 μm ; width, 164-238 μm . The body of the deutonymph is shorter than that of the tritonymph. The dorsal chaetotaxy, ecdysis line (fig. 32) and propodosomal region resembles that of the tritonymph. The venter differs from that of the tritonymph in the presence of only four hystergastral setae and three pairs of genital setae. The gnathosoma is similar to that of the female or tritonymph except that the ventral tubercle is relatively smaller and that the gnathosoma is considerably less sclerotised. Except for the specific differences in the leg chaetotaxy (fig. 33) and the lesser degree of division of the femora the legs are similar to those of the tritonymph. The leg chaetotaxy differs from that of the tritonymph as follows : femora I-IV, $\frac{2}{5} - \frac{2}{5} - \frac{1}{4} - \frac{0}{3}$ sts ; genua I-II, 3 asl, 5 sts-1 bsl, 5 sts ; tarsi I-IV, 4 bsl, 1 pe, 1 dt, 2 tsl, 13 sts-1 bsl, 1 dt, 1 tsl, 14 sts-1 tsl, 15 sts. 13 sts.

PROTONYMPH (fig. 34)

Dimensions. Idiosoma : length, 246-300 μm ; width, 181-212 μm . The protonymph can be distinguished from the other nymphal stages by the presence of only one pair of genital papillae, two hystergastral setae, one pair of genital setae on very small genital valves, as well as by variation in size. The femora possess only ventral folds as the onset of the division process. The leg chaetotaxy differs from that of the deutonymph as follows (fig. 34) : coxae I-IV, 3 sts, 1 pe-2 sts-3 sts-1 sts ; trochanters, I-IV, 1-1-2-0 sts ; femora I-IV, 7-7-5-0 sts ; tibia IV, 0 ; tarsi I-IV, 2 bsl, 1 pe, 1 dt, 2 tsl, 13 sts-1 bsl, 1 dt, 1 tsl, 14 sts-1 tsl, 15 sts-7 sts.

LARVA (fig. 35)

Dimensions. Idiosoma : length, 188-241 μm ; width, 150-173 μm . The larva possesses three pairs of legs, a complete dorsal chaetotaxy and a propodosomal plate. Hystergastral setae lacking. The chaetotaxy of the legs is as follows (fig. 35) : coxae I-III, 3 sts, 1 pe-2 sts-1 sts ; trochanters I-III, 0-0-1 sts ; femora I-III, 7-7-5 sts ; genua I-III, 2 asl, 4 sts, 1 ms-1 bsl, 4 sts, 1 ms-1 asl, 4 sts ; tibiae I-III, 2 bsl, 5 sts-1 bsl, 5 sts -1bsl, 5 sts ; tarsi I-III, 2 bsl, 1 disc, 2 tsl, 12 sts-1 bsl, 1 tsl, 13 sts-1 tsl, 13 sts.

MATERIAL STUDIED

♀ — Holotype, 20 ♀ — paratypes, 7 ♂ — paratypes, 5 tritonymph paratypes (2 with male and 3 with female features) from soil and grass (*Panicum maximum*), campus of University of the North, Sovenga, N. Transvaal, South Africa, 5.v.1971, J. Den Heyer ;

1 ♂ — paratype from soil, Malelane district, E. Tvl., 4.x.1971, J. Den Heyer ;

1 ♀ — paratype from decaying carnation plants (*Dianthus caryophyllus*), Roodeplaat, Tvl., 11.vii.1969, T. J. Coates ;

1 ♀ — paratype collected from debris of mixed flora, campus of University of the North, Sovenga, N. Tvl., 9.iv.1971, J. Den Heyer ;

29 ♀ — paratypes and 1 ♂. — paratype collected from soil and grass (*Panicum maximum*), University campus, Sovenga, N. Tvl., 2.vi.1971, J. Den Heyer ;

5 ♀ — paratypes and 1 tritonymph paratype (female features) from soil under Nyala tree (*Xanthocercus zambeziaca*), Breslau farm, Limpopo bank, Soutpansberg District, N. Tvl., 16.iv.1972, C. C. Straub ;

1 deutonymph paratype on 11.x.1970 and 5 ♂ — paratypes, 3 tritonymph paratypes (2 with male and 1 with female features), 6 deutonymph paratypes, 6 protonymph paratypes, 5 larva paratypes on 20.i.1974 collected from debris under willow trees (*Salix* sp.) on bank of stream, approximately 1 km northeast of Bodenstein, W. Tvl., J. Den Heyer ;

2 ♀ — paratypes collected from debris under karee (*Rhus lancea*), 1 ♀ — paratype from debris under umbrella-thorn (*Acacia tortilis heteracantha*), 1 deutonymph paratype from debris under monkey-thorn (*Acacia galpinii*), Loskop Dam Nature Reserve, E. Tvl., 2.iii.1973, J. A. Van Huyssteen ;

2 tritonymph paratypes (1 with male, 1 with female features), 1 deutonymph paratype, 2 protonymph paratypes, collected from soil and grass, University campus, Potchefstroom, W. Tvl., 15.i.1974, J. Kruger ;

5 ♀ — paratypes, 2 ♂ — paratypes, 1 tritonymph paratype (female features), 1 protonymph paratype from gravel rich in humus along the Marquard-Winburg road, O.F.S., 20.i.1974, C. A.J. Van Rensburg.

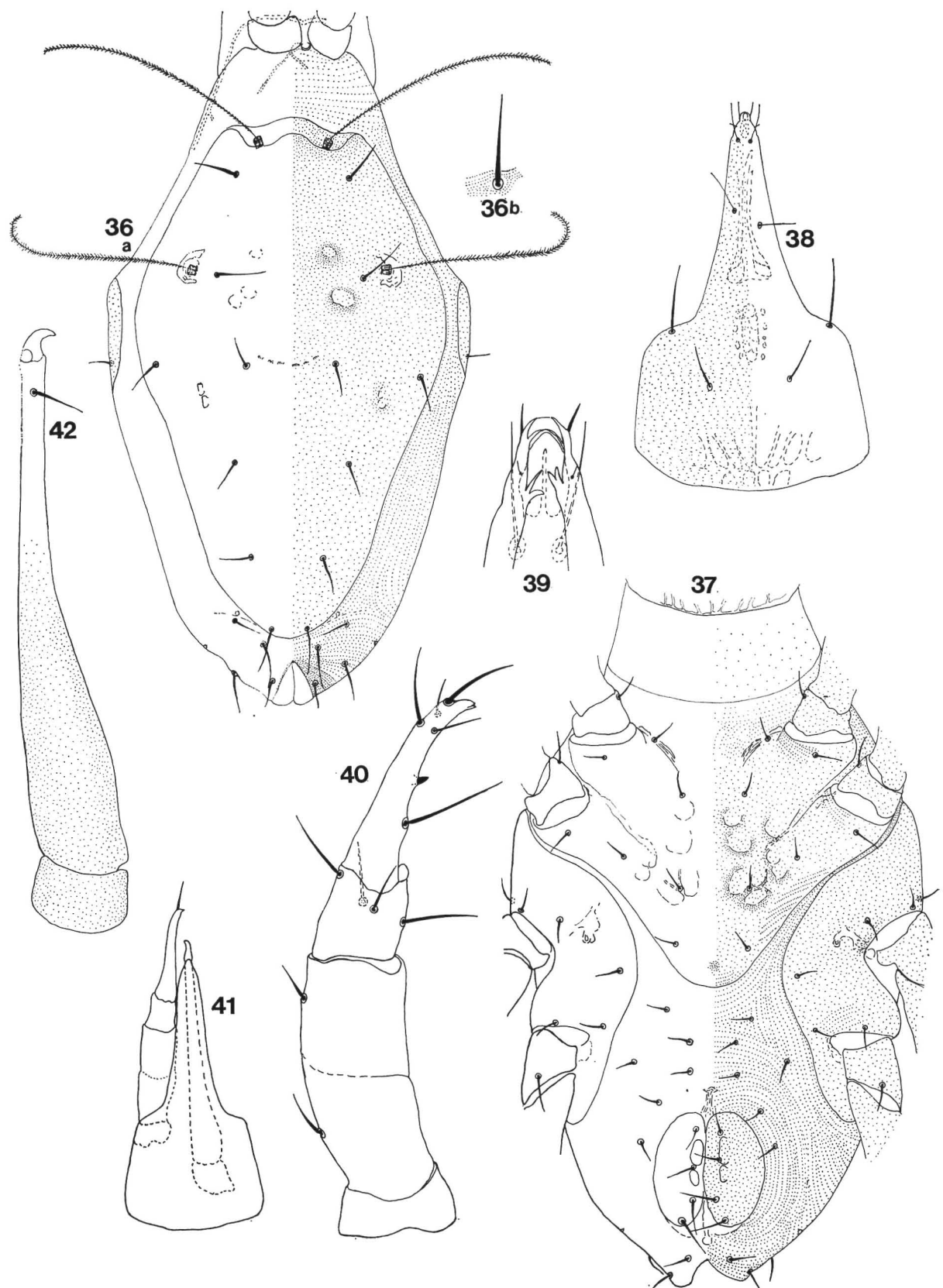
LOCATION OF MATERIAL

♀ — Holotype, 40 ♀ — paratypes, 12 ♂ — paratypes, 8 tritonymph paratypes, 5 deutonymph paratypes, 6 protonymph paratypes and 3 larva paratypes are deposited in the Acarological collection of the Institute for Zoological Research, P.U. for C.H.E., R.S.A. ; 22 ♀ — paratypes, 6 ♂ — paratypes, 5 tritonymph paratypes, 3 deutonymph paratypes, 3 protonymph paratypes and 2 larva paratypes deposited in the National collection of the Plant Protection Research Institute, Agricultural Technical Services, Pretoria, R.S.A.

***Coleoseirus magdalenae* spec. nov.**

(figs. 36-73)

This species can be distinguished from *C. tuberculatus* by the smaller tubercle on the palpal tibiotarsus while basifemur III possesses five simple tactile setae. In both sexes genu IV bears



FIGS. 36-42 : *Coleoscirus magdalenae* spec. nov., female. 36 a) Dorsum ; 36 b) Dorsal seta ; 37) Venter ; 38) Hypognathum ; 39) Entomalae ; 40) Palp ; 41) Gnathosoma ; 42) Chelicera.

two solenidia. The females have five pairs of hysterosomal setae on the dorsal plate. The natural colour of the body is pale orange to orange in the adults while the nymphal stages are of lighter colour. The gnathosoma is darker coloured but the legs possess a colour intermediate between that of the body and the gnathosoma. The body form is nearly diamond-shaped but relatively longer than that of *C. tuberculatus*. The eyes resemble those of the latter species.

FEMALE (figs. 36-61)

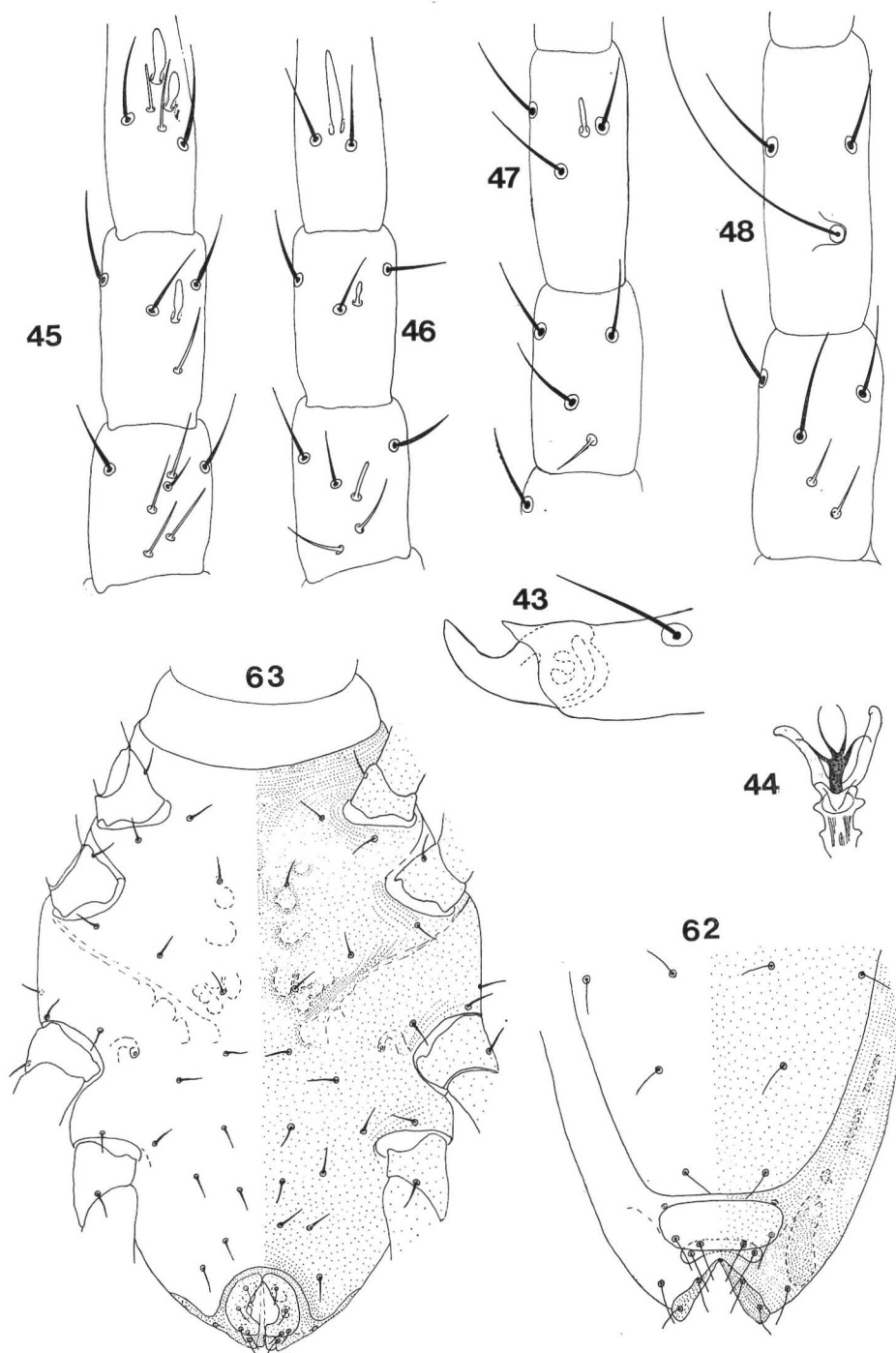
Dimensions. Idiosoma : length, 360-427 μm ; width 215-265 μm ; length of hypognathum, 183-215 μm ; length of palp, 171-192 μm ; length of chelicera, 175-197 μm ; length of legs : I, 180-303 μm ; II, 276-303 μm ; III, 307-338 μm ; IV, 323-357 μm .

Dorsum (figs. 36 a & b 49-51). The dorsal plate bears the normal setose sensillae (figs. 36 a, 49 & 50) as well as setae dl 1, dl 2 and dc 1-5. The papillae are randomly placed. Subcuticular sculpturings are present. The integument behind the gnathosoma is provided with rows of very small papillae (fig. 51) while the remaining dorsal integument possess papillae-bearing striae. Setae dl 5, dc 6 and dl 6 are borne on the integument ; the latter pair are placed laterally to the dorsal anal setae. Setae dl 1, dc 1, dc 5 and dc 6 are approximately of equal length and longer than the other simple setae. Shoulders are present. A pair of cupules are present in the normal position.

Venter (fig. 37). Except that the hystergastral setae are twelve (11-13) in number the rest of the ventral chaetotaxy is normal for the genus. Papillae on the sternal and coxal plates are mainly randomly distributed but rows are formed near the points of leg attachment and on the posterolateral margins of the sternal plate. The dorsal edges of the coxal plates may be visible in the dorsal view. A sejugal groove is present. The papillated genital plates bear four setae each of which setae g 4 are the longest. The anal region is normal for the genus. A pair of ventral para-anal setae are present. A pair of cupules occur anterolaterally to setae dl 6. The integument is provided with papillae-bearing striae (fig. 37).

Gnathosoma (figs. 38-43 & 52-54). The hypognathum (figs. 38, 52 & 53) is approximately twice as long as wide and supplied with the full number of setae ; the peg-like setae are rounded terminally (fig. 52). The entire external surface of the hypognathum, except the entomalae (fig. 39), is provided with papillae ; on the posteroventral edge the papillae may form rows. The labrum-epipharynx is well developed and fused proximally with the subcheliceral membrane (fig. 53). The palp (fig. 40) extends with approximately half the length of the tibiotarsus past the entomalae (figs. 41 & 54). Subcuticular sculpturings occur dorsally on segments II and III. All palp segments are provided with papillae (fig. 54). The palp chaetotaxy is typical of the genus. The tubercle on the tibiotarsus is cone-shaped with a rounded apex (fig. 54). The terminal claw may possess two or three very small processess formed by anterodorsal grooves. The chelicerae (fig. 42) are typical of the genus. The entire trochanter (I) and approximately 2/3 of the length of segment II are dorsally provided with papillae. A cheliceral seta occurs dorso-laterally behind the chela (fig. 43).

Legs (figs. 44-48 & 55-61). The legs are shorter than the idiosoma. The femora are completely divided by articulation facets. The legs are slender ; the tarsi end rather sharply in the



FIGS, 43-48, 62 & 63 : *Coleoscirus magdalenae* spec. nov. 43) Chela, female ; 44) Ambulacrum, female ; 45) Leg I, female ; 46) Leg II, female ; 47) Leg III, female ; 48) Leg IV, female ; 62) Dorsum, posterior part, male ; 63) Venter, male.

ambulacrum (figs. 44 & 55). The leg chaetotaxy is as follows (figs. 45-48 & 56-61) : coxae I-IV, 3 sts, 1 pe-3 sts-3 sts-3 sts ; trochanters I-IV, 1-1-2-1 sts ; femora I-IV, $\frac{5}{5} - \frac{6}{5} - \frac{5}{4} - \frac{2}{3}$ sts ; genua I-IV, 4 asl, 5 sts-2 asl, 1 bsl, 5 sts-1 asl, 5 sts-2 asl, 5 sts ; tibiae I-IV, 1 asl, 1 bsl, 5 sts-1 bsl, 5 sts-1 bsl, 5 sts-1 T, 4 sts ; tarsi I-IV, 1 pe, 4 bsl, 1 dt, 2 tsl, 21 (20) sts-1 bsl, 1 dt, 1 tsl, 22 (21) sts-1 tsl, 21 (20) sts-21 sts.

MALE (figs. 62-69)

Dimensions. Idiosoma : length 253-300 μm ; width, 168-200 μm ; length of hypognathum, 146-158 μm ; length of palp, 129-157 μm ; length of chelicera, 119-151 μm ; length of legs : I, 188-238 μm ; III, 196-223 μm ; III, 226-235 μm ; IV, 242-250 μm .

Dorsum (fig. 62). It differs considerably from that of the female. The two anterior plates are well sclerotised but the posterior one is weakly sclerotised. The anterior plate bears the setose sensillae and setae dl 1, dl 2 and dc 1-4. The smaller plate behind the large one (fig. 62) bears setae dl 5 and dc 5 while the posterior plate bears setae dc 6 ; this platelet is more sclerotised laterally and may appear as two separate platelets, each bearing a seta dc 6. Setae dl 6 occur laterally to the anal valves. Dark blotches occur in the integument laterally to the dorsal plates.

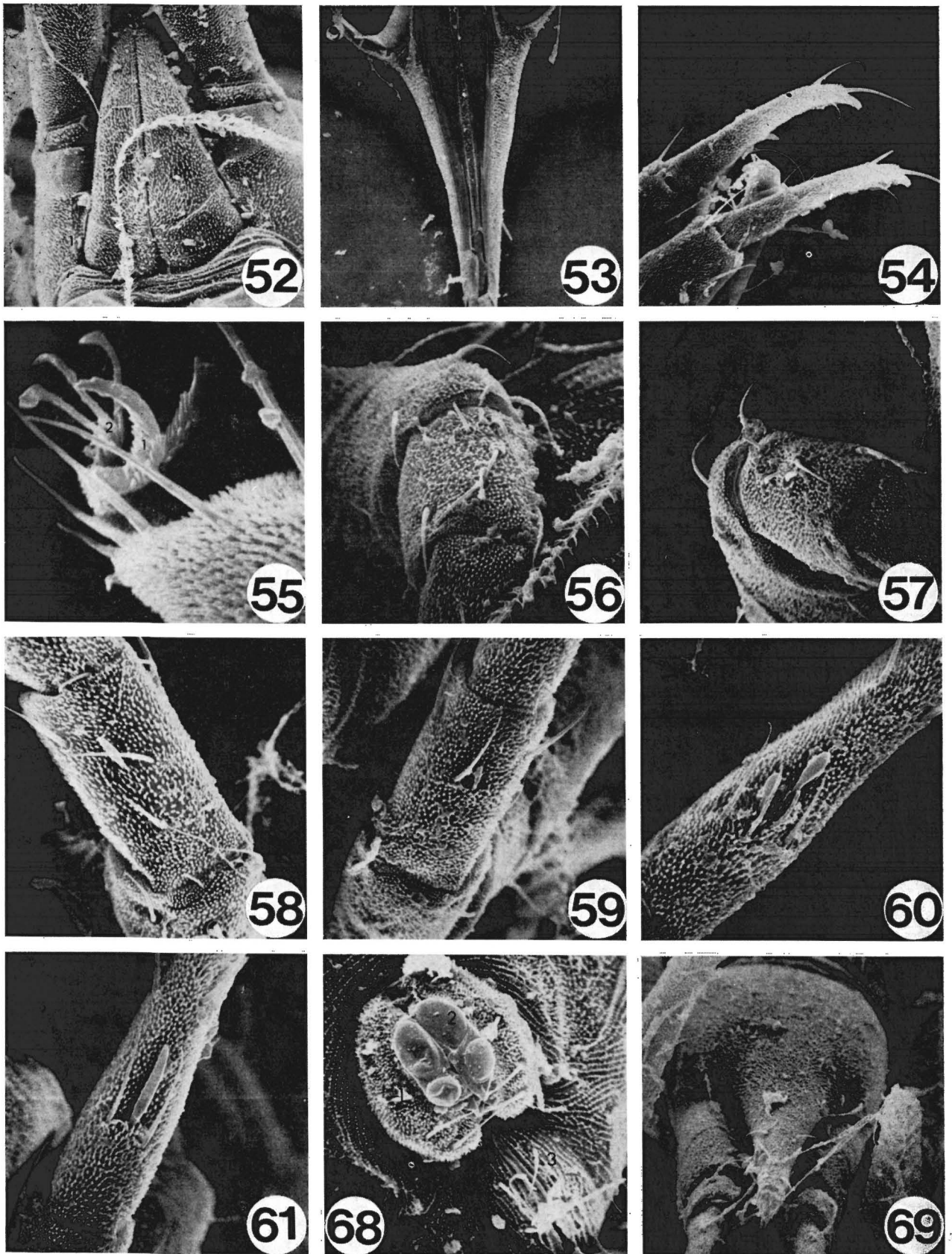
Venter (figs. 63 & 68). Except for the integument behind the gnathosoma and a very narrow strip around the genital valves, the whole venter is covered by a plate which bears all the ventral setae except the genital setae (fig. 63). The hysterogastral setae are 11 (10-13) in number ; the remaining chaetotaxy is typical of the genus. Coxae II and III are separated by a sclerotised ridge in the ventral plate in the position of the sejugal groove. Subcuticular sculpturings occur on this plate. The genital valves are relatively smaller than those of the female (fig. 68). Two pairs of anal and one pair of para-anal setae occur in the anal region ; the latter setae are placed almost on the edge of the anal valves.

Gnathosoma. This (fig. 69) resembles that of the female.

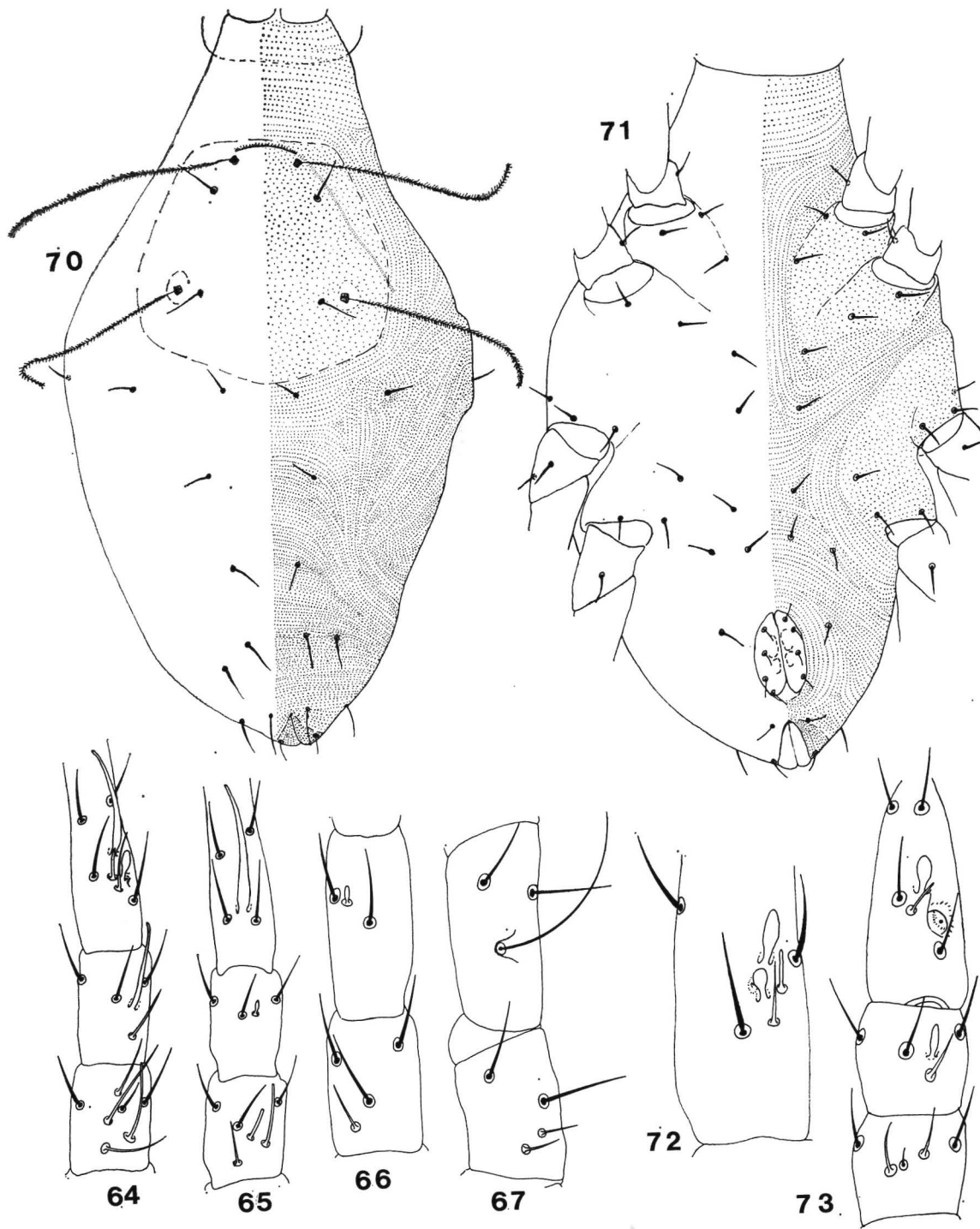
Legs (figs. 64-67). Generally the legs resemble those of the female but differ in chaetotaxy as follows (figs. 64-67) : genua I-II, 1 bsl, 3 asl, 5 sts-2 asl, 1 bsl, 5 sts ; the differences in the forms of solenidia are indicated in the figures mentioned.

TRITONYMPH (figs. 70-72)

Dimensions. Idiosoma : length, 457-469 μm ; width, 268-274 μm . This stage largely resembles the female. The dorsum (fig. 70), however, is provided with a propodosomal plate only with the ecdysis line. The dorsal chaetotaxy is as in the adults. The ventral coxae are not clearly demarcated. Eight (7-8) hysterogastral setae are present (fig. 71). The smaller genital valves bear four genital setae each. The gnathosoma and legs resemble those of the female ; the chaetotaxy of the latter differs as follows : femora I-IV, $\frac{4}{5} - \frac{6}{5} - \frac{4}{4} - \frac{0}{3}$ sts ; genu II, 1 asl, 1 bsl, 5 sts ; tarsi I-IV, 1 pe, 1 asl, 3 bsl, 1 dt, 2 tsl, 17 sts-1 bsl, 1 dt, 1 tsl, 19 sts-1 tsl, 17 sts-17 sts. The solenidia on tarsi I are more spherically shaped (fig. 72). The femora are divided.



FIGS. 52-61, 68 & 69): *Coleoscius magdalenae* spec. nov. 52) Gnathosoma, dorsal, with peg-like seta (1), female ($\times 575$); 53) Hypostome with labrum-epipharynx (1) and subcheliceral membrane (2), female ($\times 540$); 54) Anterior part of gnathosoma, female ($\times 575$); 55) Ambulacrum with rippled claw (1) and empodium (2), female ($\times 2\,800$); 56) Genu I, female ($\times 1\,200$); 57) Genu II, female ($\times 1\,175$); 58) Tibia I, female ($\times 2\,225$); 59) Tibia II, female ($\times 1\,175$); 60) Tarsus I, female ($\times 2\,225$); 61) Tarsus II, female ($\times 1\,175$); 68) Genital region with genital valves (1), genital papillae (2) and anal valves (3), male ($\times 1\,175$); 69) Gnathosoma, ventral, male ($\times 612$).



FIGS. 64-67 & 70-73 : *Coleoscyrus magdalenae* spec. nov. 64) Leg I, male; 65) Leg II, male; 66) Leg III, male; 67) Leg IV, male; 70) Dorsum, tritonymph; 71) Venter, tritonymph; 72) Tarsus I, tritonymph; 73) Leg I, larva.

LARVA (fig. 73)

Dimensions. Idiosoma : length, 246-284 μm ; width, 161-199 μm . The dorsum is provided with a weakly sclerotised papillae-bearing propodosomal plate. The dorsal chaetotaxy is similar to that of the adults. The ventral coxae are divided into two anterior groups of two each and two posterior coxae, one on each side. Genital opening with associated structures and hystergastral setae are lacking. The gnathosoma resembles that of the adults but setae hg 3 and 4 are absent. The leg chaetotaxy is as follows (fig. 73) : coxae I-III, 3 sts, 1 pe-2 sts-1 sts ; trochanters I-III, 0-0-1 sts ; femora I-III, 7-7-5 sts ; genua I-III, 2 asl, 5 sts-1 bsl, 5 sts-1 asl, 4 sts ; tibiae I-III, 1 bsl, 1 asl, 5 sts-1 bsl, 5 sts-1 bsl, 5 sts ; tarsi I-III, 1 pe (fig. 73), 2 bsl, 2 tsl, 14 sts-1 bsl, 1 tsl, 14 sts-1 tsl, 13 sts. On tarsus I the peg-like seta is disc-like.

MATERIAL EXAMINED

♀ — Holotype, 27 ♀ — paratypes, 1 ♂ — paratype, 3 tritonymph paratypes collected from compost and soil, Coligny, W. Transvaal, South Africa, 19.vii.1970, J. Den Heyer ;

1 ♂ — paratype from plant debris under apricot tree (*Prunus armeniaca*), Coligny, 12.vii.1970, J. Den Heyer ;

2 ♀ — paratypes from compost of garden debris, Pietersburg, N. Transvaal, 4.viii.1970, J. Den Heyer ;

1 ♀ — paratype on 13.ix.1970 and 1 ♀ — paratype on 12.x.1970 from leaves and soil under *Citrus* sp., Pietersburg, J. Den Heyer ;

1 ♀ — paratype from leaves under *Dombeya rotundifolia*, campus of the University of the North, Sovenga, N. Transvaal, 14.xi.1970, J. Den Heyer ;

1 ♀ — paratype from soil under Nyala tree (*Xanthocercus zambeziaca*) on Limpopo bank, Breslau, Soutpansberg District, N. Transvaal, 19.iv.1972, C. C. Straub ;

1 ♀ — paratype from untreated soil with bulbs, Strubens Valley, June 1963, M. K. P. Meyer ;

1 tritonymph paratype from soil on campus of Potchefstroom University, W. Transvaal, 4.xii.1969, P. D. Theron ;

1 ♀ — paratype from soil and Kikuyu grass, campus of Potchefstroom University, 15.i.1974, P. D. Theron ;

2 ♀ — paratypes, 2 ♂ — paratypes and 3 larva paratypes from compost, campus of Potchefstroom University, during 1965, C. A. J. Van Rensburg.

LOCATION OF MATERIAL

♀ — Holotype, 24 ♀ — paratypes, 3 ♂ — paratypes, 3 tritonymph paratypes and 2 larva paratypes deposited in the mite collection of the Institute for Zoological Research Potchefstroom University, R.S.A. ; 13 ♀ — paratypes, 1 ♂ — paratype, 1 tritonymph paratype, 1 larva paratype deposited in the National Collection of the Plant Protection Research Institute, Agricultural Technical Services, Pretoria, R.S.A.

REMARK : This species is named for Dr. Magdalena K. P. MEYER.

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