A TAXONOMIC STUDY OF THE FAMILY PHYTOSEIIDAE (ACARI) IN SOUTH AFRICA WITH CONTRIBUTIONS TO THE BIOLOGY OF TWO SPECIES

by

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C O N T E N T S.

h. SUBGENUS/.....

PART II. CONTRIBUTIONS TO THE BIOLOGY OF TWO SPECIES

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ABSTRACT

The taxonomic part of this study comprises a general review of the classification, external morphology and distribution of the predacious family Phytoseiidae in South Africa.

Five genera and 32 subgenera are recognized in the family. Three of these genera and 13 subgenera are now known from South Africa. The subgenera include the two new subgenera Bawus and Meyerius. The following 56 new species are described: Typhlodromus (Seiulus) acanthus, T.(S.) neosentus, T. (Amblydromella) capparidis, T.(A.) muliebris, T.(A.) apoxys, T.(A.) microbullatus, T.(A.) incisivus, T.(A.) februs, T.(A.) saevus, T.(A.) terrulentis, T.(A.) bullatus, T.(A.) paganus, T.(A.) vescus, T.(A.) crassus, T.(A.) praeacutus, T.(A.) buccalis, T.(A.) rasilis, T.(Paraseiulus) prunusus, T.(Meyerius) latus, T.(M.) veretillum, T.(M.) liliaceus, T.(M.) maritimus, T.(M.) zantedeschiae, T.(M.) citimus, T.(M.) incisus, T.(M.) agrostidis, T.(M.) egregius, T.(M.) chaetopus, T.(M.) immutatus, T.(M.) convallus, T.(M.) collativus, Amblyseius (Amblyseius) pascuus, A.(A.) peltatus, A.(A.) apheles, A.(A.) eurynotus, A.(A.) chilosus, A.(A.) scapilatus, A.(A.) exiguus, A.(A.) krugeri, A.(A.) culmulus, A.(A.) insignitus, A.(A.) usitatus, A.(A.) vanderlindei, A.(A.) macrosetosus, A.(A.) rhusi, A.(A.) munsteriensis, A.(A.) natalensis, A.(A.) plebeius, A.(A.) pafuriensis, A.(A.) prolixus, A.(A.) ovalitectus, A.(A.) neolargoensis, A.(A.) anomalus, A. (Proprioseiopsis) papayana, A. (Proprioseius) altusus and A.(P.) reburrus.

The following previously known species are recorded from South Africa for the first time:

Typhlodromus/.....

Typhlodromus (Amblydromella) jackmickleyi (De Leon), T. (Typhlodromus) magdalenae Pritchard & Baker, T.(Phytoseius) amba (Pritchard & Baker), Amblyseius (Amblyseius) largoensis (Muma), A.(A.) teke Pritchard & Baker, A.(A.) tutsi Pritchard & Baker, A. (Paraphytoseius) horrifer (Pritchard & Baker) and A. (Mesoseiulus) longipes (Evans).

Keys to the genera and subgenera of the world are given, together with keys to the species now known from South Africa. Species previously recorded from South Africa are: Typhlodromus (Amblydromella) transvaalensis (Nesbitt), Iphiseius (Iphiseius) degenerans (Berlese), Amblyseius (Amblyseius) grabouwensis (v.d. Merwe & Ryke), A.(A.) aferulus (Chant), A.(A.) rubicolus (v.d. Merwe & Ryke), A. (A.) transvaalensis (v.d. Merwe & Ryke), A.(A.) raptor (v.d. Merwe & Ryke). A.(A.) anneckei (v.d. Merwe & Ryke), A.(A.) citri (v.d. Merwe & Ryke), A.(A.) addoensis (v.d. Merwe & Ryke), A.(A.) undulatus (v.d. Merwe & Ryke), A.(A.) capensis (v.d. Merwe & Ryke), A.(A.) erugatus (v.d. Merwe & Ryke) and A.(Asperoseius) africanus (Chant).

In Part II a survey of the literature pertaining to the predacious relationships existing between the phytoseiids and phytophagous mites is given. The techniques for mass rearing and individual rearing of predacious mites are discussed.

The developmental stages, longevity at varying temperature and humidity and the food preferances of two species, Amblyseius (Amblyseius) tutsi Pritchard & Baker and A. (Mesoseiulus) longipes (Evans) are given.

PART I : A TAXONOMIC STUDY OF THE FAMILY PHYTOSEIIDAE IN SOUTH AFRICA

1. INTRODUCTION

The Phytoseiidae are usually lightly sclerotized relatively fast moving mites found in association with Tetranychidae, Tenuipalpidae, Eriophyidae and other phytophagous mites. They are predacious on the eggs, larval stages and adults of these injurious mites, some of which have become major pests in orchards all over the world. During recent years the Phytoseiidae have received attention in field studies following studies on their taxonomy by Garman (1948), Nesbitt (1951), Evans (1953-1963), Chant (1955-1965), Athias-Henriot (1957a-1962), De Leon (1957-1965), Ehara (1958-1962), Múma (1955-1963), Wainstein (1958-1962), Pritchard & Baker (1962) and others.

Nesbitt (1951) gives a survey of the literature pertaining to the predacious relationships existing between the Phytoseiidae and the phytophagous Tetranychidae prior to this date. A survey of the more recent literature dealing with biological control of plant parasitic mites by means of predacious mites reveals that these investigations are being carried out in different parts of the world, especially the U.S.A., Canada, England, Germany and Japan.

It is now generally accepted that the application of insecticides and fungicides has made orchards highly susceptible to certain mite and insect pests (Garman, 1961). The abundant increase in phytophagous mite populations and their expensive control by acaricides initiated and stimulated research on the biological control of these pests. These studies were reported on by Lord (1949),

Herbert (1953, 1956), Hantsbarger & O'Neill (1954), Fleschner & Ricker (1954), Huffaker & Kennett (1953 a & b, 1956), Malcolm (1955), Berker (1955, 1958), Dosse (1955 a & b, 1957, 1958a) and others. Chant (1959 b & c, 1961), stressed the point that it is absolutely necessary to study each species in detail to be able to evaluate the capabilities of the Phytoseiidae as predators of phytophagous mites

The solution of problems in the taxonomy of the family is, however, a necessary precursor and adjunt to studies on their ecology. The present study attempts a survey of the distribution, classification and external morphology of the members of the most common predacious mite family, the Phytoseiidae, in South Africa. The author hopes that this may furnish a sound basis for subsequent research work on the ecology and possible utilisation of these mites in the biological control of phytophagous Acari.

II. MATERIALS AND TECHNIQUE

The majority of material investigated in this study was collected by P.A.J. Ryke, M.K.P. Meyer and the present author. The specimens were collected with a small brush and transferred to a vial containing 70% alcohol. In some instances the plant material was beaten over a funnel (Boudreaux, 1954) or enamelled pan and the mites removed with a fine brush. The enamelled pan was found very convenient during field collections. The few species found in soil were extracted by means of the Berlese funnel.

Different methods were utilized in clearing the specimens for critical examination. Some specimens were treated with approximately 50% lactic acid at room temperature. Adequate clearing was achieved in a day to

a week/.....

a week or more, depending on the contents of the gut, the period stored in alcohol and the species concerned. When the lactic acid was gently heated some of the fresher material or less sclerotized species tended to disintegrate. A more convenient clearing agent was found in Nesbitt's fluid: 40 gm. chloral hydrate, 2.5 c.c. hydrochloric acid and 25 c.c. distilled water. Specimens cleared adequately within a few hours in this medium.

Temporary slides were made, using hollow-ground slides, each with a single cavity. These slides proved to be satisfactory as all the specimens studied fell in the range of 250-1000 μ in length (cf. Evans & Browning, 1955). The depression in the slide was filled with Nesbitt's fluid or lactic acid of the same concentration as that in which the specimens were cleared. This was important since specimens transferred from a higher to a lower concentration (especially freshly caught specimens) often burst open, or otherwise the specimens collapsed and required some time to recover their normal body shape. The cover glass was then placed over the depression, covering approximately three quarters of it. The specimen was placed in the space left uncovered by the cover glass; it was orientated and pushed underneath the cover glass with the aid of a very fine needle or wire. The specimen was thus orientated, or removed from the slide at will. All the morphological characters, especially the lengths of the setae on the dorsum and the details of the chelicerae were in most cases studied in the same specimens. To get a clear view of the posterior margin of the sternal shield it was usually necessary to remove the body contents which emerged through the vulva. This was best done by means of a fine needle.

Permanent slides were made using polyvinyl alcohol (Turtox C.M.C. 10) or Hoyer's medium. Specimens cleared in lactic acid or Nesbitt's fluid were mounted directly in one of the mounting media. Hoyer's medium is a modification of Berlese's solution and consists of the following (mixed in this sequence): 50 c.c. distilled water, 30 gm. gum arabic, 200 gm. chloral hydrate and 20 gm. glycerin.

Specimens cleared in Nesbitt's fluid and mounted in Hoyer's medium gave very satisfactory results. The specimens permanently mounted were pressed down by the cover glass to such an extent that the setae which were to be measured were in a horizontal plane. The only drawback of this method was that the chelicerae were not always in the proper plane for examination. Since specimens invariably burst open when flattened by the cover glass, a temporary slide could not thereafter be made of it in order to examine the chelicerae.

Permanent slides were dried in a drying oven at 40°C for two days. It was found necessary to ring the edge of the cover glass with nail polish after drying. This was done in order to prevent excessive drying of the medium in dry weather conditions. Excessive drying caused the mounting medium to shrink rendering the specimens useless for examination after a time. In humid conditions a slide dried in the oven may absorb moisture, due to the hygroscopic chloral hydrate, causing the cover glass to slip and damage the specimen.

The type specimens, all permanently mounted, are deposited in the collection of the Acarology Section, Plant Protection Research Institute, Pretoria.

III. FAMILY PHYTOSEIIDAE BERLESE

Phytoseiini Berlese, 1914, Acaroth. Ital., p. 11; Berlese 1916, Redia 12:33; Pritchard & Baker, 1962, Hilgardia 33: 211; Wainstein, 1962, Acarologia 4:26; Schuster & Pritchard, 1963, Hilgardia 34: 19,279. Type genus: Phytoseius Ribaga, 1902.

Phytoseiinae Vitzthum, 1941, In Bronns Klassen und Ordnungen des Tierreichs 5(IV): 767; Garman, 1948, Bull. Conn. agric. Exp. Stn. 520: 6,10; Radford, 1950, Internatl. Union Biol. Sci. (sér C., ent.) 1: 27; Nesbitt, 1951, Zool. Verh. Leiden. 12:1; Womersley, 1954, Aust. J. Zool. 2: 169; Chant, 1959b, Can. Ent. 91 (suppl. 12): 48 (in part); Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 292 (in part); Wainstein, 1962a, Acarologia 4:26 (in part); Chant, 1965, Can. Ent. 97:359.

Phytoseiidae Baker & Wharton, 1952, An Introduction to Acarology. The Macmillan Co., p. 87; Cunliffe & Baker, 1953, Pinellas Biol. Lab. Publ. 1:1; Evans, 1957, J. Linn. Soc., Zool. 43: 223; Athias-Henriot, 1957a, Bull. Soc. Hist. nat. Afr. N. 48: 320; Chant, 1959c, Acarologia 1: 146; Chant, 1959b, Can. Ent. 91 (suppl. 12): 45; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 267; Hughes 1961, Min. Agr. Fish. Food, Tech. Bull. 9: 219; González & Schuster, 1962, Bull. Univ. Chile agric. Exp. Stn. 16:3; Pritchard & Baker, 1962, Hilgardia 33: 206; Wainstein, 1962a, Acarologia 4:5; Schuster & Pritchard, 1963, Hilgardia 34: 199; Muma, 1963a, Fla Ent. 46: 11; van der Merwe & Ryke, 1963, J. ent. Soc. sth. Afr. 26: 82; Westerboer & Bernhard,/.....

Bernhard, 1963, In Beiträge zur Systematik und Ökologie Mitteleuropäisher Acarina Band II, Acad. Verlags., Leipzig: 451; Chant, 1965, Can. Ent. 97: 351 (in part).

Typhlodromidae Karg, 1960, Z. angew. Ent. 47: 440.

Typhlodromus Scheuten; Hirschmann, 1962, Acarologie SchrReihe vergl. Milbenk., Fürth. 5:30.

The phytoseiids are small, 300 to 600 μ in length, whitish to light brown in colour. With one exception, the idiosoma of the adult (fig. 1) is covered dorsally by a single shield. The shield may be slightly to heavily sclerotized and may be smooth to markedly imbricated. The shield is provided with a variable number of paired setae, four to seven in the dorsal series, two to four in the median series and six to 11 in the lateral series. These setae may be simple, spatulate, serrated, blunt, knobbed or even divided along the entire length. The system of setal designation (fig. 1) as initiated by Garman (1948) is used in this paper. According to this system the setae actually present in the longitudinal rows D (dorsal), M (median), L (lateral) and S (scapular), are numbered consecutively. The natural division of the idiosoma in the mesostigmate Acari, Hirschmann (1957), is demonstrated in the genus Macroseius. Pritchard & Baker (1962) referred to the anterior portion as the proscutum and the posterior portion as the postscutum. These terms and the terms "Prolateral" for the lateral setae anterior to seta D_4 and "Postlateral" for the lateral setae posterior to seta D_4, initiated by Pritchard & Baker (1962), are used here in combination with the Garman system. The membrane surrounding the dorsal shield usually bears two pairs of

setae./.....

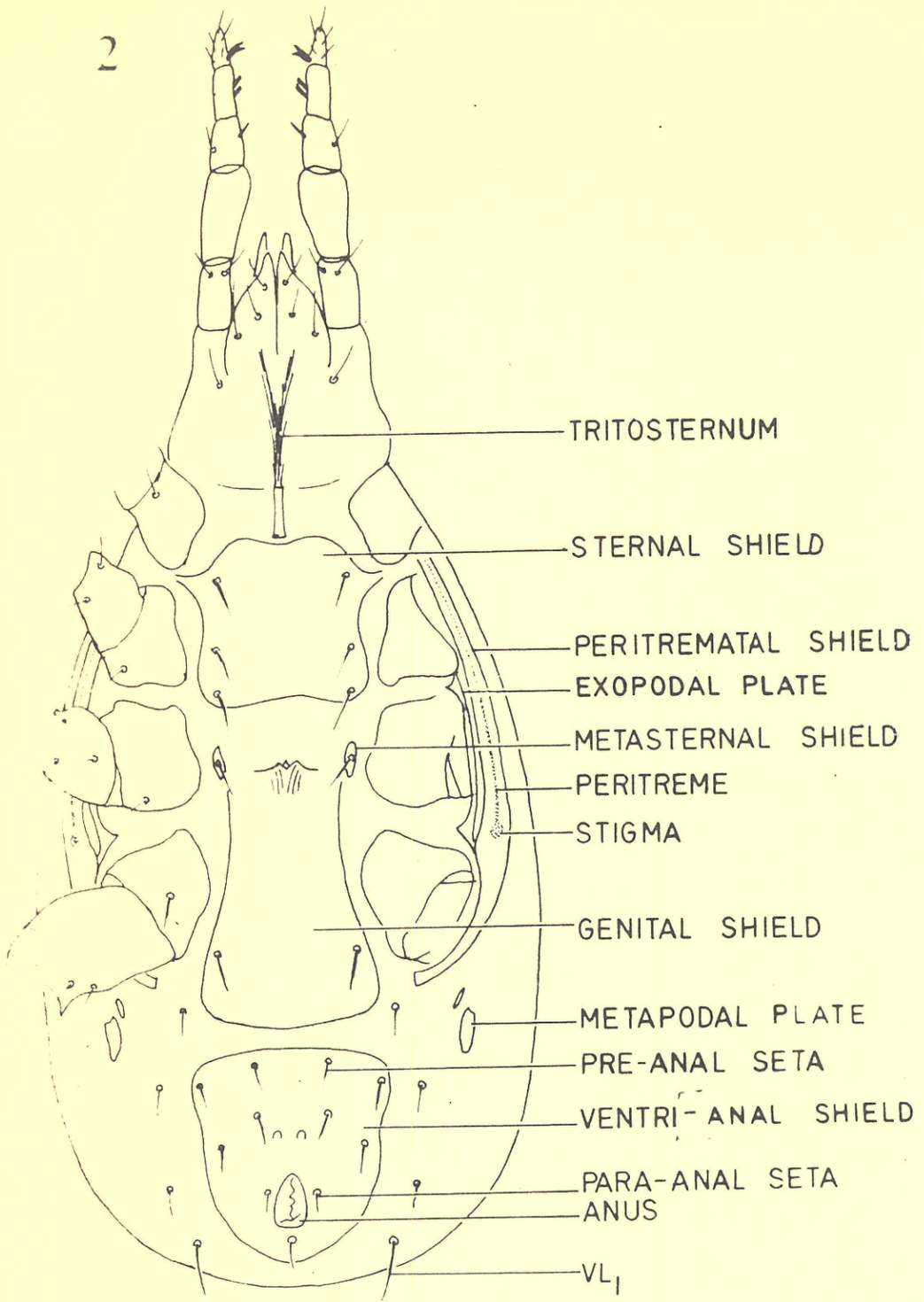


FIG.2. Diagrammatic representation of the venter of a hypothetical phytoseiid female mite.

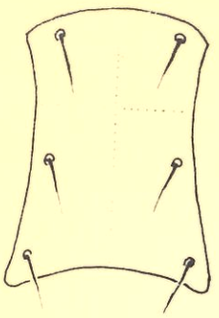
setae. These setae may be on the dorsal shield, or the posterior pair may be absent.

The venter of the idiosoma (fig. 2) is covered by a number of shields; a tritosternum is located anterior to the sternal shield. In the female the most anterior shield between the legs represents the sternal shield and bears two or three pairs of sternal setae. The broken lines in fig. 3 indicate the positions in which the length and breadth of the sternal shield are measured. Figure 4 illustrates a sternal shield with a lobed posterior margin. Posterior to the sternal shield lie two small metasternal shields, each provided with a seta. Between or a little posterior to the metasternal shields is the vulva from which the genital shield extends caudad; the latter shield is provided with a pair of setae and has a truncate to slightly concave posterior margin.

The posterior shield in the series is the ventri-anal shield, comprising the anal shield with three para-anal setae, and an anterior extension bearing from nil to four pairs of pre-anal setae which may sometimes be associated with a pair of pores. In some species the anterior extension is separated from the anal shield and in a few others only the anal shield is present. Posterior to coxae IV are one or two pairs of metapodal shields, which may be absent in some species. Lateral to the coxae lies the peritrematal shield bearing the stigma. The peritrematal shield, in most but not all species, fuses anterodorsally with the dorsal shield and posteriorly with the exopodal plate. The stigma continues anteriorly as the peritreme. The remainder of the venter is covered by an interscutal membrane provided with a variable number of paired setae.

The venter/.....

3



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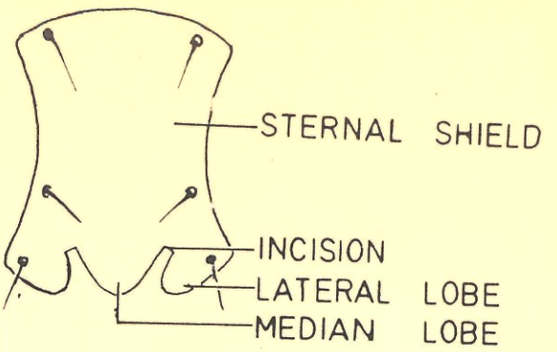

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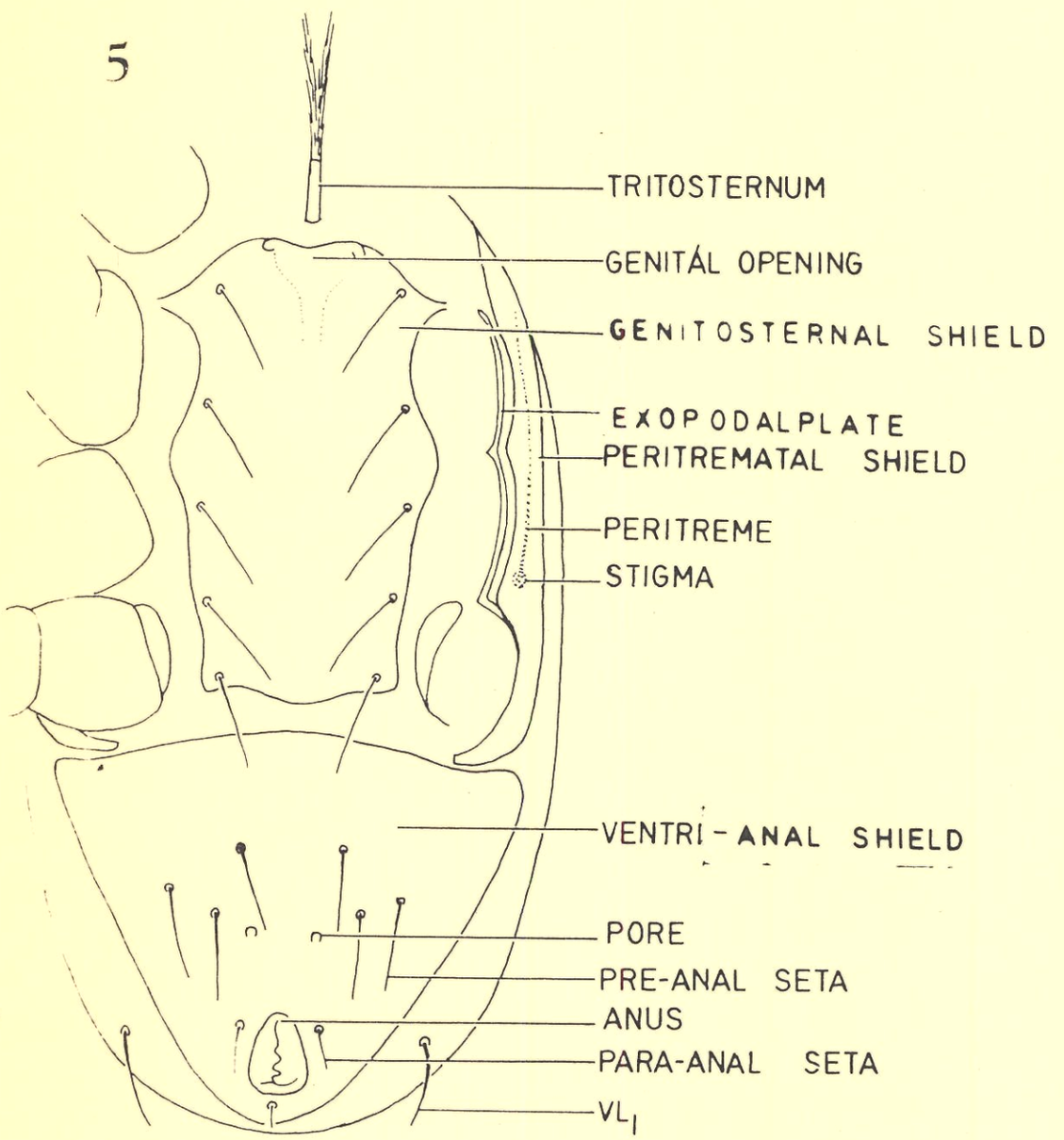


FIGS. 3-5. Diagrammatic representation of a hypothetical phytoseiid mite.

Fig.3, sternal shield, female; fig.4, posteriorly lobated sternal shield, female; fig.5, venter, male.

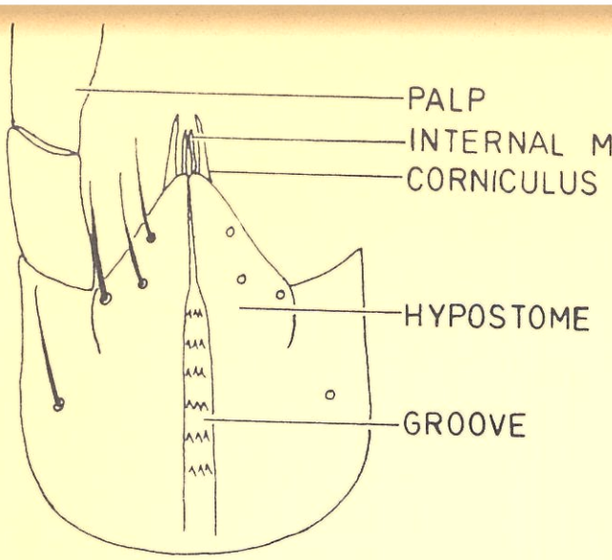
The venter of the male (fig. 5) differs greatly from that of the female in that it is covered by only two shields, an elongated genitosternal shield with the genital opening at the anterior margin and a broad, roughly triangular ventri-anal shield. In a few species the anal portion is separated from the anterior part.

The gnathosoma (figs. 1 & 6) which may be elongated, comprises two portions; the distal part with the epistome dorsally andthe two halves of the hypostome ventrally and the proximal part, which is confluent with the body proper, bearing the palps. The margin of the epistome may be smooth or slightly serrate, sometimes giving the impression of bearing small sharp teeth. Each half of the hypostome bears four setae and distally the internal malae and corniculus can be seen. The groove dividing the hypostome bears transverse rows of teeth internally. Above these lie the chelate chelicerae, consisting of one movable and one fixed digit (figs. 7 & 8). The inner margins of the digits may be smooth or denticulate and the fixed digit bears a modified seta, the pilus dentilis, about one-third of its length from the tip. In the male the movable digit (fig. 8) bears a copulatory structure, the spermatophoral process, often twice the length of the digit itself. The chaetotaxy of the palpi of the species examined during this study was normal. The tarsus of each palp is privided with a two-tined, pronged seta (fig. 9).

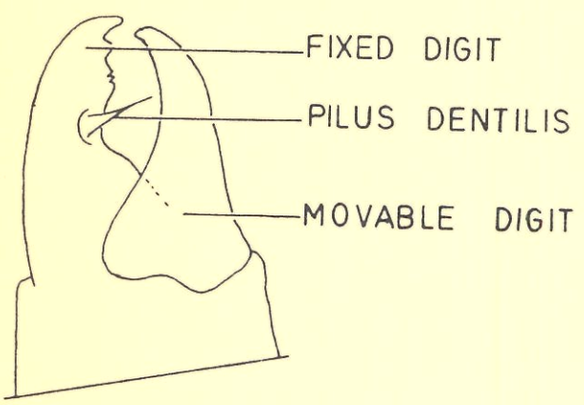
The legs terminate in a pulvillus and claw (fig. 11). Evans (1963) considered the chaetotaxy of the legs to be of taxonomic significance. The diagrammatic representation of the segmental chaetotaxy of the legs (figs. 13 & 14) is adapted from Evans (1963). In the figures the open circles represent dorsal setae (d, dorsal;

ad, anterodorsal/.....

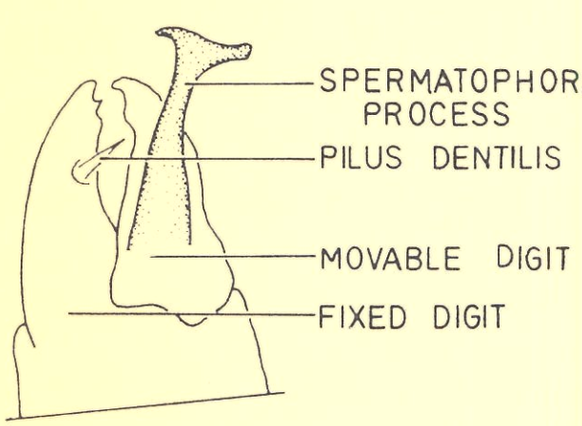
6


PALP
INTERNAL MALAE
CORNICULUS
HYPOSTOME
GROOVE

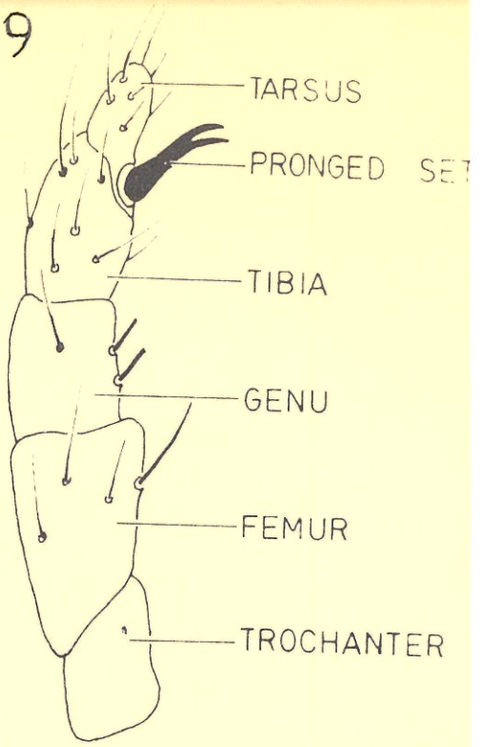
7


FIXED DIGIT
PILUS DENTILIS
MOVABLE DIGIT

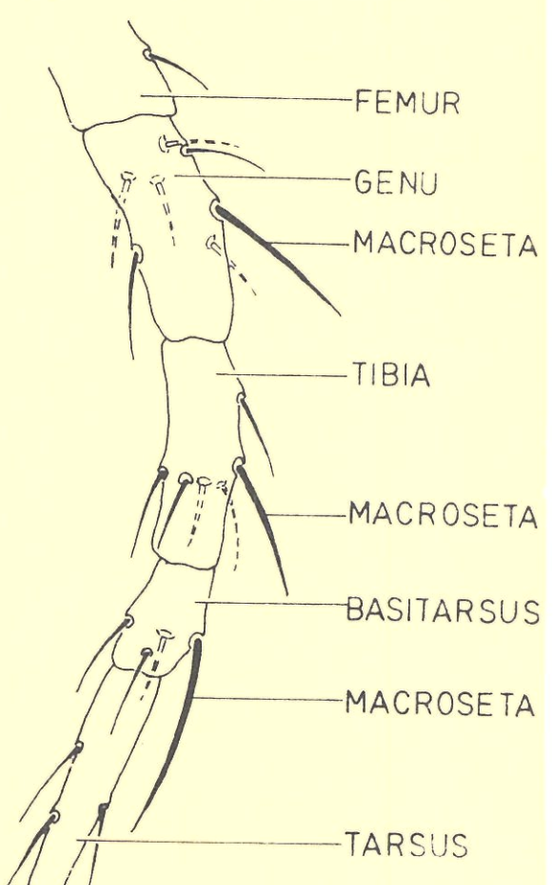
8


SPERMATOPHORAL PROCESS
PILUS DENTILIS
MOVABLE DIGIT
FIXED DIGIT

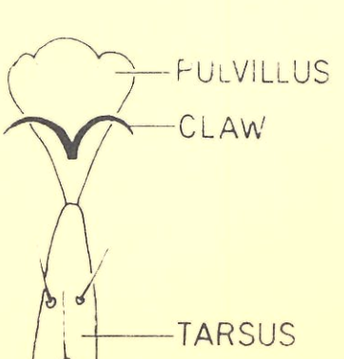
9


TARSUS
PRONGED SE
TIBIA
GENU
FEMUR
TROCHANTER

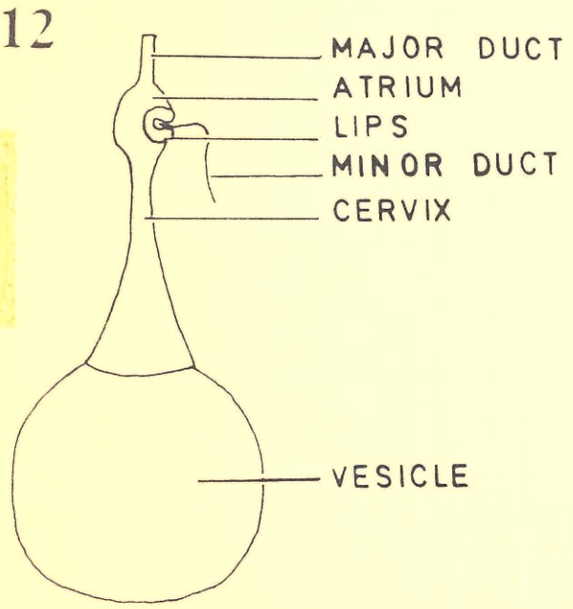
10


FEMUR
GENU
MACROSETA
TIBIA
MACROSETA
BASITARSUS
MACROSETA
TARSUS

11


PULVILLUS
CLAW
TARSUS

12


MAJOR DUCT
ATRIUM
LIPS
MINOR DUCT
CERVIX
VESICLE

ad, anterodorsal and pd, posterodorsal), the semi-toned circles represent lateral setae (al, anterolateral and pl, posterolateral), and the darkened circles represent the ventral setae (v, ventral; av, anteroventral and pv, posteroventral). A formula is proposed by Evans from which the relative positions of the setae, on the four setae-bearing faces of the segment, can easily be recognized. This formula is:

$$\text{Anterolaterals} - \frac{\text{Anterodorsals}}{\text{Anteroventrals}}, \frac{\text{Posterodorsals}}{\text{Posteroventrals}} - \text{Posterolaterals}$$

The respective setae thus assigned represent a type for a certain segment. This formula is used for the femora, genus and tibiae of all the legs.

The setal designations followed by (N) are considered to be normal for the family and will be stated as "normal" where applicable throughout this paper.

The setal distribution and types are as follows:

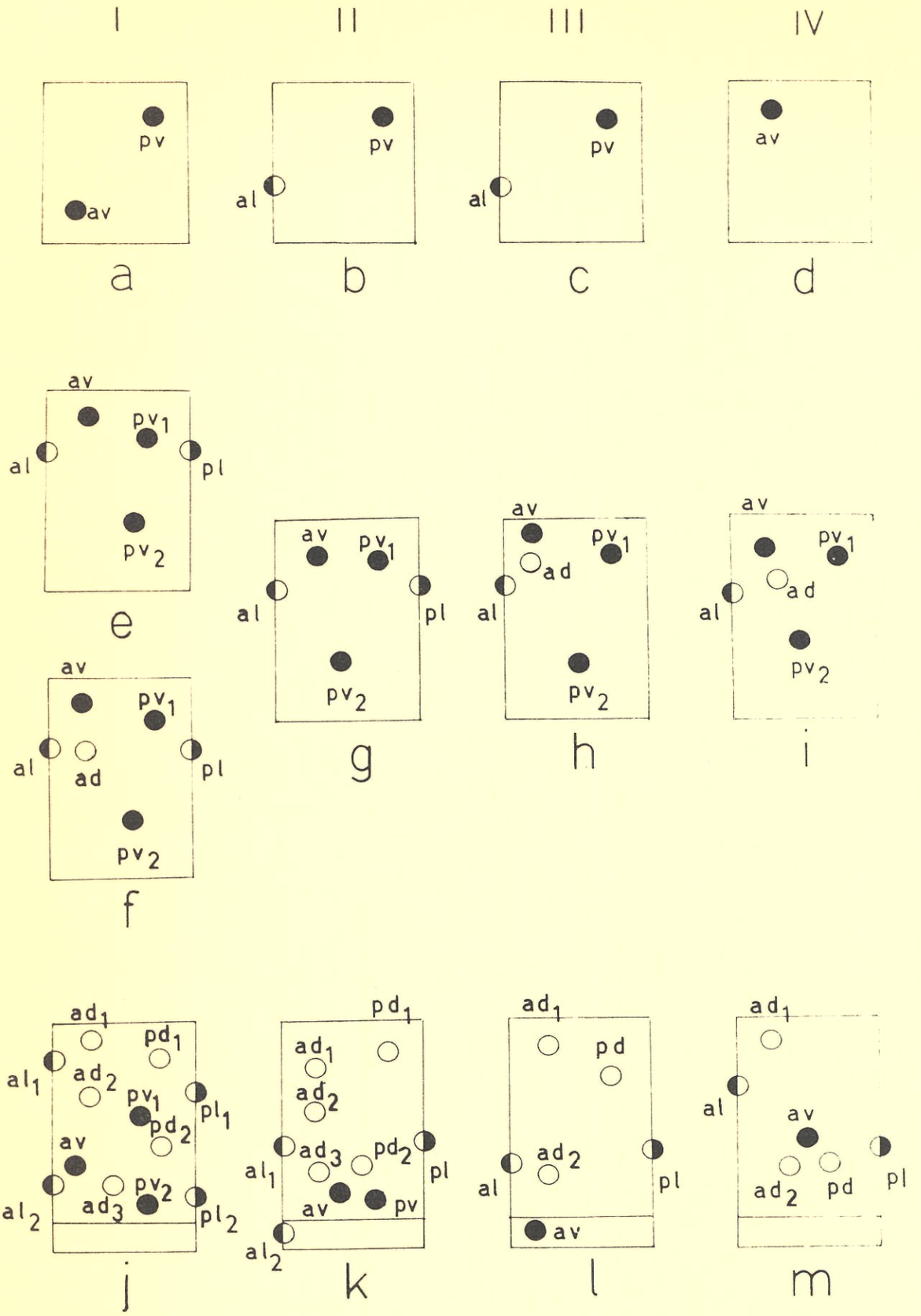
Fig. 13, a - d; a, Coxa I, av and pv (N); b, coxa II, al and pv (N); c, coxa III, al and pv (N) and d, coxa IV, av (N).

Fig. 13, e - i: e, Trochanter I, al, av, pv_1, pv_2 and pl (N) or f, al, ad, av, pv_1, pv_2 and pl; g, trochanter II, al, av, pv_1, pv_2 and pl (N); h and i, trochanter III and IV, al, ad, av, pv_1, and pv_2 (N).

Fig. 13, j-m; j, Femur I, $2-{}^{3}/1$, ${}^{2}/2-2$ (XII-type) (N); k, femur II, $2-{}^{3}/1$, ${}^{2}/1-1$ (X b-type) (N); L, femur III; $1-{}^{2}/1$, ${}^{1}/0-1$ (VI-type) (N); m, femur IV, $1-{}^{2}/1$, ${}^{1}/0-1$ (VI-type) (N).

Fig. 14, n-u: n, Genu I, $2-{}^{2}/1$, ${}^{2}/1-2$ (X-type) (N); o, genu II, $2-{}^{2}/0$, ${}^{2}/0-1$ (VII-type) (N) or p, $2-{}^{2}/1$, ${}^{2}/0-1$

(VIII-type)/.....



FIGS. 13, a-m. Diagrammatic representation of the chaetotaxy of the coxae, trochanters and femora of phytoseiid mites

Figs.a-d, coxae of legs I-IV; figs.e-i, trochanters of legs I-IV; figs.j-m, femora of legs I-IV.

(VIII-type) or q, 2-$^{2}/_{1}$, $^{2}/_{1}$-1 (IX-type); r, genu III, 1-$^{2}/_{1}$, $^{2}/_{0}$-1 (VII-type) (N) or s, 1-$^{2}/_{0}$, $^{2}/_{0}$-1 (VI-type); t, genu IV, 1-$^{2}/_{1}$, $^{2}/_{0}$-1 (VII-type) (N) or u, 2-$^{2}/_{1}$, $^{2}/_{0}$-1 (VIII-type).

Fig. 14, v-z; v, Tibia I, 2-$^{2}/_{1}$, $^{2}/_{1}$-2 (X-type) (N) or w, 2-$^{2}/_{2}$, $^{2}/_{1}$-2 (XI-type); x, tibia II, 1-$^{2}/_{1}$, $^{1}/_{1}$-1 (VII-type) (N); y, tibia III, 1-$^{1}/_{1}$, $^{2}/_{1}$-1 (VII-type) (N); z, tibia IV, 1-$^{1}/_{1}$, $^{2}/_{0}$-1 (VI-type) (N).

Basitarsus I bears nine setae (N) and basitarsi II, III and IV each bear four setae (N).

The tarsi were not taken into consideration by Evans, (1963), Chant (1965) or in the present study. The conglomeration of setae on the tarsi makes a study thereof impossible.

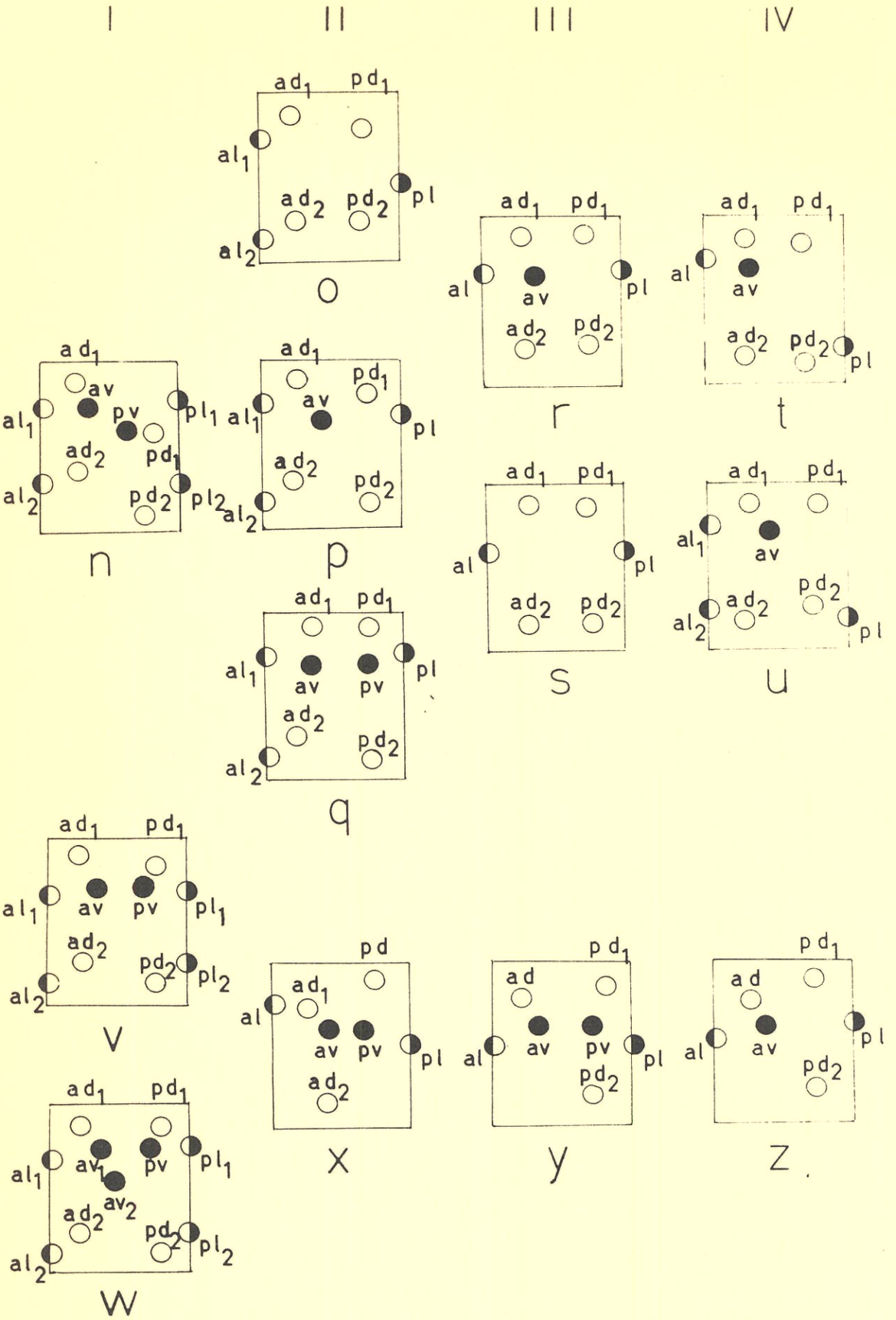
The presence of six setae on trochanter I and the XI-type for tibia I has not been previously recorded for the Phytoseiidae.

The legs may have some of the setae on the segments modified or elongated as macrosetae (fig. 10).

The spermathecae are distinct organs. They are attached between coxae III and IV, hanging free in the body and were known as "coxal glands" before Dosse (1958b & 1959) determined their function. The terminology (fig. 12) applied to the different components by Schuster & Smith (1960) is followed in this paper.

The family Phytoseiidae was first reviewed by Nesbitt (1951) as a subfamily of the Laelaptidae Berlese; he found it to contain a number of confused, poorly defined genera. Species descriptions in the early literature

were/.....



FIGS. 14, n-z. Diagrammatic representation of the chaetotaxy of the genus and tibiae of phytoseiid mites

Figs.n-u, genus of legs I-IV; figs.v-z, tibiae of legs. I-IV.

were vague, drawings, when given, lacked detail and type specimens were not available. Nesbitt presented an excellent discussion on the validity and type specimens of the genera placed by Vitzthum (1941) in the subfamily Phytoseiinae. The genera Typhlodromus Scheuten, 1857 and Seiulus Berlese, 1887 were resurrected by Oudemans (1929) on the nature of the dorsal setae, which are smooth in Typhlodromus and rough in Seiulus. As such Typhlodromus was a composite group in which Garman (1948) recognized Seiulus, Seiopsis Berlese, 1923, Amblyseius Berlese, 1914, Lasioseius Berlese, 1916, Typhlodromus and Iphidulus Ribaga, 1902, as genera of the Phytoseiinae. He characterised these genera by such characters as dorsal and leg setae, ventri-anal shield of the female and peritremal shields.

The genus Iphidulus was listed as a nomen dubium by Nesbitt (1951) who included as valid genera Amblyseius, Typhlodromus, Garmania gen. nov., Blattisocius Keegan, 1944, Kampimodromus gen. nov., Phytoseius Ribaga, 1902, and Kleemannia Oudemans, 1930, distinguishing them by such characters as dorsal setae, ventri-anal shield of the female and chelicerae.

Chant (1959b) reviewed the family Phytoseiidae and recognized two subfamilies, viz. Macroseiinae Chant, 1959, and Phytoseiinae. The former was based on the monotypic genus Macroseius Chant, Denmark & Baker, 1959. The latter included the following valid genera: Iphiseius Berlese, 1921, Typhloseiopsis De Leon, 1959, Proprioseius Chant, 1957, Asperoseius Chant, 1957, Phytoseius, Phytoseiulus Evans, 1952, Seiulus and Typhlodromus. For the designation of these genera he used such characters as dorsal setae, nature of the dorsal interscutal membrane and the ventri-anal shield.

In/.....

In 1961 Muma re-evaluated the subfamilies and genera of the family Phytoseiidae, considering the family to consist of the subfamilies Macroseiinae, Aceodrominae subfam. nov., Amblyseiinae subfam. nov., and Phytoseiinae, and recognising 43 genera. He characterized these genera by features such as dorsal and leg setae, ventri-anal and sternal shields.

Wainstein (1962) prepared a paper simultaneously with but independently of Muma (1961). He recognized two subfamilies, Phytoseiinae and Macroseiinae, three tribes, seven genera, 22 subgenera and 20 sections. He based his categories on the number and structure of the setae on the dorsal shield and interscutal membrane and the number and relative positions of the setae on the posterior venter of the idiosoma.

In their paper on Phytoseiids of Central Africa, Pritchard & Baker (1962) attempted a more conservative supra-specific classification, emphasizing relationships of genera and subgenera. They proposed as valid, six genera and 16 subgenera. The genera were based on the relative positions of the scapular setae, the number of prolateral setae, the dorsal shield being divided or entire and the degree of sclerotization of the dorsal interscutal membrane. The subgenera were based on the number of setae present on the posterior half of the dorsal shield.

Schuster & Pritchard (1963) were more liberal and elevated the genera recognized by Pritchard & Baker (1962) to tribal status and the subgenera to generic status.

Muma (1961) and Wainstein (1962a) are liberal regarding generic designations while Hirschmann (1962) and Westerboer & Bernhard (1963) are more conservative.

Hirschmann (1962) put all the species recognized to date as Phytoseiidae into a single genus in the family Gamasidae Leach 1815. Karg (1960) referred to the family Phytoseiidae as the family Typhlodromidae Bernhard, 1955. Bernhard, however, proposed this name in an unpublished thesis (Chant, 1965) but it was not substantiated by him in his later paper (Westerboer & Bernhard, 1963). Westerboer & Bernhard recognized the genus Phytoseius as a subgenus, as is done in this paper, and the name Phytoseiidae is therefore still valid. The latter authors included, besides Typhlodromus, Phytoseiulus and Iphiseius, also the genera Ameroseius Berlese, 1903, Paragarmania and Blattisocius in the family Phytoseiidae. The concept of the family Phytoseiidae as understood by most of the recent authors does not warrant such an inclusion.

The latest paper on generic concepts in the family Phytoseiidae is that of Chant (1965). This paper gives an clear insight into the problem of generic designation in the family. In his paper Chant included the family Otopheidomenidae Treat, 1955, as a subfamily of the Phytoseiidae. Since this group is not represented in this paper, no comment will be made on this inclusion.

The group treated as the subfamily Phytoseiinae by Chant (1965) is fairly well represented among the South African species examined. The following characters were used by Chant (1965) to separate the 10 genera recognized by him: the dorsal shield, being divided in two shields or being entire and the extent to which it covers the idiosoma, the retention or addition of prolateral setae during the second moult (from protonymph to deutonymph), the degree of sclerotization of the interscutal membrane, the relative positions of the scapular setae, the size and

number/.....

number of the metapodal plates, the size of the genital and ventri-anal shields and the markings of the genital shield, the degree of extension of the gnathosoma and the chaetotaxy of the legs.

It is clear that there is little agreement upon the criteria to be used for generic designation. The conservative authors rely on major morphological differences while the more liberal group depend on minor morphological characters, using the major morphological differences as subfamily or tribal characters.

The utilisation of minor morphological differences for generic separation is justified by the minute morphological differences that exist between closely related species. Typhlodromus recki Wainstein and T. rhenanus (Oudemans) for instance differ only in the relative lengths of the macroseta on leg IV of the female and the number of setae on the ventri-anal shield in the male. Typhlodromus (Meyerius) immutatus spec. nov., T.(M.) convallis spec. nov. and T.(M.) collativus spec. nov. are only differentiated by the chaetotaxy of genu II.

The above-mentioned slight differences between species have tempted authors to use the presence or absence or the relative position of a single seta for generic separation. Muma (1961) for instance distinguished between Phytoscutus Muma and Phytoscutella Muma by the presence or absence of the first postlateral setae and the relative lengths of the macrosetae on leg IV. Since the relative lengths of the macrosetae on leg IV are only for species separation, Phytoscutella and Phytoscutus are separated by the number of dorsal setae. Chant (1965) objected to the use of the number of setae on the dorsal

shield/.....

shield as a generic character, since closely related species such as Typhlodromus pyri Scheuten and T. rhenanus will then be placed in separate genera. Muma (1961) further differentiated between the genera Metaseiulus Muma and Galendromus Muma by the number of setae on the sternal shield and ventri-anal shield. Galendromus has two pairs of sternal setae in contrast to the three pairs of Metaseiulus and has four pairs of pre-anal setae instead of three as in the latter.

According to Schuster & Pritchard (1963), the type of Metaseiulus, M. validus (Chant), posesses only two, and not three, pairs of sternal setae and Galendromus occidentalis (Nesbitt) has the pre-anal setae variable in number. Therefore they put Galendromus into synonymy with Metaseiulus. As such Metaseiulus differs from Muma's definition of Typhlodromus only in the absence of the second sublateral seta and the relative position of the third postlateral seta, the latter being paired with the posterior median seta in Typhlodromus, but posterior to the posterior median seta in Metaseiulus. In thirteen of the new species described in this paper the second sublateral seta as well as the third postlateral seta posterior to the posterior median seta are present. These thirteen species can therefore be placed in either of these genera or a new genus can be proposed for them. In either of these cases the resulting genera will differ from each other only in the presence or absence of a single seta or the relative position of a single seta. Since the setae under discussion are of no known phylogenetic significance, these genera do not comply with the definition of a genus given by Mayr, Linsley & Usinger (1953), namely, that a genus is a systematic category including one or a group of

species of presumably common phylogenetic origin that is separated from similar units by a decided gap. The presence or absence or relative position of the lateral setae on the postscutum is therefore not considered to be of generic significance.

The same argument implies the use of the number of setae in the dorsal series as a generic character. Schuster & Pritchard (1963), for instance, found that the presence or absence of the fifth dorsal seta is infra-specific in Amblyseius exopodalis Kennett.

In contrast to the number of lateral setae on the postscutum and the dorsal series, the number of lateral setae on the proscutum are showed by Chant (1958b) to be of phylogenetic significance. Species having four pairs of prolateral setae retain their protonymphal complement of setae in subsequent instars. The species with five or six pairs of prolateral setae, however, add one prolateral seta in the second moult. This ontogenetic difference between species having four and those having five or six pairs of prolateral setae is therefore considered to be of generic importance.

The value of regarding the position of the first scapular seta, S_1, either on the dorsal shield or on the interscutal membrane, as a character of generic significance may be questioned when Platyseiella Muma (type: Phytoseius platypilis Chant) and Amblyseius horrifer Pritchard & Baker are considered. The latter species differs from Phytoseius platypilis only in having the first scapular seta, S_1, on the dorsal interscutal membrane and the first postlateral seta being not as strongly developed as in P. platypilis.

The same/.....

The same argument applies to the second scapular seta, S_2, which appears on the dorsal shield in Amblyseius (Amblyseius) scapilatus spec. nov. In Amblyseius seta S_2 is always on the dorsal interscutal membrane. Chant (1965) stated that in such cases the setae are on irregular projections of the dorsal shield. This argument is, however, more true of Chantia paradoxa Pritchard & Baker (fig. 22 p. 367 of Chant's paper) than of the above mentioned species. The inconsistency in the positions of the scapular setae renders them of no value at the generic level. The genus Chantia is therefore separated from Typhlodromus only on the nature of the dorsal setae being strongly spatulate and smooth, and the chaetotaxy of genu IV being of the VIII-type. The latter will further on the overruled as a generic character, leaving the nature of the dorsal setae as the only character separating Chantia from Typhlodromus. Chantia paradoxa, for instance, resembles Typhlodromus crinitus (Swirski & Shechter) in all features except for having seta S_2 on the dorsal shield. In the latter species the dorsal setae are also highly distinctive, being flat, broad, serrated-plumose, with four pairs split length-wise, thus dividing the setae. The nature of the setae is too variable a character to be of use at the generic level.

Chant (1965) used the number and size of the metapodal plates and the size and nature of sclerotization of the genital and ventri-anal shields as characters to separate Paraamblyseius Muma from Phytoseiulus and Amblyseius. The number of metapodal plates is, however, variable amongst closely related species: Amblyseius (Amblyseius) rubicolus (v.d. Merwe & Ryke) has a single pair of metapodal plates, A. (A.) anneckei (v.d. Merwe & Ryke) has none and A. (A.) addoensis (v.d. Merwe & Ryke) has

two pairs./.....

two pairs. Apart from the former it is doubtful whether Paraamblyseius has only one pair of metapodal plates, since Muma (1962) illustrated P. lunatus, (the type of this genus) as having two pairs of metapodal plates. The size and shape and nature of sclerotization of the genital and ventri-anal shields differs markedly amongst species of the genus Amblyseius: the ventri-anal shield is oblong and smooth in A. (A.) rhusi spec. nov. but tri-angular and imbricated in A. (A.) usitatus spec. nov.; the genital shield is smooth in most Amblyseius species but reticulated in A. (A.) teke Pritchard & Baker. There are also no differences between the shape of the genital and ventri-anal shields of P. lunatus and Amblyseius salebrosus (Chant). The latter species is the type of the genus Phytoscutella Muma, but was not recognized by Chant (1965).

Van der Merwe & Ryke (1963) regarded the legs as of no taxonomic significance. Evans (1963) and Chant (1965) proved them wrong as far as species are concerned. However, at supra-specific level the chaetotaxy of the legs is of no value. Chant (1965), for instance, stated that if it were not for Gigagnathus Chant having genu III of the VI-type, it would be regarded as a general typhlodromid type. In this paper, however, a new species, T. (Amblydromella) apoxys, is described which is a "general" typhlodromid according to Chant's definition of the latter. This species also has genu III of the VI-type. As generic character the type of chaetotaxy is therefore of no value in the case of Gigagnathus. The latter can now be separated from Typhlodromus only by the length of the gnathosoma.

Chantia paradoxa is stated by Chant (1965) to be

exceptional/.....

exceptional in having genu IV of the VIII-type. Chant based this genus on the latter character and the fact that both the scapular setae are on the dorsal shield. Two new species, Amblyseius (Proprioseius) altusus and A.(P.) reburrus are described in this paper, both having genu IV of the VIII-type but with the scapular setae on the interscutal membrane.

Chant (1965) admitted that the types of leg chaetotaxy cut across all the generic concepts that have been proposed. He, however, persisted in using it. The addition of these two new cases adds considerable strength to the argument that leg chaetotaxy is of no value at the generic level.

It is therefore evident that with the descriptiCn of new species, more data become available which induce workers to alter their concepts of generic characters. Bearing in mind the pitfalls that await the student of the Phytoseiidae who attempts generic evaluation, the present author feels that with the data available at present only five genera should be recognized. These genera are based on major morphological differences that are rather unique: Gigagnathus has a strongly extended gnathosoma, Macroseius has a divided dorsal shield, Typhlodromus has five or six pairs of prolateral setae, Amblyseius has four pairs of prolateral setae and Iphiseius has also four pairs of prolateral setae but its dorsal interscutal membrane is sclerotized.

Three of these genera, Typhlodromus, Iphiseius and Amblyseius are represented by the phytoseiid species now known from South Africa.

The species/.....

The species groups which exhibit common characters, such as the presence, absence or position of the scapular setae, and the presence or absence of postlateral setae (of which the significance for generic consideration is still doubtful) are here treated as subgenera.

Key to the genera of the family Phyoseiidae

1. Dorsal shield entire 2

   Dorsal shield divided into two shields .....
   ..... Macroseius Chart, Denmark & Baker

2. Dorsal shield with four pairs of prolateral setae 4

   Dorsal shield with five or six pairs of prolateral setae 3

3. Gnathosoma elongated; equal in length to leg I ..
   ..... Gigagnathus Chant

   Gnathosoma normal; much less than leg I in length ..... Typhlodromus Scheuten

4. Dorsal interscutal membrane sclerotized .....
   ..... Iphiseius Berlese

   Dorsal interscutal membrane normal, not sclerotized
   ..... Amblyseius Berlese

IV. GENUS MACROSEIUS CHANT, DENMARK & BAKER

Macroseius Chant, Denmark & Baker, 1959, Can. Ent. 91: 808; Chant, 1959b, Can. Ent. 91(suppl. 12): 113; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 272; Pritchard & Baker, 1962, Hilgardia 33: 298; Schuster & Pritchard, 1963, Hilgardia 34: 199; Muma, 1963a, Fla Ent. 46: 11; Chant, 1965, Can. Ent. 97: 366. Type: Macroseius biscutatus Chant, Denmark & Baker, 1959, monotypic.

Macroseiinae Chant, Denmark & Baker, 1959, Can. Ent. 91: 808; Chant, 1959b, Can. Ent. 91: (suppl. 12) 113; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 272; Wainstein, 1962a, Acarologia 4: 26; Muma, 1963a, Fla Ent. 46: 11. Type genus: Macroseius Chant, Denmark & Baker, 1959, monotypic.

Macroseiini Pritchard & Baker, 1962, Hilgardia 33: 211; Schuster & Pritchard, 1963, Hilgardia 34: 199.

The genus Macroseius is distinct in having the dorsal shield transversely divided. The proscutum bears four pairs of dorsal setae, one pair of median setae, four pairs of prolateral setae and the first pair of scapular setae. The postscutum bears three pairs of dorsal setae, one pair of median setae and five pairs of postlateral setae. The second pair of scapular setae is on the dorsal interscutal membrane.

This genus is known only from the type species collected from Sarracenia sp., Alachua Co., Florida.

V. GENUS/.....

V. GENUS GIGAGNATHUS CHANT

Gigagnathus Chant, 1965, Can. Ent. 97: 368. Type: Gigagnathus extendus Chant, 1965, monotypic.

The genus Gigagnathus is unique in having the hypostome narrow, gently elongated, extending to the distal margin of genu I. The dorsal shield bears six pairs of dorsal setae, two pairs of median setae, six pairs of prolateral setae and three pairs of postlateral setae. The first pair of scapular setae is present on the dorsal interscutal membrane but the second pair is absent.

This genus is known only from the type species; the ♀-holotype and two females from Chamaecyparis sp. from Bermuda at Boston collected by J.D. Crump.

VI. GENUS TYPHLODROMUS SCHEUTEN

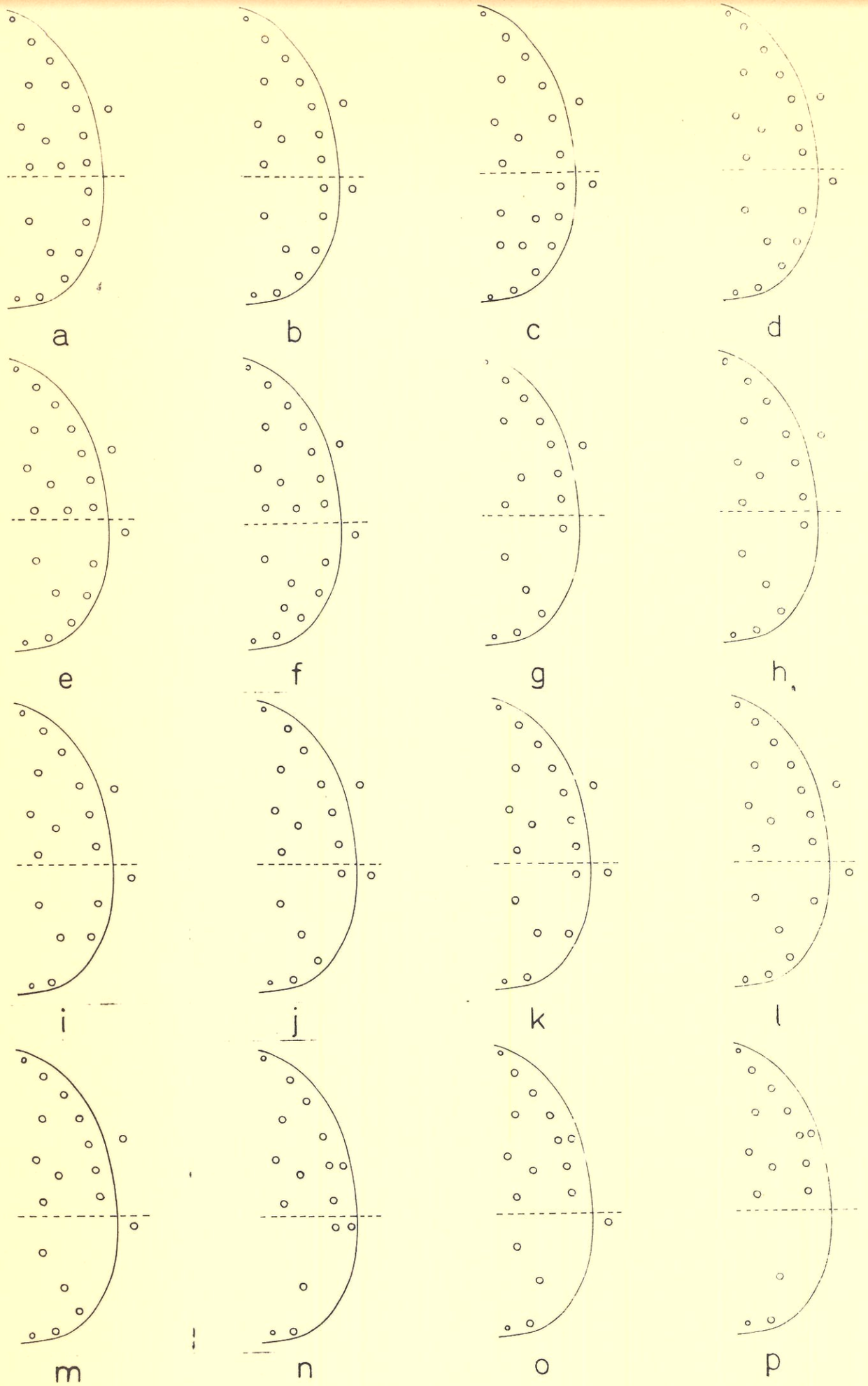
Typhlodromini Wainstein, 1962a, Acarologia 4: 26; Pritchard & Baker, 1962, Hilgardia 33: 211; Schuster & Pritchard, 1963, Hilgardia 34: 198, 199.

Chantiini Pritchard & Baker, 1962, Hilgardia 33: 211; Schuster & Pritchard, 1963, Hilgardia 34: 198, 199.

The cosmopolitan genus Typhlodromus is characterised by having the gnathosoma much shorter in length than leg I and the dorsal shield provided with five or six pairs of prolateral setae. The number of dorsal, median and postlateral setae is variable. The total number of setae on the dorsal shield, however, does not exceed 20 pairs in known species. One or two pairs of scapular setae are present, located on either the dorsal interscutal membrane or on the dorsal shield.

Relationships within the genus are expressed by the

patterns/.....



FIGS. 15, a-p. Diagrammatic representation of the setal insertions for subgenera in the genus Typhlodromus Scheuten

a. Seiulus b. Seiulus c. Chiliseius d. Amblydromella
e. Paraseiulus f. Bawus g. Metaseiulus h. Galendromimus
i. Colchodromus j. Chanteius k. Typhlodromus l. Meyerius
m. Typhloseiopsis n. Chantia o. Phytoseius p. Phytoseius

patterns of setae on the dorsal shield (fig. 15, a-p) and the number and relative positions of the scapular setae. These characters are utilized in the presentation of subgenera.

Key to the subgenera of the world: females

1. Postscutum with five pairs of lateral setae 2
   Postscutum with less than five pairs of lateral setae 3

2. Proscutum with six pairs of lateral setae (figs. 15, a & b) ..... Seiulus
   Proscutum with five pairs of lateral setae (fig. 15, c) ..... Chiliseius

3. Postscutum with four pairs of lateral setae 4
   Postscutum with less than four pairs of lateral setae 5

4. Dorsal shield with two pairs of median setae (fig. 15, d) ..... Amblydromella
   Dorsal shield with three pairs of median setae (fig. 15, e) ..... Paraseiulus
   Dorsal shield with four pairs of median setae (fig. 15, f) ..... Bawus subgen. nov.

5. Postscutum with three pairs of lateral setae 6
   Postscutum with less than three pairs of lateral setae 11

6. Both pairs of scapular setae present 8
   Second pair of scapular setae absent 7

7. Proscutum/.....,

7. Proscutum with six pairs of prolateral setae (fig. 15, g) ..... Metaseiulus

Proscutum with five pairs of prolateral setae (fig. 15, h) ..... Galendromimus

8. Proscutum with six pairs of prolateral setae 10

Proscutum with five pairs of prolateral setae 9

9. Postscutum with the median setae transversely paired with one of the lateral pairs of setae (fig. 15, i) ..... Colchodromus

Postscutum with the median setae not transversely paired with any of the lateral pairs of setae (fig. 15, j) ..... Chanteius

10. Postscutum with the median setae transversely paired with one of the lateral pairs of setae (fig. 15, k) ..... Typhlodromus

Postscutum with the median setae not transversely paired with any of the lateral pairs of setae (fig. 15, l) ..... Meyerius subgen. nov.

11. Postscutum with one pair of lateral setae 12

Postscutum with two pairs of lateral setae (fig. 15, m) ..... Typhloseiopsis

12. Second pair of scapular setae present on the dorsal shield (fig. 15, n) ..... Chantia

Second pair of scapular setae present on the dorsal interscutal membrane or absent (figs. 15, o & p)..... Phytoseius

A. Subgenus/.....

a. Subgenus Seiulus Berlese

Seius (Seiulus) Berlese, 1887, Acari Myr. Scorp., fasc. 41, no. 3. Type: S.(S.) hirsutigenus Berlese, 1887, monotypic.

Seiulus Berlese, Oudemans, 1902, Tijdschr. Ent. 45: 17; Oudemans, 1929, Ent. Ber., Ams. 8: 14; Garman, 1948, Bull. Conn. agric. Exp. Stn. 520: 6; Nesbitt, 1951, Zool. Verh., Leiden 12:9; Athias-Henriot, 1958a, Bull. Soc. Hist. nat. Afr. N. 49:36; Chant, 1959b, Can. Ent. 91 (suppl. 12): 112; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 299; Wainstein,1962a, Acarologia 4:23; Schuster & Pritchard, 1963, Hilgardia 34: 199; Muma, 1963a, Fla Ent. 46: 14.

Typhlodromus (Seiulus); Pritchard & Baker, 1962, Hilgardia 33: 212.

Echinoseius Ribaga, 1902, Riv. Patol. Veg. 10: 177. Type: Seius (Seiulus) hirsutigenus Berlese, 1887, monotypic.

Neoseiulella Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 295; Muma, 1963a, Fla Ent. 46: 13. Type: Typhlodromus nesbitti Womersley, 1954, monotypic.

Australiseiulus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 296; Muma, 1963a, Fla Ent. 46: 13. Type: Kampinodromus australicus Womersley, 1954, monotypic.

Typhloctonus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 299; Muma, 1963a, Fla Ent. 46: 14. Type: Typhlodromus tiliarum Oudemans, 1930, by original designation.

Typhlodromus/.....

Typhlodromus (Nesbitteius) Wainstein, 1962a, Acarologia 4: 23. Type of subgenus: Typhlodromus nesbitti Womersley, 1954, by original designation.

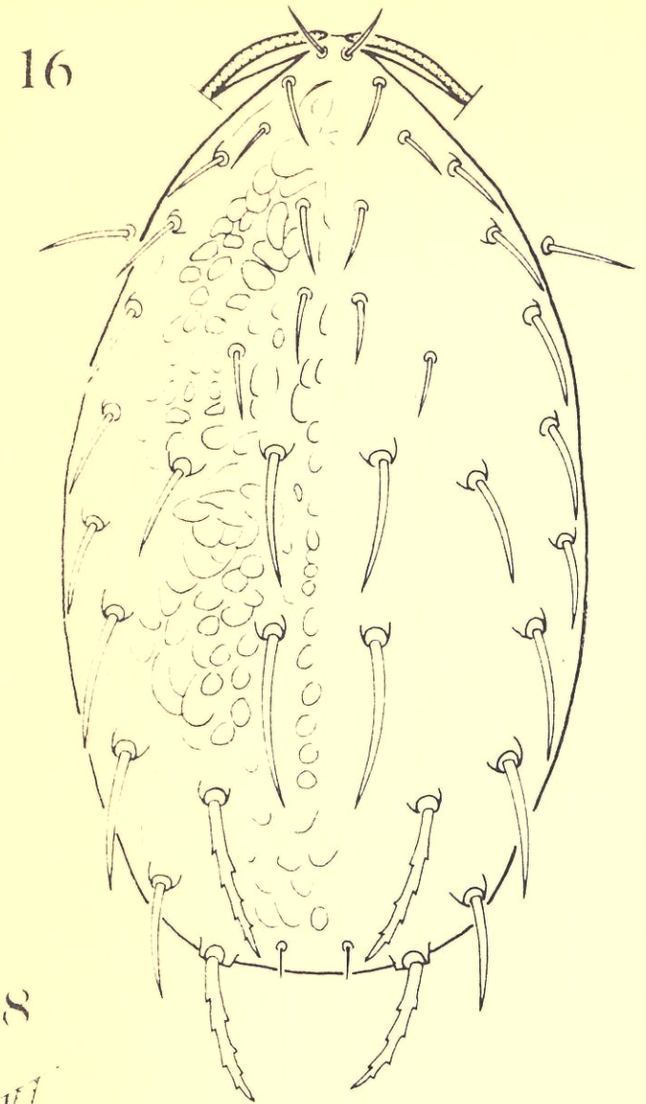
Typhlodromus (Australodromus) Wainstein, 1962a, Acarologia 4: 23. Type of subgenus: Kampimodromus australicus Womersley, 1954, monotypic.

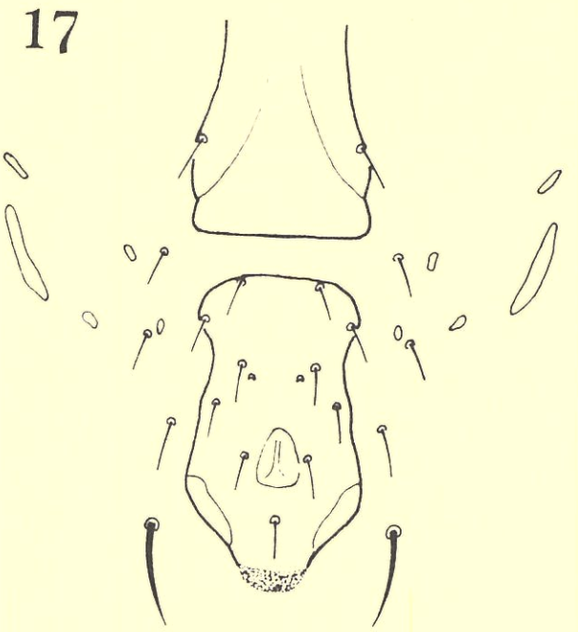
The subgenus Seiulus is characterized by having six pairs of prolateral setae, five pairs of postlateral setae, six pairs of dorsal setae, two or three pairs of median setae and one or two pairs of scapular setae on the dorsal interscutal membrane.

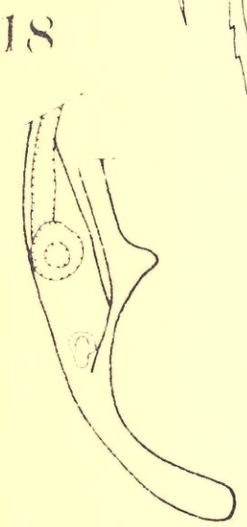
It is evident from the literature that the features of the type species Seiulus hirsutigenus are not known. Nesbitt (1951) proved that S. hirsutigenus is the type species of Seiulus but gave no description of the former. Chant (1959b) identified S. hirsutigenus as a nymph and placed it in his list of "dubious species". He however recognized it as the type of Seiulus. The definitions of Seiulus by Muma (1961) and Wainstein (1962a) are clear cut and give the exact number of setae which a species should have to be included in this genus. These authors, however, gave no indication by which means they pinpointed these characters on S. hirsutigenus. Pritchard & Baker (1962) stated that, on the contrary, S. hirsutigenus is a female specimen but they are uncertain about the number of median setae and scapular setae.

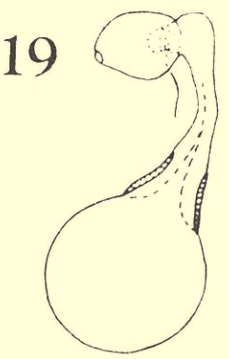
The only clear characters of this species are the presence of six pairs of prolateral and five pairs of postlateral setae. Typhlodromus species having these characters should therefore be placed in the subgenus Seiulus.

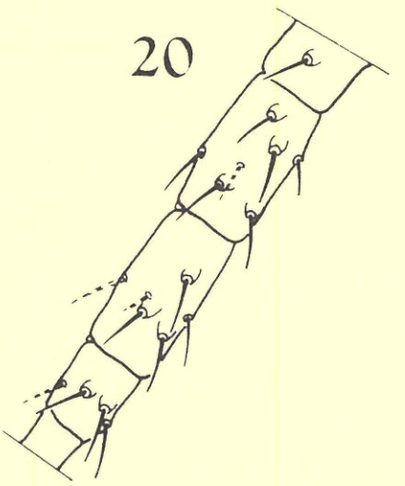
Key to/.....











FIGS. 16-20. Typhlodromus (Seiulus) acanthus spec. nov., female

fig.16, dorsum; fig.17, posterior ventral surface; fig.18, peritrematal shield; fig.19, spermatheca; fig.20, leg IV.

Key to the South African species of the subgenus Seiulus: females

1. Seta M_3 longer than the distance between its base and the base of seta L_{11} .... acanthus spec. nov.

Seta M_3 shorter than the distance between its base and the base of seta L_{11} .... neosentus spec. nov.

Typhlodromus (Seiulus) acanthus spec. nov. (Figs. 16-20).

This species resembles T.(S.) sentus Pritchard & Baker in having the dorsal setae of the legs placed on tubercles. The setae on the dorsal shield are longer and more strongly developed in T.(S.) acanthus than T.(S.) sentus and the spermathecae differ markedly.

Female: Dorsum (fig. 16): The strongly imbricated dorsal shield measures 303 μ in length and 160 μ in width. There are two pores on the shield. It is provided with 20 pairs of strong setae mostly set on tubercles and arranged as follow; six dorsal, three median (the second pair is almost on the same level as seta D_4) and 11 laterals (setae S_2 is on the dorsal shield and is considered as the seventh lateral). These setae measure in length: D_1 and L_2, 21 μ; D_2, D_3, M_1, L_1 and L_3, 25 μ; D_4, L_8 and L_9, 46 μ; D_5 and M_3, 58 μ; D_6, 11 μ; M_2, 38 μ; L_4 and L_7, 30 μ; L_5 and L_6, 34 μ; L_{10}, 40 μ; and L_{11}, 52 μ. Only setae M_3 and L_{11} are serrated; the others are smooth. Setae D_5 and M_3 are the longest setae on the dorsal shield and are respectively longer than the distances between the setal

bases/.....

bases D_5-M_3 and M_3-L_{11}. The lateral setae are equal to or longer than the distances between their bases and the bases of the setae following next in the series, except setae L_4, L_5 and L_6 which are slightly shorter.

Seta S_1 is on the dorsal interscutal membrane and measures 29 μ in length.

The narrow peritrematal shields are fused anteriorly to the dorsal shield. The peritremes reach anterior to the bases of setae D_1.

Venter: The sternal shield is too poorly sclerotized to follow its outline.

The genital shield (fig. 17) is 52 μ wide and provided with a pair of setae.

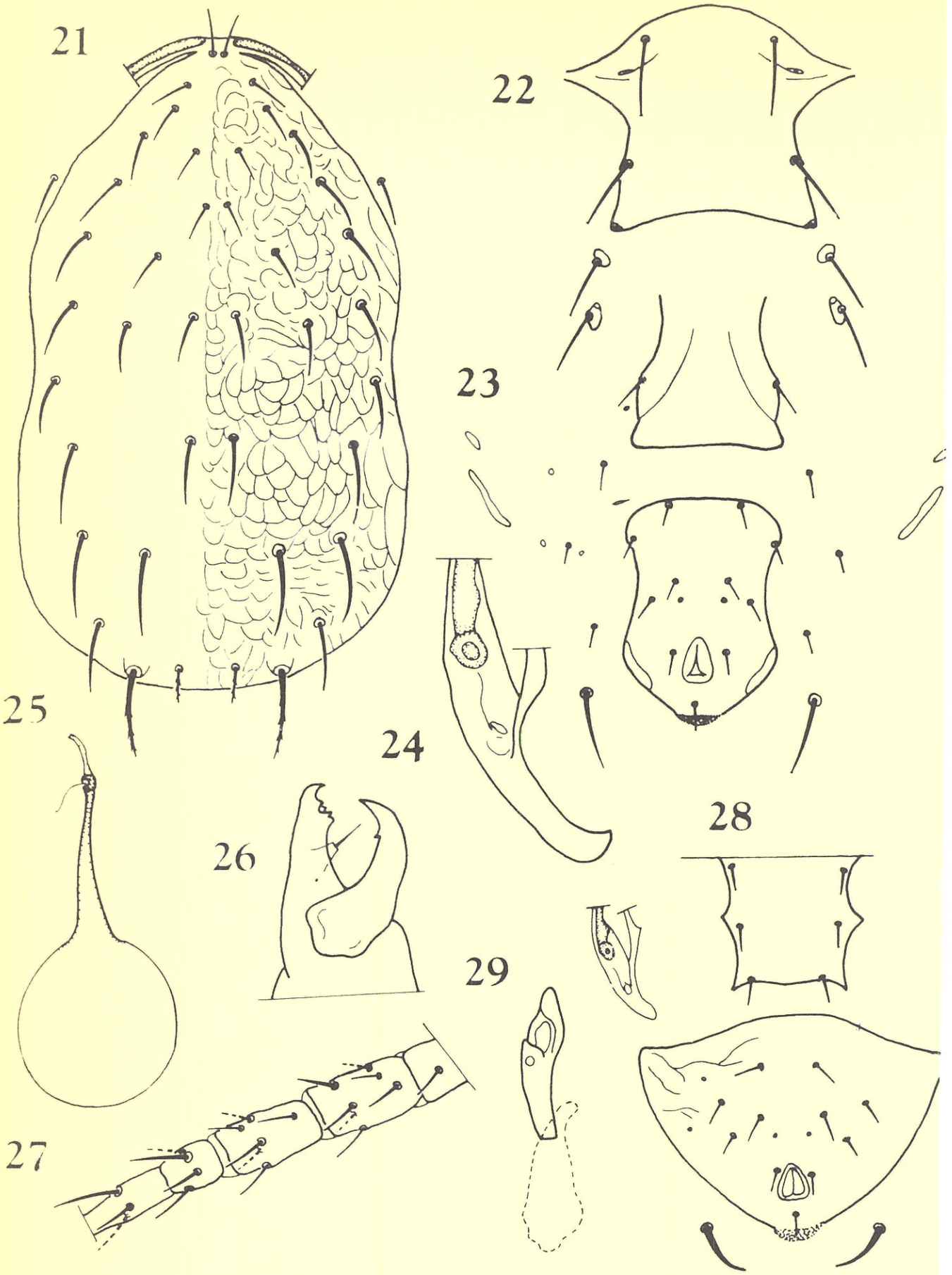
The long, 87 μ, and narrow, 50 μ, ventri-anal shield (fig. 17) bears four pairs of pre-anal setae. Just caudomedial to the inner posterior pair of setae is a pair of pores. The lateral margins of the shield are sharply constricted caudal to the first lateral pair of pre-anal setae and diverge towards a point posterior to the level of the anus. The para-anal setae are normal.

The interscutal membrane bears four pairs of setae, the caudal pair being long, 30 μ. Two pairs of metapodal plates and three pairs of lateral platelets are also present on the membrane.

The peritrematal shield (fig. 18) is fused to the exopodal plate posteriorly to the stigma and terminates obtusely caudal to coxa IV.

Spermatheca (fig. 19): The major duct, length 9 μ, is bulbous and probably incorporates the atrium. The lips,

3 μ in/.....



FIGS. 21-29. Typhlodromus (Seiulus) neosentus spec. nov. Fig.21, dorsum, female; fig.22, sternal shield, female; fig.23, posterior ventral surface, female; fig.24, peritrematal shield, female; fig.25, spermatheca, female; fig.26, chelicera, female; fig.27, leg IV, female; fig.28, posterior ventral surface, male; fig.29, chelicera, male.

3 μ in diameter, are situated where the major duct joins the cervix in a asymmetric way. The cervix length 20 μ, is bulged opposite to the lips and then evenly constricted. The somewhat flared portion, 6 μ, towards the vesicle is more heavily walled than the remainder of the spermatheca.

Chelicera: The chelicerae are impossible to examine due to their position.

Legs: Trochanter I bears six setae and genu II is of the VIII-type. Chaetotaxy of the other legs is normal. The legs are without macrosetae but the dorsal setae are on tubercles. Leg IV is illustrated in fig. 20.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY. 66/226/1) from Grewia kwebensis, Nwanedzi, Kruger National Park (Tvl.) 27.IX.1963 (M.K.P. Meyer).

Typhlodromus (Seiulus) neosentus spec. nov.
(figs. 21-29)

T.(S.) neosentus closely resembles T.(S.) sentus. However the majority of the setae on the dorsal shield are smooth in T.(S.) neosentus but serrated in T.(S.) sentus. Judging from the drawings of the latter by Pritchard and Baker (1962) the setae on the legs are very short and dorsally placed on tubercles. In T.(S.) neosentus the setae are of average length and their bases are normal.

Female: Dorsum: (fig. 21): The dorsal shield, length 358(225-) μ and width 221(195-) μ, is heavily imbricated. The shield bears 20 pairs of setae, arranged as follows: six dorsal, three median (the second pair is on the same

level as/.....

level as setae D_4) and 11 laterals (seta S_2 is on the dorsal shield and is here designated as seta L_7). These setae measure in length: D_1, M_1, L_1 and L_2, 24 (22-25) μ; D_2, D_3 and L_6, 20(19-25) μ; D_4, M_2, L_3 and L_4, 30(29-33) μ; D_5 and L_{10}, 40(-43) μ; M_3 and L_{11}, 50(47-) μ; L_5 and L_7, 35(33-36) μ; L_6, 38(35-) μ; L_8, 43(41-) μ and L_9, 47(44-) μ. The indicated longer variations for setae D_2 and D_3 are for the Punda Milia and Barberton specimens, in which these two setae are longer than seta D_1. The setae on the dorsal shield show an increase in length from anterior to posterior, except for seta D_6. The latter and seta L_{11}, both on strong tubercles, are the only serrated setae on the dorsal shield. The other setae are smooth and the lateral setae may reach to the bases of consecutive setae.

Setae S_1, length 28 μ, are on the dorsal interscutal membrane.

The slender peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes terminate just anterolateral of the bases of setae D_1.

Venter: The sternal shield (fig. 22) is folded in the holotype but measures 55-58 μ in length and 47-51 μ in width in the paratypes. The shield has a convex anterior margin and a slightly concave posterior margin and bears only two pairs of sternal setae. The lateral margins reach posteriorly only to the second pair of lyriform pores. Sternal setae III and IV are on small separate metasternal shields.

The genital shield (fig. 23) is 67(64-) μ wide with a straight posterior margin. The lateral margins are constricted posterior to the pair of setae.

The ventri-anal/.....

The ventri-anal shield (fig. 23), length 106(102-110) μ, width anterior 67(64-69) μ and posterior 71(64-71) μ, has a slightly convex anterior margin and constricted lateral margins. The shield bears four pairs of pre-anal setae and a pair of pores almost caudal to the inner posterior pair of setae and on the same level as the lateral posterior pair of setae.

The ventral interscutal membrane is provided with four pairs of setae. The caudal pair is long and smooth, measuring 37-39 μ in length. Two pairs of metapodal plates are present on the membrane with five small scattered platelets.

The peritrematal shield is fused posteriorly with the exopodal plate (fig. 24) and terminates posterior to coxa IV with a rounded caudal margin, pointed anteromedially.

Spermatheca (fig. 25): The slender, thin walled major duct measures 5 μ in length. The atrium is fully occupied by small lips, 2 μ in diameter. The cervix is slender, but diverges slightly towards the vesicle and is a little more heavily walled than the major duct.

Chelicera (fig. 26): The fixed digit, length 22 μ, is provided with four subapical teeth and a pilus dentilis. The movable digit, length 25 μ, bears a single recurved tooth on its inner margin.

Legs: The chaetotaxy of the legs is normal, except for trochanter I bearing six setae and genu II being of the VIII-type. Leg IV (fig. 27) bears a macroseta, 26 μ long, on the basitarsus. The bases of the setae on the legs are normal and not tuberculate.

Male:/.....

Male: Dorsum: The dorsal shield measures 252 μ in length and 136 μ in width. The chaetotaxy of the dorsal shield resembles that of the female. The setae are however shorter, measuring in length: D_1 and D_6, 16 μ; D_2, D_3, M_1, L_2 and L_7, 19 μ; D_4, L_1, L_3 and L_4, 22 μ; D_5, M_2, L_5 and L_6, 26 μ; M_3, 32 μ; L_8, 28 μ; L_9 and L_{10}, 26 μ and L_{11}, 29 μ.

Setae S_1, length 22 μ, are on the dorsal shield where the peritrematal shields begin to fuse antero-laterally with the dorsal shield. The peritremes reach anterior to the bases of setae D_1.

Venter: The genitosternal shield is normal with five pairs of setae and the genital opening on its anterior margin.

The ventri-anal shield (fig. 28) is triangular, length 89 μ and width 120 μ, and laterally mildly imbricated. Its anterior margin is medially convex and the lateral corners are free, not fused to the peritrematal shields. The shield bears four pairs of pre-anal setae and a pair of pores caudomedial to the inner posterior pair of setae and on the same level as the lateral posterior pair of setae. Lateral to the pre-anal setae are two pairs of pseudopores. Para-anal setae are normal.

The ventral interscutal membrane bears a single pair of setae, the caudal pair, which are 22 μ in length.

The peritrematal shield fuses posteriorly with the exopodal plate and terminates bluntly.

Chelicera: The chelicerae are in such a position that

the number/....

the number of teeth on the chelae could not be determined. The movable digit however bears a spermatophoral process, 19 μ in length, on its outer margin. This queerly shaped process is illustrated in fig. 29.

Legs: The chaetotaxy of the legs is normal, but for trochanter I bearing six setae and genu II being of the VIII-type, as in the female.

Material studied: ♀-Holotype (serial No. AcY 66/227/1) and two ♀-paratypes found in association with Ceroplastes mimosae on Acacia karroo, Pienaarspoort, Dist. Pretoria (Tvl.) 3.I.1963 (C.J. Cilliers). ♂-Allotype and one ♀-paratype from Acacia arabica, Punda Milia, Kruger National Park (Tvl.) 7.I.1964 (M.K.P. Meyer). Four ♀-paratypes found in association with eriophyid galls on Prunus sp., Barberton (Tvl.) 22.XI.1962 (P. le S. Milstein).

b. Subgenus Chiliseius González & Schuster, new status.

Chiliseius González & Schuster, 1962, Bull. Univ. Chile agric. Exp. Stn. 16:7. Type: Chiliseius camposi Gonzáles & Schuster, 1962, monotypic.

The subgenus Chiliseius is characterized by having five pairs of prolateral setae, five pairs of postlateral setae and three pairs of median setae of which two are on the postscutum. Two pairs of scapular setae are present on the dorsal interscutal membrane.

This subgenus is known only from its type species, collected from grapevine and apple trees, Chile.

c. Subgenus/.....

c. Subgenus Amblydromella Muma, new status.

Amblydromella Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 294; Muma, 1963a, Fla Ent. 46: 13. Type: Typhlodromus (Typhlodromus) fleschneri Chant, 1960, by original designation.

Neoseiulus Hughes, 1948; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 295; Schuster & Pritchard, 1963, Hilgardia 34: 198, 199; Muma, 1963a, Fla Ent. 46: 13. Type: Neoseiulus barkeri Hughes, 1948, by original designation. Misidentification.

Typhlodromus (Neoseiulus); Nesbitt, 1951, Zool. Verh., Leiden 12: 34; Womersley, 1954, Aust. J. Zool. 2: 183; Wainstein, 1962a, Acarologia 4:21; Pritchard & Baker, 1962, Hilgardia 33: 218. Misidentification.

? Anthoseius De Leon, 1959e, Ent. News 70: 258; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 296; Muma, 1963a, Fla Ent. 46: 14. Type: Anthoseius hebetis De Leon, 1959, monotypic.

Clavidromus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 296; Muma, 1963a, Fla Ent. 46: 13. Type: Typhlodromus jackmickleyi De Leon, 1958, by original designation.

Typhlodromella Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 299; Muma, 1963a, Fla Ent. 46: 14. Type: Seiulus rhenanus Oudemans, 1905, by original designation.

The subgenus Amblydromella is characterized by having ten pairs of lateral setae; six prolateral and

four/....

four postlateral. Six pairs of setae are present in the dorsal series and two in the median series. Two pairs of scapular setae are on the dorsal interscutal membrane.

The characters attributed to the genus Neoseiulus Hughes, 1948, are very vague. The description of N. barkeri, the type species of Neoseiulus, also lacks detail. No mention has been made of the number or distribution of the setae on the dorsal shield. It is therefore no wonder that the interpretations of authors differ markedly from the redescription and drawings of this species by Hughes (1961).

Nesbitt (1951) stated that an examination of the type species revealed 10 pairs of lateral setae. The redescription and drawings of N. barkeri by Chant (1959b) were apparently based on this finding since he did not state that he had the type specimen before him. Chant's drawing of the dorsal shield of the female of N. barkeri, however, bears no resemblance to the illustration of the dorsum of the male by Hughes (1948). Hughes did not illustrate the dorsum of the female in her 1948 paper.

These redescriptions of the genus Neoseiulus and its type species, led authors such as Muma (1961), Wainstein (1962a), Pritchard & Baker (1962) and others, to interpret Neoseiulus as having 10 pairs of lateral setae; six prolateral and four postlateral.

Hughes (1961), however, redescribed and illustrated her species, N. barkeri, as having nine pairs of lateral setae; four prolateral and five postlateral. She thus deemed it necessary to synonymize Neoseiulus with Typhlodromus and redescribed N. barkeri as Typhlodromus (Amblyseius) barkeri (Hughes).

An examination of the type specimens of Neoseilus by the present author convinced him that this species is a typical Amblyseius sp. and should be referred to Amblyseius sens. str.

The genus Amblydromella exhibits the characters previously ascribed to Neoseiulus and is here proposed as a subgenus to substitute for the latter.

The genus Anthoseius, since its true features are not known, is doubtfully included in this subgenus. The only clear character, according to the description of de Leon (1959e), is that it has five pairs of prolateral setae. However, a photostat of de Leon's unpublished drawing of the type species shows six prolateral setae on one side and five on the other side of the shield. Since de Leon is seriously ill and has been unable to submit the type for study by the present author, the status of Anthoseius must remain undecided for the present.

Key to the South African species of the subgenus Amblydromella: females

1. Ventri-anal shield with four pairs of pre-anal setae 3

   Ventri-anal shield with three pairs of pre-anal setae 2

2. Leg IV without macrosetae .....
   ..... transvaalensis (Nesbitt).

   Leg IV with three macrosetae .....
   ..... jackmickleyi (De Leon).

3. Seta/.....

3. Seta L_9 much shorter than seta L_8 12

Seta L_9 equal to or not much shorter than seta L_8 4

4. Seta L_{10} distally knobbed or blunt and seta M_2 equal to or shorter than the distance between its base and the base of seta L_9 5

Seta L_{10} pointed and seta M_2 reaching well beyond the base of seta L_9 .... capparidis spec. nov.

5. Seta M_2 distally knobbed 6

Seta M_2 pointed 7

6. Leg IV with three macrosetae 11

Leg IV with two macrosetae ....muliebris spec. nov.

7. Leg IV with one macroseta 8

Leg IV with two macrosetae ... apoxys spec. nov.

8. Macroseta on leg IV pointed 9

Macroseta on leg IV distally knobbed .... microbullatus spec. nov.

9. Genu II of the VII-type 10

Genu II of the VIII-type..... incisivus spec. nov.

10. Seta L_{10} distally narrowed and blunt; spermatheca with large well defined atrium ... . februs spec. nov.

Seta L_{10} not as above and atrium incorporated in cervix ..... saevus spec. nov.

11. Setae/.....

11. Setae M_3 and L_{10} knobbed .....
..... terrulentis spec. nov.
Setae M_3, L_8, L_9, L_{10} and S_1 knobbed .....
..... bullatus spec. nov.

12. Seta M_3 longer than or equal to the distance between its base and the base of seta L_9 15
Seta M_3 markedly shorter than the distance between its base and the base of seta L_9 13

13. Ventri-anal shield anteriorly and posteriorly approximately of equal width; leg III with macrosetae 14
Ventri-anal shield posteriorly narrowed; leg III without macrosetae .... paganus spec. nov.

14. Dorsal setae not thickened; genu III and tibia IV each with one macroseta .....
..... vescus spec. nov.
Dorsal setae markedly thickened; genu III, genu IV and basitarsus IV each with two macrosetae and tibia III and tibia IV each with three macrosetae ..... crassus spec. nov.

15. Leg IV with more than one macroseta; genu II normal 16
Leg IV with a single macroseta; genu II of the VIII-type ..... praeacutus spec. nov.

16. Leg IV with three knobbed macrosetae and sternal shield with three pairs of setae .....
..... buccalis spec. nov.
Leg IV with two knobbed macrosetae and sternal shield with two pairs of setae .....
..... rasilis spec. nov.

Typhlodromus/.....

Typhlodromus (Amblydromella) transvaalensis (Nesbitt), comb. nov.

Kampimodromus transvaalensis Nesbitt, 1951, Zool. Verh., Leiden 12: 55.

Typhlodromus transvaalensis; Chant 1955, Can. Ent. 87: 498.

Typhlodromus (Typhlodromus) transvaalensis; Chant, 1959b, Can. Ent. 91 (suppl. 12): 60.

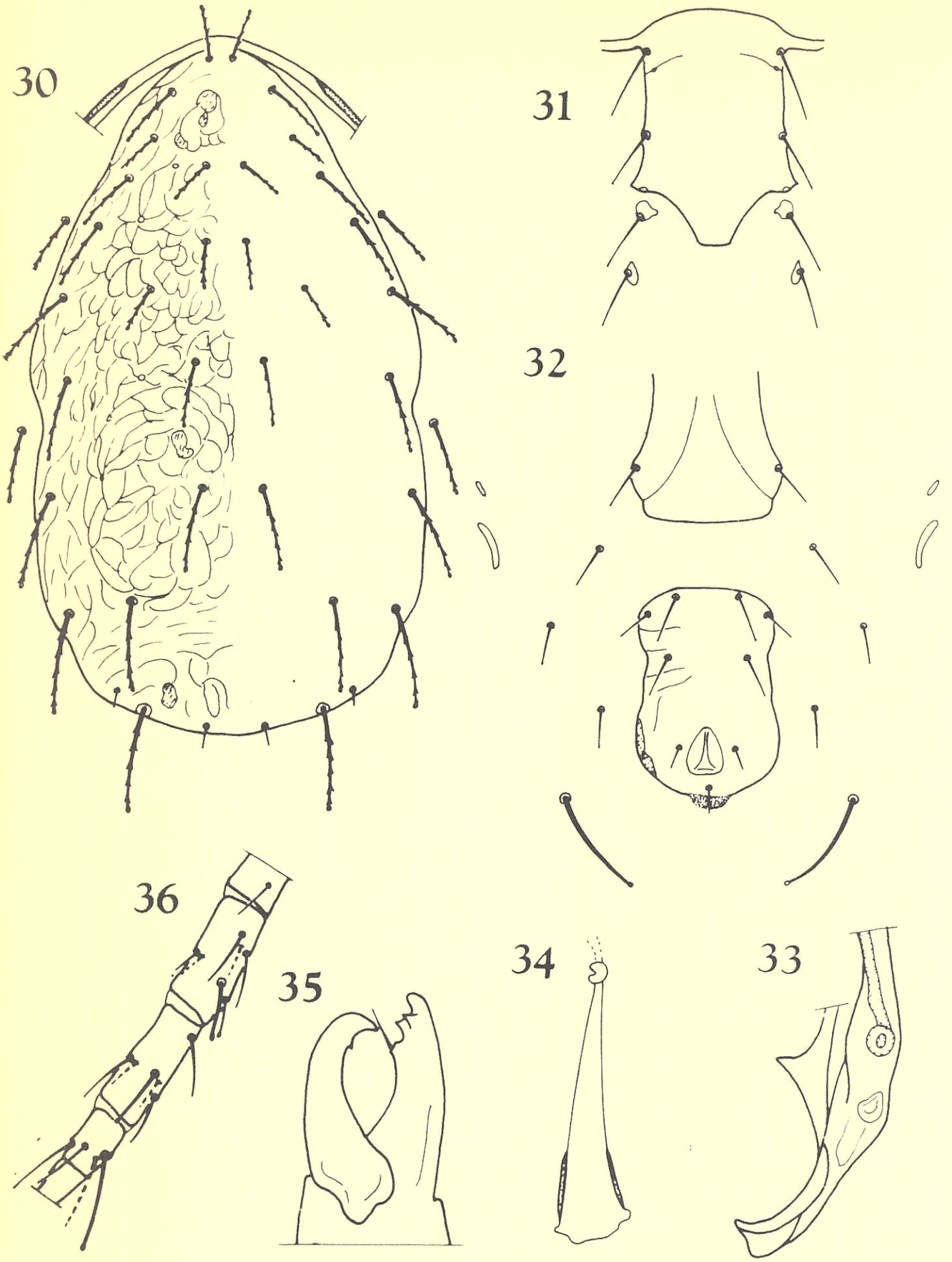
Typhlodromus (Neoseiulus) transvaalensis; Pritchard & Baker, 1962, Hilgardia 33(7): 222.

Typhlodromus (A.) transvaalensis is distinct from other species in the subgenus Amblydromella with three pairs of pre-anal setae on the ventri-anal shield, in having seta L_6 longer than the distance between its base and the base of seta L_7.

Nesbitt's original description, supplemented by the illustrations made by Chant (1959b), fully reveals the identity of this species. The present author did not encounter the species during this study and not having seen the type specimens either, is not able to comment on previous descriptions of this species. Chant (1965) designated the chaetotaxy of genu II as being of the VIII-type.

Distribution: Nesbitt described the type female of this species from peanuts, Nylstroom (Tvl.) February 1947 (R.F. Lawrence), No. 5970 in the Canadian National Collection and another female from Rattus sp., Pinellas Park (Florida) 17.XI.1947. Chant (1959b) recorded this species from leaves of Stanhopea sp.,

Panama/.....



FIGS. 30-36. Typhlodromus (Amblydromella) jackmickleyi De Leon, female

Fig.30, dorsum; fig.31, sternal shield; fig.32, posterior ventral surface; fig.33, peritrematal shield; fig.34, spermatheca; fig.35, chelicera; fig.36, leg IV.

Panama Canal Zone, collected by himself.

Typhlodromus (Amblydromella) jackmickleyi (De Leon), comb. nov.

(Figs. 30-36)

Typhlodromus jackmickleyi De Leon, 1958, Fla Ent. 41: 75.

Clavidromus jackmickleyi (De Leon); De Leon, 1962b, Acarologia 4: 474.

This species closely resembles T.(A.) transvaalensis in having relatively long lateral setae, except for seta L_9 which is minute, and three pairs of pre-anal setae. It can be distinguished from the latter in having the majority of the dorsal serrated setae distally knobbed, by the presence of three knobbed macrosetae on leg IV, by the oblong shape of the ventri-anal shield and by the sternal shield bearing only two pairs of sternal setae.

Female: Dorsum: The lightly imbricated dorsal shield (fig. 30), length 356-367 μ, width 215-230 μ, is provided with 18 pairs of setae. These setae are arranged as follows: six dorsal, two median (one anterior and one posterior), six prolateral and four postlateral. All these setae, except three pairs, are serrated and knobbed. The exceptions are seta L_2 not knobbed and setae L_9 and D_6 neither knobbed nor serrated. The setae on the dorsal shield measure in length: D_1, D_2 and D_3, 29-33 μ; D_4, L_1 and L_4, 37-42 μ; D_5 and L_5, 45-48 μ; D_6 and L_9, 11-13 μ; M_1, 25-29 μ; M_2, 52-57 μ;

L_2, 23-26 μ/.....

L_2, 23-26 μ; L_3, 35-40 μ, L_6, 47-52 μ; L_7, 52 -56 μ; L_8, 56-59 μ and L_{10}, 62-68 μ. All setae thus of moderate length, except D_6 and L_9 which are very short. Setae L_1, L_2, L_3 and L_8 are longer than the distances between their bases and the bases of the respective setae following next in the series. Seta L_4 in some specimens equals the distance between its base and the base of seta L_5. Setae D_1 and M_2 are also longer than the distances between their bases and the bases of setae L_1 and L_9 respectively.

Setae S_1 and S_2, 34 μ and 39-43 μ long respectively, both serrated and knobbed, are placed on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes reach to the level of setae L_1.

Venter: The much longer, 92 -100 μ, than broad, 63 -68 μ, sternal shield (fig. 31) bears only two pairs of sternal setae. The lateral margins reach posteriorly only to the lyriform pores and taper then to form a prominent median lobe with a short posterior margin. Sternal setae III and IV are placed on small separate irregularly shaped metasternal shields.

The genital shield (fig. 32), 78-84 μ wide, bears a pair of setae and is caudally narrowed with an almost straight posterior margin. In some specimens the caudal portion of the shield is not as markedly narrowed as illustrated.

The laterally imbricated oblong ventri-anal shield (fig. 32), length 112-120 μ and breadth 74-81 μ has three/....

has three pairs of pre-anal setae. The pores usually present on the shield could not be observed in any of the specimens. The lateral margins of the shield are unevenly waisted. Para-anal setae normal.

The ventral interscutal membrane is provided with four pairs of setae. The caudal pair is 56-59 μ long and knobbed. Two pairs of metapodal plates are also present on the membrane.

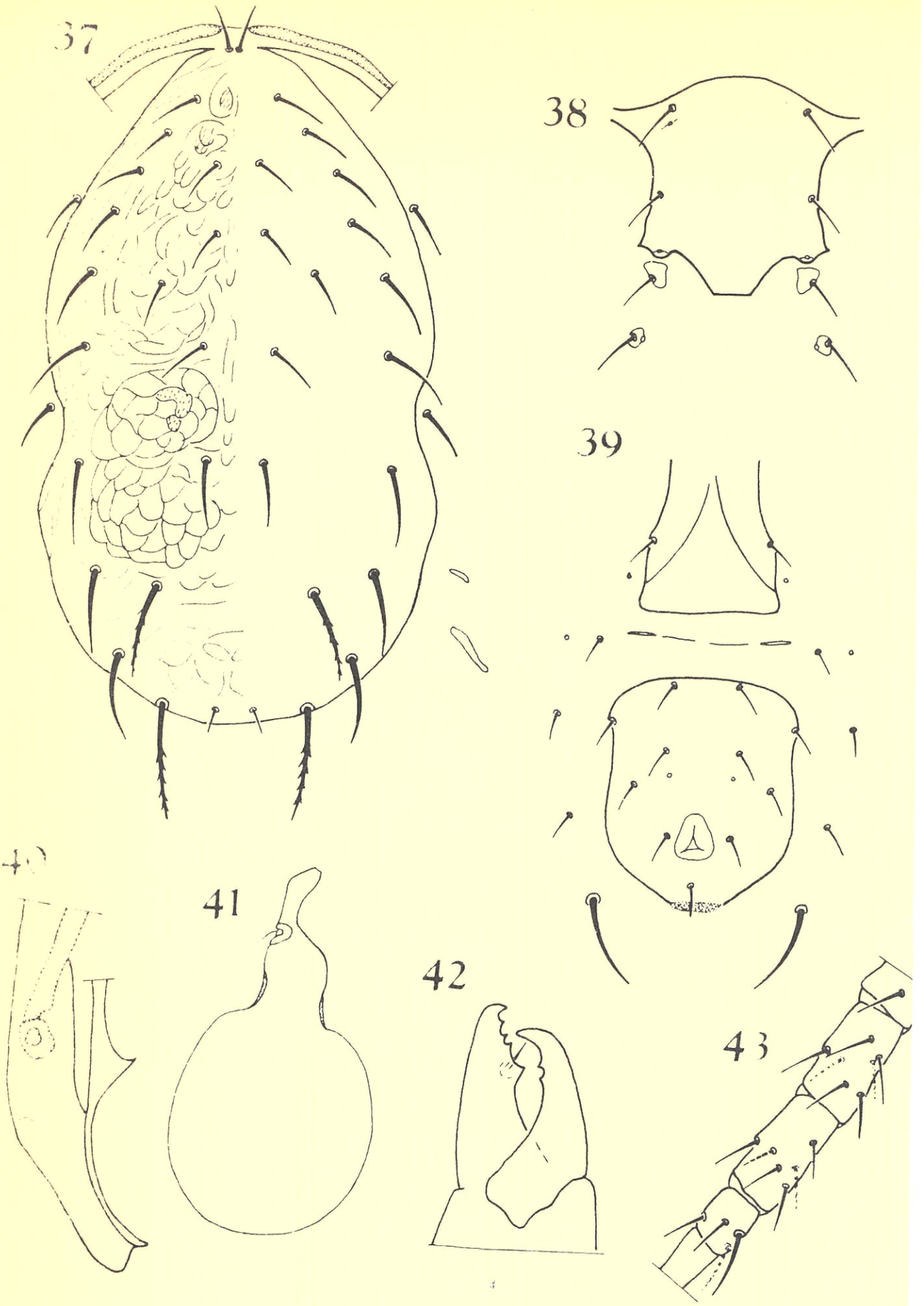
Posteriorly the peritrematal shields (fig. 33) are fused to the exopodal plates and curved around coxae IV, terminating ventromedially with a broad end.

Spermatheca (fig. 34): The major duct of the spermatheca is impossible to trace due to its poorly sclerotized nature. The atrium, only 2 μ in diameter, is fully occupied by the lips. The cervix, 17-20 μ in length, is very thin walled and gradually increases in diameter towards the vesicle. The portion, 5-7 μ, adjacent to the vesicle is however thick walled. None of the females were fertilized and the vesicle has a deflated appearance. De Leon (1962b) illustrated only the thick walled portion of the cervix.

Chelicera (fig. 35): The fixed digit, 30 μ in length, bears two subapical teeth and a pilus dentilis. The movable digit, also 30 μ in length, bears a single tooth on its inner margin.

Legs: Chaetotaxy of the legs is normal, except for trochanter I bearing six setae and genu II being of the VIII-type. Only leg IV (fig. 36) bears knobbed macrosetae, measuring in length: 24-27 μ on the genu, 27-30 μ on the tibia and 45-48 μ on the

basitarsus./.....



FIGS. 37-43. Typhlodromus (Amblydromella) capparidis spec. nov., female

Fig.37, dorsum; fig.38, sternal shield; fig.39, posterior ventral shield; fig.40, peritrematal shield; fig.41, spermatheca; fig.42, chelicera; fig.43, leg IV.

basitarsus. The female collected from Citrus sp., Nelspruit, has an additional knobbed macroseta, 21 μ long, on the tibia as illustrated.

Male: Unknown.

Distribution: De Leon (1958) described this species from the ♀-holotype from Conocarpus erecta in association with T. ellipticus De Leon, Coral Gables (Florida) 16.X.1956 (De. De Leon), deposited in the University of Florida Collections, Gainsville.

Material studied: 21 ♀♀ from virgin soil, Empangeni (Natal) 6.I.65-5.IV.65 and 24.VIII.1965 (G. Nel). Thirty ♀♀ from soil in cane fields, Saccharum officinarum, variety 376, Empangeni (Natal) 18.I.1965-19.IV.65 and 8.VI.65-2.IX.65 (G. Nel) and a single ♀ from leaves of Citrus sp., Nelspruit (Tvl.) February, 1965 (J.F. de Villiers).

Typhlodromus (Amblydromella) capparidis spec. nov.

(Figs. 37-43)

T.(A.) capparidis is distinct amongst related species with setae L_7, L_8 and L_9 long, in that seta M_2 reaches well beyond the base of seta L_9. Its closest relative is probably T.(A.) microbullatus spec. nov. It differs, however, from the latter in having seta L_{10} pointed and the ventri-anal shield smooth.

Female: Dorsum (fig. 37): The dorsal shield measures 304(300-313) μ in length and 165(-180) μ in width. The shield is imbricated and bears 18 pairs of setae distributed as follows: six dorsal, two median (one anterior and one posterior), six prolateral and four/.....

and four postlateral. These setae measure: D_1, L_2 and M_1, 24(22-25) μ; D_2 and D_3, 20(19-22) μ; D_4, 25(24-25) μ; D_5 and L_5, 32(30-33) μ; D_6, 13 μ; M_2, 43(42-46) μ; L_1, L_3 and L_4, 27(-30) μ; L_6, 34(-36) μ; L_7, 38(37-39) μ; L_8 and L_9, 40(39-41) μ and L_{10}, 56(-60) μ. The setae are thus all, except D_6, of moderate length. Setae L_1 and L_9 are longer than and setae L_2, L_3 and L_8 are equal to the distances between their bases and the bases of the setae following next in the series. Seta M_2, serrated, is longer than the distance between its base and the base of seta L_9. Seta L_{10} is serrated and distally sharp.

Setae S_1 and S_2, both 30(28-31) μ in length, are situated on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally to the dorsal shield and the peritremes reach anterolaterally to the bases of the closely spaced setae D_1.

Venter: The sternal shield (fig. 38) measures 76(74-80) μ in length and 58(56-58) μ in width. The shield bears only two pairs of setae and terminates laterally just caudal to the second pair of lyriform pores. The posterior margin has a broad V-shaped median lobe with a short straight posterior margin. Laterally, the shield is slightly lobed. Sternal seta III are placed on large roughly triangular shields and setae IV on smaller oval metasternal shields.

Genital shield (fig. 39), width 58(56-60) μ, normal with a pair of setae and a straight posterior margin.

The smooth ventri-anal shield (fig. 39) is

broader/.....

broader at 76(74-80) μ than the genital shield and 98(97-100) μ in length. The shield is provided with four pairs of well spaced pre-anal setae and a pair of pores caudal to the inner posterior pair of setae. The anterior margin is flatly convex with rounded lateral corners and the lateral margins are slightly concave. Para-anal setae normal.

Between the genital and ventri-anal shield four longish platelets are present on the interscutal membrane; the inner pair being very slender. Laterally two pairs of small platelets and, still more laterally, two pairs of much longer metapodal plates are present. Four pairs of setae are also present on the membrane, with the caudal pair 39(37-40) μ in length.

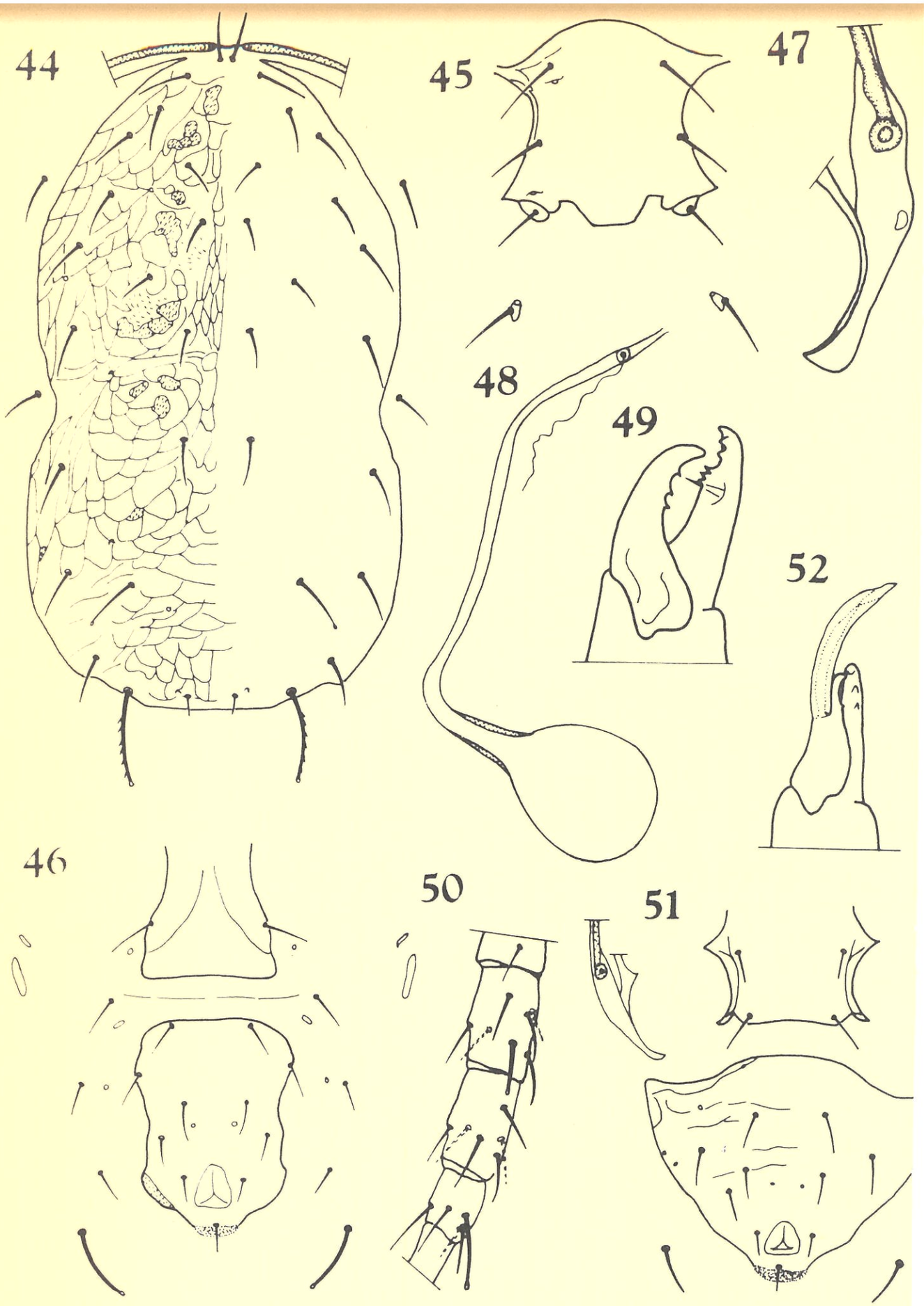
The peritrematal shield fuses posteriorly (fig. 40) with the exopodal plate. The former ends caudomedially broad and the latter pointed.

Spermatheca (fig. 41): The major duct, slightly swollen, measures 8 μ in length with the lips closer to the former. An atrium is absent. The cervix suddenly broadens from the major duct to become a relatively short, 9 μ, and wide tube of 8 μ diameter. The first half of the cervix is thin walled and the second half relatively thick walled.

Chelicera (fig. 42): The fixed digit, length 31 μ, of the chelicera bears four teeth and a pilus dentilis on the distal half of its inner margin. The movable digit, length 34 μ, bears two teeth on its inner margin.

Legs: Except for trochanter I which bears six setae, the chaetotaxy of the legs is normal. Only the

basitarsus/.....



FIGS. 44-52. Typhlodromus (Amblydromella) muliebris spec. nov. Fig.44, dorsum, female; fig.45, sternal shield, female; fig.46, posterior ventral surface, female; fig.47, peritrematal shield, female; fig.48, spermatheca, female; fig.49, chelicera, female; fig.50, leg IV, female; fig. 51, posterior ventral surface, male; fig.52, chelicera , male.

basitarsus of leg IV (fig. 43) bears a sharp or blunt macroseta, 25-26 μ in length.

Male: unknown.

Material studied: ♀-Holotype (serial no. AcY 66/228/1) and five ♀-paratypes from leaves of Capparis citrifolia, Addo Elephant National Park, Addo (C.P.) 11.I.1965 (G.G. van der Merwe). Two ♀-paratypes from leaves of Ballota africana, Oudtshoorn (C.P.) 25.I.1965 (M.K.P. Meyer). One ♀-paratype from leaves of Malvacea sp. 30 miles west of Port Elizabeth (C.P.) 13.I.1965 (M.K.P. Meyer) and three ♀-paratypes from leaves of Malvacea sp., Grahamstown (C.P.) 9.I.1956 (P.A.J. Ryke).

Typhlodromus (Amblydromella) muliebris spec. nov.

(Figs. 44-52)

This species is unique amongst related species in having a very long slender spermatheca. The other characters, such as the chaetotaxy of the dorsum and the macrosetae on leg IV, resemble T.(A.)apoxys spec. nov. However, it differs from the latter in having seta M_2 smooth and distally knobbed, the sternal shield bearing three pairs of setae and in the shape of the ventri-anal shield.

Female: Dorsum (fig. 44): The clearly imbricated dorsal shield, length 343(353) μ and breadth 195(193) μ, is provided with dorsomedian rugose patches and six pairs of pores. The shield bears 18 pairs of setae distributed as follow: six dorsal, two median (one anterior and one posterior), six prolateral and four postlateral. These setae measure in length: D_1, D_5, L_2 and L_3, 25(23) μ; D_2, 19(17) μ; D_3, D_4 and M_1,/.....

and M_1, 21(19) μ; D_6, 11 μ; M_2, 30(28) μ; L_1, 32(30) μ; L_4 and L_9, 27(25) μ; L_5, L_6, L_7 and L_8, 28(26) μ and L_{10}, 51(47) μ. Setae M_2 and L_{10} are knobbed and the latter is also serrated. Only setae L_1 and L_2 are longer, the others are shorter, than the distances between their bases and the bases of consecutive setae, Seta D_1 is longer than the distance between its base and the base of seta L_1, while seta M_2 is only three-quarters as long as the distance between its base and the base of seta L_9.

Setae S_1 and S_2, 27(25) μ and 23(21) μ long respectively, are placed on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes reach anterolaterally to the bases of seta D_1.

Venter: The sternal shield (fig. 45), length 85 μ and breadth 67 μ, is provided with three pairs of setae. The posterior margin is lobate. The lateral lobe gives the impression of a separate shield that is fused with the sternal shield. The median lobe is broad with a straight posterior margin.

The genital shield, width 71 μ, is normal and bears a pair of setae.

The shield-shaped ventri-anal shield (fig. 46), length 111(109) μ and breadth 80(78) μ, has slightly constricted lateral margins. The outline of the shield is somewhat irregular. Four pairs of pre-anal setae are widely spaced on the shield; the caudolateral pair lies on the posterior half of the shield. A pair of well-separated pores lies caudal to the inner

posterior/.....

posterior pair of setae. The normal three para-anal setae are present.

The ventral interscutal membrane flanking the ventri-anal shield is provided with four pairs of setae, VL_1 being 43(39) μ long and knobbed. Three pairs of platelets are also present on the membrane in addition to the two pairs of metapodal plates. Between the genital and ventri-anal shields are a long slender line of four platelets.

The peritrematal shield is fused with the exopodal plate (fig. 47) while curving around coxa IV, ending with a sharp inner corner and a rounded outer corner.

Spermatheca (fig. 48): The spermatheca is extra-ordinarily long and tubelike. No atrium is discernible and the lips occupy the whole width of the tube. The cervix is 56 μ long and flares slightly towards the vesicle. This flared portion, 8 μ long, has thickened walls.

Chelicera (fig. 49): The movable digit, length 29 μ, of the chelicera is provided with three recurved teeth on its inner margin. The fixed digit, length 26 μ, bears five teeth and a pilus dentilis on the distal half of its inner margin. The proximal three of these five teeth are closely grouped.

Legs: Leg IV (fig. 50) bears a knobbed macroseta, length 21 μ, on the genu and a knobbed macroseta, length 30 μ, on the basitarsus. The setae on the tibia are normal. The other legs and their chaetotaxy are normal, except for trochanter I bearing six setae and genu II being of the VIII-type.

Male: Dorsum: /.....

Male: Dorsum: The chaetotaxy of the dorsal shield of the male resembles that of the female. The setae are however relatively shorter: D_1, D_5 and L_2, 17 μ; D_2, D_3, D_4 and M_1, 14 μ; D_6, 11 μ; M_2, 23 μ; L_1, 25 μ; L_3, L_4, L_5 and L_6, 21 μ; L_7, L_8 and L_9, 19 μ and L_{10}, 36 μ. Setae L_1 and L_2 respectively equal the distances between their bases and the bases of setae L_2 and L_3. Seta L_{10} is serrated and knobbed and seta M_2 is smooth with a very small distal knob.

Setae S_1 and S_2, both 20 μ in length, are placed on the dorsal shield.

The peritrematal shields are fused anterolaterally with the dorsal shield and the peritremes reach anterolaterally to the bases of setae D_1.

Venter: The sternal shield is normal with five pairs of setae and the genital opening on its anterior margin.

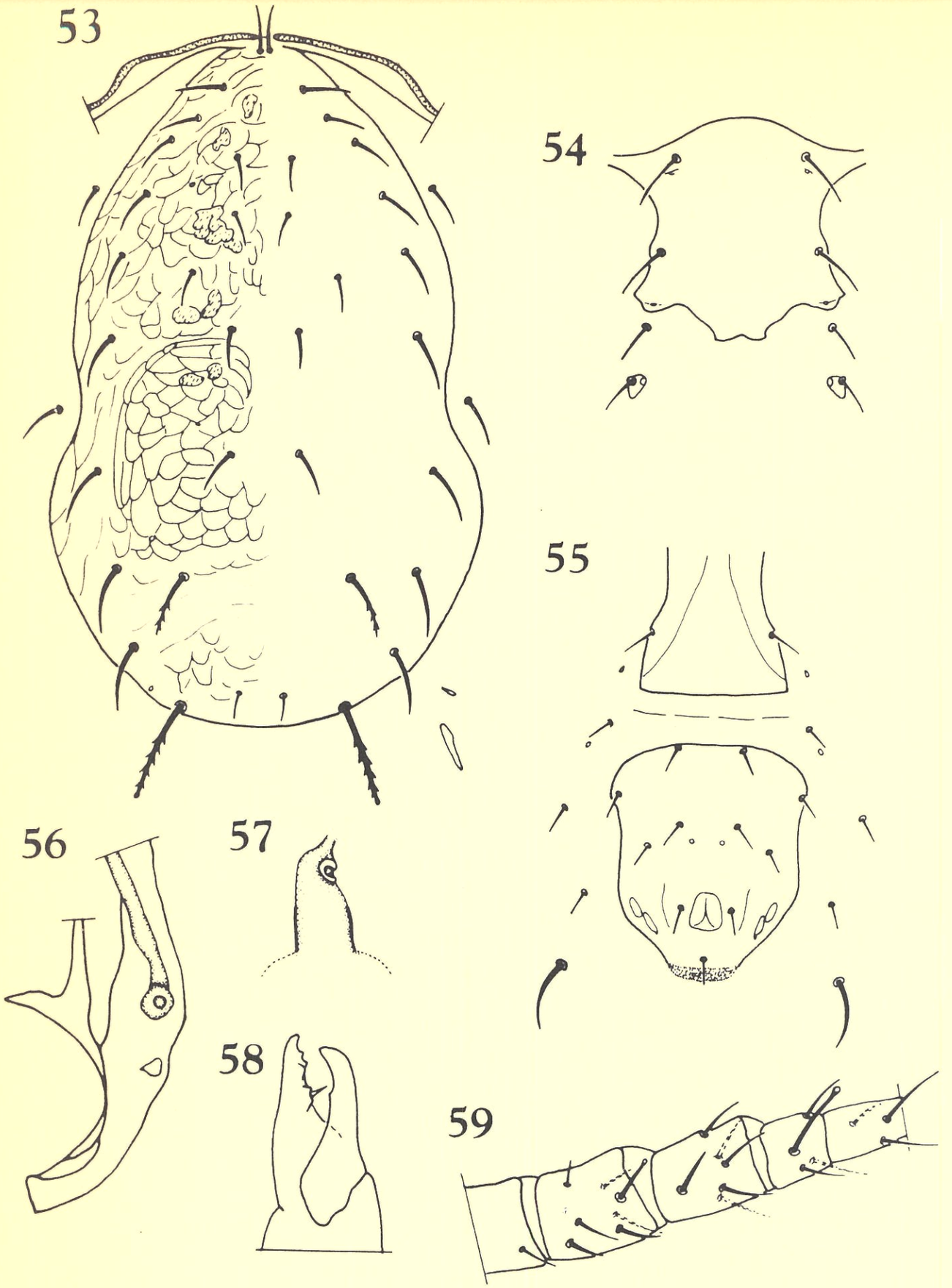
The ventri-anal shield (fig. 51), length 91 μ and breadth 123 μ, bears four pre-anal setae on one side and three on the other side, with a pair of pores caudomedial to the inner posterior pair of setae. Para-anal setae normal. The mildly imbricated shield is triangular in shape with a convex median anterior margin.

The posterior extremities of the peritrematal shields are not fused to the ventri-anal shield but are well separated from the latter.

A single pair of ventrolateral setae, measuring 24 μ in length, is present on the interscutal membrane.

Chelicera (fig. 52): The fixed digit bears two subapical teeth on its inner margin. A pilus dentilis

could/.....



FIGS. 53-59. Typhlodromus (Amblydromella) apoxys spec. nov., female

Fig.53, dorsum; fig.54, sternal shield; fig.55, posterior ventral surface; fig.56, peritrematal shield; fig.57, spermatheca; fig.58, chelicera; fig.59, leg IV.

could not be discerned, probably due to the position of the digit. The movable digit, with a single tooth, bears a 30 μ long spermatophoral bearer on its outer margin. Ventrally observed this process resembles a slightly bent tube, distally tapered to a sharp point.

Legs: The chaetotaxy of the legs is normal, except for trochanter I bearing six setae and genu II being of the VIII-type, as in the female. Leg IV bears two knobbed macrosetae, the one on the genu being 15 μ long and that on the basitarsus 22 μ.

Material studied: ♀-Holotype (serial no. AcY 66/229/1), ♂-allotype and one ♀-paratype from leaves of Chrysophyllum megalismontanum, Nelspruit (Tvl.) 2.IV.1955 (P.A.J. Ryke).

Typhlodromus (Amblydromella) apoxys spec. nov.

(Figs. 53-59)

T.(A.) apoxys is distinctive amongst South African Amblydromella species in having genu III of the VI-type. Its general appearance resembles T.(A.) saevus spec. nov., but it can easily be distinguished from the latter by the two knobbed macrosetae on leg IV.

Female: Dorsum (fig. 53). Dorsal shield, length 306(300-306) μ, with anterior half narrower than posterior half which is 196(186-196) μ wide. The shield is imbricated, with two pairs of pores and dorsomedian rugose patches. There are 18 pairs of setae on the shield, distributed as follows: six dorsal, two median (one anterior and one posterior) six prolateral and four postlateral. These setae measure in length: D_1, D_4, M_1, and L_2, 19(19 -19) μ; D_2 and D_3, 16(14-16) μ; D_5, L_1 and L_5,/.....

and L_5, 24(21-24) μ; D_6, 12-13 μ; M_2, L_8 and L_9, 32(28-32) μ; L_3 and L_4, 22(20-22) μ; L_6, 26(24-26) μ; L_7, 29(27-29) μ and L_{10}, 49(45-49) μ. Setae L_1 and L_2 are longer than the respective distances between bases $L_1 - L_2$ and $L_2 - L_3$. Setae L_8 and L_9 are slightly shorter than the distances between their bases and the bases of setae following next in the series. The length of the serrated seta M_2 equals approximately half the distance between its base and the base of the serrated and knobbed seta L_{10}.

Setae S_1 and S_2, 22(20-22) μ and 24(22-24) μ long respectively, are located on the dorsal interscutal membrane.

The peritrematal shields, anteriorly narrow, fuse anterodorsally with the dorsal shield. The peritremes reach to just anterior of the bases of the closely spaced setae D_1.

Venter: The sternal shield (fig. 54) bears only two pairs of sternal setae. The shield is longer, 70(65-70) μ, than broad, 50(48-52) μ, due to the presence of a large median lobe. Laterally, the shield extends to just posterior to the second pair of lyriform pores. Sternal setae III are situated on the interscutal membrane and sternal setae IV are located on triangular metasternal shields.

The genital shield (fig. 55), width 60(58-60) μ, has a pair of setae and a straight posterior margin.

The ventri-anal shield (fig. 55), 100(97-100) μ long and anteriorly 84(80-84) μ wide, has a slightly convex anterior margin, rounded lateral corners and

slightly/....

slightly constricted lateral margins. The shield is somewhat less wide across the anus than across the first lateral pair of pre-anal setae. The shield bears four pairs of pre-anal setae and a pair of pores caudomedial to the inner posterior pair of setae. Para-anal setae normal.

The ventral interscutal membrane is provided with four pairs of setae; the caudal pair being long, 30(26-30) μ. Between the genital and ventri-anal shields lie four slender platelets with two small rounded platelets laterally. Two pairs of metapodal plates are also present on the membrane.

The peritrematal shield fuses posteiorly with the exopodal plate (fig. 56) and ends truncated.

Spermatheca (fig. 57). The major duct of the spermatheca could not be followed along its whole length, but is probably very short. The spermatheca is swollen across the small lips but lacks the dark appearance of the normal atrium. This pseudo-atrium becomes the short, 8 μ, cervix. The last two-thirds of the broad, 6 μ, cervix is more thick-walled than the first part.

Chelicera (fig. 58): The fixed digit, length 20 μ, bears three subapical teeth and a pilus dentilis. The movable digit, length 20 μ, bears a single tooth on its inner margin.

Legs: Chaetotaxy: trochanter I with six setae and genu III of the VI-type. The other legs are normal. Leg IV (fig. 59) with a knobbed macroseta, length 23(20-23) μ, on the basitarsus. Genu IV also bears a knobbed macroseta in the holotype, but in the paratypes

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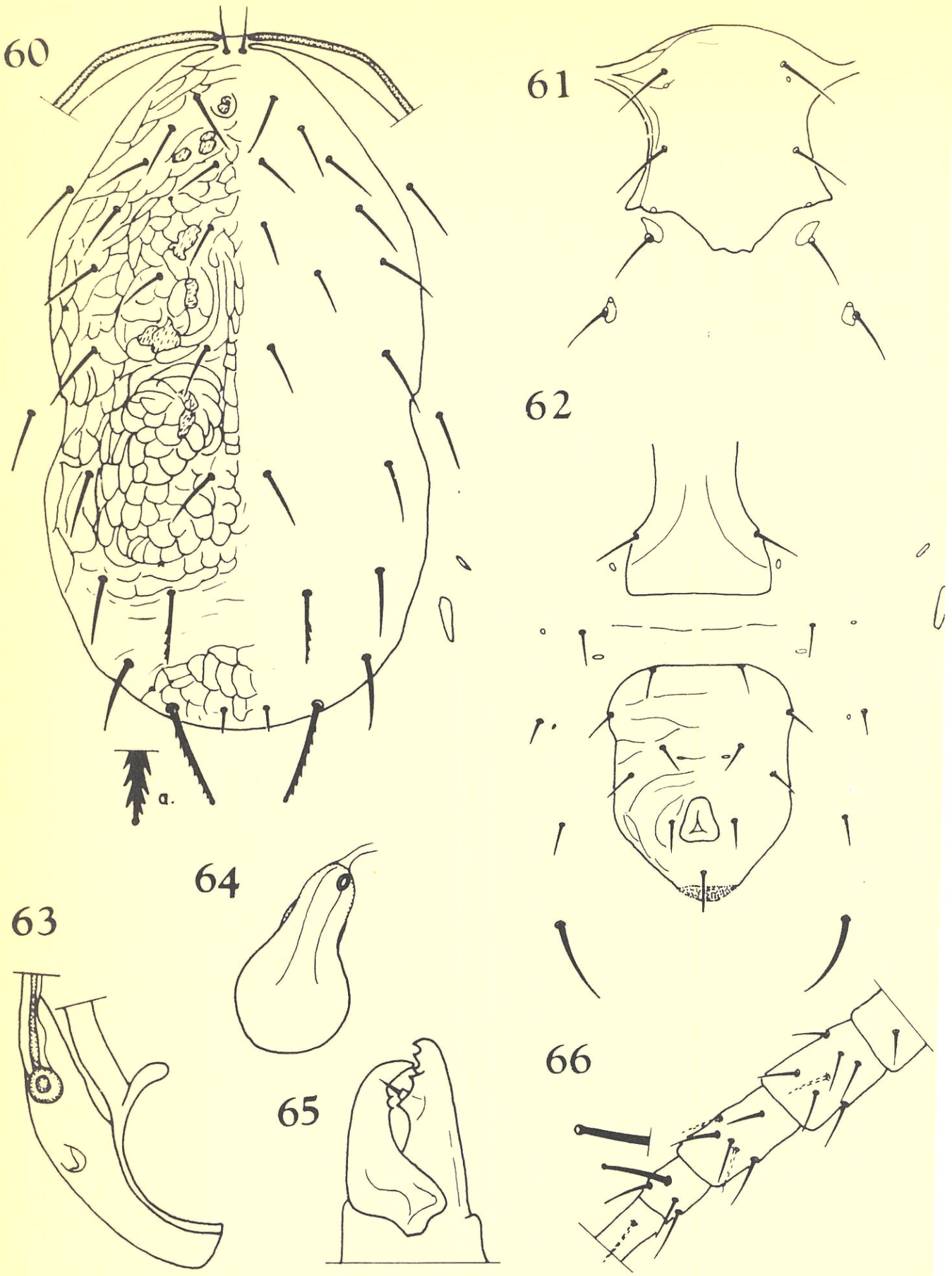


FIGS. 60-66. Typhlodromus (Amblydromella) microbullatus spec. nov., female

Fig.60, dorsum; fig.61, sternal shield; fig.62, posterior ventral surface; fig.63, peritrematal shield; fig.64, spermatheca; fig.65, chelicera; fig.66, leg IV.

this seta is blunt to sharp.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/230/1) from unidentified plant, Munster (Natal) 19.XI.1955 (M.K.P. Meyer). Two ♀-paratypes from leaves of Diospyros dichrophylla, East London (C.P.) 16.I.1965 (G.G. van der Merwe) and one ♀-paratype from leaves of Combretum imberbe, Kruger National Park grid N216 (Tvl.) 13.I.1964 (P. Jordaan).

Typhlodromus (Amblydromella) microbullatus spec. nov.

(Figs. 60-65)

T.(A.) microbullatus is related to T.(A.) capparidis. The differences between these species were discussed under the latter.

Female: Dorsum (fig. 60): The imbricated dorsal shield, length 292(282-296) μ and breadth 167(1962-169) μ, bears dorsomedian rugose patches and four pairs of pores. The shield bears 18 pairs of setae, distributed on the shield as follows: six dorsal, two median (one anterior and one posterior) six prolateral and four postlateral. These setae measure in length: D_1, D_2, D_3 and M_1, 21(18-21) μ; D_4 and L_2, 23(22-24) μ; D_5 and L_4, 28(25-28) μ; D_6, 11-12 μ; M_2, 33(32-34) μ; L_1 and L_3, 26(24-) μ; L_5, L_6, L_7, L_8 and L_9, 31(29-32) μ and L_{10}, 46(45-50) μ. Setae M_2 and L_{10} are serrated. The latter is also knobbed; the enlarged distal detail is illustrated in fig. 60a. The setae on the shield are of moderate length with setae L_1, L_2 and L_9 longer than and setae L_3 and L_4 equal in length to the distances between their bases and the bases of setae following

next/.....

next in the series. Seta M_2 is slightly shorter than the distance between its base and the base of seta L_9.

Seta S_1, length 28(26-28) μ, and seta S_2, length 25(23-25) μ, are placed on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes reach antero-laterally to the bases of setae D_1.

Venter: The sternal shield (fig. 61), length 74(-82) μ and breadth 52(-58) μ, has a strong median lobe and bears only two pairs of setae. The lateral margins of the shield reach posteriorly only to the second pair of lyriform pores. Sternal setae III and IV are present on small shields of almost equal size.

The genital shield (fig. 62) width 55(-59) μ, is distinctly narrower than the ventri-anal shield, width 72(-78) μ and length 90(-98) μ. The latter is shield-shaped and bears four pairs of well spaced pre-anal setae and a pair of pores just caudo-medial to the inner pair of pre-anal setae. Para-anal setae normal.

The interscutal membrane bears four pairs of setae, VL_1 being 34-37 μ in length. The membrane is also provided with two pairs of metapodal plates, the secondary pair being not much larger than some of the sclerotized plates on the membrane.

The peritrematal shield (fig. 63) fuses with the exopodal plate and curves around coxa IV terminating in a truncated broad end with the posterior corner somewhat rounded.

Spermatheca (fig. 64): The atrium and cervix are bell-shaped, length 10-12 μ, and are indistinctly

separated/.....

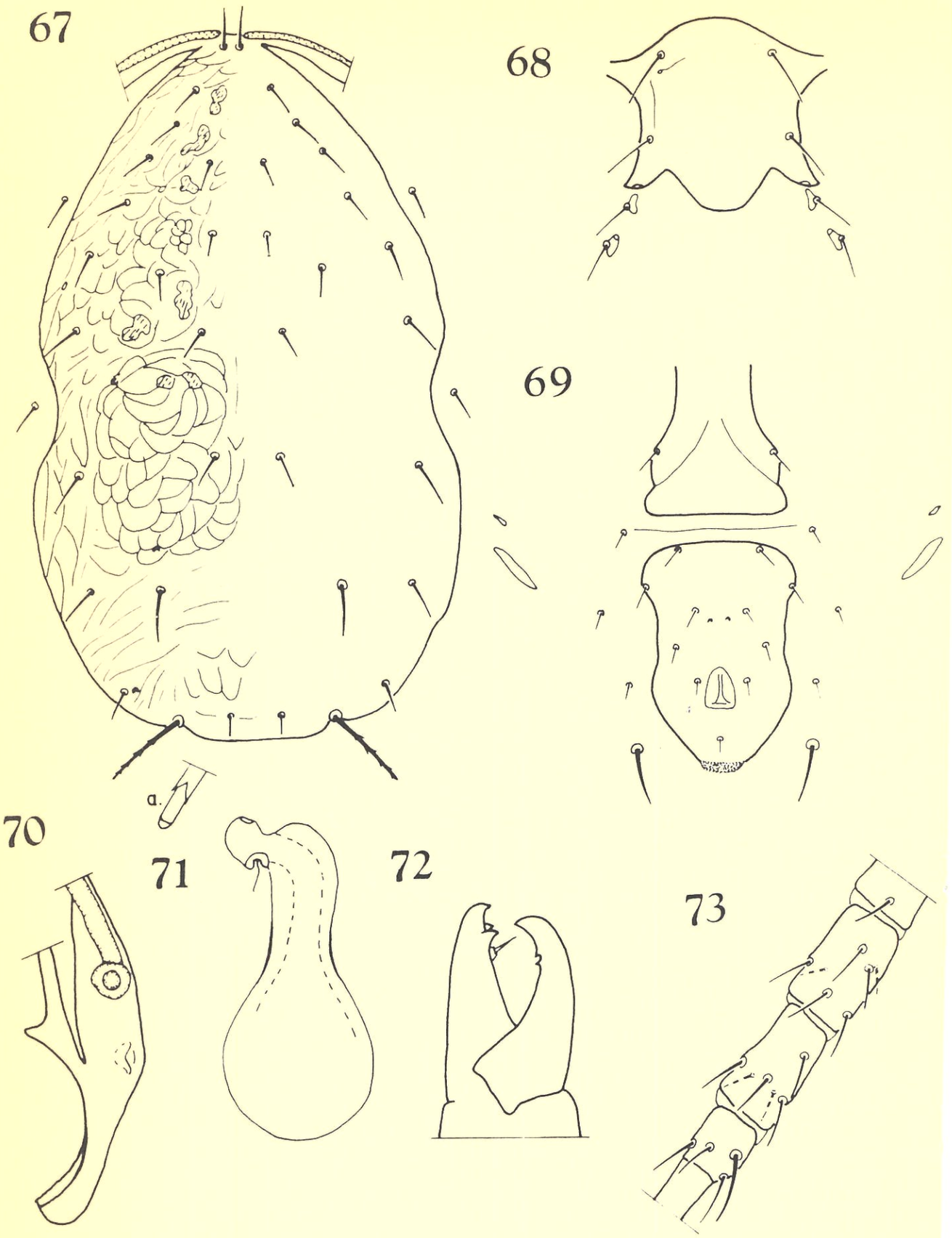
separated from each other. The distal part, 5-6 μ, of the cervix is distinctly sclerotized. The lips are rather small and located close to the major duct. This duct is very faint.

Chelicera (fig. 65): The movable digit, length 21 μ, bears two teeth. The fixed digit, length 21 μ, bears four strong teeth and a pilus dentilis.

Legs: Leg IV (fig. 66) bears a knobbed macroseta, length 24(20-24) μ, on the basitarsus. The chaetotaxy of the legs is normal, except for trochanter I having six setae.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/231/1) and six ♀-paratypes from leaves of an unidentified plant, Munster (Natal) 15.IV.65 (M.K.P. Meyer). One ♀-paratype from grass, Munster (Natal) 20.IV.55 (M.K.P. Meyer). One ♀-paratype from leaves of Ficus sp., Munster (Natal) 15.IV.1955 (M.K.P. Meyer). One ♀-paratype from leaves of Malvacea sp., Munster (Natal) 19.IV.1955 (M.K.P. Meyer). One ♀-paratype from leaves of Croton sylvaticus, Insuzi Drift, Tugela River, Kranskop (Natal) 28.XI.1962 (G.G. van der Merwe). One ♀-paratype from leaves of Compositae sp., Mariann Hill near Durban (Natal) 26.XI.1962 (G.G. van der Merwe). One ♀-paratype from leaves of Cynachum obtusifolium, Amanzimtoti (Natal) 1.XII.1962 (G.G. van der Merwe). One ♀-paratype from leaves of Trimeria grandifolia, Ntwalume Drift near Umkomaas (Natal) 3.XII.1962 (G.G. van der Merwe). One ♀-paratype from unidentified plant, Palm Beach (Natal) 19.IV.1955 (M.K.P. Meyer). Two ♀-paratypes from leaves



FIGS. 67-73. Typhlodromus (Amblydromella) incisivus spec. nov., female

Fig. 67, dorsum; fig.68, sternal shield; fig.69, posterior ventral surface; fig.70, peritrematal shield; fig.71, spermatheca; fig.72, chelicera; fig.73, leg IV.

of Impomoca purpurea, Port Edward (Natal) 13.V.1965 (M.K.P. Meyer). Two ♀-paratypes from leaves of Dalenchampia capensis, East London (C.P.), 16.I.1965 (G.G. van der Merwe). Two ♀-paratypes from Rhus pyroides, Igoda River near East London (C.P.) 17.I.1965 (G.G. van der Merwe). One ♀-paratype from leaves of Trimeria rotundifolia, Storms River Mouth (C.P.) 20.I.1965 (M.K.P. Meyer). Two ♀-paratypes from leaves of Rubis pinatus, Homtini Pass near Knysna (C.P.) 22.I.1965 (M.K.P. Meyer) and one ♀-paratype from an unidentified plant, Knysna (C.P.) 6.I.1956 (P.A.J. Ryke).

Typhlodromus (Amblydromella) incisivus spec. nov.

(Figs. 67-73)

This species has relatively short setae on the dorsal shield and closely resembles T.(A.) terrulentis spec. nov. T.(A.) zatari (Chaudri) and T.(A.) nodosus (De Leon). It differs from these species in having a single sharp macroseta on leg IV. The other three species have three knobbed or spatulate macrosetae on leg IV. T.(A.) incisivus also differs from these species in the asymmetric shape of its spermatheca.

Female: Dorsum (fig. 67): The lateral waisted dorsal shield, length 352(346-374) μ and width 226(219-235) μ, is imbricated with dorsomedian rugose patches and five pairs of pores. The shield bears 18 pairs of setae arranged as follows: six dorsal, two median (one anterior and one posterior), six prolateral and four postlateral. These setae measure in length: D_1, L_4 and L_8, 22(21-24) μ; D_2 and D_3, 15(13-15) μ; D_4, D_5, L_1, L_3 and L_9, 19(18-21) μ; D_6, 10-11 μ;

M_1 and L_2,/.....

M_1 and L_2, 17(16-18) μ; M_2, 31(30-34) μ; L_5 and L_6, 24(23-26) μ; L_7, 26(25-29) μ and L_{10}, 49(48-53) μ. The setae are thus relatively short and there is only a slight difference in their respective lengths. None of these setae reach to the bases of the consecutive setae. Seta M_2 is smooth and much shorter than the distance between its base and the base of seta L_9. Seta L_{10} is serrated, distally hyaline and obtuse (fig. 67 a).

Setae S_1 and S_2, both 19(18-20) μ long, are present on the dorsal interscutal membrane.

The peritrematal shields fuse anterodorsally with the dorsal shield and the peritremes reach almost anterior to the bases of setae D_1.

Venter: The posteriorly lobed sternal shield (fig. 68), length 74(74-80) μ and width 58(56-60) μ, bears two pairs of sternal setae. The lateral margins of the shield reach posteriorly to the second pair of lyriform pores. From these pores the posterior margin is anteriorly incised, forming two caudolaterally tapered lateral lobes and a prominent median lobe. Sternal setae III and IV are placed on small separate metasternal shields.

The genital shield bears a pair of setae (fig. 69), and is posteriorly somewhat dilated, width 71(69-72) μ, with a straight posterior margin.

The longer, 110(108-115) μ, than broad, 80(76-84) μ, ventri-anal shield (fig. 69) is dilated anteriorly and across the anus. The lateral margins in between are slightly undulate and almost parallel. The shield is provided with four pairs of short pre-anal setae and a pair of pores equidistant caudomedially from the inner

posterior/.....

posterior pair of setae. Para-anal setae are normal.

The ventral interscutal membrane bears four pairs of setae. The first three pairs are very short. The much longer caudal pair measures 28(-32) µ. Between the genital and ventri-anal shields lies a long slender platelet with two pairs of metapodal plates laterally.

The peritrematal shield fuses caudally with the exopodal plate (fig. 70) and ends bluntly, caudomedial to coxa IV.

Spermatheca (fig. 71): The asymmetric spermatheca has a short, 5 µ, swollen major duct. This duct opens laterally into the cervix, with the lips present at the narrowed fusion. There is no atrium present. The vesicle resembles a bell 21 µ long and 8 µ broad. The last portion, 8 µ, of the cervix towards the vesicle. is more strongly sclerotized than the remainder of the spermatheca.

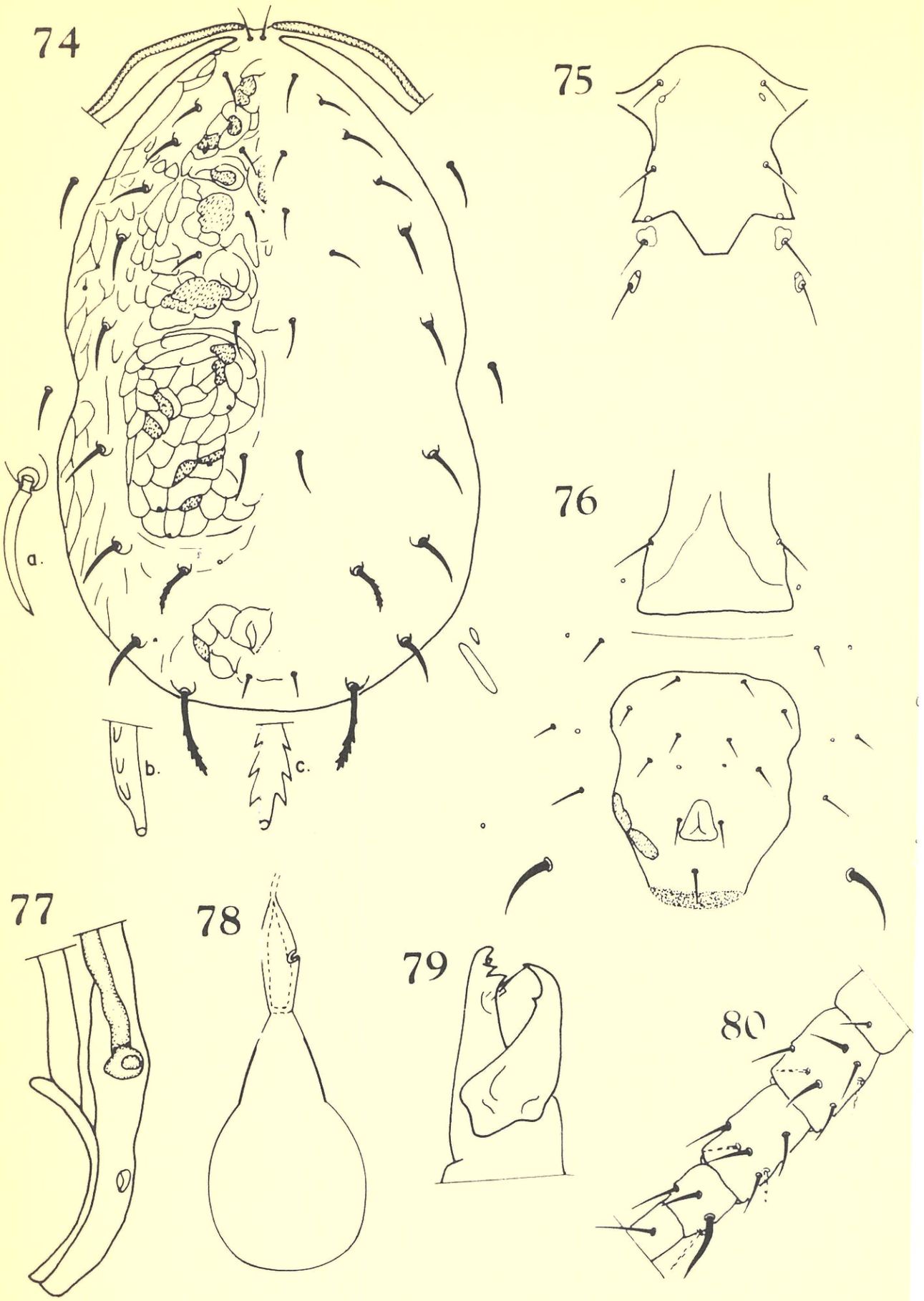
Chelicera (fig. 72): The fixed digit of the chelicera bears only two strong subapical teeth and a pilus dentilis. The movable digit bears two closely placed teeth on its inner margin.

Legs: Chaetotaxy of the legs is normal, except for trochanter I bearing six setae and genu II being of the VIII-type. Leg IV (fig. 73) bears a single macroseta on the basitarsus measuring 25(-26) µ in length.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/232/1) and two ♀-paratypes from leaves of Dodonaea viscosa, Mountain Zebra National Park near Cradock (C.P.)

28.I.1965/.....



FIGS. 74-80. Typhlodromus (Amblydromella) februs spec. nov., female

Fig.74, dorsum; fig.75, sternal shield; fig.76, posterior ventral surface; fig.77, peritrematal shield; fig.78, spermatheca; fig.79, chelicera; fig.80, leg IV.

28.I.1965 (M.K.P. Meyer) and one ♀-paratype from leaves of Atriplex vestita, Soutkloof, near Addo (C.P.) 2.II.1965 (M.K.P. Meyer).

Typhlodromus (Amblydromella) februs spec. nov.

(Figs. 74-80)

T.(A.) februs closely resembles T.(A.) bakeri (Garman) and T.(A.) saevus spec. nov., but has the majority of dorsal setae thornlike. The ventri-anal shield is not creased as in T.(A.) bakeri and the spermatheca differs markedly from the short broad spermatheca of T.(A.) saevus. Judging from the illustration of the spermathecae of T.(A.) bakeri published by Dosse (1958), the spermathecae of the latter and T.(A.) februs are also markedly different.

Female: Dorsum (fig. 74): The imbricated dorsal shield, length 357(346-358) μ and breadth 219(214-224) μ, has ten pairs of pores and some dorsomedian rugose patches. The shield bears 18 pair of setae arranged as follows: six dorsal, two median (one anterior and one posterior, the latter on a tubercle), six prolateral (all on tubercles except the first), and four postlaterals (all on tubercles). The majority of these setae are thornlike (fig. 74a illustrates enlarged seta L_7) and measure in length: D_1, D_2, D_3 and M_1, 18(17-20) μ; D_4, L_1, l_3 and L_4, 23(21-24) μ; D_5, L_5, L_6 and L_7, 26(24-26) μ; D_6, 13-14 μ; M_2 and L_9, 28(26-29) μ; L_2, 21(18-21) μ; L_8, 30(29-32) μ and L_{10}, 47(45-48) μ. Only seta L_1 equals the distance between its base and the base of the seta next following in the series, the others being shorter. The serrated seta M_2 is much shorter than the distance between its base and the base of seta L_9. Figures 74b. and c.

illustrate/.....

illustrate respectively the distal lateral and dorsal detail of the serrated and blunt seta L_{10}.

Setae S_1 and S_2, 24(22-24) μ and 21(19-21) μ long respectively, are placed on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes reach almost anterior to the bases of setae D_1.

Venter: The long, 84(80-84) μ, narrow, 50(46-50) μ, sternal shield (fig. 75) bears only two pairs of setae and has a prominent median lobe with a straight posterior margin. Sternal setae III are placed on irregular shields and setae IV on small oval metasternal shields. The genital shield (fig. 76), width 69(67-69) μ, is normal with lateral margins slightly constricted posterior to the pair of setae.

The ventri-anal shield (fig. 76), length 104(104-108) μ and breadth 84(82-86) μ, is shield-shaped with the lateral margins slightly constricted. The post-anal region is rather broad, and the pre-anal region of the shield is provided with four pairs of short setae which are well spaced but none are on the margin of the shield. A pair of pores is present posterior to the inner pair of setae and on the same level as the caudolateral pair. The ventral interscutal membrane flanking the ventri-anal shield is provided with four pairs of setae. Seta VL_1 measures 33(32-35) μ in length. Two pairs of metapodal shields are present on the membrane together with four very small scattered platelets. Between the genital and ventri-anal shields lies a long slender platelet.

The peritrematal shield (fig. 77) fuses with the exopodal plate and together they curve posteriorly around coxa IV with a blunt end.

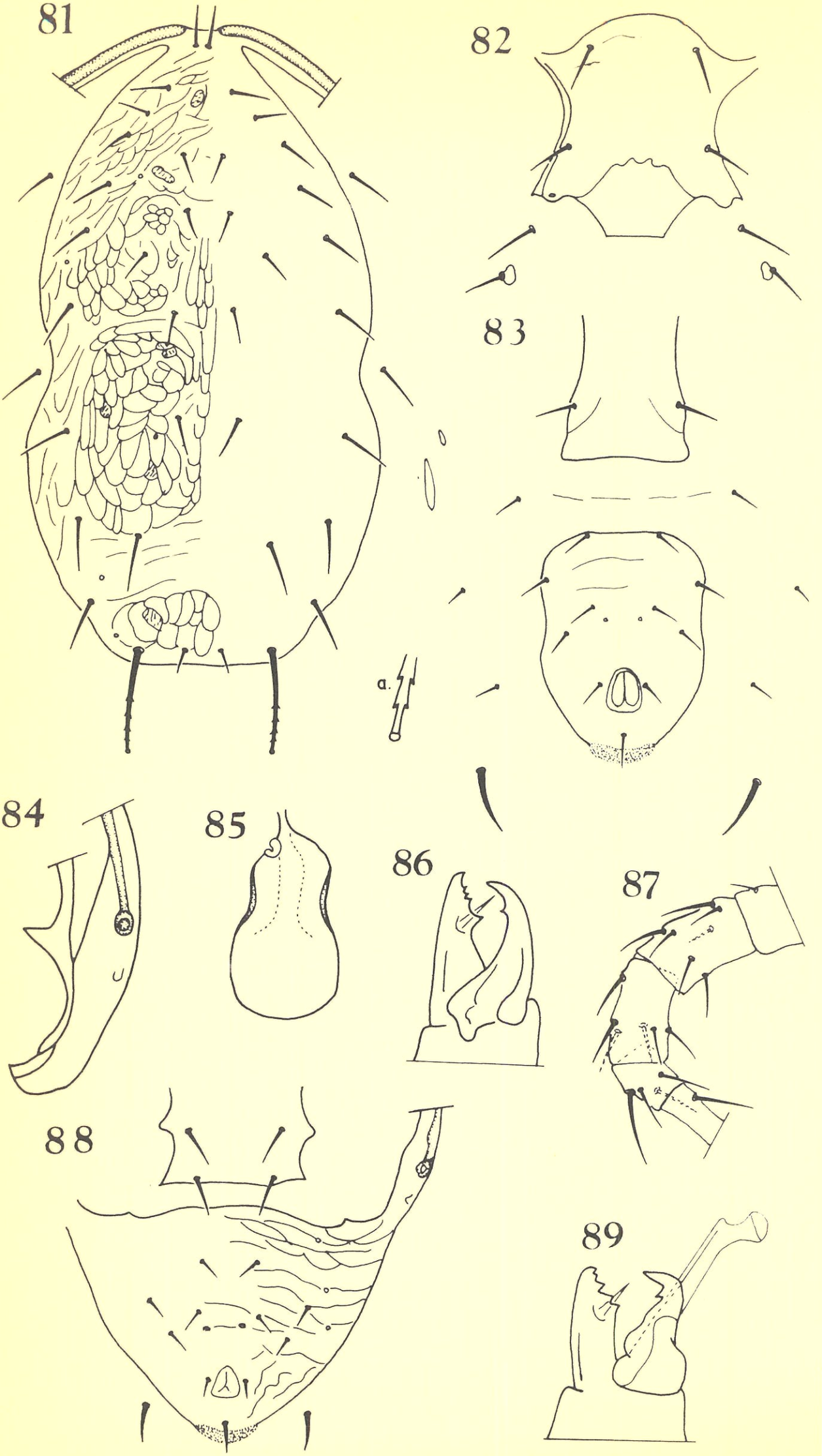
Spermatheca (fig. 78): The major duct is too poorly sclerotized to discern. The long, 15 μ, atrium is thick walled with very small lips halfway along its length. From the level of the lips the atrium tapers towards the major duct and continues, almost tubelike, towards the cervix. The first third of the length, 13 μ, of the evenly flared cervix is very thin walled. The remaining part towards the vesicle is more thick walled but still less so than the atrium.

Chelicera (fig. 79): The movable digit, length 22 μ, of the chelicera bears a single tooth. The fixed digit, length 25 μ, is provided with three teeth on its inner distal margin together with the pilus dentilis, the proximal tooth being well developed.

Legs: Only the basitarsus of leg IV (fig. 80) is provided with a macroseta, 23(22-24) μ in length. The legs have normal chaetotaxy, except trochanter I which bears six setae.

Material studied: ♀-Holotype (serial no. AcY 66/233/1) and five ♀-paratypes from leaves and twigs of Acacia xanthophloea, Pafuri, Kruger National Park (Tvl.) 9.I.1964 (M.K.P. Meyer) and six ♀-paratypes also from A. xanthophloea, but at Shingwedzi, Kruger National Park (Tvl.) 13.I.1964 (M.K.P. Meyer).

Typhlodromus/.....


81
82
83
a.
84
85
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89

Typhlodromus (Amblydromella) saevus spec. nov.

(Figs. 81-89)

T.(A.) saevus closely resembles T.(A.) microbullatus in most of the characters displayed by these two species. However, the dorsal setae are relatively shorter in the former than in the latter. The macroseta on basitarus IV is sharp in T.(A.) saevus but knobbed in T.(A.) microbullatus.

Female: Dorsum (fig. 81): The imbricated dorsal shield, length 315(313-338) μ and breadth 179(175-195) μ, has laterally waisted margins, five pairs of pores and dorso-median rugose patches. The shield is provided with 18 pairs of setae arranged as follows: six dorsal, two median (one anterior and one posterior), six prolateral and four postlateral. These setae measure in length: D_1, D_5, L_1, L_3, L_4 and L_5, 23(20-24) μ; D_2, D_3 and M_1, 16(15-18) μ; D_4 and L_2, 19(18-20) μ; D_6, 11-12 μ; M_2, L_7, L_8 and L_9, 28(27-30) μ; L_6, 26(25-26) μ and L_{10}, 51(47-52) μ. All the setae on the dorsal shield are thus of moderate length. Only setae L_1 and L_2 are, in a few specimens, longer than the distance

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Figs. 81-89. Typhlodromus (Amblydromella) saevus spec. nov.

Fig. 81, dorsum, female; fig. 82, sternal shield, female; fig. 83, posterior ventral surface, female; fig. 84, peritrematal shield, female; fig. 85, spermatheca, female; fig. 86, chelicera, female; fig. 87, leg IV, female; fig. 88, posterior ventral surface, male; fig. 89, chelicera, male.

between their bases and the bases of the setae following next in the series. Seta M_2, serrated in a few females, equals just over half the length of the distance between its base and the base of seta L_9. The serrated seta L_{10} is distally strongly knobbed (fig. 81a) except in females from Zebediela in which this knob is rather small.

Setae $S_{\bar{}}$ and S_2, 24(20-24) μ in length, are situated on the dorsal interscutal membrane.

The peritrematal shields fuse anterodorsally with the dorsal shield. The peritremes reach anterolaterally to the bases of setae D_1.

Venter: The sternal shield, length 72(-76) μ and breadth 52(-59) μ, bears only two pairs of setae (fig. 82) the third pair being on the interscutal membrane. The fourth pair are situated on small oval metasternal shields. The posterior margin of the sternal shield is lobate with the lateral lobes very small and the median lobe prominent with a straight posterior margin.

The genital shield (fig. 83), width 60(-68) μ, is normal and bears a pair of setae.

The ventri-anal shield, length 104(102-109) μ and breadth 74(-82) μ, is shield-shaped (fig. 83) and provided with four pairs of widely spaced pre-anal setae and a pair of small pores caudomedial to the third pair of pre-anal setae. The normal three para-anal setae are present.

The ventral interscutal membrane is provided with four pairs of setae, one pair (VL_1) being 32(30-32) μ long. Four slender platelets lie between the genital and ventri-anal shields. The secondary

metapodal/.....

metapodal plate is one-fourth of the length of the primary one.

Curving around coxa IV the broad peritrematal shield (fig. 84) ends posteriorly rounded and anteromedially in a sharp point.

Spermatheca (fig. 85): The spermatheca is bell-shaped; the narrow major duct opens into the cervix. The spermatheca thus lacks an atrium. Small lips are present on one side of the cervix where the major duct enters the cervix.

Chilicera (fig. 86): The fixed digit, length 23 μ, is provided with three small subapical teeth and a prominent tooth adjacent to the pilus dentilis. The movable digit, length 23 μ, bears a single tooth on its inner margin.

Legs: Leg IV (fig. 87) bears a single macroseta, length 25(24-27) μ, on the basitarus. Chaetotaxy of the legs is normal, except for trochanter I bearing six setae.

Male: Dorsum: The chaetotaxy of the dorsal shield, length 260 μ and breadth 150 μ, resembles that of the female, the setae however being shorter: D_1, 16 μ; D_2, D_3, D_4, D_5 and M_1, 14 μ; D_6, 11 μ; M_2, L_7 and L_8, 21 μ; L_1 and L_4, 17 μ, L_2, 15 μ; L_3, 16 μ; L_5, L_6 and L_9, 19 μ and L_{10}, 28 μ. Seta S_1 and S_2, both 19 μ in length, are located on the dorsal shield.

The peritrematal shields fuse anterolaterally with the dorsal shield and the peritremes reach almost anterior to the bases of setae D_1.

Venter:/.....

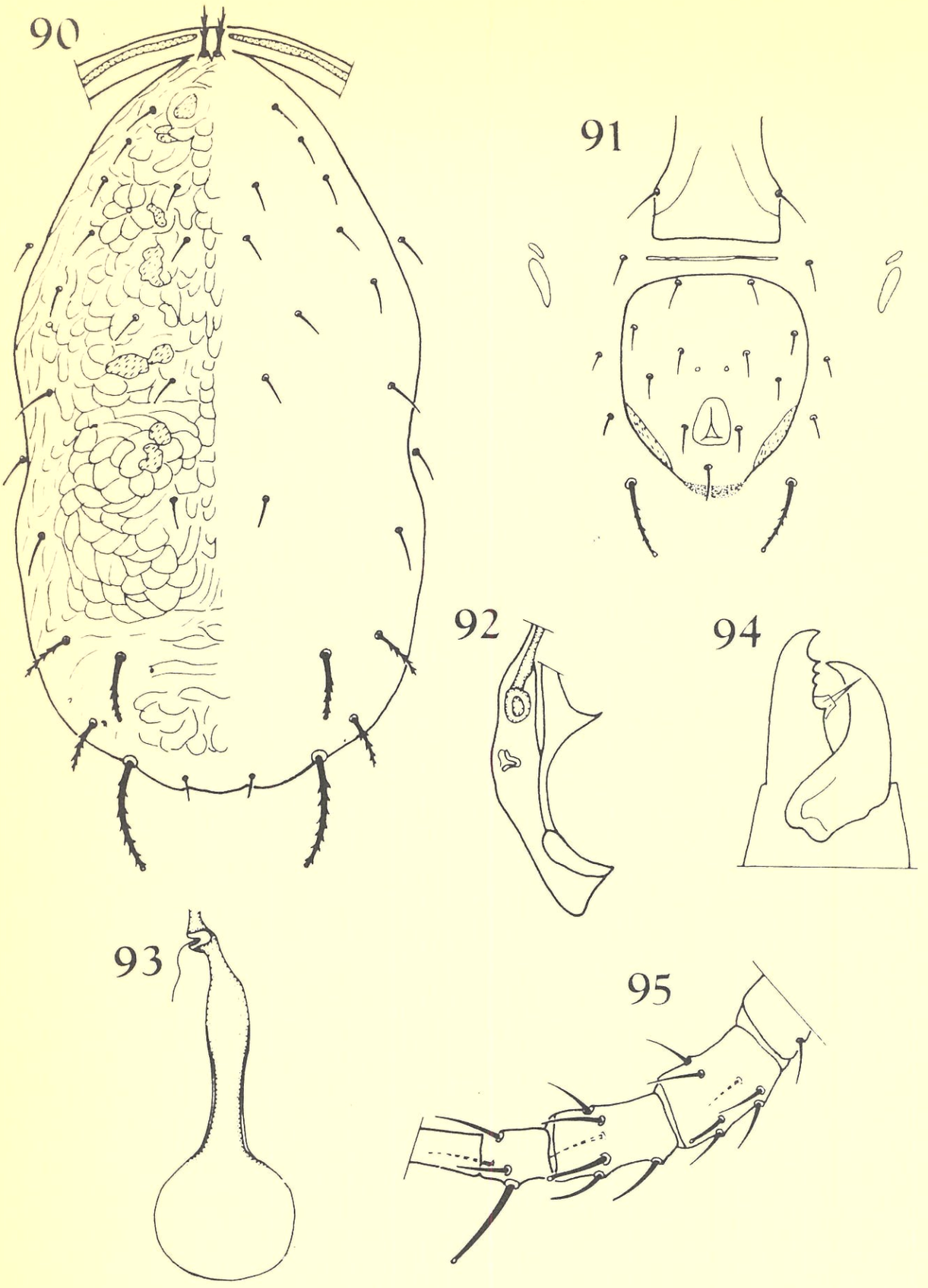
Venter: The ventri-anal shield (fig. 88) is fused anterolaterally with the peritrematal shields. The imbricated shield is provided with four pairs of pre-anal setae and a pair of pores caudomedial to the inner pair of pre-anal setae. The ventral interscutal membrane bears a single pair of setae, VL_1, measuring 18 μ in length.

Chelicera (fig. 89): The fixed digit of the chelicera bears four teeth on its inner margin and a pilus dentilis. The movable digit bears a single tooth and a spermatophoral bearer, 17 μ in length. The latter has a straight shaft terminating in a small condylus and a branch with a big knob, resembling the proximal portion of the femur of Homo sapiens. This knobbed branch is 6 μ long.

Legs: The chaetotaxy of the legs is normal, except for trochanter I bearing six setae. The macroseta on basitarsus IV measures 19 μ in length.

Materials studied: ♀-Holotype (serial no. AcY 66/234/1) and ♂-paratype from leaves of Ficus sp., Caledon (C.P.) 28.XII.1954 (P.A.J. Ryke). ♂-Allotype, two ♂-paratypes and five ♀-paratypes from leaves of Citrus sp., Zebediela, Dist. Potgietersrust (Tvl.) February, March and May 1964 (J. den Heyer). One ♀-paratype from Populus sp., Caledon (C.P.) 28.XII.1954 (P.A.J. Ryke). One ♀-paratype from Ficus sp., Grabouw (C.P.) 2.I.1955 (P.A.J. Ryke). One ♀-paratype from Ficus sp., Villiersdorp (C.P.) 30.XII.1954 (P.A.J. Ryke). One ♀-paratype from Leucosidea csirecea, Golden Gate Highland Park (O.F.S.) 24.X.1963 (M.K.P. Meyer). Three ♀-paratypes from leaves of Prunus sp., Potchefstroom (Tvl.) January 1954 (P.A.J. Ryke). Two ♀-paratypes

from leaves/.....



FIGS. 90-95. Typhlodromus (Amblydromella) terrulentis spec. nov., female

Fig.90, dorsum; fig.91, posterior ventral surface; fig.92, peritrematal shield; fig.93, spermatheca; fig.94, chelicera; fig.95, leg IV.

from leaves of Carica papaya, Groblersdal (Tvl.) 23.I.1963 (G.G. van der Merwe). One ♀- paratype from leaves of Musa sapientum, Groblersdal (Tvl.) 9.I.1963 (G.G. van der Merwe). Two ♀-paratypes from unidentified plant, Wolkberg, Dist. Tzaneen (Tvl.) 24.II.1964 (G.G. v.d. Merwe) and seven ♀-paratypes from Citrus sp., Zebediela, dist, Potgietersrus (Tvl.) May 1964 (G.G. van der Merwe and M.K.P. Meyer).

Note: J. den Heyer observed these mites feeding on Caligonellidae larvae and Aonidiella aurantii crawlers.

Typhlodromus (Amblydromella) terrulentis spec. nov.
(Figs. 90-95)

This species closely resembles T.(A.) nodosus in having the setae on the dorsal shield short and the three macrosetae on leg IV. knobbed. T.(A.) terrulentis differs from T.(A.) nodosus in having seta M_2 knobbed and as long as the distance between its base and the base of seta L_9. It also differs from T.(A.) nodosus in the shape of the ventri-anal shield, laterally constricted in the latter, and the form of the spermatheca.

Female: Dorsum (fig. 90): Dorsal shield 334 µ long, 176 µ wide, imbricated with some dorsomedian rugose patches and five pairs of pores. The shield bears 18 pairs of setae, arranged as follow: six dorsal, two median (one anterior and one posterior), six prolateral and four postlateral. The lengths of these setae are: D_1, 23 µ; D_2, D_3 and D_6, 12 µ; D_4, D_5, M_1, L_3 and L_4, 14 µ; M_2, 31 µ; L_1, 19 µ; L_2, 16 µ; L_5, 17 µ; L_6 and L_7, 21 µ; L_8 and L_9, 29 µ and L_{10}, 56 µ. /.....

56 μ. Setae D_1, M_2, L_8, L_9 and M_{10} are serrate and M_2 and L_{10} are also knobbed. All the setae on the shield are shorter than the distance between their bases and the bases of setae following next in the series. Seta M_2 equals the distance between its base and the base of seta L_9.

Setae S_1 and S_2, 17 μ and 15 μ long respectively, are placed on the dorsal interscutal membrane.

The peritrematal shields fuse anterodorsally with the dorsal shield and the peritremes reach anterodorsally to the bases of setae D_1. The latter are placed on small adjoining tubercles.

Venter: The sternal shield is damaged and unrecognisable.

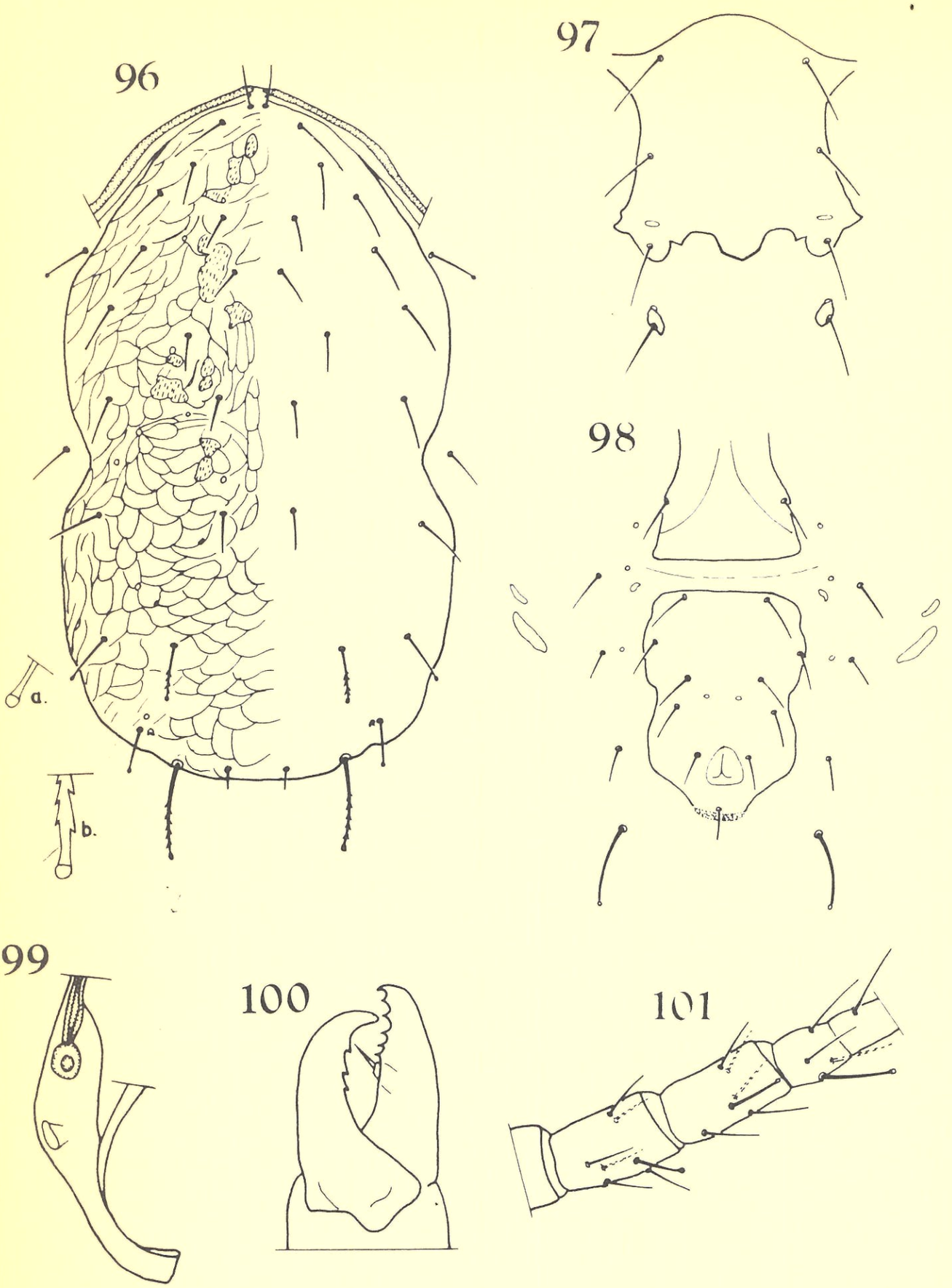
The genital shield (fig. 91), width 61 μ, is normal with a pair of setae and a straight posterior margin.

Ventri-anal shield (fig. 91) tri-angular with ovate lateral margins, somewhat longer, 112 μ, than broad, 91 μ. The shield is provided with four pairs of pre-anal setae and a pair of pores equidistant caudomedially from the inner posterior pair of setae. Para-anal setae normal.

The interscutal membrane bears four pairs of setae, the caudal pair, VL_1, being 32 μ long, faintly serrated and knobbed. Between the genital and ventri-anal shield lies a long slender platelet and laterally two pairs of metapodal plates.

The peritrematal shield (fig. 92) ends bluntly, caudomedial to coxa IV.

Spermatheca/.....



FIGS. 96-101. Typhlodromus (Amblydromella) bullatus spec. nov., female

Fig.96, dorsum; fig.97, sternal shield; fig.98, posterior ventral surface; fig.99, peritrematal shield; fig. 100, chelicera; fig.101, leg IV.

Spermatheca (fig. 93): The major duct of the spermatheca could not be followed. The atrium is fully occupied by big lips. The first part, 10 μ, of the cervix is thin walled and is slightly constricted at its junction with the atrium. The second part, 20 μ, is thick walled and slightly flared towards the vesicle.

Chelicera (fig. 94): The fixed digit, length 27 μ, bears four teeth on its inner margin and a pilus dentilis. The movable digit, length 30 μ, is devoid of teeth.

Legs: Leg IV (fig. 95) with three knobbed macrosetae. These setae measure in length, 17 μ on the genu, 23 μ on the tibia and 35 μ on the basitarsus. The macroseta on the gnu is shorter than some of the other setae on the limb and that on the tibia is equal in length to most of the setae on the limb. The chaetotaxy of the legs is normal, except for leg I having six setae on the trochanter.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/235/1) from soil covered with grass, Potchefstroom (Tvl.) 8.X.1964 (G.C. Loots).

Typhlodromus (Amblydromella) bullatus spec. nov.

(Figs. 96-101)

The relative lengths of the setae on the dorsal shield relate this species to T.(A.) apoxys. It differs however from the latter in having setae M_2, L_8 and L_9 knobbed and in bearing three knobbed macrosetae on leg IV instead of two.

Dorsum/.....

Dorsum (fig. 96): The imbricated dorsal shield, length 346 μ, breadth 198 μ, bears eighteen pairs of aciculate setae: six dorsal, two median (one anterior and one posterior) six prolateral and four postlateral. The lengths of these setae are: D_1, D_5, L_2 and L_9, 24 μ; D_2 and D_3, 19 μ; D_4 and M_1, 21 μ; D_6, 11 μ; M_2, L_5, L_6, L_7 and L_8, 30 μ; L_1, 32 μ; L_3 and L_4, 26 μ and L_{10}, 50 μ. Setae L_8, L_9, L_{10} and M_2 are knobbed (fig. 96 a. and b.). Setae L_{10} and M_2 are also serrated. Only setae L_1 and L_2 are longer than the distances between their bases and the bases of setae L_2 and L_3 respectively. Seta L_9 is almost equal to the distance between its base and that of L_{10}.

Seta S_1, 26 μ in length and knobbed, and seta S_2, length 24 μ, are on the dorsal interscutal membrane. The peritrematal shields fuse anteriorly with the dorsal shield and the peritremes almost meet just anterior to the bases of setae D_1.

Venter: The sternal shield (fig. 97) bears three pairs of setae and measures 82 μ in length and 65 μ in width. The posterior margin of the shield is lobate. The incision is broad with a smaller notch cutting into the lateral lobe. Sternal setae IV are placed on oval metasternal shields.

The genital shield, width 74 μ, is normal and bears a pair of setae.

The oblong ventri-anal shield (fig. 98), length 115 μ and breadth 78 μ, has a straight anterior margin and irregular lateral margins. The latter are indented posterior to the first pair of pre-anal setae and the shield is sharply waisted in the region of the

pair of/....

pair of pores. Four pairs of pre-anal setae are widely spaced on the shield, the caudal pair being situated on the caudal half of the shield.

The ventral interscutal membrane bears four pairs of setae. The long caudal pair is knobbed and measures 40 μ in length. In addition to scattered platelets, the membrane is also provided with two pairs of metapodal shields. Between the genital and ventri-anal shields (fig. 99) lie four slender platelets. The peritrematal shield curves posteriorly around coxa IV, ending square.

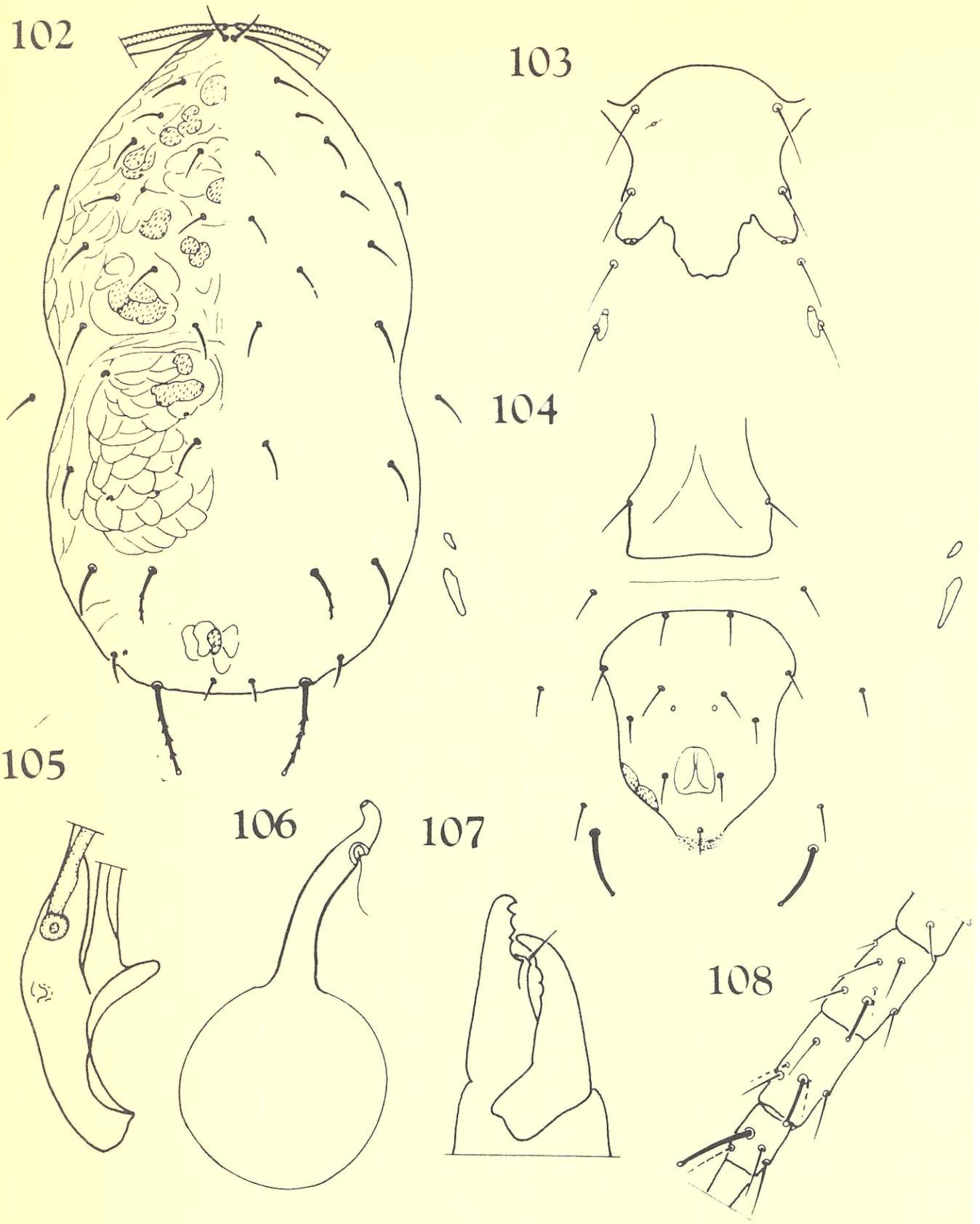
Spermatheca: Although this specimen is without doubt a mature female, no spermatheca could be discerned.

Chelicera (fig. 100): The fixed digit, length 28 μ, bears five sharp teeth and a pilus dentilis. The movable digit, length 25 μ, bears three recurved teeth on its inner margin.

Legs: Leg IV (fig. 101) is provided with three knobbed macrosetae. Those on the genu and tibia are each 21 μ long and that on the basitarsus 28 μ. These macrosetae are only slightly longer than the other setae on the respective segments. The chaetotaxy of the legs is normal, except that tibia I bears six setae and genu II is of the VIII-type.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/236/1) from leaves of Ficus sycomorus, Mlambane, Kruger National Park (Tvl.) 4.X.1963 (M.K.P. Meyer).



FIGS. 102-108. Typhlodromus (Amblydromella) paganus spec. nov., female

Fig.102, dorsum; fig.103, sternal shield; fig. 104, posterior ventral surface; fig.105, peritrematal shield; fig.106, spermatheca; fig.107, chelicera; fig.108, leg IV.

Typhlodromus (Amblydromella) paganus spec. nov.

(Figs. 102-108)

T.(A.) paganus is related to T.(A.) vescus spec. nov. and T.(A.) ndibu (Pritchard & Baker). It differs from these two species by the absence of macrosetae on leg III and from T.(A.) ndibu in having seta L_9 markedly shorter than setae L_8 and D_5. T.(A.) paganus also differs from both species in having only two pairs of setae on the sternal shield and in the shape of the spermatheca.

Female: Dorsum (fig. 102): The imbricated dorsal shield, length 353(340-360) μ and width 193(190-212) μ, with dorsal and dorsomedian rugose patches and five pairs of pores. The 18 pairs of setae on the shield are arranged as follows: six dorsal, two median (one anterior and one posterior), six prolateral and four postlateral. These setae measure in length: D_1, D_4, D_5, L_1, L_3, L_4 and L_5, 20(19-21) μ; D_2, D_3, L_2 and L_9, 17(16-18) μ; D_6, 11-12 μ; M_1, 18(-20) μ; M_2, 29(-31) μ; L_6 and L_7, 24(23-25) μ; L_8, 26(-28) μ and L_{10}, 50(47-52) μ. The majority of the setae are thus relatively short, none equalling or surpassing in length the distance between its base and the base of the seta following next in the series. The serrated seta M_2 equals half the distance between its base and the base of the serrated and knobbed seta L_{10}. Seta M_2 is also much shorter than the distance between its base and the base of seta L_9. Seta L_9 is markedly shorter in length than seta L_9.

Setae S_1 and S_2 are equal in length, 20(19-22) μ, and placed on the dorsal interscutal membrane.

The /....

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes reach anterior to the bases of the closely spaced setae D_1.

Venter: The sternal shield (fig. 103), length 84(82-84) μ and width 61(59-63) μ, bears only two pairs of setae. The lateral margins reach to the second pair of lyriform pores and the posterior margin is lobed. The lateral lobes are formed by tapered incisions cutting posteriorly into the shield. A large median lobe, irregular in outline, is also thus formed. Sternal setae III are on the interscutal membrane and setae IV are on longish metasternal shields.

Genital shield; width 67(-74) μ, with a pair of setae and a straight posterior margin (fig. 104).

The ventri-anal shield (fig. 104), length 112(-120) μ, is anteriorly wider, 89(-98) μ, than across the anus, 71(-78) μ. The shield bears four pairs of well spaced pre-anal setae and a pair of pores caudomedial to the inner posterior pair of setae. The anterior margin is convex and the lateral margins are slightly concave and taper to the level of the anus. The shield is thus markedly bulged at the level of the first pair of lateral setae. Para-anal setae normal.

The ventral interscutal membrane is provided with four pairs of setae, the caudal pair being 32(30-34) μ long and knobbed. Two pairs of metapodal plates are also present on the membrane. Between the genital and ventri-anal shields lies a long slender platelet.

The peritrematal shield is fused posteriorly to the exopodal plate (fig. 105) and ends broad, caudal

to coxa IV. /....

to coxa IV.

Spermatheca (fig. 106): The major duct of the spermatheca, 5 μ in length, widens slightly from the external opening and becomes the cervix. There is no atrium but only lips 3 μ in diameter. The cervix, 26 μ in length, is slightly arched and tubelike, 4 μ in diameter. Its lateral walls are more stout than those of the major duct and are shortly and abruptly flared where they meet the vesicle.

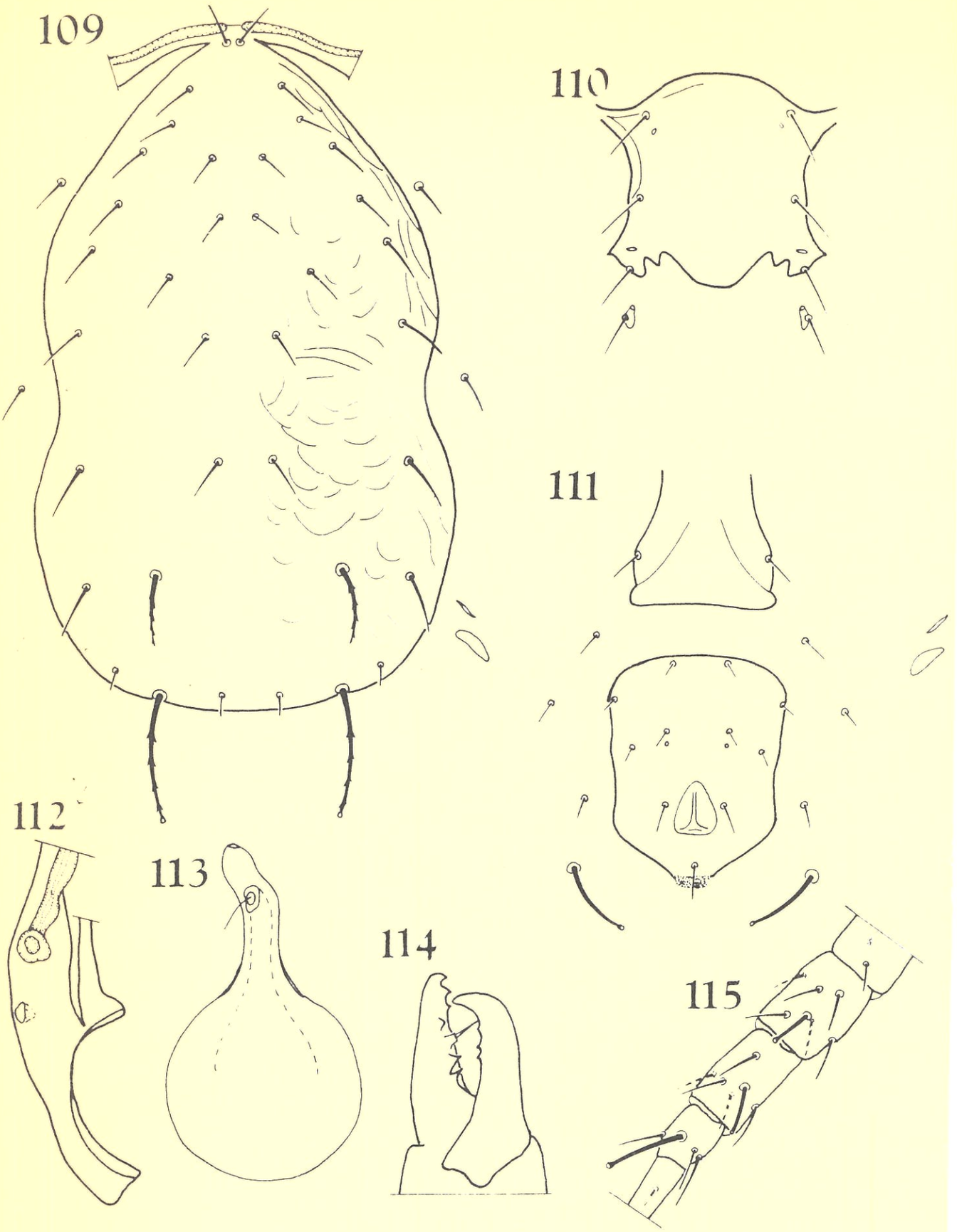
Chelicera (fig. 107): The fixed digit, length 21 μ, of the chelicera bears four teeth and a pilus dentilis on the distal half of its inner margin. The movable digit, length 24 μ, bears three small teeth on its inner margin.

Legs: The chaetotaxy of the legs is normal except for trochanter I having six setae. Leg IV (fig. 108) bears three knobbed macrosetae measuring 20(18-) μ on the genu, 22(20-) μ on the tibia and 32(30-34) μ on the basitarsus.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/237/1) and one ♀-paratype from leaves and twigs of Acacia karroo, Fort Beaufort (C.P.) 15.I.1965 (M.K.P. Meyer). One ♀-paratype from Plumbago auriculata, Suurberg, Dist. Alexandria (C.P.) 27.I.1965 (M.K.P. Meyer). Four ♀-paratypes from leaves of Diospuros lycioides, Mountain Zebra National Park near Cradock (C.P.) 28.I.1965 (G.G. v.d. Merwe). Two ♀-paratype from leaves of Brinus armeniaca, Mountain Zebra National Park near Cradock (C.P.) 28.I.1965 (G.G. v.d. Merwe). One

♀-paratype/.....



FIGS. 109-115. Typhlodromus (Amblydromella) vescus spec. nov., female

Fig.109, dorsum; fig.110, sternal shield; fig. 111, posterior ventral surface; fig.112, peritrematal shield; fig.113, spermatheca; fig.114, chelicera; fig.115, leg IV.

♀-paratype from leaves of Populus sp., Mountain Zebra National Park near Cradock (C.P.) 29.I.1965 (M.K.P. Meyer). One ♀-paratype from leaves of Salix sp., Mountain Zebra National Park near Cradock (C.P.) 29.I.1965 (M.K.P. Meyer). Three ♀-paratypes from leaves of Rhus erosa, Mountain Zebra National Park near Cradock (C.P.) 29.I.1965 (M.K.P. Meyer). One ♀-paratype from Melianthus comosus, Mountain Zebra National Park near Cradock (C.P.) 29.I.1965 (G.G. v.d. Merwe). Two ♀-paratypes from Schotia afra, Addo (C.P.) 2.II.1965 (M.K.P. Meyer) and two ♀-paratypes from Rhus refracta, Addo (C.P.) 2.II.1965 (G.G. v.d. Merwe).

Typhlodromus (Amblydromella) vescus spec. nov.

(Figs. 109-115)

This species closely resembles T.(A.) ndibu. T.(A.) vescus, however, differs from this species in having seta L_9 very short and seta L_1 reaching beyond the base of seta L_2. There is also a marked difference in the spermathecae. The atrium is incorporated in the broad cervix in T.(A.) vescus but is small and well defined from the cervix in T.(A.) ndibu.

Female: Dorsum (fig. 109): The mildly imbricated dorsal shield, length 334(330-343) µ, breadth 210(198-212) µ, is provided with 18 pairs of setae. These setae measure in length: D_1, L_1, L_3 and L_4, 23(22-25) µ; D_2 and D_3, 19(17-) µ; D_4, M_1 and L_2, 21(19-23) µ; D_5 and L_5, 26(24-28) µ; D_6, 11(10-12) µ; M_2, 39(36-40) µ; L_6, 27(-30) µ; L_7, 30(-33) µ; L_8, 32(-36) µ; L_9, 13(12-16) µ and L_{10}, 64(58-) µ. Setae M_2 and L_{10} are serrated and L_{10} is also knobbed.

The majority/.....

The majority of the setae of the dorsal shield are thus relatively short. Only seta L_1 (and in some specimens L_2) is longer than the distance between its base and that of the seta following next in the series. Seta M_2 reaches to approximately three-quarters of the distance between its base and that of seta L_9.

Setae S_1 and S_2, each 21(-24) μ long, are situated on the dorsal interscutal membrane.

The peritrematal shields fuse anterodorsally with the dorsal shield and the peritremes reach anterior to the bases of setae D_1.

Venter: The sternal shield, length 84(82-86) μ and breadth 65(63-67) μ, has a lobed posterior margin (fig. 110). The median lobe is broad and the lateral lobes are bilobed medially. Sternal setae IV are placed on small metasternal shields.

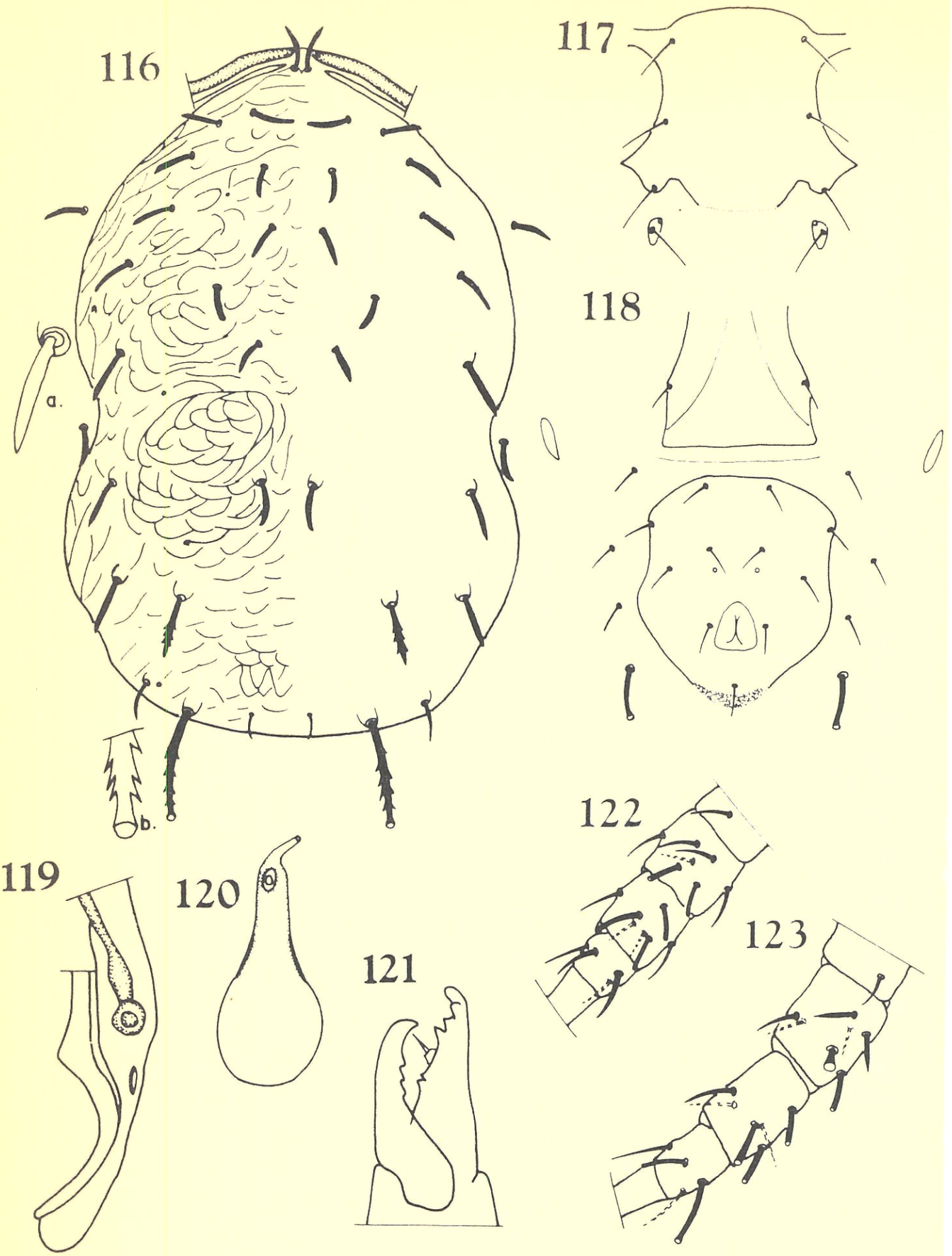
The genital shield (fig. 111) is posteriorly slightly dilated. The shield, 70(68-71) μ in width, bears the normal pair of genital setae.

Ventri-anal shield (fig. 111) with lateral margins almost parallel and provided with four pairs of short pre-anal setae. Caudal to the inner pair of pre-anal setae lies a pair of pores. Para-anal setae normal. The shield measures 112(104-) μ in length and 89(84-93) μ in width.

Four pairs of setae are present on the interscutal membrane, the fourth pair being long, 41(39-44) μ, and knobbed. Two pairs of metapodal platelets are also present.

The peritrematal shields terminate caudomedially

in broad/....



FIGS. 116-123. Typhlodromus (Amblydromella) crassus spec. nov., female

Fig.116, dorsum; fig.117, sternal shield; fig.118, posterior ventral surface; fig.119, peritrematal shield; fig.120 spermatheca; fig.121, chelicera; fig.122, leg III; fig.123, leg IV.

in broad blunt ends (fig. 112).

Spermatheca (fig. 113); The short and broad (5 μ x 4 μ) major duct of the spermatheca becomes the cervix. The presence of an atrium is marked only by the position of the lips. The cervix, 10 μ long, is broad and slightly flared towards the vesicle. This flared portion is more heavily sclerotized than the rest of the spermatheca.

Chelicera (fig. 114): The fixed digit, 24 μ long, is provided with five teeth and a pilus dentilis on its inner margin. The movable digit, 26 μ long, bears three smaller teeth on its inner margin.

Legs: Trochanter I bears six setae. Chaetotaxy of the other legs is normal. Leg IV (fig. 115) is provided with three knobbed macrosetae; the one on the genu measures 19(18-21) μ, that on the tibia 22(21-24) μ and that on the basitarsus 34(32-) μ. Genu III bears a short knobbed macroseta, 14-15 μ in length.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/238/1) and three ♀-paratypes from leaves of Mangifera indica, Nelspruit (Tvl.) 4.IV.1955 (P.A.J. Ryke) and three females from unidentified plant, Nelspruit (Tvl.) 4.IV.1955 (P.A.J. Ryke).

Typhlodromus (Amblydromella) crassus spec. nov.

(Figs. 116-123)

T.(A.) crassus differs from all other members of the subgenus in that legs III and IV are provided with more than one macroseta on those limbs usually provided

with macrosetae. Westerboer & Bernhard (1963) however illustrated leg IV of T.(A.) bakeri (Garman) with two thick blunt macrosetae on each of the genu, tibia and basitarsus. These authors made no comment on leg III. These findings are in contrast to Chant (1958b): "only the macroseta on the basitarsus being noticeable", and Chant (1959b): "Legs without macrosetae".

Female: Dorsum (fig. 116): The lightly imbricated dorsal shield, length 313(310-324) μ and breadth 202(195-209) μ, is provided with five pairs of pores and 18 pairs of setae. The latter are distributed on the shield as follow: six dorsal, two median (one anterior and one posterior), six prolateral and four postlateral. These setae measure in length: D_1 and L_1, 22(19-) μ; D_2, D_3, D_4, M_1, L_2 and L_9, 18(16-) μ; D_5, L_3, L_4 and L_5, 24(21-) μ; D_6, 12(10-) μ; M_2, 33(30-) μ; L_6, L_7 and L_8, 28(24-) μ; and L_{10}, 57(55-) μ. All these setae, except L_9 and D_6, are very thick; fig. 116 a. illustrates seta L_6 enlarged. Setae L_6, L_7, L_8, L_9, L_{10}, D_5 and M_2 are placed on small tubercles. Only seta L_1, though in some specimens L_2 also, in length reaches to the base of the seta following next in the series. The serrated seta M_2 equals approximately two-thirds of the distance between its base and the base of seta L_9. Seta L_{10} is also serrated but bears a strong distal knob (fig. 116 b).

Setae S_1 and S_2 are also thickened and equal in length, 22(18-) μ, and are placed on the dorsal interscutal membrane.

The peritrematal shields fuse anterodorsally with the dorsal shield and the broad peritremes reach anterior to the bases of setae D_1.

Venter:/.....

Venter: The sternal shield (fig. 117), approximately 70 µ long and 60 µ wide, bears three pairs of sternal setae. The posterior margin of the shield is lobate. Sternal setae III are thus on small lateral lobes. The incisions are square-cut and the median lobe is broad with its posterior margin obscure. Sternal setae IV are placed on metasternal shields.

The genital shield (fig. 118), width 67(66-68) µ, is normal with a pair of setae and a straight posterior margin.

The broad, smooth ventri-anal shield (fig. 118), length 100(87-) µ and width 84(82-) µ, bears four pairs of well spaced pre-anal seta and a pair of pores caudal to the inner posterior pair of setae. The anterior margin of the shield is flatly convex and the lateral margins are slightly concave. Para-anal setae are normal.

The interscutal membrane bears four pairs of setae, the caudal pair being 26(24-) µ long and distinctly knobbed. The two females from Richards Bay, however, lack this feature. Between the genital and ventri-anal shields lies a long slender platelet with a single pair of metapodal plates laterally.

The peritrematal shield (fig. 119) fuses caudally with the exopodal plate and curves around coxa IV, ending obtusely.

Spermatheca (fig. 120): The major duct of the small spermatheca is slender and only 3 µ long. The lips, a mere 2 µ long, are close to the opening of the major duct. The atrium is incorporated in the cervix.

Both/....

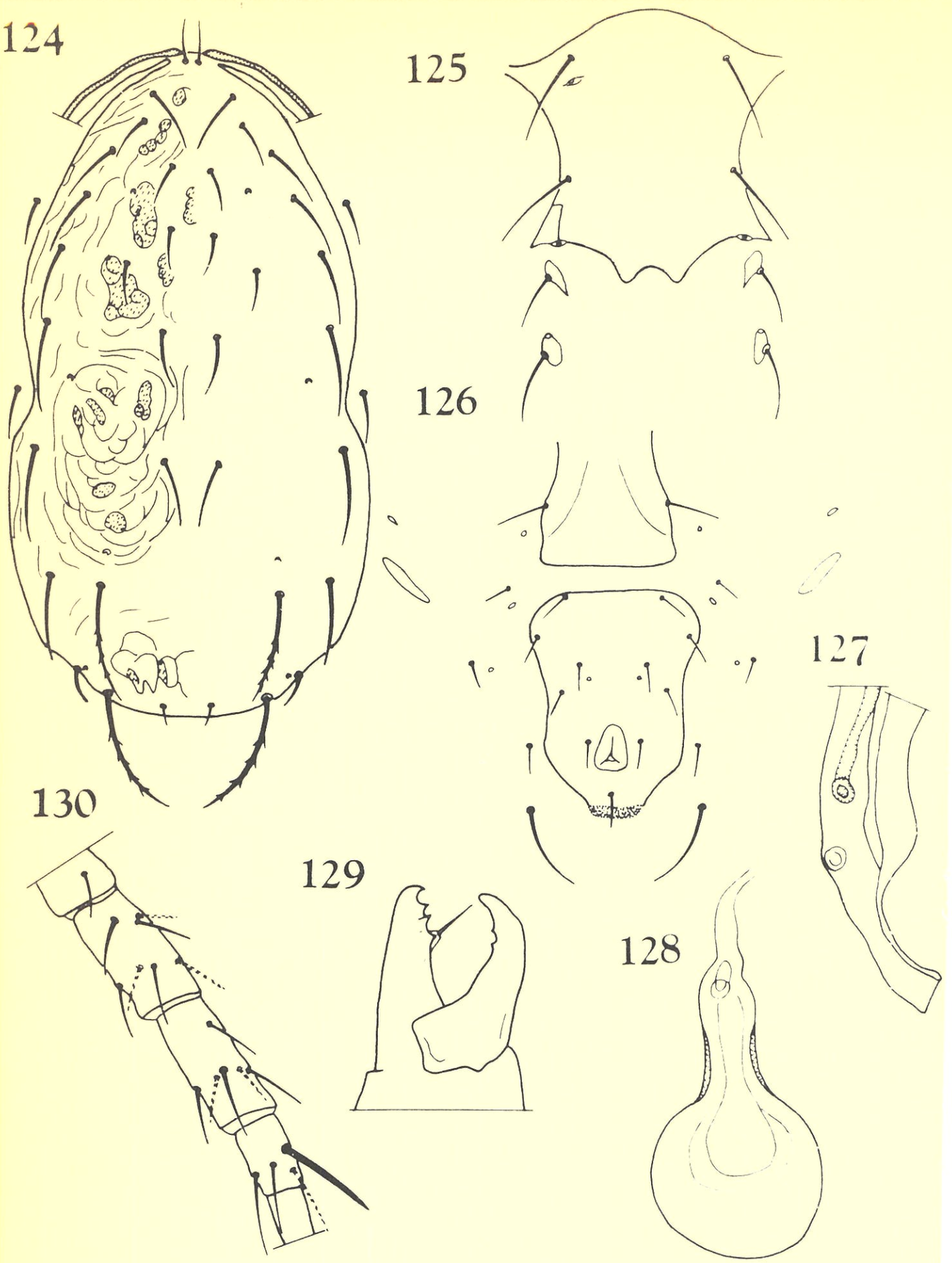
Both resemble a longish bell, measuring 12 μ from the major duct to the beginning of the vesicle. The atrium portion and the first half of the cervix is thin walled. The remaining portion towards the vesicle is more strongly sclerotized.

Chelicera (fig. 121): The chelicera, in a somewhat oblique position, reveals three recurved teeth on the inner margin of the movable digit. The fixed digit, at 24 μ equal in length to the movable digit, bears five teeth and a pilus dentilis. Three of these teeth are placed on the distal third of the digit and two proximally.

Legs: The chaetotaxy of the legs is normal, except for trochanter I bearing six setae. Leg III (fig. 122) is provided with two blunt, hyaline-tipped setae, 14 μ in length, on the genu and three of the same type on the tibia; two measure 14 μ each and the third is 17 μ long. Leg IV (fig. 123) bears the following macrosetae: a short, 10 μ, strongly knobbed seta and a longer, 16 μ, blunt hyaline-tipped seta on the genu; two blunt hyaline-tipped setae, 16 μ in length, and a long 18 μ, knobbed seta on the tibia and on the basitarsus a slender hyaline-tipped seta, 18 μ in length, and a long, 26 μ knobbed seta.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/239/1) from Phoenix reclinata, Munster (Natal) 14.IV.1955 (M.K.P. Meyer). Two ♀-paratypes from leaves of Compositae, Shelly Beach (Natal) 13.V.1965 (M.K.P. Meyer) and two ♀-paratypes from unidentified plant, Richards



FIGS. 124-130. Typhlodromus (Amblydromella) praeacutus spec. nov., female

Fig.124, dorsum; fig.125, sternal shield; fig.126, posterior ventral surface; fig.127, peritrematal shield; fig.128, spermatheca; fig.129, chelicera; fig.130, leg IV.

Bay (Natal) 29.XI.1962 (G.G. v.d. Merwe).

Typhlodromus (Amblydromella) praeacutus spec. nov.

(Figs. 124-130)

T.(A.) praeacutus resembles T.(A.) rhenanoides (Athias-Henriot) in having rather long lateral setae and setae L_{10} aciculate. The aciculate nature of the macrosetae on the basitarsus of some of the females of T.(A.) praeacutus relates this species to T.(A.) rhenanus. It differs, however, from the latter in having seta L_9 very short and seta M_2 very long. T.(A.) praeacutus differs from both these species in having the atrium and lips of the spermatheca incorporated in the cervix.

Female: Dorsum (fig. 124): The imbricated dorsal shield, length 330(318-332) µ and breadth 176(172-188) µ, with some dorsomedian hyalane patches (shaded in the illustration) and four pairs of pores. The shield bears 18 pairs of setae; six dorsal, two median (one anterior and one posterior), six prolateral and four postlateral. These setae measure in length: D_1, D_2, D_3 and L_2, 23(20-24) µ; D_4, 30(27-32) µ; D_4, L_3 and L_4, 38(34-39) µ; D_6, 11(10-13) µ; M_1, 25(23-27) µ; M_2, 61(58-64) µ; L_1, 35(28-) µ; L_5, 43(33-) µ; L_6 and L_8, 46(40-48) µ; L_7, 56(50-57) µ, L_9, 18(-20) µ and L_{10}, 68(60-) µ. Seta L_1 is much longer and setae L_2, L_3 and L_4 are slightly longer than the distances between their respective bases and the bases of setae following next in the series. Seta L_5 is slightly shorter to somewhat longer than the distance between its base and the base of seta L_6. The serrated seta M_2 is longer than the distance between its base and the base of the short seta L_9. The former is also

longer/.....

longer than the distance between its base and the base of seta L_{10}. The latter is serrated and in a few specimens provided with a very small distal knob.

Seta S_1 and S_2, both 29(27-32) μ in length, are on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes reach anterior to the bases of setae D_1.

Venter: The sternal shield (fig. 125), length 76(74-80) μ and breadth 56(54-58) μ, bears only two pairs of sternal setae. The anterior margin of the shield is slightly convex and the concave lateral margins reach posteriorly only to the second pair of lyriform pores. The posterior margin is ventro-caudally strongly lobed. The posterior margin of this lobe is strongly indented. Sternal setae III are placed on oval, posteriorly pointed shields and sternal setae IV on oval metasternal shields.

The genital shield (fig. 126), width 63(60-65) μ, is normal with a pair of setae.

The ventri-anal shield (fig. 126) is anteriorly dilated, 72(71-75) μ broad, and the lateral margins narrow to become almost parallel just anterior to the level of the anus. The anterior margin is straight between the first pair of widely spaced pre-anal setae. Four pairs of the latter setae are present on the shield with a pair of pores caudomedial to the inner posterior pair of setae. Para-anal setae are normal.

The ventral interscutal membrane is provided with four pairs of setae, the caudal pair being 46(45-48) μ long. The membrane also bears two pairs

of /.....

of metapodal plates and three small lateral platelets. The secondary metapodal plates are only slightly larger than these platelets.

The peritrematal shields fuse caudally with the exopodal plates (fig. 127), ending obtusely.

Spermatheca (fig. 128): The major duct, slightly dilated towards the atrium, measures 10 μ in length. The lips mark the position of the atrium, since the latter is incorporated in the cervix. The atrium and cervix resemble a broad, 5 μ, somewhat elongated, 15 μ, bell. The distal half, towards the vesicle, is more strongly sclerotized than the domed portion and the major duct.

Chelicera (fig. 129): The fixed digit bears three strong teeth and a pilus dentilis on the distal third of its inner margin. The movable digit, equal in length, 24 μ, to the fixed digit, is provided with two smaller teeth on its inner margin.

Legs: The chaetotaxy of the legs is normal, except for trochanter I bearing six setae and genu II being of the VIII-type. Leg IV (fig. 130) bears a single macroseta, length 34(32-35) μ, on the basitarsus. Some of the females from Nelspruit, the Kruger National Park and the female from Barberspan have this macroseta on basitarsus IV short, 26 μ, and knobbed.

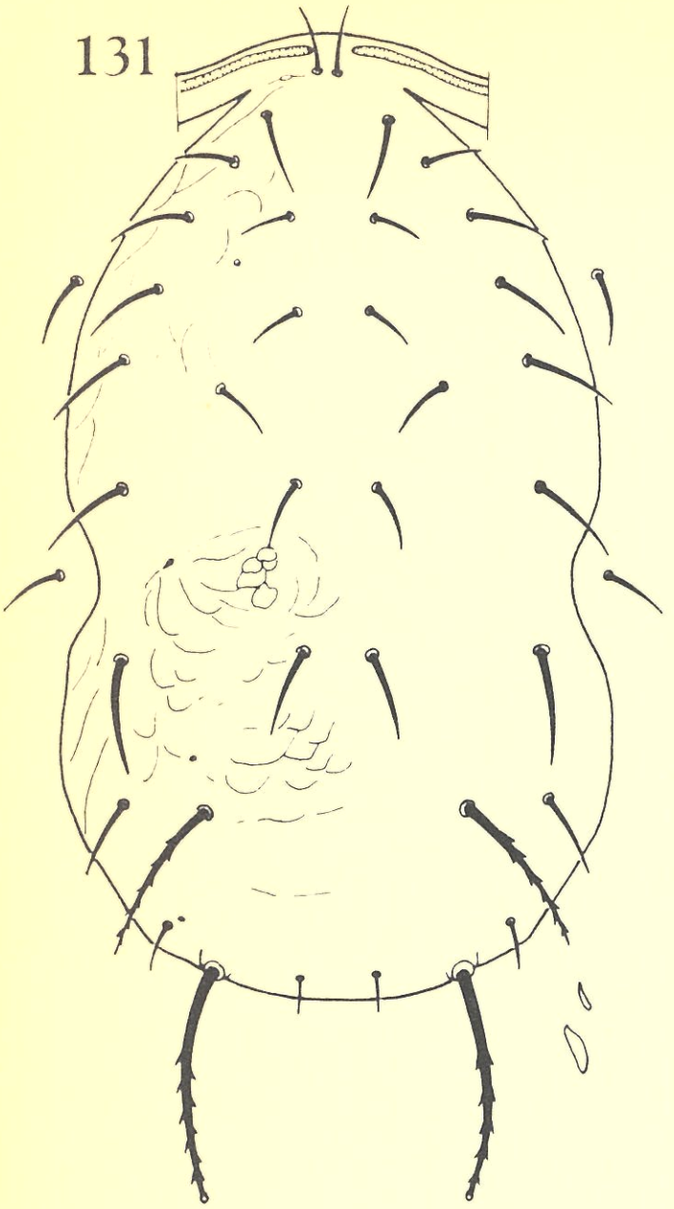
Male: Unknown.

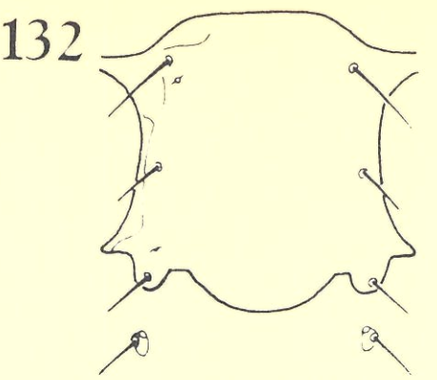
Material studied: ♀-Holotype (serial no. AcY 66/240/1) and one ♀-paratype from leaves of Prunus sp., Witbank (Tvl.) 28.III.1964 (G.G. v.d. Merwe). Seven ♀-paratypes from Citrus sp. fruit infested with

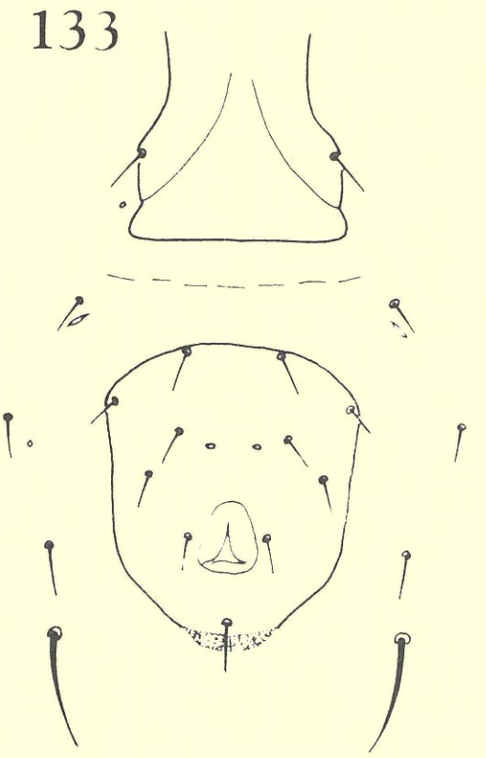
Aonidiella/.....

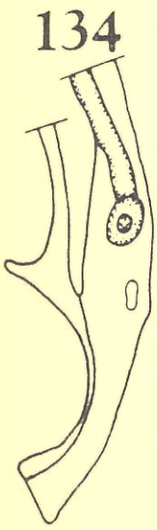
Aonidiella aurantii, Nelspruit (Tvl.) October 1963 and October 1964 (A. Schwartz). Two ♀-paratypes from leaves of unidentified plant, Pretoria (Tvl.) 9.X.1964 (G.G. v.d. Merwe). One ♀-paratype from unidentified plant, Potgietersrus (Tvl.) 5.XI.1964 (G.G. v.d. Merwe). One ♀-paratype from Nuxia congesta, Crocodile River, Kruger National Park (Tvl.) 4.X.1963 (M.K.P. Meyer). One ♀-paratype from Budleia sp., Golden Gate Highland Park (O.F.S.) 25.X.1963 (M.K.P. Meyer). Four ♀-paratype from leaves of Gossypium sp., Letsitele Valley near Tzaneen (Tvl.) 1.IX.1965 (T.J. Naudé). One ♀-paratype from leaves of Lonchocarpus capassa, Shingwidzi, Kruger National Park (Tvl.) 11.I.1964 (P. Jordaan). One ♀-paratype from leaves of Lonchocarpus capassa, Mbyaniti grid S.93 Kruger National Park (Tvl.) 4.X.1963 (G.G. v.d. Merwe). One ♀-paratype from leaves of Lonchocarpus capassa, Lower Sabie, Kruger National Park (Tvl.) 29.IX.1963 (M.K.P. Meyer). One ♀-paratype from Lonchocarpus capassa, Olifants River grid N237 Kruger National Park (Tvl.) 29.IX.1963 (M.K.P. Meyer). One ♀-paratype from an unidentified plant and one ♀-paratype from Euclea natalensis, Timbavati River, grid C 47 Kruger National Park (Tvl.) 25.IX.1963 (M.K.P. Meyer). One ♀-paratype from Citrus sp., Malelane (Tvl.) 9.V.1963 (M.K.P. Meyer). One ♀-paratype from Euclea natalensis, Mlambane River, grid S.93 Kruger National Park (Tvl.) 4.X.1963 (G.G. v.d. Merwe). One ♀-paratype from Stychnar spinose, Nelspruit (Tvl.) 8.V.1964 (M.K.P. Meyer). One ♀-paratype from Grewia flavescens, Mhlumeni River, Kruger National Park (Tvl.) 3.X.1963 (G.G. v.d. Merwe). One ♀-paratype from an unidentified plant, Tshokwane, Kruger National Park (Tvl.)

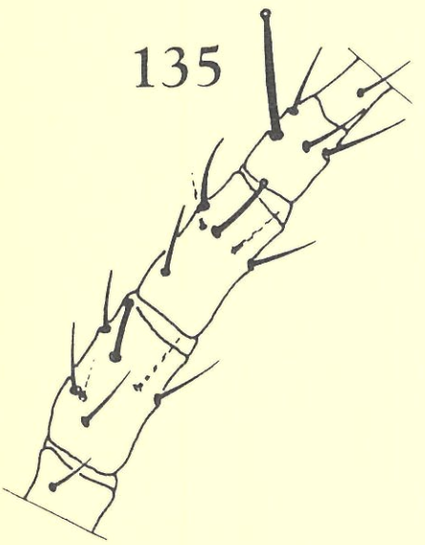
28.IX.1963/.....











FIGS. 131-135. Typhlodromus (Amblydromella) buccalis spec. nov., female

Fig.131, dorsum; fig.132, sternal shield; fig.133, posterior ventral surface; fig.134, peritrematal shield; fig.135, leg IV.

28.IX.1963 (G.G. v.d. Merwe). One ♀-paratype from leaves of Sida cordifolia, grid S.103 Kruger National Park (Tvl.) 4.X.1963 (M.K.P. Meyer). One ♀-paratype from leaves of Ficus sp., Mountain Zebra National Park near Cradock (C.P. 28.I.1965 (G.G. v.d. Merwe). Seven ♀-paratypes from leaves of Ficus sp., Potchefstroom (Tvl.) October 1954 (P.A.J. Ryke). One ♀-paratype from leaves of Croton megalobotrys, grid N.237 Kruger National Park (Tvl.) 14.I.1964 (P. Jordaan). Two ♀-paratypes from Combretum hereroense, Shingwidzi, Kruger National Park (Tvl.) 13.I.1964 (M.K.P. Meyer). One ♀-paratype from leaves of Punica granatum, Barberspan (Tvl.) 20.I.1964 (G.G. v.d. Merwe). Three ♀-paratypes from an unidentified plant, Nelspruit (Tvl.) 5.IV.1955 (P.A.J. Ryke) and one ♀-paratype from Lannea eclulis, Malelane (Tvl.) 16.II.1965 (P. Luus).

Typhlodromus (Amblydromella) buccalis spec. nov.

(Figs. 131-135)

This species has seta L_{10} knobbed, seta L_9 very short, seta M_2 long and the three macrosetae on leg IV with bulbous ends, thus closely resembling T.(A.) fleschneri (Chant). It differs from the latter species in having sternal setae III on metasternal shields and the anterior tips of the peritremes not being recurved as in T.(A.) fleschneri.

Female: Dorsum (fig. 131): Dorsal shield, length 296(-306) μ and breadth 167(-179) μ, very mildly imbricated with four pairs of pores. The shield bears 18 pairs of setae arranged as follows: six dorsal, two median (one anterior and one posterior), six

prolateral/.....

prolateral and four postlateral. These setae measure in length: D_1, D_4 and M_1, 23(22-24) μ; D_2, D_3 and L_2, 20(19-21) μ; D_5 and L_5, 30(-32) μ; D_6, 12 μ; M_2, 57(-64) μ; L_1, L_3, L_4 and L_8, 28(27-29) μ; L_6, 34(33-37) μ; L_7, 40(-43) μ; L_9, 18(17-19) μ and L_{10}, 78(-85) μ. Seta L_9 is decidedly shorter than seta L_8. Prolaterals of moderate length; seta L_1 much longer and setae L_3 and L_4 slightly longer than the distances between their respective bases and the bases of setae following next in the series. Seta D_1 equal in length to the distance between its base and that of seta L_1. The serrated seta M_2 also equals in length the distance between its base and the base of seta L_{10}. The latter, which is serrated and distally knobbed, almost equals in length the distance between its base and the base of its corresponding seta.

Setae S_1 and S_2, 25(-24-26) μ and 23(22-24) μ long respectively, are situated on the dorsal interscutal membrane.

Anterodorsally, the peritrematal shields fuse with the dorsal shield and the peritremes reach almost anterior to the bases of the closely spaced setae D_1.

Venter: The sternal shield (fig. 132), length 84(-86) μ and breadth 63(61-63) μ, bears three pairs of sternal setae. Posterior margin lobate, with the third pair of sternal setae on small lateral lobes. The median lobe is broadly convex and the lateral incisions are square-cut. Sternal setae IV are placed on small metasternal shields.

Genital shield (fig. 133), width 59(-63) μ, with a pair of setae and posteriorly broadly lobed with a

straight/....

straight posterior margin.

The smooth ventri-anal shield (fig. 133) has a shallowly convex anterior margin and its lateral margins taper slightly to the level of the anus. The shield, measuring 89(-96) μ in length and 74(-78) μ in width, is provided with four pairs of well spaced pre-anal setae. A pair of pores lies median to the inner posterior pair of setae. Para-anal setae normal.

The ventral interscutal membrane bears four pairs of setae, VL_1 being long, 40(38-41) μ. Two pairs of metapodal plates are present. A long line of short narrow platelets lies between the genital and ventri-anal shields.

The caudal portion of the peritrematal shield (fig. 134) fuses with the exopodal plate and has a truncated ending.

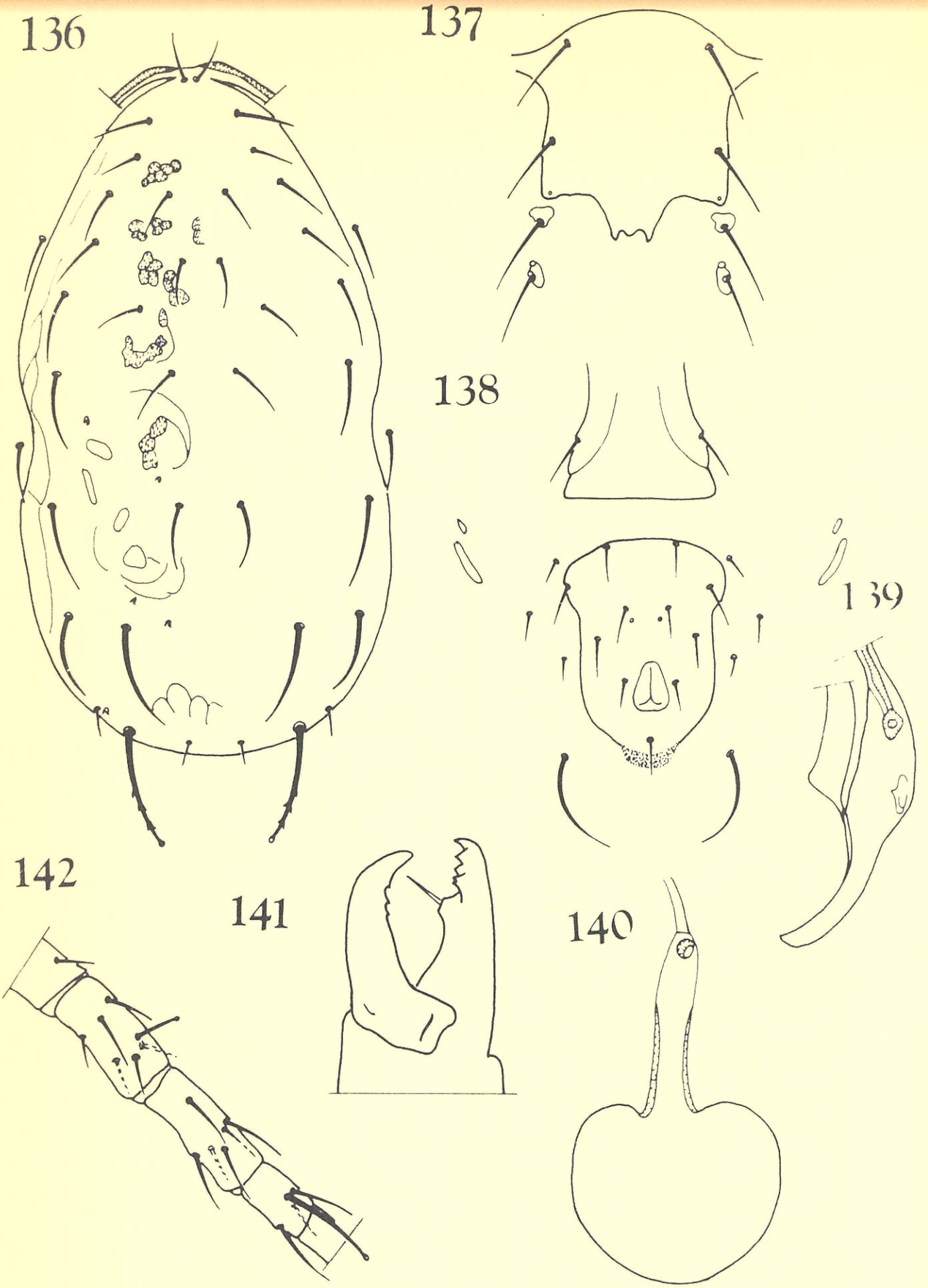
Spermathecae: The position of the spermathecae renders them impossible to examine.

Chelicera: The fixed digit of the chelicera is dentate and the movable digit bears three teeth. The position of the chelicera makes it impossible to illustrate or to determine the number of teeth on the fixed digit.

Legs: Chaetotaxy of the legs is normal, except for trochanter I having six setae. Leg IV (fig. 135) bears three knobbed macrosetae, measuring 16 μ on the genu, 21 μ on the tibia and 33 μ on the basitarsus.

Male: Unknown.

Material studied: ♀-Holotype (serial No. AcY 66/241/1) from leaves of an unidentified plant, Storms River Mouth/....



FIGS. 136-142. Typhlodromus (Amblydromella) rasilis spec. nov., female

Fig.136, dorsum; fig.137, sternal shield; fig.138, posterior ventral surface; fig.139, peritrematal shield; fig.140, spermatheca; fig.141, chelicera; fig.142, leg IV.

Mouth (C.P.) 20.I.1965 (M.K.P. Meyer). One ♀-paratype from leaves of Curtisia dentata, Tsitsikama Seacoast National Park (C.P.) 19.I.1965 (G.G. v.d. Merwe) and one ♀-paratype from Curtisia dentata Bloukrans Pass, Dist. Knysna (C.P.) 21.I.1965 (M.K.P. Meyer).

Typhlodromus (Amblydromella) rasilis spec. nov.

(Figs. 136-142)

T.(A.) rasilis closely resembles T.(A.) buccalis and to a lesser degree T.(A.) vulgaris (Ehara). It can easily be distinguished from these species by the presence of only two pairs of setae on the sternal shield and leg IV bearing only two knobbed macrosetae. It differs also from the latter in having seta L_{10} distally knobbed.

Dorsum (fig. 136): Dorsal shield, length 348(330-) μ and breadth 188(179-) μ, is poorly imbricated with some rugose markings dorsomedially. The shield is provided with 18 pairs of setae arranged on the shield as follows: Six dorsal, two median (one anterior and one posterior), six prolateral and four postlateral. These setae are of the following lengths: D_1, D_2, D_3 and M_1, 26(24-) μ; D_4 and L_3, 31(28-) μ; D_5, 35(34-36) μ; D_6, 12(-14) μ; M_2, 56(53-) μ; L_1 and L_4, 33(30-) μ; L_2, 22(19-) μ; L_5, 38(35-) μ; L_6, 42(40-) μ; L_7, 48(45-) μ; L_8, 44(42-46) μ; L_9, 14(-20) μ and L_{10}, 62(60-65) μ. Seta L_1 is longer than the distance between its base and that of seta L_2. Setae L_2, L_3 and L_4 equal or nearly equal the distances between their bases and those of respective setae next following. All the other setae are shorter than the distances between their bases and the bases of the setae

following/.....

following in the series. Seta M_2 is slightly longer than the distance between its base and that of L_{10}. Setae S_1, length 30(28-) μ, and S_2, length 36(32-) μ, are placed on the dorsal interscutal membrane. The peritremes reach anterior to the bases of setae D_1.

Venter: The sternal shield (fig. 137), length 82(78-84) μ and breadth 61(-68) μ; bears only two pairs of setae. A strong posteriorly waved median lobe is present. Sternal setae III are situated on small irregularily shaped shields. Setae IV are on oval-shaped metasternal shields.

The genital shield, width 52(50-54) μ, is normal with a pair of genital setae.

The anterior one-third of the ventri-anal shield (fig. 138) is widened, 80(74-) μ, with the remaining lateral margins almost parallel. The shield bears four pairs of well spaced pre-anal setae; the caudal pair is almost in the middle of the shield. A pair of pores lie just caudomedial to the inner pair of setae.

The membrane flanking the ventri-anal shield is provided with four pairs of setae, the anterior three pairs being short and VL_1 rather long 52(50-54) μ. The secondary metapodal shields are one-third of the length of the slender primary ones. The peritrematal shield (fig. 139) fuses posteriorly with the exopodal plate and ends caudomedially with a sharp point.

Spermatheca (fig. 140): The major duct is slender and tubelike but could not be followed for its full length. The lips are close to the major duct. The atrium continues directly into the tubelike cervix which is 18 μ in length. The last two-thirds of the latter is

thick/....

thick walled in comparison to the thin walled atrium and first portion of the cervix.

Chelicera (fig. 141): The fixed digit, length 26 µ, bears three subapical teeth, the proximal one being bi-dentate, and a pilus dentilis. The movable digit, length 24 µ, bears three recurved teeth on its inner margin.

Legs: Leg IV (fig. 142) bears two knobbed macrosetae; the one on the genu being 19(-21) µ in length and that on the basitarsus 40(35-) µ in length. Chaetotaxy of the legs is normal, except for trochanter I having six setae.

Male: Unknown.

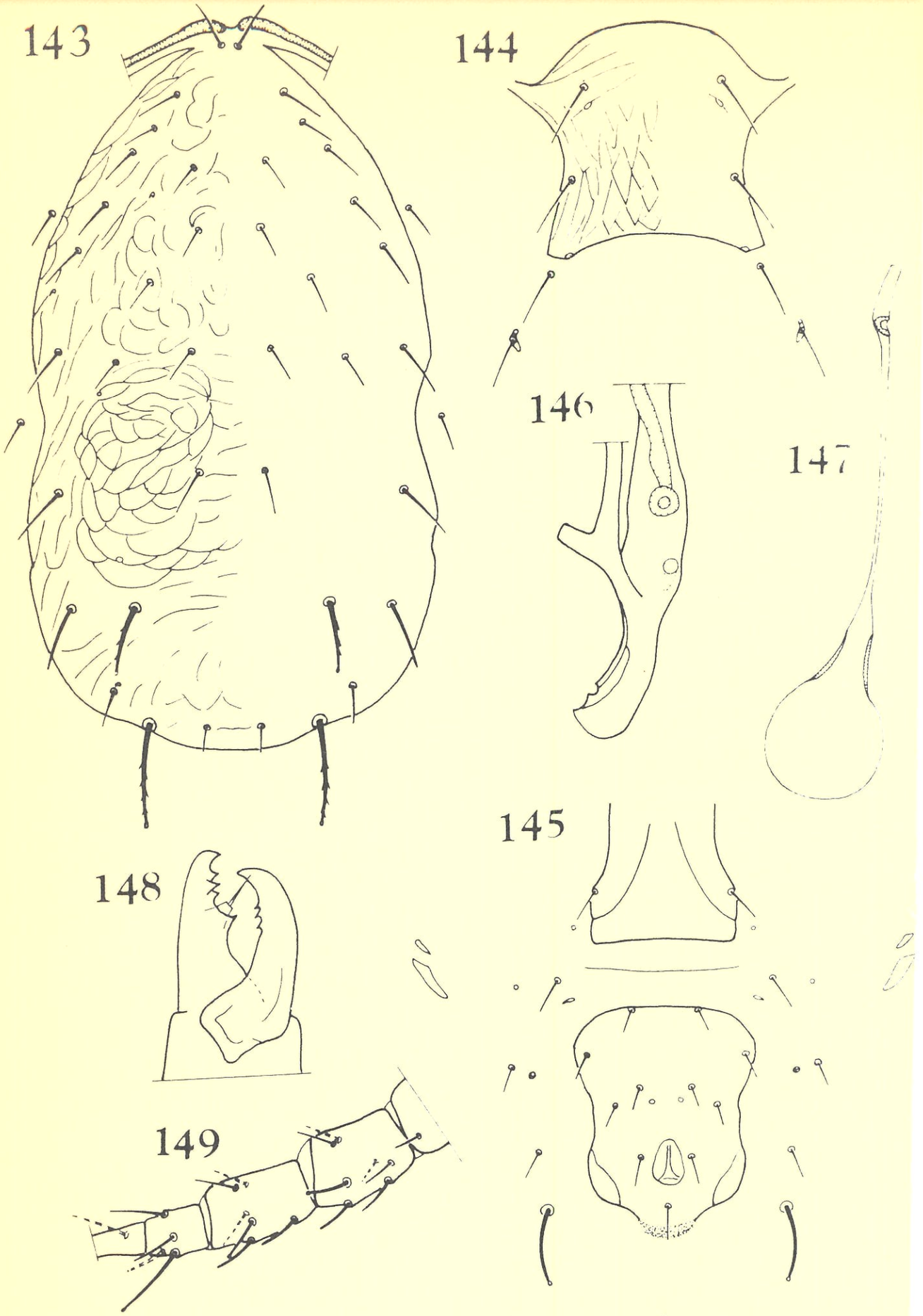
Material studied: ♀-Holotype (serial no. AcY 66/242/1) and seven ♀-paratypes from leaves and fruit of Citrus sp., Zebediela (Tvl.) 2.IV.1964 (J. den Heyer). One ♀-paratype from Citrus sinensis, Zebediela (Tvl.) May 1964 (M.K.P. Meyer) and one ♀-paratype from leaves of Combretum sp., grid S.43 Kruger National Park (Tvl.) 1.X.1963 (M.K.P. Meyer).

d. Subgenus Paraseiulus Muma, new status

Paraseiulus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 299; Wainstein, 1962b, Ent. Obozr. (Ent. Rev.) 41: 139; Muma, 1963a, Fla Ent. 46: 14. Type: Seiulus soleiger Ribaga, 1902, by original designation.

Melodromus Wainstein, 1962a, Acarologia 4: 23. Type: Seiulus soleiger Ribaga, 1902, by original designation.

The subgenus/.....



FIGS. 143-149. Typhlodromus (Paraseiulus) prunusus spec. nov., female

Fig.143, dorsum; fig.144, sternal shield; fig.145, posterior ventral surface; fig.146, peritrematal shield; fig.147, spermatheca; fig.148, chelicera; fig.149, leg IV.

The subgenus Paraseiulus is characterized by having six pairs of dorsal setae, three pairs of median setae, six pairs of prolateral setae and four pairs of postlateral setae. Two pairs of the median setae are on the proscutum. Two pairs of scapular setae are present on the dorsal interscutal membrane.

This subgenus differs from the subgenus Amblydromella in having an additional pair of median setae on the proscutum. It includes the species T.(P.) soleiger, T.(P.) ecclesiasticus (De Leon), T.(P.) kuzini (Wainstein) and the following new species from South Africa.

Typhlodromus (Paraseiulus) prunusus spec. nov.
(Figs. 143-149)

This species differs from the known species of the subgenus Paraseiulus in having setae M_3, L_{10} and the ventro-caudal setae distally knobbed. It further differs from these species in having setae L_9 much shorter than seta L_8 and in the macrosetae being knobbed on leg IV.

Female: Dorsum (fig. 143): The dorsal shield, length 381(372-393) µ and breadth 216(214-223) µ, is imbricated with five pairs of pores. The shield is provided with 19 pairs of setae arranged as follow: six dorsal, three median (the second pair is just posterior to the level of seta D_4), six prolateral and four postlateral. These setae measure in length: D_1, L_1, L_4 and L_5, 25(24-27) µ; D_2, D_3, D_4, M_1, M_2, L_2 and L_9, 18(17-21) µ; D_5 and L_3, 22(-25) µ; D_6, 13-14 µ; M_3 and L_8, 38(-41) µ; L_6, 30(-32) µ; L_7, 36(35-37) µ/.....

L_7, 36(35-37) μ and L_{10}, 59(57-60) μ. These setae are relatively short and only setae L_1 and L_2 are equal to or longer than the distance between their bases and the bases of the setae following next in the series. Setae L_8, L_{10} and M_3 terminate bluntly or in a knob and the latter two setae are also serrated.

Setae S_1 and S_2, 23(-24) μ and 19(-21) μ long respectively, are on the dorsal interscutal membrane.

Anteriorly the peritrematal shields are fused to the dorsal shield and the peritremes reach anterior to the bases of setae D_1.

Venter: The mildly imbricated sternal shield (fig. 144), length 67(-71) μ and width 63(-67) μ, bears only two pairs of sternal setae. The lateral margins reach posteriorly to the level of the second pair of lyriform pores. The posterior margin is slightly concave and the anterior margin is convex. The third pair of sternal setae are on the interscutal membrane and the fourth pair are on small metasternal shields.

The genital shield (fig. 145), 74 μ wide, has a straight posterior margin and bears a pair of setae.

The smooth ventri-anal shield (fig. 145) is 123(-126) μ long and anteriorly 97(-99) μ wide. The lateral margins are slightly constricted, leaving the shield 87(-90) μ wide across the anus. The shield bears three pairs of pre-anal setae and a pair of pores caudomedial to the inner posterior pair of setae. The para-anal setae are normal.

Four pairs of setae are on the ventral interscutal membrane. The caudal pair is long, 39(37-41) μ and

knobbed./.....

knobbed. Two pairs of metapodal plates and four pairs of platelets are lateral to the genital and ventri-anal shields on the membrane. A long slender platelet lies between the latter two shields.

Posteriorly the peritrematal shield (fig. 146) is fused with the exopodal plate. The former has a broad end with a small sharp median point posterior to coxa IV.

Spermatheca (fig. 147): The long slender spermatheca has a relatively short, 7 µ, major duct. The lips, 3 µ in diameter, mark the position of the atrium. The latter is indistinctly separated from the major duct. The cervix is very long, 48 µ, and slender. The last portion towards the vesicle is somewhat flared and 9 µ thereof is thick walled. The remainder of the spermatheca is very thin walled.

Chelicera (fig. 148): The movable and fixed digits are both 30 µ long. The fixed digit carries four sharp teeth and a pilus dentilis. Three of these teeth are subapical and one lies proximal to the pilus dentilis. The movable digit bears three recurved teeth on its inner margin.

Legs: Chaetotaxy of the legs is normal, except for trochanter I which is provided with six setae. Leg IV (fig. 149) is provided with five macrosetae, measuring in length: 19(-21) µ (knobbed) and 19(-21) µ (blunt) on the genu; 19(-21) µ (knobbed) and 19(-21) µ (blunt) on the tibia and 33(-36) µ (knobbed) on the basitarsus.

Male: Unknown.

Malterial studied: ♀-Holotype (serial no. AcY 66/243/1) and six ♀-paratypes from Prunus persica, Potchefstroom

(Tvl.)/.....

(Tvl.) April 1954 (P.A.J. Ryke). Three ♀-paratypes from Prunus domestica, Potchefstroom (Tvl.) Januarie 1954 (P.A.J. Ryke) and one ♀-paratype from Prunus malus, Potchefstroom (Tvl.) 26.III.1954 (P.A.J. Ryke).

e. Subgenus Bawus subgen. nov.

Type: Paraseiulus subsoleiger Wainstein, 1962b, Ent. Obozr. (Ent. Rev.) 41: 139.

The subgenus Bawus has six pairs of dorsal setae; four pairs of median setae, six pairs of prolateral setae and four pairs of postlateral setae. Two pairs of scapular setae are present on the dorsal interscutal membrane.

This subgenus is distinct in having two pairs of median setae on the proscutum and two pairs of median setae on the postscutum. T.(B.) subsoleiger is the only known species in this subgenus. It is recorded from Alma-Ata and Georgia, USSR.

The subgenus is named in honour of Dr. B.A. Wainstein, consisting of his initials.

f. Subgenus Metaseiulus Muma.

Metaseiulus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 295; González & Schuster, 1962, Bull. Univ. Chile agric. Exp. Stn. 16: 19; Schuster & Pritchard, 1963, Hilgardia 34: 214; Muma, 1963a, Fla Ent. 46: 13. Type: Typhlodromus validus Chant, 1957, by original designation.

Galendromus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 298; Muma, 1963a, Fla Ent. 46: 14; Muma, 1963b, Fla Ent. (suppl. 1): 15. Type: Typhlodromus validus Chant, 1957, by original designation.

Typhlodromus (Typhlodromus) section Menaseius Wainstein, 1962a, Acarologia 4:21; Muma, 1963a, Fla Ent. 46: 14. Type of section: Seius pomi Parrot, 1906, monotypic.

Galendromus (Menaseius); Muma, 1963b, Fla Ent. (suppl.1): 27. New synonymy.

Galendromus (Leonodromus) Muma, 1963b, Fla Ent. (suppl.1): 36. Type of subgenus: Typhlodromus luculentis De Leon, 1960, by original designation. New synonymy.

Typhlodromus (Metaseiulus); Pritichard and Baker, 1962, Hilgardia 33: 222.

Chanteius (Eratodromus) Wainstein, 1962a, Acarologia 4: 20. Type of subgenus: Typhlodromus validus Chant, 1957, by original designation.

The subgenus Metaseiulus Muma is characterized by having six pairs of dorsal setae, two pairs of median setae, six pairs of prolateral setae and three pairs of postlateral setae; one pair anterolaterally and two pairs caudolaterally. The second pair of median setae is not paired with any of

the postlateral setae and the first pair of scapular setae is on the dorsal interscutal membrane while the second pair is absent.

This subgenus is not yet known from South Africa.

g. Subgenus Galendromimus Muma, new status.

Galendromimus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 297; Muma, 1963a, Fla Ent. 46: 14. Type: Typhlodromus alveolaris De Leon, 1957, monotypic.

Cydnodromella Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 286; Muma, 1963a, Fla Ent. 46: 12. Type: Typhlodromus pilosus Chant, 1959, monotypic.

Chanteius (Deleoneius) Wainstein, 1962a, Acarologia 4: 19. Type of subgenus: Typhlodromus alveolaris De Leon, 1957, monotypic.

Chanteius (Allodromus) Wainstein, 1962a, Acarologia 4: 19. Type of subgenus: Typhlodromus pilosus Chant, 1959, monotypic.

? Nothoseius De Leon, 1965, Fla Ent. 48: 127. Type: Nothoseius boringuensis De Leon, 1965, monotypic. New synonymy.

The subgenus Galendromimus includes those species having five pairs of prolateral setae and three pairs of postlateral setae; one pair anterolaterally and two pairs caudolaterally. The second pair of median setae is not paired with any of the postlateral setae and the second pair of scapular setae is absent while the

first pair/.....

first pair is present on the dorsal interscutal membrane.

De Leon (1965) described his genus Nothoseius as having four pairs of prolateral setae and four pairs of postlateral setae but with the second scapular seta absent. The fifth pair of lateral setae of N. boringuensis is, however, according to De Leon's illustration, much closer to the lateral margin than the sixth pair of lateral setae. In species having four pairs of prolateral setae this is usually the contrary. It is therefore possible that the fifth pair of lateral setae is actually the second pair of scapular setae shifted onto the dorsal shield or it may be the sixth prolateral pair of setae with the firth prolateral pair of setae absent. Since the immature stages of this species are not known, the genus Nothoseius is doubtfully included in Typhlodromus (Galendromimus).

The female of Nothoseius boringuensis is unique in having "a somewhat transparent crescent-shaped body attached by anterior and posterior ends at mid-line of dorsal shield." The adaptive value of this unusual appendix is not known and is therefore not considered of supraspecific significance.

The subgenus Galendromimus has not yet been found in the South African fauna.

h. Subgenus Colchodromus Wainstein

Chanteius (Colchodromus) Wainstein, 1962a, Acarologia 4: 19; Muma, 1963a, Fla Ent. 46: 13. Type of subgenus: Typhlodromus rarus Wainstein, 1958, monotypic.

The subgenus/....

The subgenus Cochodromus is characterized by having six pairs of dorsal setae, two pairs of median setae, five pairs of prolateral setae and three pairs of postlateral setae; the second pair being transversely paired with the posterior median pair of setae. Two pairs of scapular setae are present on the dorsal interscutal membrane.

This subgenus is known only from the type species from the USSR.

i. Subgenus Chanteius Wainstein, new status.

Chanteius Wainstein, 1962a, Acarologia 4: 19; Muma, 1963a, Fla Ent. 46: 13. Type: Typhlodromus contiguus Chant, 1959, by original designation.

The subgenus Chanteius is characterized by having six pairs of dorsal setae, two pairs of median setae, five pairs of prolateral setae and three pairs of postlateral setae; one pair anterolaterally and two pairs caudolaterally. The second pair of median setae is not transversely paired with any of the postlateral setae and the dorsal interscutal membrane bears two pairs of scapular setae.

This subgenus is not yet known from South Africa.

j. Subgenus Typhlodromus Scheuten

Typhlodromus Scheuten, 1857, Arch. Naturgesch. 23: 111; Oudemans, 1929, Ent. Ber., Amst. 8: 14; Garman, 1948, Bull. Conn. agric. Exp. Stn. 520: 7;

Nesbitt,/.....

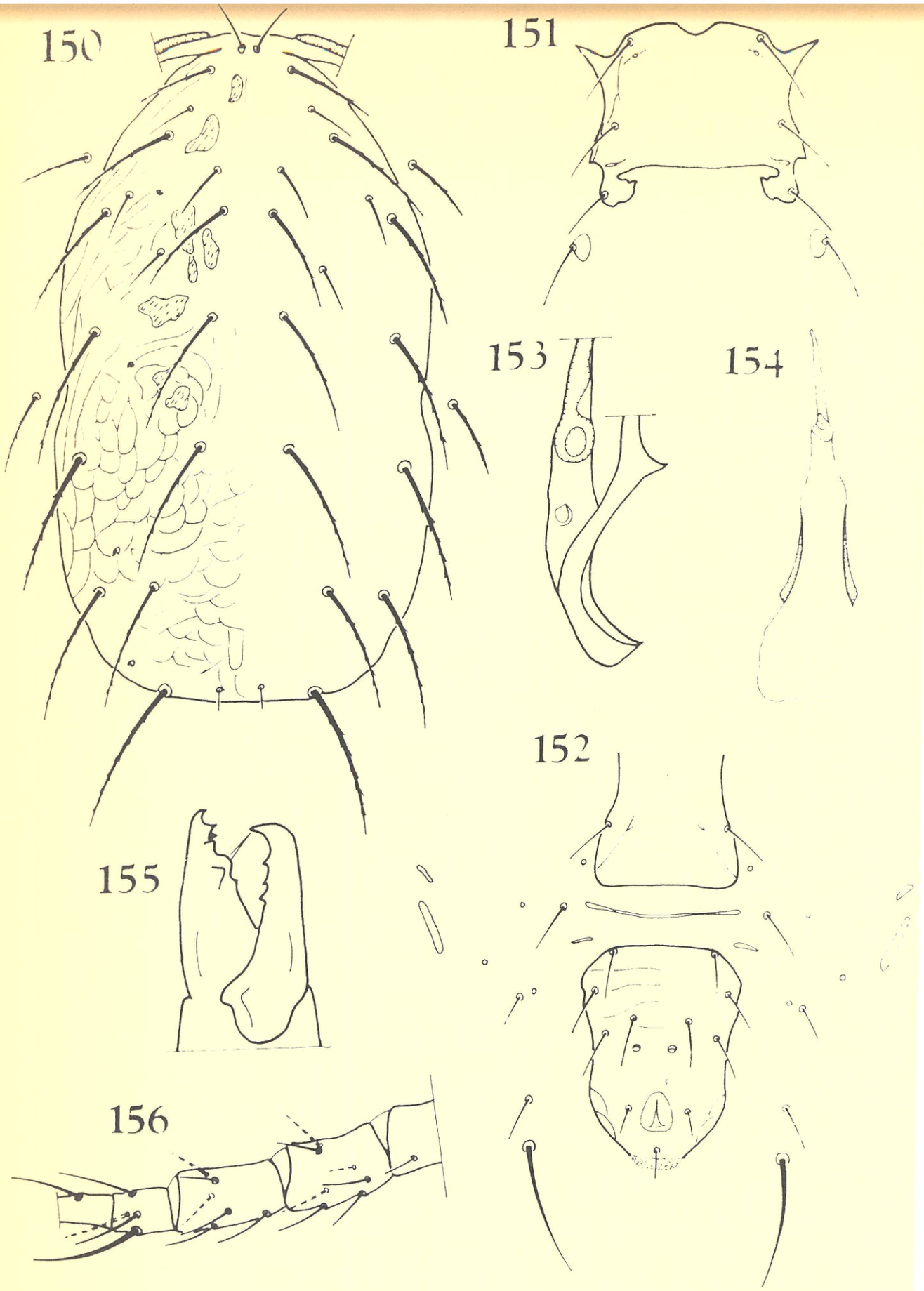
Nesbitt, 1951, Zool. Verh., Leiden 12: 4; Cunliffe & Baker, 1953, Pinellas Biol. Lab. Publ. 1:1; Womersley, 1954, Aust. J. Zool. 2: 172; Muma, 1955, Ann. ent. Soc. Am. 48: 268; Athias-Henriot, 1957a, Bull. Soc. Hist. nat. Afr. N.48: 336; Wainstein, 1958, Soobsch. Akad. Nauk. Gruz. 21: 201; Ehara, 1959, Acarologia 1: 285; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 298; Wainstein, 1962a, Acarologia 4: 21; Muma, 1963a, Fla Ent. 46: 14; Schuster & Pritchard, 1963, Hilgardia 34: 199. Type: Typhlodromus pyri Scheuten, 1857, by subsequent designation of Oudemans (1929).

Typhlodromus (Typhlodromus): Chant, 1957a, Can. Ent. 89: 289; Chant, 1957c, Can. Ent. 89: 530; Chant, 1959b, Can. Ent. 91 (suppl. 12): 48; Pritchard & Baker, 1962, Hilgardia 33: 218; Muma, 1963a, Fla Ent. 46: 14.

Typhlodromus sens. str. is characterized by having six pairs of dorsal setae, two pairs of median setae, six pairs of prolateral setae and three pairs of postlateral setae; the second pair is transversely mated with the posterior pair of median setae. Both pairs of scapular setae are present on the dorsal interscutal membrane.

The following single species of the subgenus is known from the South African fauna.

Typhlodromus/.....



FIGS. 150-156. Typhlodromus (Typhlodromus) magdalenae Pritchard and Baker, female

Fig.150, dorsum; fig.151, sternal shield; fig.152, posterior ventral surface; fig.153, peritrematal shield; fig.154, spermatheca; fig.155, chelicera; fig.156, leg. IV.

Typhlodromus (Typhlodromus) magdalenae Pritchard & Baker

(Figs. 150-156)

Typhlodromus (Typhlodromus) magdalenae Pritchard & Baker, 1962, Hilgardia 33: 218.

Typhlodromus (T.) magdalenae differs from Typhlodromus (T.) pyri Scheuten in having the second and fourth prolateral setae short and equal in length while the third, fourth and fifth dorsal setae are approximately as long as the remaining lateral setae.

Female: Dorsum (fig. 150): The imbricated dorsal shield, length 320-330 μ and breadth 176-188 μ, has some dorsomedian rugose patches and four pairs of pores. The shield is provided with 17 pairs of setae arranged as follow: six dorsal, two median, six prolateral and three postlateral (the second being paired with the postmedian seta). These setae measure in length: D_1, M_1, L_2 and L_4, 24-28 μ; D_2, 30-33 μ; D_3, 54-56 μ; D_4, M_2 and L_5, 66-70 μ; D_5, L_6, L_7 and L_8, 72-78 μ; D_6, 10 μ; L_1, 47-52 μ; L_3, 60-64 μ; and L_9, 75-82 μ. Setae D_1, D_2, D_6, M_1, L_2 and L_4 are smooth but the remaining elongate setae are serrated. All the setae on the dorsal shield, except D_1, D_5 and M_1, are equal to or longer than the respective distances between their bases and the bases of the setae next following.

The serrated setae S_1 and S_2 are on the dorsal interscutal membrane and are 38-40 μ and 42-45 μ long respectively.

The peritrematal shields are fused anteriorly with the dorsal shield. The peritremes terminate anterior to the bases of setae L_1.

Venter:/.....

Venter: The anteriorly dented sternal shield (fig. 151), length 46-50 μ and breadth 67-70 μ, bears three pairs of sternal setae. The almost straight posterior margin is well anterior to the third pair of sternal setae. The latter are thus on irregularly margined lateral lobes. The posterior margin cuts laterally into these lobes giving the impression that the lobes are about to become separated from the sternal shield. Sternal setae IV are on oval metasternal shields.

The genital shield, width 70-74 μ, is normal with a pair of setae.

The lightly imbricated ventri-anal shield (fig. 152) length 110-115 μ and width (anterior) 110-115 μ, (across the anus) 66-70 μ, has a convex anterior margin and concave lateral margins. The shield is provided with four well-spaced pre-anal setae and a pair of pores caudomedial to the inner posterior pair of setae. The para-anal setae are normal.

The ventral interscutal membrane is provided with four pairs of setae; VL_1 being finely serrated and long, 63-67 μ. Two pairs of metapodal plates are located laterally on the membrane. Between the genital and ventri-anal shields lies a long slender platelet and close to the anterolateral corners of the latter shield is a pair of oblong platelets equal in size to the secondary metapodal plates. Lateral to the former two shields and median to the metapodal plates are four pairs of scattered circular platelets.

The exopodal plate overlaps the peritrematal shield posteriorly (fig. 153) and both terminate posterior to coxa IV in a rounded posterior margin

with an/....

with an anteromedially directed sharp point.

Spermatheca (fig. 154): The thin walled slender major duct is approximately 10 μ long. An atrium is not discernible but big lips, 3 μ in diameter, mark its presumed position. The first portion, approximately 10 μ, of the cervix is thin walled and does not have a definite shape. The second portion towards the vesicle is thick walled and tube-like. The cervix measures approximately 22 μ in length from the lips to the vesicle.

Chelicera (fig. 155): The fixed digit, length 23 μ, is provided with six teeth and a pilus dentilis. The movable digit, length 26 μ, bears three recurved teeth on its inner margin.

Legs: The chaetotaxy of the legs is normal except for trochanter I bearing six setae. Leg IV (fig. 156) is provided with a single macroseta, measuring 42-45 μ in length.

Male: Pritchard & Baker included one male in the paratypes of this species but did not describe it. No males are present in the South African collection.

Distribution: Pritchard & Baker described this species from the ♀-holotype, LWIRO, IRSAC, Belgian Congo, May 18, 1955 (E.W. Baker), on tree legume; type no. 2698 in the U.S. National Museum and seven ♀-paratypes from various plants, Belgian Congo and Ruanda-Urundi, Central Africa.

Material studied: One ♀ from leaves of Passiflora sp., Tzaneen (Tvl.) 4.XI.1964 (G.G. v.d. Merwe) and two ♀♀

from /.....

from Mangifera indica, Westfalia near Tzaneen (Tvl.) 26.II.1964 (G.G. v.d. Merwe).

k. Subgenus Meyerius subgen. nov.

Type: Typhlodromus (Meyerius) liliaceus spec. nov.

Chanteius (Eratodromus) Wainstein, 1962a, Acarologia 4: 20. Type of subgenus: Typhlodromus validus Chant, 1957, by original designation. Misidentification.

The subgenus Meyerius has six pairs of dorsal setae, two pairs of median setae, six pairs of prolateral setae and three pairs of postlateral setae; the second pair anterolateral and two pairs caudolateral. The second pair of median setae is not transversely paired with any of the postlateral setae and both pairs of scapular setae are present on the dorsal interscutal membrane.

The identification of Typhlodromus validus Chant (the type of the subgenus Eratodromus Wainstein, 1962a) by Wainstein (1962a) must be in error. Chant (1959b) and Schuster & Pritchard (1963) clearly showed that T. validus lacks the second pair of scapular setae. Furthermore, Muma (1961) had already designated T. validus as the type of Metaseiulus Muma.

A new name, Meyerius, is therefore, proposed for those new species, herein described, that resemble Metaseiulus but have the second pair of scapular setae present on the dorsal interscutal membrane.

The name/.....

The name Meyerius is in honour of Dr. (Miss) M.K.P. Meyer but should be referred to as masculine.

Key to the species of subgenus Meyerius: females

1. Alternating prolateral setae (L_1, L_3, etc.) relatively short; setae L_5 shorter than the distance between its base and the base of seta L_6 7

   Alternating prolateral setae (L_1, L_3, etc.) relatively long; seta L_5 about as long as or longer than the distance between its base and the base of seta L_6 2

2. Seta L_5 very long; equal to or longer than the distance between its base and the base of seta L_7 4

   Seta L_5 shorter; not longer than four-fifths of the distance between its base and the base of seta L_7 3

3. First half of the cervix of lesser diameter than the atrium ..... latus spec. nov.

   First half of the cervix of greater diameter than the atrium ..... veretillum spec. nov.

4. Setae L_1 and L_3 not equal in length 5

   Setae L_1 and L_3 equal in length .... liliaceus spec. nov.

5. Setae/.....

5. Setae L_6 and L_7 short and equal in length 6

   Seta L_6 two-thirds of the length of seta L_7, the latter being twice the length of D_5 ..... maritimus spec. nov.

6. Spermatheca with first half of the cervix slender ..... zantrdeschiae spec. nov.

   Spermatheca with first two-thirds of the cervix broad ..... citimus spec. nov.

7. Seta M_2 equal to or longer than the distance between its base and the base of seta L_9 8

   Seta M_2 shorter than the distance between its base and the base of seta L_9 .... incisus spec. nov.

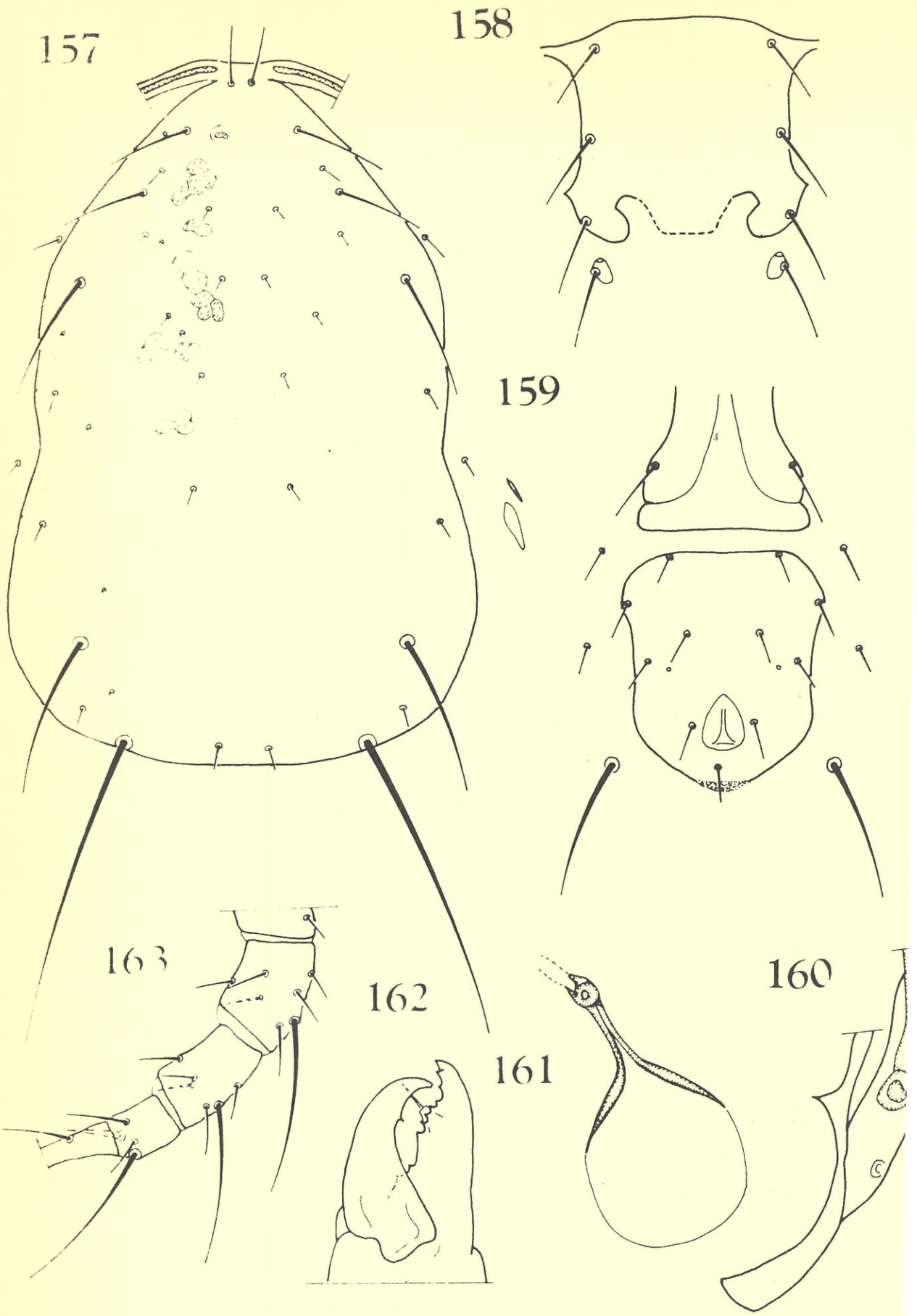
8. Setae L_1 and L_3 equal to or longer than the distances between their respective bases and those of setae L_2 and L_4 9

   Setae L_1 and L_3 much shorter than the distances between their respective bases and those of setae L_2 and L_4 .... agrostidis spec. nov.

9. Setae L_5 and L_6 equal or almost equal in length 10

   Seta L_5 much shorter than seta L_6 .... egregius spec. nov.

10. Spermatheca/.....



FIGS. 157-163. Typhlodromus (Meyerius) latus spec. nov., female

Fig.157, dorsum; fig.158, sternal shield; fig.159, posterior ventral surface; fig. 160, peritrematal shield; fig.161, spermatheca, fig.162, chelicera; fig.163, leg IV.

10. Spermatheca with cervix slender and evenly flared towards the vesicle. .... chaetopus spec. nov.

Spermatheca with cervix stout and disc-like 11

11. Genu II of the VII-type .... immutatus spec. nov.
Genu II of the VIII-type ... convallis spec. nov.
Genu II of the IX-type ... collativus spec. nov.

Typhlodromus (Meyerius) latus spec. nov.
(Figs. 157-163)

The general shape of the spermatheca of this species relates it to T.(M.) maritimus spec. nov., T.(M.) zantedeschiae spec. nov. and T.(M.) chaetopus spec. nov. It differs from the first two species in having setae L_5 much shorter than the distance between its base and the base of seta L_7, and from T.(M.) chaetopus in having seta L_5 equal to or slightly longer than the distance between its base and the base of seta L_6.

Female: Dorsum: (fig. 157): Dorsal shield with some rugose patches dorsomedially, seven pairs of pores and laterally, faint imbrications. The shield, measuring 412 μ in length and 272 μ in width, bears 17 pairs of setae. These setae are arranged on the shield as follows: six dorsal, two median (one anterior and one posterior), six prolateral (seta L_4 somewhat median) and three postlateral (the seta usually paired with M_2 is absent). These setae measure in length: D_1, 38 μ; D_2, D_3, D_4, D_5, M_1 and L_4, 7-10 μ;/....

L_4, 7-10 μ; D_6, L_2, L_6, L_7 and L_8, 14 μ; M_2, 100 μ; L_1 and L_3, 56 μ; L_5, 79 μ and L_9, 195 μ. Seta D_1 is equal in length to the distance between its base and the base of seta L_1. Setae L_1 and L_5 are longer than the distances between their bases and the bases of setae L_3 and L_6 respectively but seta L_3 is shorter than the distance between its base and the base of seta L_5. Seta M_2 is much longer than the distance between its base and the base of seta L_9 and the latter seta is much longer than the distance between its base and the base of the other seta L_9. The rest of the setae are very short or minute.

Setae S_1 and S_2, 22 μ and 12 μ long respectively, are situated on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes reach anterolaterally to the bases of setae D_1.

Venter: Sternal shield (fig. 158), length 93 μ and width 87 μ, with three pairs of sternal setae and a faintly margined median lobe on the posterior margin. The median lobe is broad and posteriorly straight. The lateral lobes are large and the incisions are broad. Sternal setae IV are situated on oval metasternal shields.

The genital shield (fig. 159), width 89 μ, with a pair of setae and sharply incised posterolateral margins. The shield thus appears to have a broad caudal lobe with a straight posterior margin.

The ventri-anal shield (fig. 159), anteriorly 104 μ wide, with four pairs of pre-anal and a pair of widely spaced pores. The shield is 130 μ long and has

a straight/....

a straight anterior margin, rounded anterolateral corners and slightly constricted lateral margins. Para-anal setae normal.

The ventral interscutal membrane is provided with three pairs of setae, the caudal pair being long, 80 μ. Two pairs of metapodal plates are also present on the membrane.

The exopodal plate is fused posteriorly with the peritrematal shield (fig. 160) and has a broad end caudomedial to coxa IV.

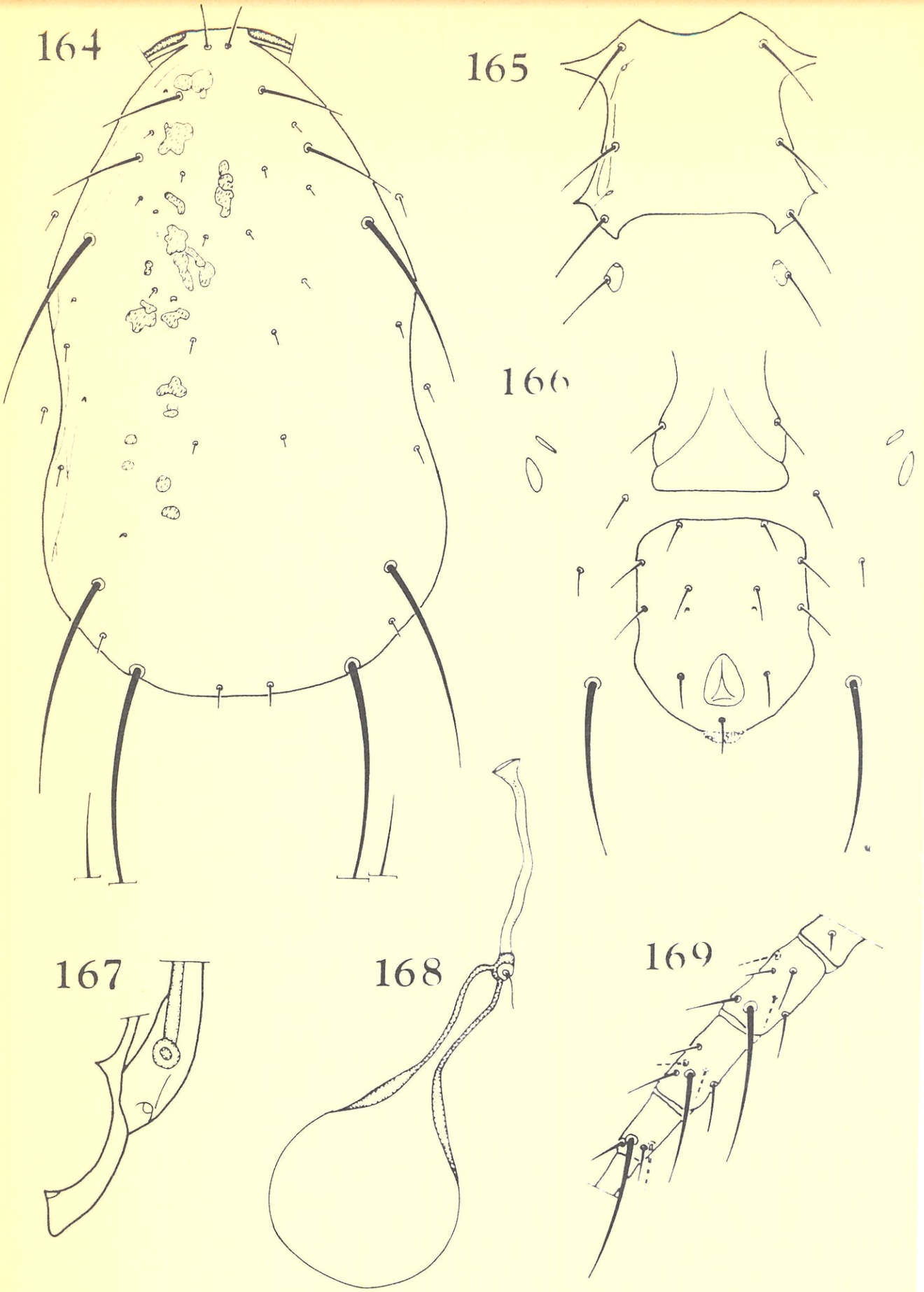
Spermatheca. (fig. 161): The major duct of the spermatheca is obscure but the bifid atrium is bulbous, 4 μ in diameter, with the lips in its centre. The cervix is thick walled but the first half of its length is slender. Thence it is flared and more thick walled than the first half.

Chelicera (fig. 162): The movable and fixed digits are of equal length, 38 μ; the former bears a single tooth. The fixed digit bears nine teeth and a pilus dentilis on its inner margin.

Legs: The chaetotaxy of the legs is normal. Legs III and IV (fig. 163) are provided with macrosetae, measuring in length: on genu III, 45 μ; on tibia III, 42 μ; on genu IV, 94 μ; on tibia IV, 86 μ and on basitarsus IV, 89 μ.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/244/1) from dry Protea sussanae, Kirstenbosch (C.P.) 29.I.1958 (P.A.J. Ryke).



FIGS. 164-169. Typhlodromus (Meyerius) veretillum spec. nov., female

fig.164, dorsum; fig.165, sternal shield; fig.166, posterior ventral surface; fig.167, peritrematal shield; fig.168, spermatheca; fig.169, leg IV.

Typhlodromus (Meyerius) veretillum spec. nov.

(Figs. 164-169)

T.(M.) veretillum is distinctive amongst the group of species having seta L_5 shorter than the distance between its base and the base of seta L_7, in that the spermatheca has a small atrium and the first portion of the cervix is dilated.

Female: Dorsum (fig. 164): Dorsal shield, length 360 (365) μ, breadth 224(235) μ, with lateral imbrications and dorsomedian rugose patches. The shield bears 17 pairs of setae; L_4 has shifted to a median position and the seta normally designated as L_8 is absent. The setae on the shield measure in length as follows: D_1, 28(32) μ; D_2, D_3, D_4, D_5, M_1, L_2, L_3 and L_6, 7-9 μ; D_6, L_7 and L_8, 9-11 μ; M_2, 122 μ; L_1, 52(56) μ; L_3, 57(61) μ; L_5, 99 μ and L_9, 188 μ. Most setae are thus minute or very short with a tendency amongst the remainder to increase in length from anterior to posterior, i.e. setae D_1, L_1, L_3, L_5, M_2 and L_9.

Dorsal interscutal membrane with setae S_1 and S_2 measuring 18(14) μ and (8) μ in length respectively.

The peritrematal shields are fused anterodorsally with the dorsal shields and the peritremes reach almost to the bases of setae D_1.

Venter: The sternal shield (fig. 165) is of equal length and breadth, 67(72) x 67(72) μ and bears three pairs of sternal setae. The anterior margin of the shield is concave and the posterior margin is straight except for small lateral lobes pointed caudomedially. Sternal setae IV are placed on distinct oval metasternal

shields./.....

shields.

The genital shield (fig. 166), width 73(80) μ, is posteriorly somewhat widened and bears a pair of setae.

The ventri-anal shield is smooth (fig. 166) with lateral margins parallel anteriorly but slightly wider across the anterior portion of the anus where it measures 89(96) μ in width. The anterior margin of the shield is straight with rounded lateral corners. The shield measures 115(120) μ in length. Four pairs of pre-anal setae are present on the shield with the lateral two pairs very close to the lateral margins. Caudal to the inner posterior pair of setae lies a pair of pores. Para-anal setae normal.

The ventral interscutal membrane is provided with three pairs of setae, the caudal pair being long, 89(93) μ. Two pairs of metapodal shields are also present on the membrane.

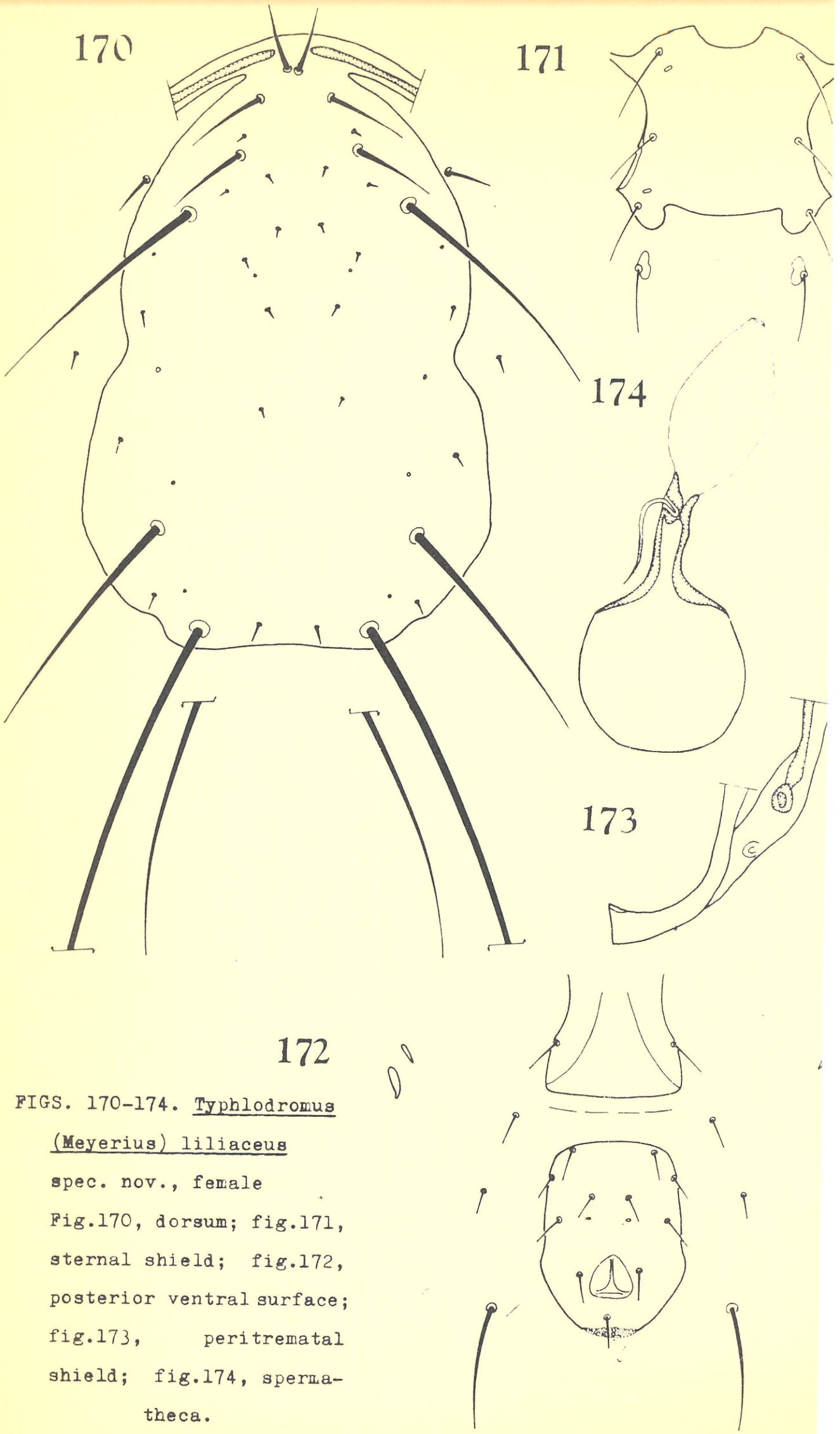
The peritrematal shield (fig. 167) fuses with the exopodal shield and ends caudomedially broad.

Spermatheca (fig. 168): The major duct of the spermatheca is long, 33(28) μ, and narrow. Atrium relatively small, 4 μ long, and almost completely occupied by the lips. The thick walled cervix measures 32(34) μ in length and is dilated where it joins the atrium. Thence the cervix is evenly waisted and from halfway is flared towards the vesicle.

Chelicerae: The postion of the chelicerae renders them impossible to examine.

Legs: The chaetotaxy of the legs is normal. Only

leg IV/.....



FIGS. 170-174. Typhlodromus (Meyerius) liliaceus spec. nov., female

Fig.170, dorsum; fig.171, sternal shield; fig.172, posterior ventral surface; fig.173, peritrematal shield; fig.174, spermatheca.

leg IV (fig. 169) bears macrosetae. These setae measure in length: 80(84) μ on the genu, 66(70) μ on the tibia and 75(80) μ on the basitarsus.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/245/1) and one ♀-paratype from leaves of Solanum refrofexum, Storms River Mouth (C.P.) 21.I.1965 (M.K.P. Meyer).

Typhlodromus (Meyerius) liliaceus spec. nov.

(Figs. 170-178)

T.(M.) liliaceus differs from related species having seta L_5 equal to or longer than the distance between its base and the base of seta L_7 (T.(M.) maritimus spec. nov. and others) in that it has setae L_1 and L_3 equal in length. The spermatheca and ventri-anal shield also differ markedly from related species.

Female: Dorsum (fig. 170): Dorsal shield smooth, length 440(420-) μ and breadth 311(293-) μ, with five pairs of pores and lateral margins constricted opposite setae S_2. The shield bears 17 pairs of setae: six dorsal, two median (one anterior and one posterior), six prolateral (L_4 somewhat median) and three postlateral (the setae usually paired with seta M_2 is absent). These setae measure in length: D_1, 42(40-43) μ; D_2, D_3, D_4, D_5, M_1, L_2 and L_4, 6-9 μ; D_6, L_6, L_7 and L_9, 10-13 μ; M_2 and L_5, 165(163-169) μ; L_1 and L_3, 62 μ and L_9, 421(416-427) μ. Majority of setae thus minute or very short. Setae D_1, L_1 and L_3 respectively reach well beyond the bases of setae L_1,

L_3 and /.....

L_3 and L_5. Seta L_5 is equal in length to seta M_2 and is also equal in length to the distance between its base and the base of seta L_7. Seta L_9 is as long as the dorsal shield.

Setae S_1 and S_2, 31 μ and 17 μ long respectively, are on the dorsal interscutal membrane.

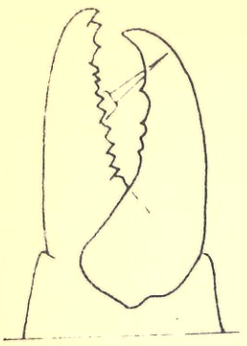
The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes end anterolateral to the bases of setae D_1.

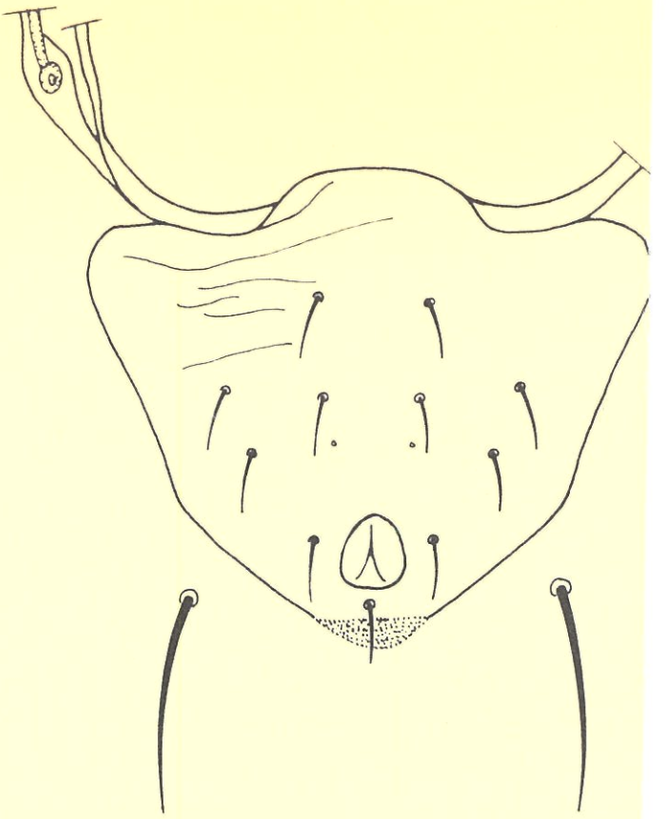
Venter: The sternal shield (fig. 171), length 96(-100) μ and breadth 78(76-) μ, is provided with three pairs of sternal setae. The anterior margin of the shield is medially indented and the slightly convex posterior margin lies on the same level as sternal setae III. The lateral lobes are smooth. Sternal setae IV are on irregular metasternal shields.

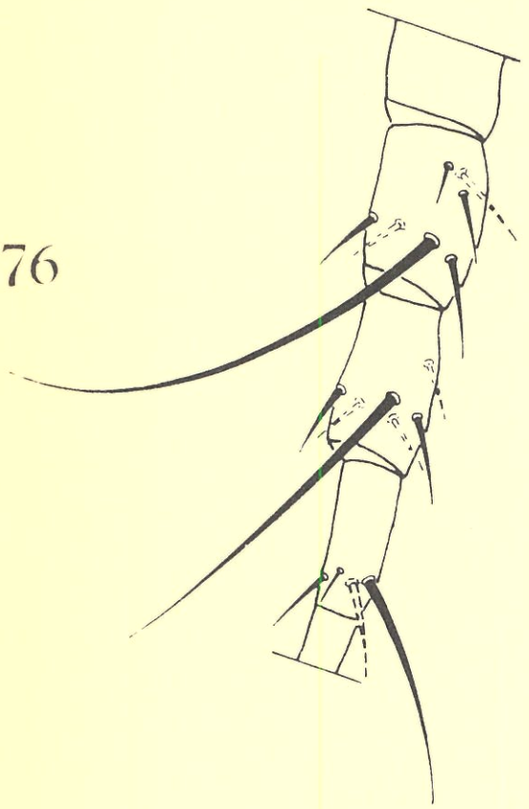
Genital shield (fig. 172), width 84(80-) μ, normal with one pair of setae.

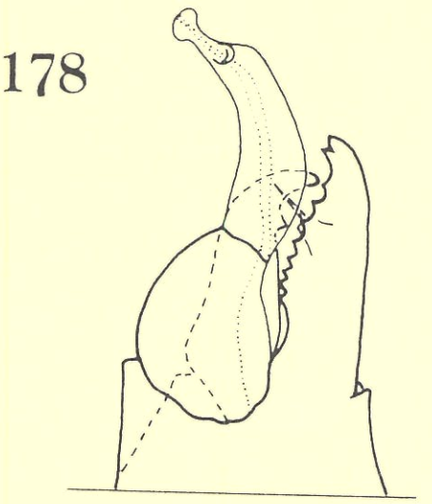
The smooth ventri-anal shield (fig. 172), length 143(141-) μ and width 102(100-) μ, with four pairs of pre-anal setae and a pair of pores caudal to the inner posterior pair of seta and on the same level as the lateral posterior pair of setae. The anterior margin of the shield is almost straight with gradually rounded lateral corners. The lateral margins are almost parallel though anteriorly narrower, and slightly bulged across the anterior portion of the anus.

The ventral interscutal membrane is provided with three pairs of setae, VL_1 being 93 μ in length, and two pairs of metapodal plates. Between the genital and









FIGS. 175-178. Typhlodromus (Meyerius) liliaceus spec. nov.

Fig.175, chelicera, female; fig.176, leg IV, female; fig.177, posterior ventral surface, male; fig.178, chelicera, male.

ventri-anal shield are four slender platelets.

The peritrematal shield (fig. 173) is fused posteriorly with the exopodal plate and is caudomedially rectangular.

Spermatheca (fig. 174): The stout spermatheca has a long, 20 μ, dilated major duct. The bifid atrium, length 6 μ, is provided with narrow lips and the minor duct is thicker than normal. The thick walled cervix, length 11 μ, is for half of its length of the same width as the atrium. Thence it flares sharply towards the vesicle.

Chelicera (fig. 175): The fixed digit, length 34 μ, bears 11 teeth along its inner margin and a pilus dentilis. The movable digit, length 39 μ, has four teeth on its inner margin.

Legs: The chaetotaxy of the legs is normal. The lengths of the macrosetae on the legs are as follows: on genu I, 63 μ; on tibia I, 69 μ; on tarsus I, with two macrosetae, 69 μ and 74 μ; on genu II, 39 μ; on basitarsus II, 37 μ; on genu III, 63 μ; on tibia III, 52 μ; on basitarsus III, 41 μ; on genu IV, 1963 μ; on tibia IV, 126 μ and on basitarsus IV, 84 μ. Fig. 176 illustrates the long macrosetae on leg IV.

Male: Dorsum: The dorsal shield measures 336 μ in length and 235 μ in width and the chaetotaxy pattern resembles that of the female. The longer setae are however relatively shorter than those of the female and measure in length: D_1, 36 μ; M_2, 132 μ; L_1, 55 μ, L_4, 139 μ and L_9, 327 μ. Setae L_4 are thus slightly longer than setae M_2, but in the female they are equal

in length./.....

in length.

Setae S_1 and S_2 on the dorsal shield are 30 μ and 13 μ long respectively.

Venter: Sternal shield normal with five pairs of setae and the genital opening on the anterior margin.

The triangular ventri-anal shield (fig. 177) is slightly imbricated anteriorly and provided with four pairs of pre-anal setae. A pair of pores is present, caudal to the inner posterior pair of pre-anal setae. Para-anal setae normal.

The peritrematal shields are fused anteromedially to the ventri-anal shield.

Chelicera (fig. 178): The fixed digit, length 26 μ, has nine teeth and a pilus dentilis on its inner margin. The movable digit, length 25 μ, has a single tooth on its inner margin and a spermatophoral process laterally. The spermatophoral process, 26 μ in length, is slightly curved and narrowed distally with a knob. A small lateral lobe is situated distally just where the process narrows.

Legs: The chaetotaxy of the legs is normal. The lengths of the macrosetae on the legs are as follows: on genu I, 49 μ; on tibia I, 54 μ; on tarsus I (two macrosetae), 54 μ and 59 μ; on genu II, 38 μ; on tibia II, 31 μ; on basitarsus II, 33 μ; on genu III, 49 μ; on tibia III, 44 μ; on basitarsus III, 35 μ; on genu IV, 113 μ; on tibia IV, 99 μ and on basitarsus IV, 71 μ.

Material studied: ♀-Holotype (serial no. AcY 66/246/1) from/.....

from bulbous plant, Munster (Natal) 16.IV.1955 (M.K.P. Meyer), ♂-Allotype from Zantedeschia aethiopica Munster (Natal) 16.IV.1955 (M.K.P. Meyer). This ♂ is on the same slide as the ♀-Holotype and ♂-Allotype of T.(M.) zantededeschiae spec. nov. One ♀-paratype from leaves of Grewia species, Shelly Beach (Natal) 14.V.1965 (M.K.P. Meyer) and five ♀-paratypes from leaves of Mimusops caffra, Shelly Beach (Natal) 10.V.1965 (M.K.P. Meyer).

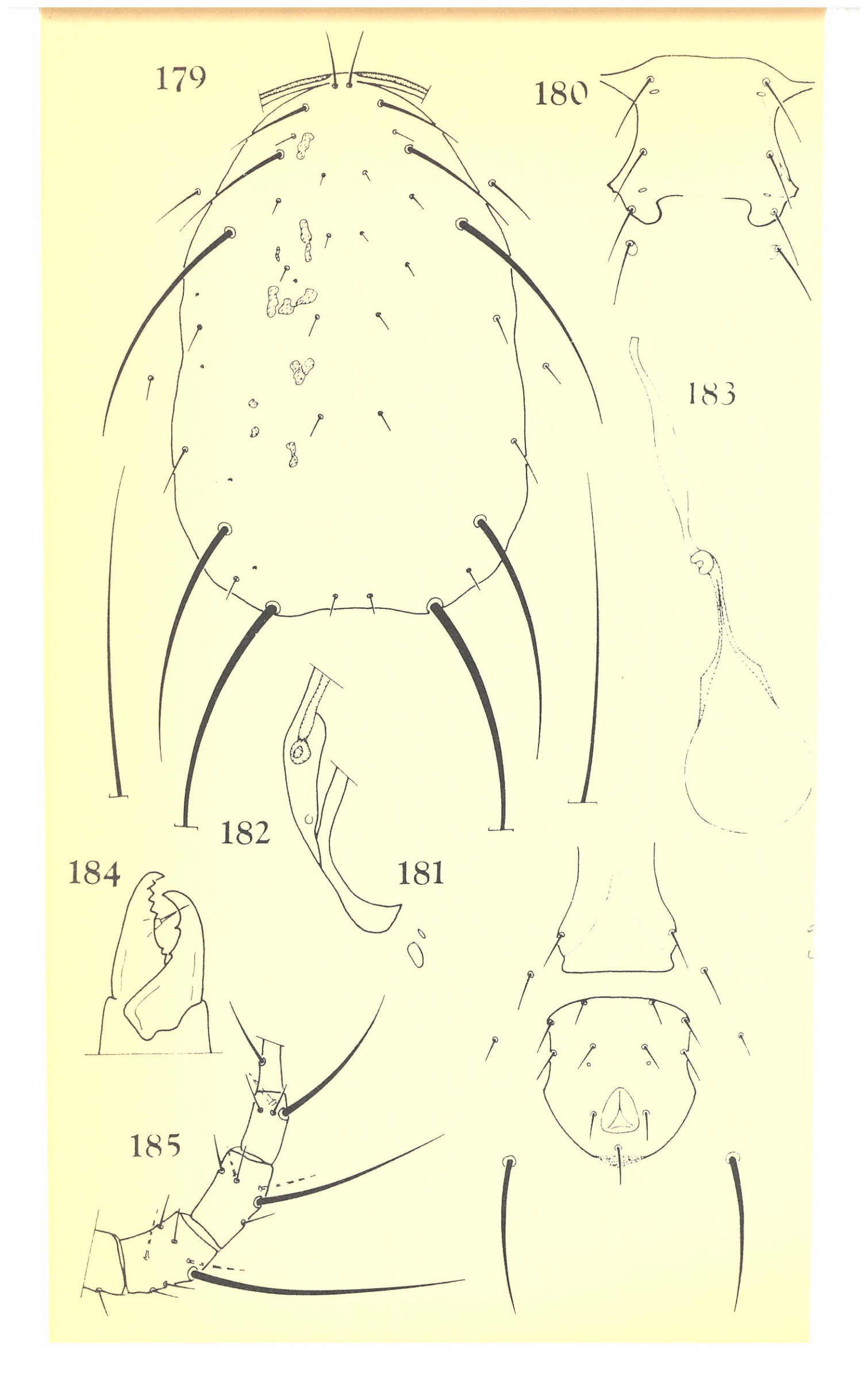
Typhlodromus (Meyerius) maritimus spec. nov.

(Figs. 179-185)

T.(M.) maritimus closely resembles T.(M.) zantedeschiae spec. nov. and T.(M.) citimus spec. nov. However it differs from both these species in having seta L_6 markedly shorter than seta L_7 and from the latter in the shape of the spermatheca.

Female: Dorsum. (fig. 179): Dorsal shield 360(358-378) μ long and 247(235-250) μ wide with dorsomedian rugose patches and 17 pairs of setae. These setae are located on the shield as follows: six dorsal, two median (one anterior and one posterior), six prolateral (seta L_4 is situated more medially) and three postlaterals (the seta usually paired with the postmedian seta is absent). These setae measure in length: D_1, 36(34-) μ; D_2, D_3, M_1 and L_4, 9(-10) μ; D_4 and D_6, 14(-15) μ; D_5, L_2 and L_8, 17(16-18) μ; M_2 and L_5, 167(159-169) μ L_1, 61(59-64) μ; L_3, 89(84-) μ; L_6, 21(19-) μ; L_7, 33(32-36) μ and L_9, 384(381-389) μ. Setae M_2 and L_9 are finely and sparsely serrated. Setae D_1, L_1 and L_3 are at least one fourth longer than the distances

between/....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between setae D_1 and L_1, L_1 and L_3 and L_3 and L_5 respectively. Seta L_5 equals in length the distance between its base and that of seta L_7 and is also equal in length to seta M_2. Seta L_6 is about two-thirds the length of seta L_7 and the latter is twice the length of seta D_5. Seta L_9 is longer than the length of the dorsal shield.

Setae S_1 and S_2, 38(34-) μ and 17(16-18) μ long respectively, are located on the dorsal interscutal membrane. The peritrematal shields are fused anterodorsally with the dorsal shield, with the peritremes reaching anterior to the bases of setae D_1.

Venter: Sternal shield (fig. 180), as long as broad, 76 μ, with three pairs of sternal setae. The posterior margin is probably straight (the central portion is obscure) and somewhat anterior to sternal setae III. The lateral lobes thus formed are smoothly rounded. Sternal setae IV are placed anteriorly on small metasternal shields.

Genital shield (fig. 181), 84(78-) μ wide, is provided with a pair of setae. The shield is

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Figs. 179-185. Typhlodromus (Meyerius) maritimus spec. nov. female.

Fig. 179, dorsum; fig. 180, sternal shield; fig. 181, posterior ventral surface; fig. 182, peritrematal shield; fig. 183, spermatheca; fig. 184, chelicera; fig. 185, leg IV

contricted posteriorly and the caudal part is markedly narrower than the width across the setae.

Ventri-anal shield smooth (fig. 181), length 121(117-121) μ and breadth 104(96-104) μ, with four pairs of well spaced pre-anal setae and a pair of pores caudal to the inner posterior pair of setae. The anterior margin of the shield is shallowly convex while the anterior part of the lateral margin is concave to a level anterior to the anus, while the posterior part has a convex taper. Para-anal setae normal.

Three pairs of setae are present on the ventral interscutal membrane, of which the caudal pair is the longest, 109(106-111) μ. Two pairs of metapodal platelets are also present on the membrane.

The posterior part of the peritrematal shield (fig. 182) is fused with the exopodal plate which is caudally broadly rounded but tapers to a sharp point anteromedially.

Spermatheca (fig. 183): The major duct of the spermatheca is thin walled and very long, 36 μ. The atrium is fully occupied by prominent lips, 4 μ in diameter. The cervix is for the first half of its length slender but thick walled with the inner margins flared towards the vesicle. The outer margins are more strongly flared, forming obtuse angles medially, but run parallel to each other for the last third of the distance to the vesicle, meeting the inner margins laterally.

Chelicera (fig. 184): The fixed digit, length 30(28-) μ, bears four teeth and a pilus dentilis on the

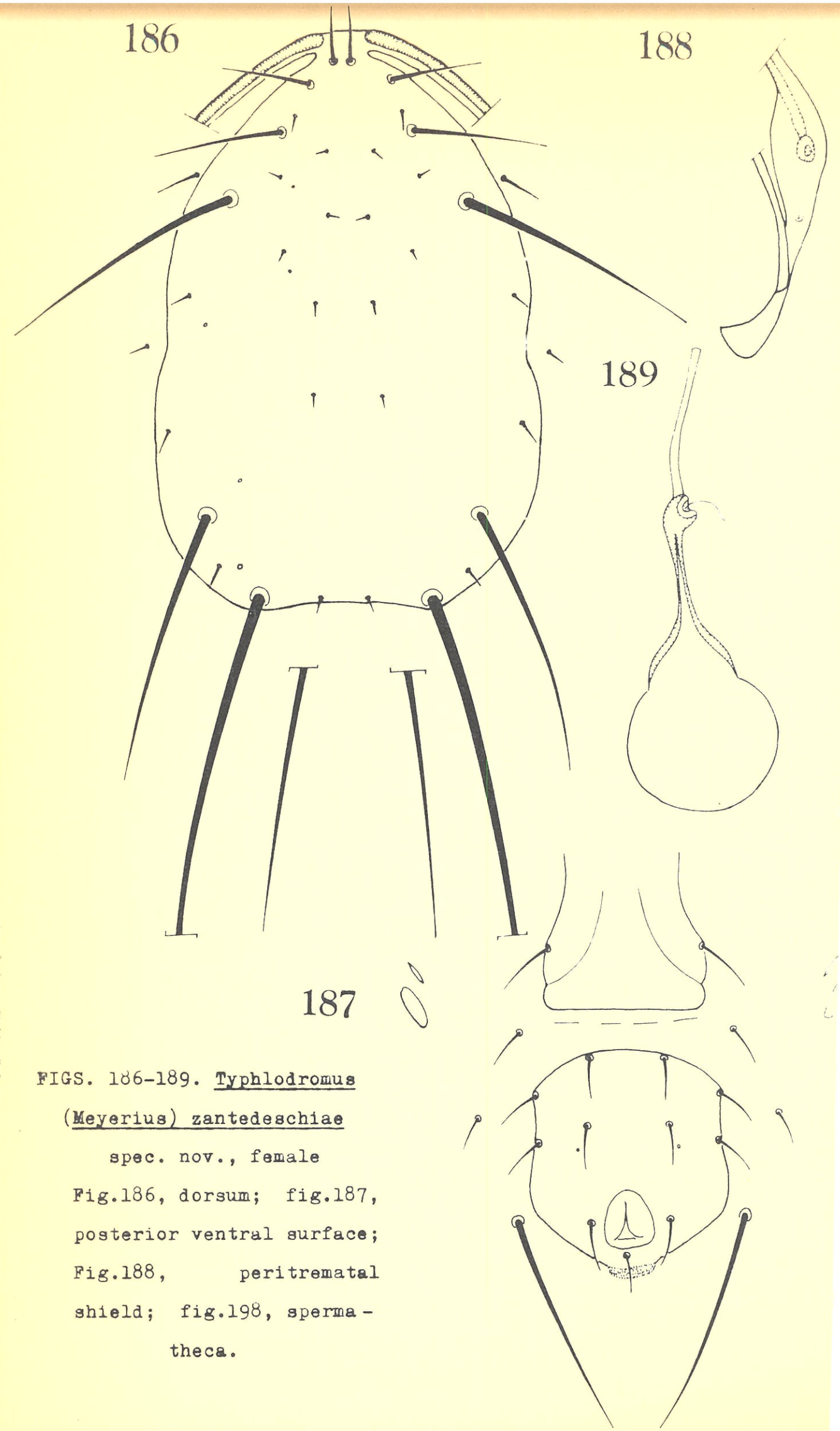
distal/.....

distal half of its inner margin and two teeth proximally. Movable digit, length 38(36-) μ, with two teeth on its inner margin.

Legs: The chaetotaxy of the legs is normal. The lengths of the macrosetae on the legs are: on genu I and on tibia I, 56(52-) μ; on tarsus I with two macrosetae, 56(51-) μ and 65(62-) μ; on genu II, on tibia II and on basitarsus II, 37(34-) μ; on genu III, 61(59-) μ; on tibia III, 56(50-) μ; on basitarsus III, 39(36-) μ; on genu IV, 167 μ; on tibia IV, 125 μ and on basitarsus IV, 95 μ (fig. 185). (Macrosetae on the fourth leg of other specimens very strongly curved, rendering measurement impossible).

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/247/1) from unidentified beach shrubs, Kleinmond (C.P.) 26.XII.1953 (P.A.J. Ryke). Two ♀-paratypes from Pterocelastrus tricuspidatus, two ♀-paratypes from Carissa bispinosa, two ♀-paratypes from Cassine papillosa and two ♀-paratypes from Malvacea species, Storms River Mouth (C.P.) 18-21.I.1965 (G.G. v.d. Merwe). Three ♀ -paratypes from Rhus micronata, Natures Valley, Dist. Knysna (C.P.) 21.I.1965 (M.K.P. Meyer) and ♀-paratype from Capparis citrifolia, Hankey (C.P.) 1.II.1965 (M.K.P. Meyer).



FIGS. 186-189. Typhlodromus (Meyerius) zantedeschiae spec. nov., female

Fig.186, dorsum; fig.187, posterior ventral surface; Fig.188, peritrematal shield; fig.198, sperma-theca.

Typhlodromus (Meyerius) zantedeschiae spec. nov.

(Figs. 186-193)

This species closely resembles T.(M.) citimus spec. nov. It differs mainly from the latter in the shape of the cervix of the spermatheca. In T.(M.) zantedeschiae the first half of the cervix is slender but in T.(M.) citimus the first three-quarters of the cervix is tubelike and broader than in the former. The macroseta on genu IV of T.(M.) zantedeschiae is distally knobbed but is aciculate in T.(M.) citimus.

Female: Dorsum (fig. 186): Dorsal shield length 384(372-) μ and breadth 259(247-) μ, smooth but for five pairs of pores and provided with 17 pairs of setae. These setae are arranged as follows: six dorsal, two median (one anterior and one posterior), six prolateral (L_4 somewhat median) and three postlateral (the seta usually paired with M_2 is absent). These setae measure in length: D_1, 36(33-) μ; D_2, D_3, M_1 and L_4, 8-10 μ; D_4, D_5, D_6, 12 μ; M_2, 186(180-190) μ; L_1, 60(57-61) μ; L_2, L_6 and L_8, 14(13-) μ; L_3, 94(85-) μ; L_5, 179(172-) μ; L_7, 18(16-) μ and L_9, 396(394-418) μ. Setae D_1 and L_3 respectively reach well beyond the bases of setae L_1 and L_5. Seta L_1 is almost equal to the distance between its base and the base of seta L_4. Seta L_5 is slightly shorter than M_2 but is longer than the distance between its base and the base of seta L_4. Seta L_9 is longer than the dorsal shield.

Setae S_1 and S_2, 33(31-) μ and 15 μ long respectively, are on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally

with the/....

with the dorsal shield and the peritremes reach anterolaterally to the bases of setae D_1.

Venter: Sternal shield impossible to examine due to weak sclerotisation. The normal four pairs of setae are present.

Genital shield (fig. 187), width 84(80-) µ, with a pair of setae. The shield is sharply constricted laterally, posterior to the pair of setae, so that it appears to have a broad posterior lobe with a straight caudal margin.

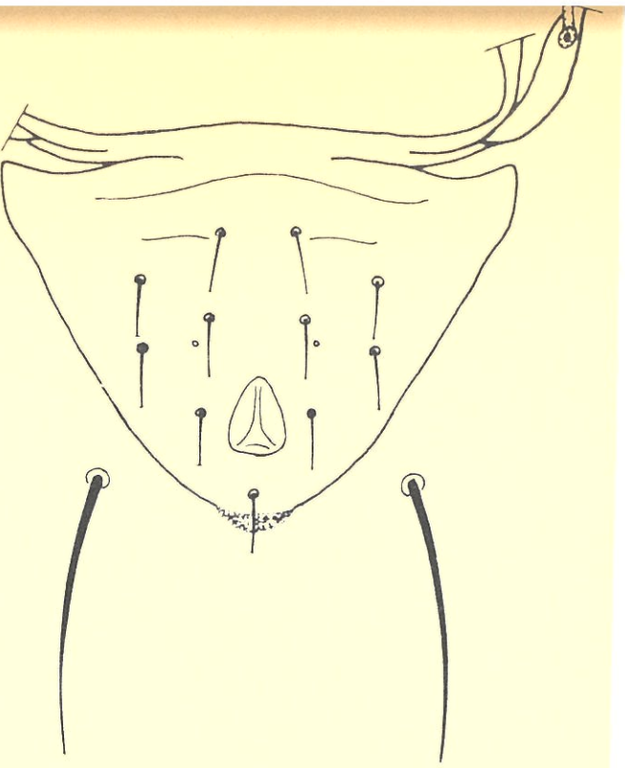
The large ventri-anal shield (fig. 187), length 115(-120) µ and breadth 104(98-) µ, is provided with four pairs of pre-anal setae and a pair of pores caudolateral to the inner posterior pair of setae. The anterior and lateral pairs of setae are placed on the convex anterior margin and the slightly concave lateral margins respectively. Para-anal setae normal.

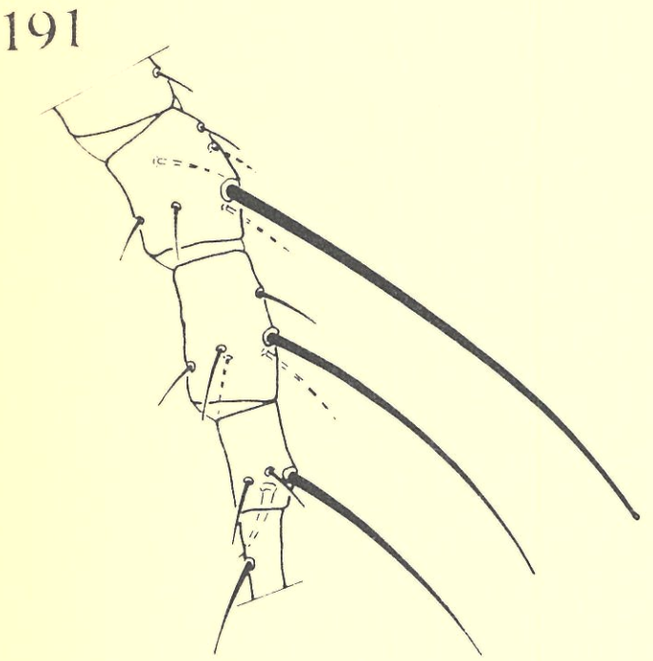
The ventral interscutal membrane is provided with three pairs of setae, the caudal pair being long, 115(110-) µ. Two pairs of metapodal plates are present on the membrane, with four slender platelets between the genital and ventri-anal shields.

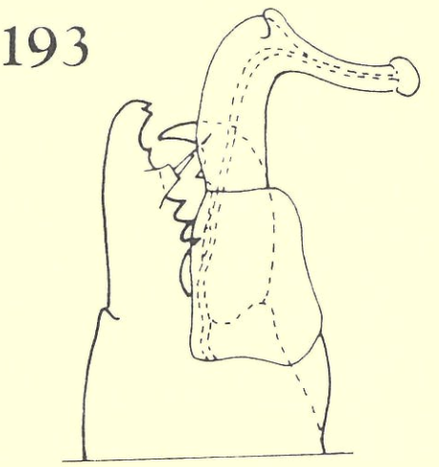
The peritrematal shield (fig. 188) is fused posteriorly with the exopodal plate and ends broadly with the anterior corner sharp and the posterior corner rounded.

Spermatheca (fig. 189): The major duct is slender and 20 µ long. Atrium bulbous, 5-6 µ in diameter, with prominent lips close to the major duct. First half of the cervix, total length 22(20-) µ, slender but

thence/.....







FIGS. 190-193. Typhlodromus (Meyerius) zantedeschiae spec. nov.

Fig.190, chelicera, female; fig.191, leg IV, female; fig.192, posterior ventral surface, male; fig.193, chelicera, male.

thence flared with thick walls, which become almost parallel immediately before joining the vesicle.

Chelicera (fig. 190): The fixed digit, length 30 μ, with a pilus dentilis and six teeth on its inner margin. Four of these teeth are located on the distal third of the digit and two proximally. The movable digit, 36 μ in length, bears two teeth on its inner margin.

Legs: The chaetotaxy of the legs is normal. Lengths of macrosetae on legs as follows: on genu I, 56(52-) μ; on tibia I, 61(58-) μ; on tarsus I, with two macrosetae, both 56 μ; on genu II, 37(35-) μ; on genu III, 67(63-) μ; on tibia III, 56(50-) μ; on genu IV, 182(178-186) μ, knobbed; on tibia IV, 130(-136) μ and on basitarsus IV 97(93-) μ (fig. 191).

Male: Dorsum: The dorsal chaetotaxy of the male resembles that of the female but for the presence of setae S_1 and S_2, 27 μ and 16 μ long respectively, on the dorsal shield. The longer setae on the shield of the male are shorter than those on the shield of the female, measuring D_1, 30 μ; M_2, 137 μ; L_1, 48 μ; L_3, 78 μ; L_5, 143 μ and L_9, 310 μ.

Venter: Sternal shield normal with five pairs of setae and the genital opening on its anterior margin.

The ventri-anal shield (fig. 192) is triangular, with four pairs of pre-anal setae and a pair of pores caudolateral to the inner posterior pair of setae. Anteromedially the shield is fused with the extended exopodal plates. Para-anal setae normal.

Ventral/....

Ventral interscutal membrane with a single caudal pair of setae 89 μ long.

Chelicera (fig. 193): Movable and fixed digits of equal length, 22 μ; the movable digit with a single tooth on its inner margin. The fixed digit has on its inner margin five teeth, the proximal three being large and sharp, and a pilus dentilis. The movable digit is provided with an L-shaped spermatophoral process. The major portion is broad and 18 μ long, with an anteriorly-directed lobe where the minor portion branches off. The branch, 15 μ in length, is narrow and distally knobbed. A broad saclike structure lies proximally over the movable digit.

Legs: The chaetotaxy of the legs is normal. Lengths of the macrosetae on the legs: on genu I and on tibia I, 47 μ; on tarsus I with two macrosetae, 47 μ and 52 μ; on genu II, 31 μ; on genu III, 52 μ; on tibia II, 45 μ; on genu IV, 130 μ; on tibia IV, 99 μ and on basitarsus IV, 81 μ.

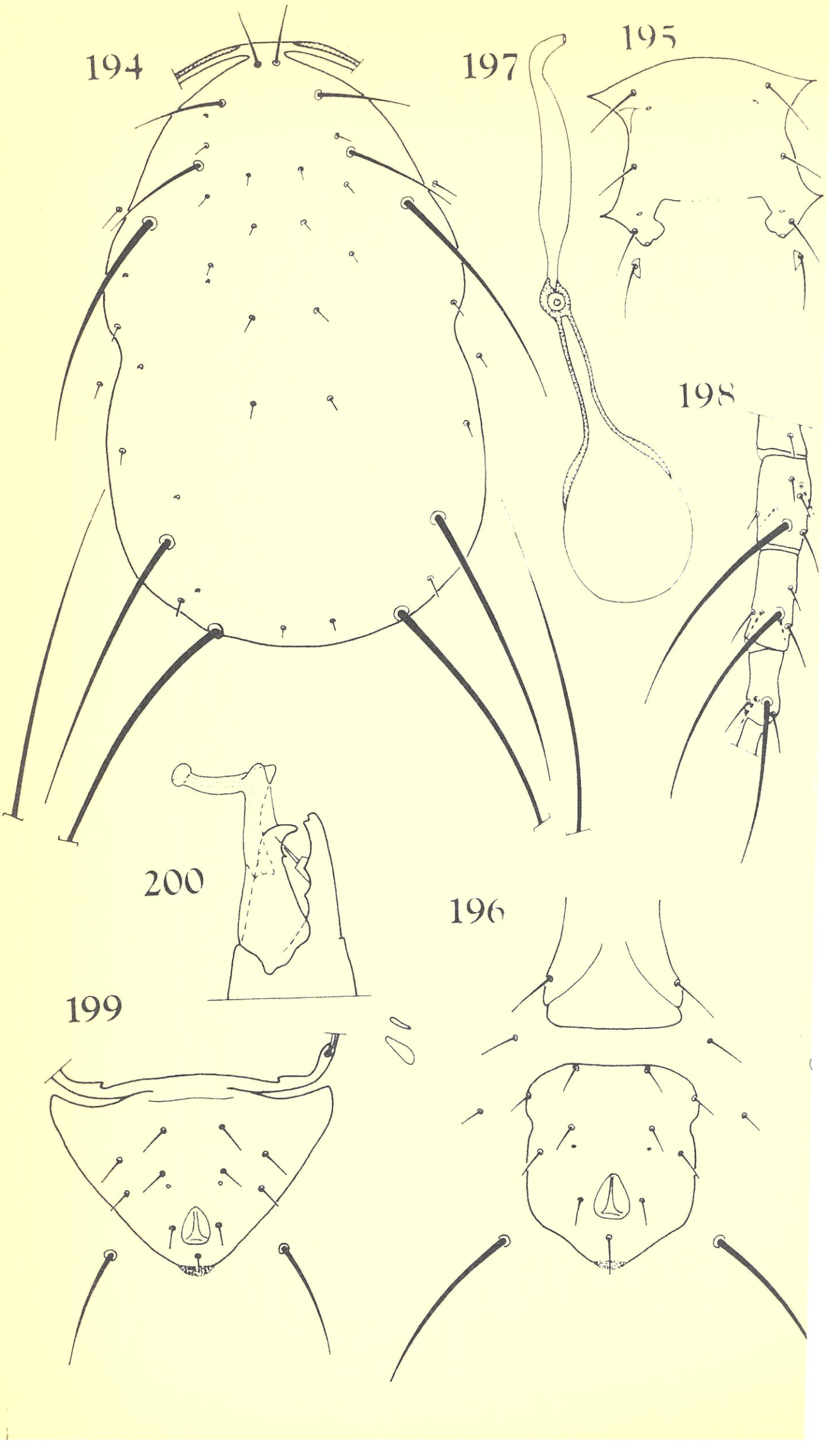
Material studied: ♀-Holotype (serial no. AcY 66/248/1) and ♂-Allotype from leaves of Zantedeschia aethiopica, Munster (Natal) 16.IV.1955 (M.K.P. Meyer) (The ♂-Allotype of T.(M.) liliaceus is on the same slide). Two ♀-paratypes from unidentified plant, Munster (Natal) 16.IV.1955 (M.K.P. Meyer).

Typhlodromus (Meyerius) citimus spec. nov.

(Figs. 194-200).

The characteristics that differentiate this species from T.(M.) zantedeschiae have already been discussed under the latter.

Female:/.....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Female: Dorsum (fig. 194): Dorsal shield, length 364(260) μ and breadth 235(228) μ, smooth but for six pores and provided with 17 pairs of setae, distributed as follows: six dorsal, two median (one anterior and one posterior), six prolateral (seta L_4 caudal and somewhat median of seta L_3) and three postlateral (the seta usually paired with the postmedian seta is absent). These setae measure in length: D_1, 32(34) μ; D_2, D_3, D_4, D_5, D_6, M_1, L_2, L_4, L_6, L_7 and L_8, 8-10 μ; M_2, 170(174) μ; L_1, 58(59) μ; L_3, 67(69) μ; L_5, 144(146) μ and L_9, 371(365) μ. Majority of the dorsal setae thus very short. Seta D_1 is equal in length to the distance between its base and that of seta L_1 andthe latter equals the distance between its base and that of seta L_4. Seta L_3 is one-third longer than the distance between its base and that of seta L_5 and the latter is as long as the distance between its base and that of seta L_7. Seta M_2 is almost as long as the distance between its base and that of prolateral L_5. Seta L_9 is slightly longer than the length of the dorsal shield.

Setae S_1 and S_2, 25 μ and 12 μ long respectively, are on the dorsal interscutal membrane; seta S_1 is immediately anterior to the level of the base of

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Figs. 194-200. Typhlodromus (Meyerius) citinus spec. nov.

Fig. 194, dorsum, female; Fig. 195, sternal shield, female; fig. 196, posterior ventral surface, female, fig. 197, spermatheca, female; fig. 198, leg IV, female; fig. 199, posterior ventral surface, male; fig. 200, chelicera, male.

seta L_5 and is adjacent to the edge of the dorsal shield and S_2 is well posterior to L_6.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes reach almost to the bases of setae D_1.

Venter: Sternal shield (fig. 195), 77 μ in length and 71 μ in width, with three pairs of sternal setae. The posterior margin of the shield is obscure but straight and well anterior to the third pair of sternal setae, forming lateral lobes which are posteriorly and medially angular with broad incisions anteromedially. Sternal setae IV on small triangular metasternal shields.

Genital shield (fig. 196) 82 μ wide, posteriorly sharply constricted and provided with a pair of setae.

Ventri-anal shield (fig. 196) smooth, length 122(119) μ and breadth 104(100) μ, provided with four pairs of well-spaced pre-anal setae. The anterior margin of the shield is straight with rounded antero-lateral corners. Lateral margins parallel but notched between the two lateral pairs of pre-anal setae. A pair of pores is present caudal to the inner pair of pre-anal setae and on the same level as the posterior lateral pair of setae. Para-anal setae normal.

The ventral interscutal membrane bears three of the normal four pairs of setae, the third pair being absent and the fourth pair being long, 111 μ, almost equal in length to the length of the ventri-anal shield. The membrane is also provided with two pairs of metapodal plates.

The posterior details of the peritrematal shields

are/....

are obscure in both specimens examined.

Spermatheca (fig. 197): Spermatheca with major duct very long, 37 μ, and thin walled. The bifid atrium is bulbous, 6 μ; with the lips located centrally. Cervix, 30 μ long, thick walled; the first two-thirds tubelike, 3 μ in diameter, and the last third flared towards the vesicle.

Chelicerae: Impossible to illustrate in detail due to their position in this preparation. However, the fixed digit is provided with four teeth and a pilus dentilis and the movable digit has a single tooth.

Legs: The chaetotaxy of the legs is normal. Lengths of the macrosetae present on the legs are : on genu I and tibia I, 51(48) μ; on tarsus I, two macrosetae, 56 μ and 63(61) μ; on genu II, tibia II and basitarsus II, 33(35) μ; on genu III, 56 μ; on tibia III, 46(44) μ; on basitarsus III, 37 μ; on genu IV, 149(154) μ; on tibia IV, 115(120) μ and on basitarsus IV, 89(96) μ (fig. 198).

Male: Dorsum: Dorsal shield 298(292) μ long and 193(188) μ wide with the chaetotaxy resembling that of the female. The lengths of these setae are: D_1, 30 μ; D_2, D_3, D_4, D_5, D_6, M_1, L_2, L_4, L_6, L_7 and L_8, 8-10 μ; M_2, 120(123) μ; L_1, 53 μ; L_3, 59 μ; L_5, 122(125) μ and L_9, 241(247) μ. The longer setae are thus relatively shorter than those of the female, especially L_9 which is approximately 130 μ shorter.

Setae S_1 and S_2, 22 μ and 11 μ long respectively, are situated on the dorsal shield.

Venter:/.....

Venter: Sternal shield normal, with five pairs of setae and with the genital opening on the anterior margin of the shield.

The smooth ventri-anal shield (fig. 199) is triangular, 130 μ long and 175 μ wide and bears four pairs of pre-anal setae and a pair of pores caudal to the inner posterior pair of setae. Para-anal setae normal.

The peritrematal shields are fused anteromedially with the ventri-anal shield.

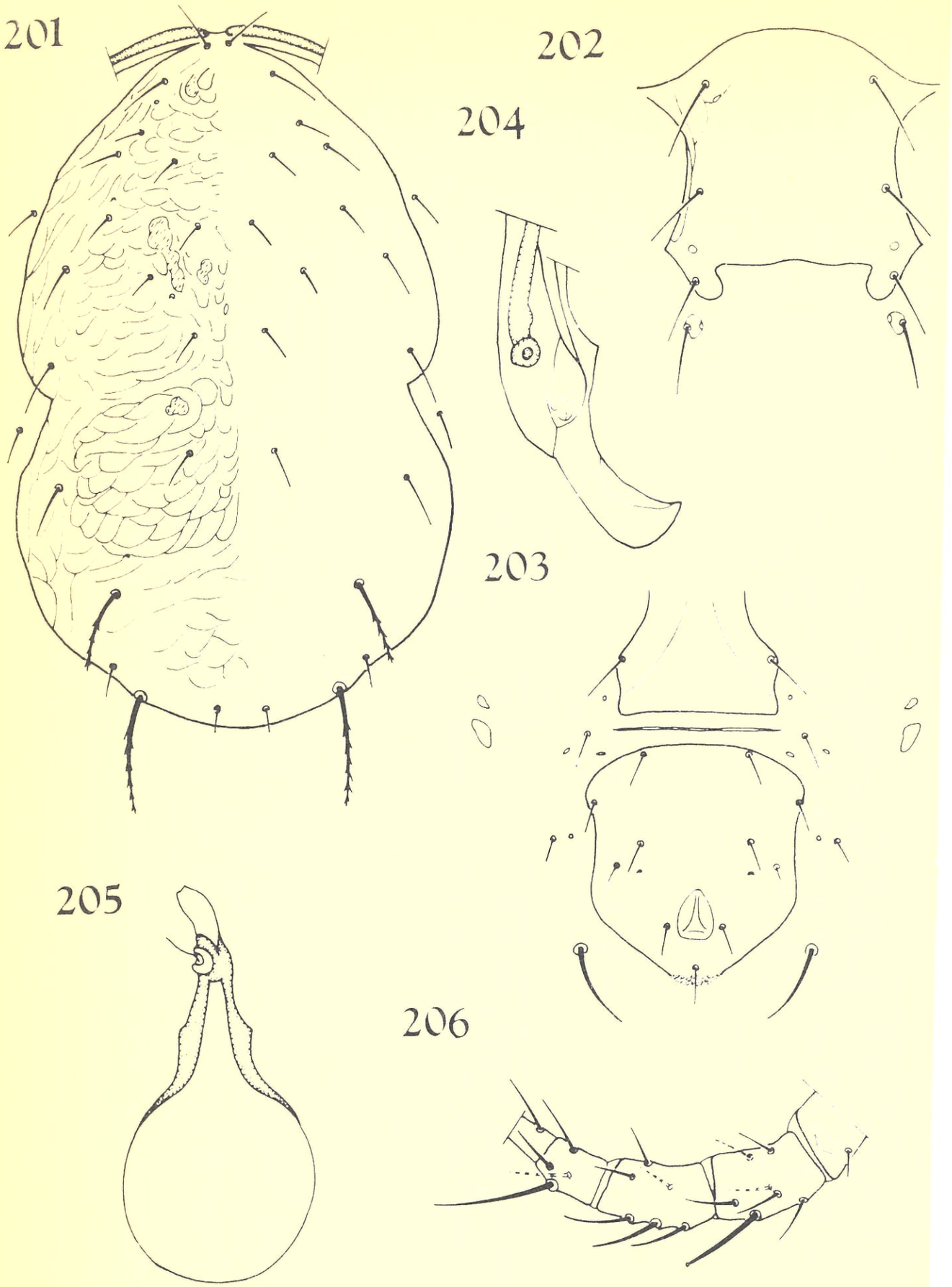
The interscutal membrane bears a single pair of setae VL_1, 74 μ in length.

Chelicera (fig. 200): The fixed digit, length 22 μ, bears along its inner margin one subapical tooth, two other teeth and a pilus dentilis. The movable digit, length 25 μ, has a single tooth on its inner margin and a spermatophoral bearer. The latter is L-shaped, has a small lobe at the corner of the L and the distal extremity is knobbed. The major portion is 18 μ long, with the knobbed branch 12 μ long.

Legs: The chaetotaxy of the legs is normal. Lengths of the macrosetae present on the legs: on genu I, 39 μ; on tibia I, 35 μ; on tarsus I, two macrosetae, 52 μ and 46 μ; on genu II, on tibia II and basitarsus II, 28 μ; on genu III, 45 μ; on tibia III 42 μ; on basitarsus III, 50 μ; on genu IV, 100 μ; on tibia IV, 84 μ and on basitarsus IV, 79 μ.

Material studied: ♀-Holotype (serial no. AcY 66/249/1) ♂-allotype, one ♀-paratype and one ♂-paratype from leaves of Sideroxylon inerme, Addo Elephant National Park (C.P.) 12.I.1965 (M.K.P. Meyer).

Typhlodromus/.....



FIGS. 201-206. Typhlodromus (Meyerius) incisus spec. nov., female

Fig.201, dorsum; fig.202, sternal shield; fig.203, posterior ventral surface; fig.204, peritrematal shield; fig.205, spermatheca; fig.206, leg IV.

Typhlodromus (Meyerius) incisus spec. nov.

(Figs. 201-206)

This species differs from related species having short anterolateral setae, in seta M_2 being much shorter than the distance between its base and the base of seta L_9 and the macroseta on genu IV being knobbed. The general shape of the spermatheca of T.(M.) incisus resembles that of T.(M.) agrostidis spec. nov. These two species however differ markedly in the shape of their dorsal shields, which is long and narrow in T.(M.) agrostidis is contrast to the broad shield of T.(M.) incisus.

Female: Dorsum (fig. 201): Dorsal shield; length 402 μ and breadth 235 μ, imbricated with a few pores and rugose patches; lateral margins sharply constricted caudad to seta L_6. The shield bears 17 pairs of setae: six dorsal, two median (one anterior and one posterior), six prolateral (L_4 slightly median) and three postlateral (the seta usually paired with the postmedian seta is absent). The lengths of these setae are: D_1, L_1 and L_5, 28 μ; D_2, D_3, D_4, M_1, L_2, L_4 and L_8, 19 μ; D_5 and L_3, 24 μ; D_6, 14 μ; M_2, 48 μ; L_6 and L_7, 31 μ and L_9, 66 μ. All setae thus relatively short; only seta L_2 is equal in length to the distance between its base and the base of the next caudal seta, though L_1 is almost so. Seta M_2 is twice as long as setae D_5 and seta L_3 is serrated and slightly longer than the distance between its base and the base of seta L_8. Seta L_9 is also serrated and much shorter than the distance between its base and the base of the corresponding seta L_9.

Setae/.....

Setae S_1 and S_2 are equal in length, 19 μ, and are situated on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes reach well anterior to the bases of setae D_1.

Venter: Sternal shield (fig. 202), length 43 μ and width 39 μ, with three pairs of sternal setae. Anterior margin of the shield convex and posterior margin slightly sinuous but lying anterior to sternal setae III. The lateral lobes are smooth and bear sternal setae III. Sternal setae IV are on small metasternal shields.

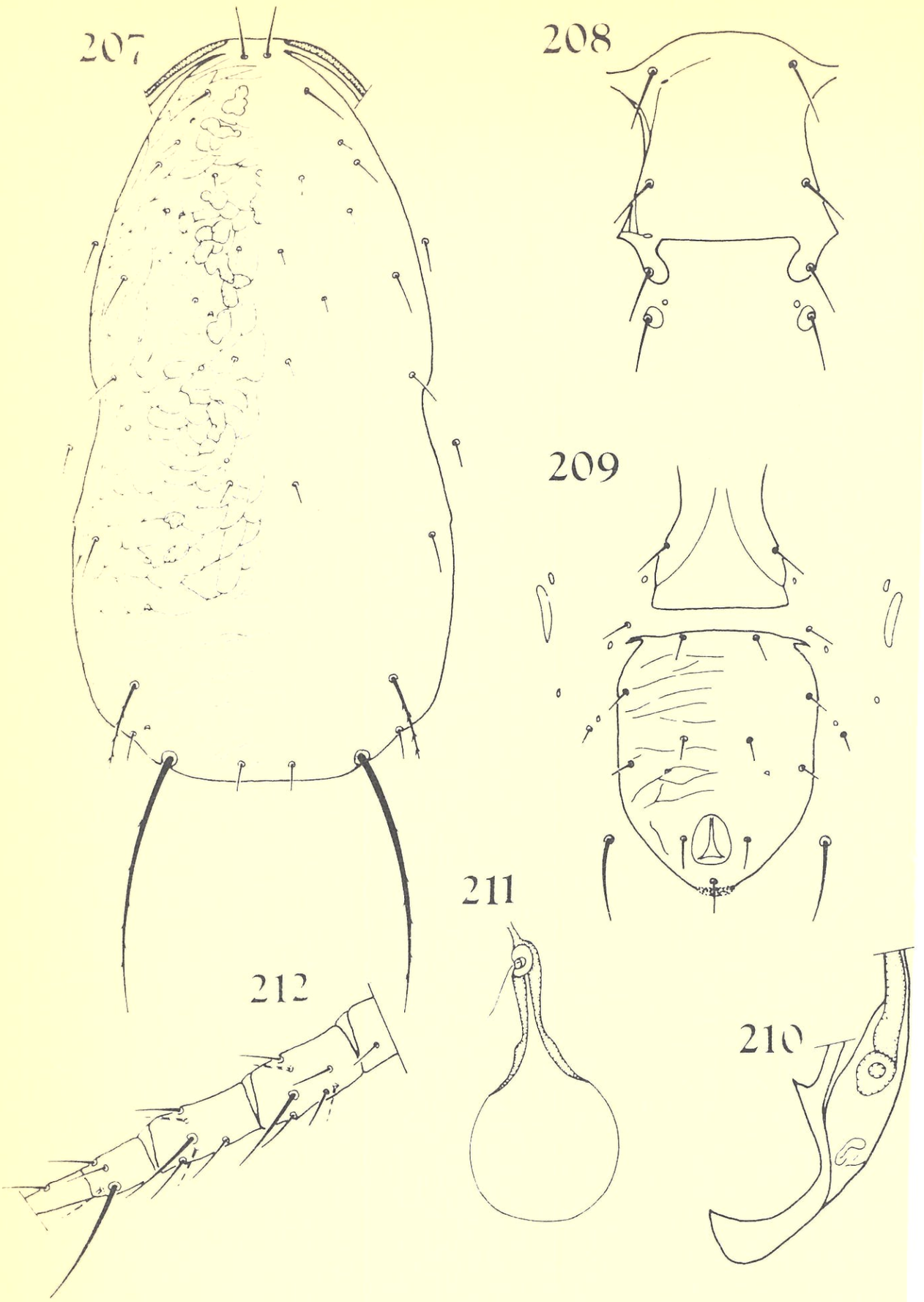
The genital shield (fig. 203) is 42 μ wide and laterally bulged across the single pair of setae, with straight posterior margin.

The ventri-anal shield is broad, 59 μ wide compared to its length of 66 μ, (fig. 203) and has an evenly convex anterior margin and slightly concave lateral margins. The shield bears four pairs of well spaced pre-anal setae. A pair of pores lies caudad to the inner posterior pair of pre-anal setae and almost on the same level as the lateral posterior pair of setae. Para-anal setae normal.

The ventral interscutal membrane is provided with three pairs of setae, the caudal pair being long, 24 μ. Two pairs of metapodal plates are situated posterior to coxae IV and a long slender platelet lies between the genital and ventri-anal shields. Four pairs of small platelets lie scattered laterally to these shields.

The peritrematal shield (fig. 204) is rounded

posteriorly/.....



FIGS. 207-212. Typhlodromus (Meyerius) agrostidis spec. nov., female

fig.207, dorsum; fig.208, sternal shield; fig.209, posterior ventral surface; fig.210, peritrematal shield; fig.211, spermatheca; fig.212, leg IV.

posteriorly but ends anteromedially in a sharp point.

Spermatheca (fig. 205): The stout spermatheca has a short, 7 μ, and broad major duct. The bifid atrium, length 7 μ, has prominent lips. The cervix, length 16 μ, is thick walled and slightly flared for three-quarters of its length. Hence it suddenly flares to follow the rounding of the vesicle. Halfway along the length of the cervix the lateral margins are sharply bulged laterally.

Chelicerae: The position of the chelicerae in this preparation renders them impossible to examine.

Legs: The chaetotaxy of the legs is normal. Only leg IV (fig. 206) is provided with macrosetae. The thick macroseta on the genu is 36 μ long and is provided with a small terminal knob. The three dorsal setae on the tibia are of almost equal length, 28 μ, and the macroseta on the basitarsus is rather long, 51 μ.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/250/1) leaves of Cynanchum ellipticum, van Stadens Pass (C.P.) 1.II.1965 (G.G. v.d. Merwe).

Typhlodromus (Meyerius) agrostidis spec. nov.

(Figs. 207-212)

T.(M.) agrostidis resembles T.(M.) incisus, T.(M.) chaetopus spec. nov. and other related species in having setae L_5, L_6 and L_7 of moderate lengths. However, it differs from these species in having a slender dorsal shield and a seta M_2 which is less than

half/.....

half the length of seta L_9. It differs also in having a ventri-anal shield with straight, rather than concave, lateral margins.

Female: Dorsum: Dorsal shield (fig. 207) almost twice as long, 388(-407) μ, as broad, 205(202-216) μ, imbricated, with eight pairs of pores and some dorso-median rugose patches. The shield is provided with 17 pairs of setae arranged as follows: six dorsal, two median (one anterior and one posterior), six prolateral (seta L_4 decidedly median) and three postlateral (the seta usually paired with M_2 is absent). These setae measure in length: D_1 and L_1, 24(22-25) μ; D_2, D_3, D_4, D_5, M_1, L_2 and L_4, 9-11 μ; D_6 and L_3, 14(-16) μ; M_2, 50(48-) μ; L_5, 21(19-) μ; L_6, 19(-20) μ; L_7, 23(21-24) μ; L_8, 17(-20) μ and L_9, 139(-141) μ. The female collected in the Tsitsikama Park has setae M_2 and L_9 somewhat shorter at 42 μ and 126 μ respectively. All the setae are thus relatively short, except seta M_2 which is longer than the distance between its base and the base of seta L_9; the latter is about three times as long as M_2. Setae M_2 and L_9 are serrated.

Setae S_1 and S_2, 19(17-) μ and 17(16-18) μ long respectively, are located on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes reach anterolaterally to the bases of setae D_1.

Venter: The sternal shield (fig. 208), length 80(-86) μ and width 61(-63) μ, is provided with three pairs of setae. The posterior margin is straight and well

anterior/.....

anterior to the third sternal seta so that two lateral lobes are formed. Sternal setae IV are on round metasternal shields. The small lyriform pores which usually are found on the anterior margin of the metasternal shields, are on the interscutal membrane.

Genital shield (fig. 209), width 68(-73) µ, normal with a pair of setae.

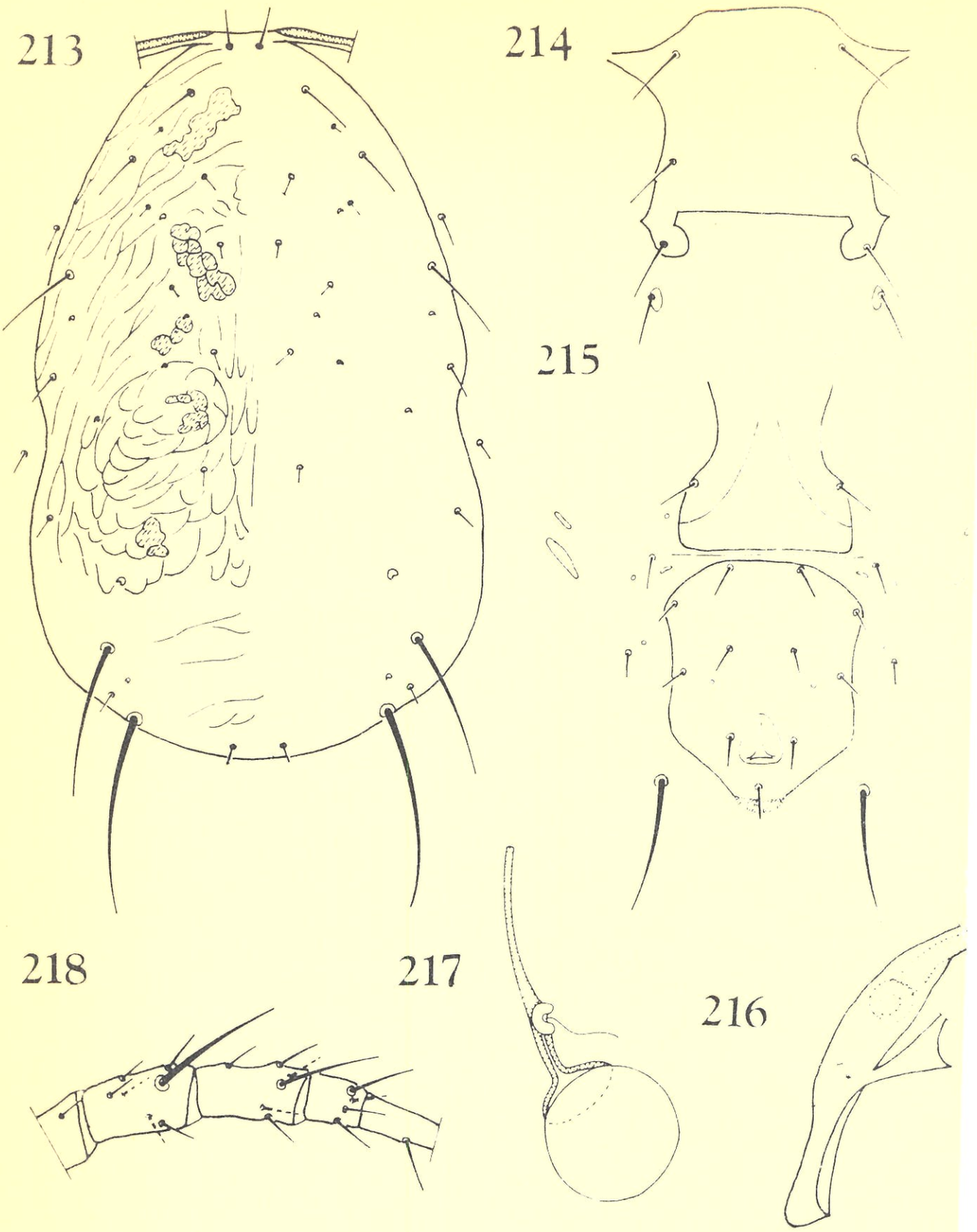
The imbricated ventri-anal shield (fig. 209), length 139(136-148) µ and breadth 102(-106) µ, bears four pairs of well spaced pre-anal setae and a pair of pores caudolateral to the inner posterior pair of setae. The shield is oblong in outline with a straight anterior margin, which continues laterally to form two small projections.

The ventral interscutal membrane is provided laterally with four small platelets and three pairs of setae. The caudal pair are of moderate length, 46(-48) µ. Two pairs of metapodal plates are also present on the interscutal membrane posterior to coxae IV.

The peritrematal shield (fig. 210) is rounded posteriorly but ends anteromedially in a sharp point.

Spermatheca (fig. 211): The length of the slender major duct could not be followed due to its weak sclerotisation. The atrium, 5 µ in diameter, has large lips. The inner margins of the cervix are evenly flared from the lips to the vesicle. However, the outer margins taper from the atrium towards the first half of the cervix, where they are strongly flared for a very short distance, but less flared towards the

vesicle/.....



FIGS. 213-218. Typhlodromus (Meyerius) egregius spec. nov., female

Fig.213, dorsum; fig.214, sternal shield; fig. 215, posterior ventral surface; fig.216, peritrematal shield; fig.217, spermatheca; fig.218, leg IV.

vesicle. The cervix, 14 μ in length, thus appears to have lateral projections along its flared walls.

Chelicerae: Due to their position, the chelicerae were impossible to examine.

Legs: The chaetotaxy of the legs is normal. Only leg IV (fig. 212) is provided with macrosetae, measuring in length; 42(33-45) μ on the genu, 42(40-45) μ on the tibia and 61(58-62) μ on the basitarsus.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/251/1) and one ♀-paratype from Eragrostis species, East London (C.P.) 15.I.1965 (G.G. v.d. Merwe). One ♀-paratype from Trichoclodus orinitus, Tsitsikama Seacoast National Park (C.P.) 18.I.1965 (M.K.P. Meyer).

Typhlodromus (Meyerius) egregius spec. nov.

(Figs. 213-218)

T.(M.) egregius is distinct amongst related species having seta L_5 shorter than the distance between its base and the base of seta L_6, in that seta L_6 is less than half the length of seta L_5. The general shape of the spermatheca of this species resembles those of T.(M.) immutatus spec. nov., T.(M.) convallis spec. nov. and T.(M.) collativus spec. nov.

Female: Dorsum (fig. 213): Dorsal shield imbricated with some dorsomedian rugose patches. The shield, length 362 μ and width 224 μ, is provided with 17 pairs of setae distributed as follows: six dorsal, two median (one anterior and one posterior), six prolateral

(seta L_4 /.....

(seta L_4 is well median) and three postlateral (the seta usually paired with M_2 is absent). The lengths of these setae are: D_1, 26 μ; D_2, D_3, D_4, D_5, D_6, M_1, L_2, L_4 and L_8, 8-11 μ; M_2, 75 μ; L_1, 32 μ; L_3, 28 μ; L_5, 45 μ; L_6, 18 μ; L_7, 14 μ and L_9, 104 μ. Majority of dorsal setae thus minute or short, setae D_1, L_1, L_3 and L_5 of moderate length and M_2 and L_9 rather long.

Setae S_1 and S_2, 17 μ and 12 μ long respectively, are on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes reach almost to the bases of setae D_1.

Venter: The sternal shield (fig. 214), length 67 μ and breadth 67 μ, bears three pairs of sternal setae. The anterior margin of the shield is normal and the posterior margin is straight, but anterior to the third pair of sternal setae. The resulting lateral lobes are smoothly rounded with square-cut incisions anteromedially. Sternal setae IV on oval metasternal shields.

The genital shield, width 85 μ, normal with a pair of setae.

Ventri-anal shield (fig. 215) smooth, length 126 μ and breadth 97 μ, with anterior margin convex and lateral margins slightly concave. The shield is equally wide anteriorly and across the anus. On its anterior half the shield is provided with four pairs of pre-anal setae and a pair of pores caudolateral to the inner posterior pair of setae. Para-anal setae normal.

The ventral interscutal membrane is provided with

three pair/....

three pair of setae, the caudal pair being 69 μ long. Two pairs of metapodal plates are alsc present together with four small platelets medially. Between the genital and ventri-anal shields lies a long slender platelet.

Caudal detail of peritrematal shield as in fig. 216.

Spermatheca (fig. 217): Major duct long, 19 μ, and slender. Atrium absent; only big lips, 4 μ x 3 μ, present. The cervix is thick walled and its first portion is slender and tubelike, 5 μ long and 2 μ wide. The second portion resembles a flat dish, approximately 3 μ in depth and 10 μ in diameter.

Chelicerae: The position of the chelicerae renders them impossible to examine.

Legs: The chaetotaxy of the legs is normal. Leg IV (fig. 218) with three macrosetae measuring in length; 57 μ on the genu, 47 μ on the tibia and 33 μ on the basitarsus of one leg IV while the macroseta on the basitarsus of the other leg IV measures 68 μ in length.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/252/1) from Helichrysum petiolatum, Outeniqua Pass (C.P.) 23.I.1965 (G.G. v.d. Merwe).

Typhlodromus (Meyerius) chaetopus spec. nov.

(Figs. 219-224)

The narrow first two-thirds of the long cervix of the spermatheca renders this species unique amongst related species such as T.(M.) convallis spec. nov.

The imbrications of the dorsal shield are also less marked than in related species.

Female: Dorsum (fig. 219): The dorsal shield is very mildly imbricated, length 365(360) μ and breadth 212(220) μ, and provided with 17 pairs of setae. Distribution of these setae is; six dorsal, two median (one anterior and one posterior), six prolateral (L_2 and L_4 slightly median) and three postlateral (the seta usually paired with the postmedian seta is absent). The lengths of these setae are: D_1, and L_1, 28(26) μ; D_2, D_3, D_4, D_5, D_6, M_1, L_2 and L_8, 13-15 μ; M_2, 58(56) μ; L_3, 24(22) μ; L_4, 20(18) μ; L_5 and L_6, 34(32) μ; L_7, 38 μ and L_9, 87(84) μ. The setae are thus short, with only setae M_2 and L_9 of moderate length. Setae L_7 are longer than seta L_5 and L_6 which are of equal length. Setae L_1 and L_3 are slightly longer than the distances between their bases and those of setae L_2 and L_4 respectively. Seta M_2 reaches beyond the base of seta L_9 and the latter is in length equal to two-thirds the distance between its base and that of the corresponding seta L_9.

Setae S_1, 22(20) μ, and S_2, 18(16) μ, are on the dorsal interscutal membrane, with seta S_1 posterior to the level of seta L_4 and seta S_2 in its normal position.

Anterodorsally, the peritrematal shields are fused with the dorsal shield and the peritremes reach almost to the bases of setae D_1.

Venter: Sternal shield (fig. 220), 74 μ in length and 63 μ in width, with three pairs of sternal setae.

Posterior/.....

Posterior margin of the shield slightly sinuous and well anterior to the third pair of sternal setae. The resulting lateral lobes are oval and smooth in outline with broad incisions anteromedially. Sternal setae IV on oval metasternal shields.

Genital shield (fig. 221) 75 μ wide, posteriorly sharply constricted, provided with a pair of setae.

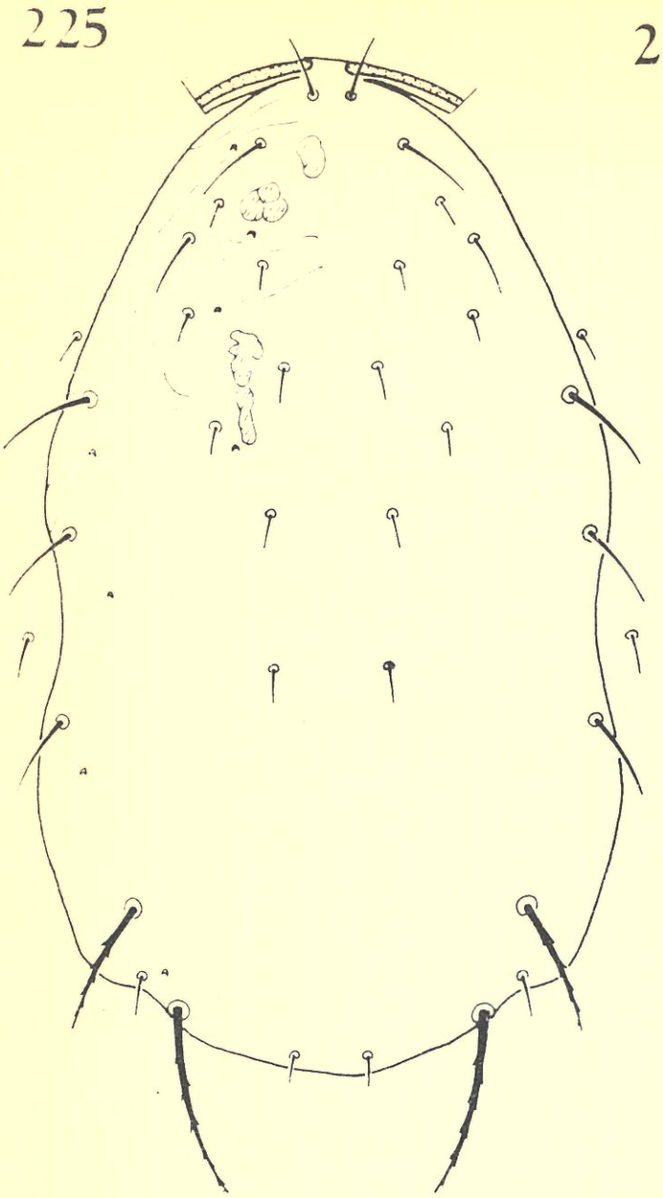
The smooth ventri-anal shield (fig. 221), length 121 μ, bears four pairs of well separated pre-anal setae and a pair of pores caudal to the inner pair of setae and on the same level as the posterior lateral setae. The shield has a convex anterior margin (anterolateral corners slightly dented) and the lateral margins are slightly constricted just posterior to the first pair of lateral setae. Hence the shield is evenly bulged, its broadest part (98 μ) being just caudal to the posterior pair of lateral setae. Para-anal setae normal. The measurements of the holotype only are given, since an egg in the paratype obscures the shield in this specimen.

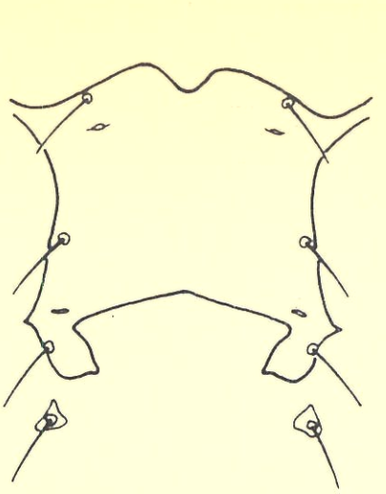
The ventral interscutal membrane bears three of the normal four pairs of setae, the third pair being absent and the fourth pair being long 69(65) μ. Two pairs of metapodal plates are also present on the membrane.

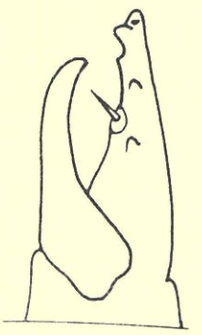
Posteriorly the peritrematal shield (fig. 222) is longitudinally fused with the exopodal plate and ends broad with a sharp point medially.

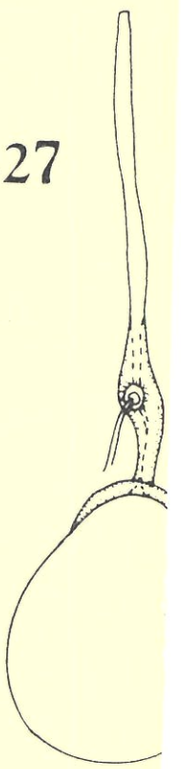
Spermatheca (fig. 223): Major duct thin-walled and long, 24 μ; atrium bulbous, 5 μ, with prominent lips. The first two-thirds, 12 μ, of the cervix is narrow, 2 μ, and tube-like but thick-walled. The remaining

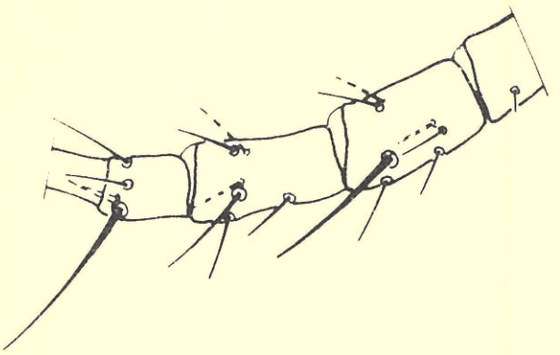
part of /....











FIGS. 225-229. Typhlodromus (Meyerius) immutatus spec. nov., female

Fig.225, dorsum; fig.226, sternal shield; fig. 227, spermatheca; fig.228, chelicera; fig.299, leg IV.

part of the cervix, total length 19 μ, is more thickly walled than the first part and flared towards the vesicle.

Chelicerae: Chelicerae impossible to examine due to their position. The fixed digit, however, is multidentate.

Legs: The chaetotaxy of the legs is normal except for genu II, which is of the VIII-type. Only leg IV (fig. 224) bears macrosetae; the one on the genu being 47 μ long, on the tibia 38 μ and on the basitarsus 57 μ.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/253/1) and one ♀-Paratype from Erica unicolor, Robinson Pass (C.P.) 25.I.1965 (M.K.P. Meyer).

Typhlodromus (Meyerius) immutatus spec. nov.

(Figs. 225-229)

The dorsal chaetotaxy of this species resembles that of T.(M.) convallis spec. nov. and T.(M.) collativus spec. nov.. T.(M.) immutatus however differs from these species in the features of the posterior margin of the sternal shield, the spermathecae and genu II being of the VII-type (normal).

Female: Dorsum (fig. 225): Dorsal shield very lightly imbricated, length 360 μ and breadth 206 μ, with eight pairs of pores and dorsomedian rugose patches. The nature of the imbrications on the posterior half of the shield could not be determined due to the presence of a large egg in the specimen. The shield bears 17

pairs/.....

pairs of setae, distributed as follows: six dorsal, two median (one anterior and one posterior), six prolateral (L_4, slightly median) and three postlateral (the seta usually paired with M_2 is absent). These setae measures in length: D_1, 26; D_2, D_3, D_4, D_5, M_1, L_2 and L_4, 13-15 μ; D_6, 11 μ; M_2, 52 μ; L_1, 31 μ; L_3, 24 μ; L_5, 38 μ; L_6 and L_7, 33 μ; L_8, 17 μ and L_9, 72 μ. Majority of setae on the shield thus very short, with setae L_2 and L_4 equal in length. Amonst the setae of moderate length, only seta L_1 is longer than the distance between its base and the base of the seta next following. Seta M_2, faintly serrated, is longer than the distance between its base and the base of seta L_9. The latter, also faintly serrated, is half as long as the distance between its base and the base of the corresponding seta L_9.

Setae S_1 and S_2 are placed on the dorsal interscutal membrane. Seta S_1, 15 μ long, is equal in length to setae D_4 and D_5. Seta S_2 measures 17 μ and equals seta L_8 in length.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes reach anteriorly to the bases of setae D_1.

Venter: The sternal shield (fig. 226), broader, 70 μ, than long, 56 μ, bears three pairs of sternal setae. The anterior margin of the shield is anteriorly indented and the posterior margin lies well anterior to the third pair of sternal setae. The latter are thus placed on lateral lobes with irregular caudomedial margins. The lateral lobes are also slightly incised anteromedially. Sternal setae IV are placed on small

irregularly/.....

irregularly shaped metasternal shields.

The genital and ventri-anal shields could not be examined, due to the presence of the egg. The posterior details of the peritrematal shields were also impossible to examine. (The author did not attempt to remove the egg and remount the specimen, fearing that it would disintegrate, since it is already burst open between legs I and II).

Two pairs of metapodal plates are present on the interscutal membrane and the caudal pair of lateral setae (VL_1) measures 50 μ in length.

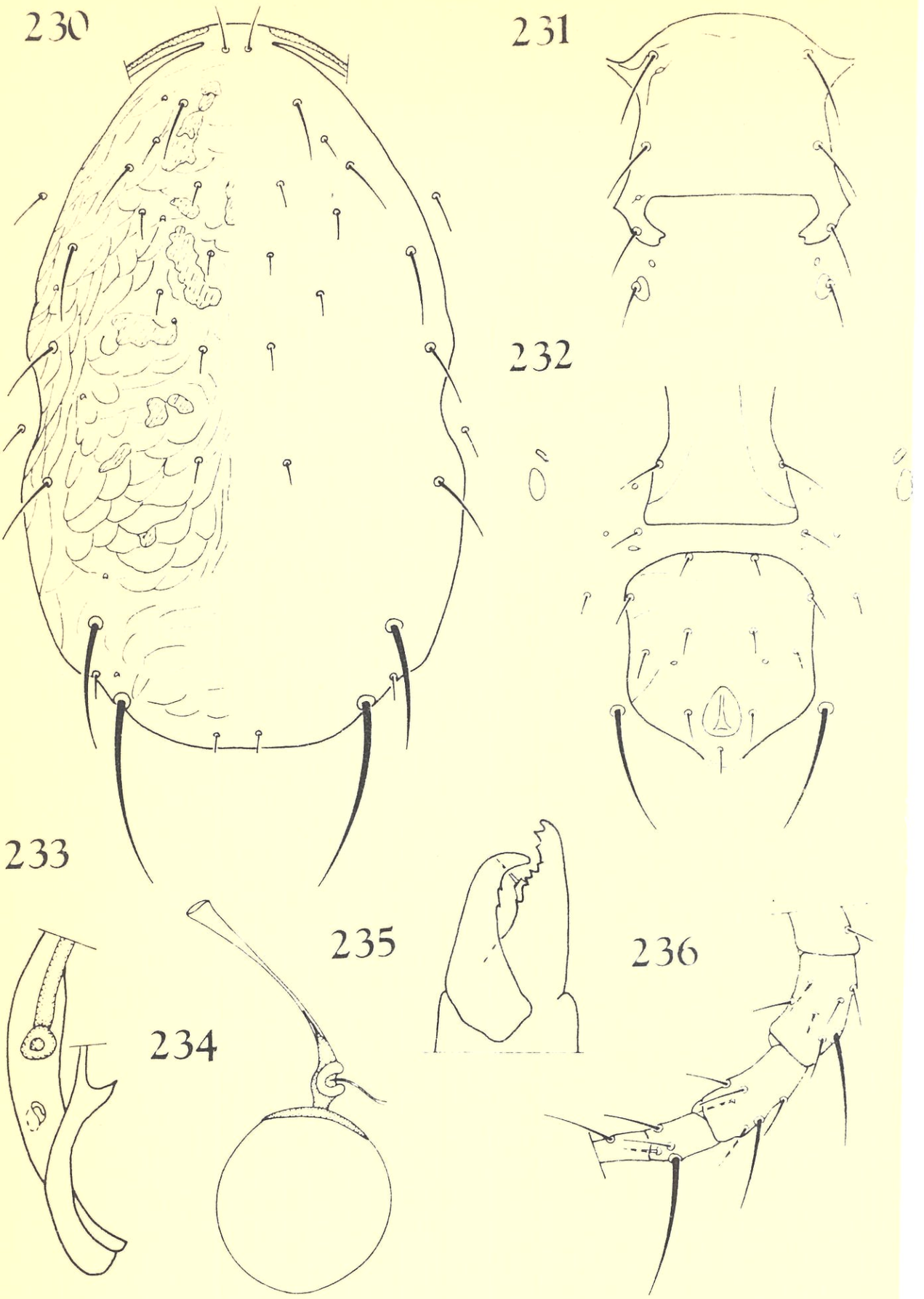
Spermatheca (fig. 227): Major duct of spermatheca long, 28 μ, and slender. The unevenly bulged atrium, 8 μ long, has small lips close to the cervix. The first portion of the cervix is 5 μ long, narrow and tubelike, while the second portion is broad, 11 μ long, and strongly concave. The atrium and cervix are both thick walled.

Chelicera (fig. 228): The chelicera, in an oblique position, reveals four teeth and a pilus dentilis on the fixed digit. The movable digit is probably devoid of teeth.

Legs: The chaetotaxy of the legs is normal. Leg IV (fig. 229) is provided with three macrosetae, measuring in length; 50 μ on the genu, 34 μ on the tibia and 58 μ on the basitarsus.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/254/1) from leaves/.....



FIGS. 230-236, Typhlodromus (Meyerius) convallis spec. nov., female

Fig.230, dorsum; fig.231, sternal shield; fig.232, posterior ventral surface; fig.233, peritrematal shield; fig.234, spermatheca; fig.235, chelicera; fig.236, leg IV.

from leaves of Gazania rigens, Shelly Beach (Natal) 14.V.1965 (M.K.P. Meyer).

Typhlodromus (Meyerius) convallis spec. nov.

(Figs. 230-236)

T.(M.) convallis closely resembles T.(M.) immutatus and T.(M.) collativus spec. nov. It differs from these species in having the chaetotaxy of genu II of the VIII-type, which relates it to T.(M.) chaetopus. The differences between these two species are discussed under the latter.

Female: Dorsum (fig. 230): The imbricated dorsal shield, length 360(-375) μ and breadth 214(210-223) μ, with seven pairs of pores and some dorsomedian rugose patches. The shield bears 17 pairs of setae; six dorsal, two median (one anterior and one posterior) six prolateral (L_4 well median) and three postlateral (the seta usually paired with M_2 is absent). These setae measure in length: D_1, 25(24-26) μ; D_2, D_3, M_1, L_2, L_4 and L_8, 14(13-15) μ; D_4 and D_5, 16(15-17) μ; D_6, 11-12 μ; M_2, 65(59-) μ; L_1, 31(29-32) μ; L_3, 29(27-30) μ; L_5 and L_7, 39(37-41) μ; L_6, 35(33-37) μ and L_9, 94(90-) μ. Majority of setae thus very short with setae L_2 and L_4 equal in length. Only setae L_1 and L_3 are as long as or longer than the distance to the bases of the setae next following. The serrated seta M_2 is about one-third of its length longer than the distance between its base and the base of seta L_9. The latter, also serrated, equals in length three-quarters of the distance between its base and the base of its paired member.

Setae/....

Setae S_1 and S_2, 23(22-25) μ and 15(14-16) μ long respectively, are present on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes reach to a position anterolateral to the bases of setae D_1.

Venter: The sternal shield (fig. 231), as long as wide 67(-69) μ, bears three pairs of sternal setae. The anterior margin is convex and the posterior margin lies well anterior to the third pair of sternal setae. The latter are thus placed on narrow lobes formed by broad, almost square, mediolateral incisions. Medially the lobes are minutely dented. Sternal setae IV are placed on small metasternal shields. The lyriform pores, usually present on the latter, are present on the interscutal membrane.

The genital shield (fig. 232), width 80(74-) μ, is slightly broader posteriorly than across the pair of setae.

The imbricated ventri-anal shield (fig. 232), length 120-130 μ (posteriorly folded in the holotype) and breadth 110(98-) μ, with four pairs of pre-anal setae and a pair of pores caudolateral to the inner posterior pair of setae. The anterior margin of the shield is slightly convex. The lateral margins are slightly concave, leaving the shield anteriorly and posteriorly of almost equal width. Para-anal setae normal.

The ventral interscutal membrane bears three pairs of setae, the caudal pair being long, 80(74-) μ. Two

pairs of/....

pairs of metapodal plates are present together with some small platelets lateral to the genital and ventri-anal shields.

The peritrematal shields are overlapped posteriorly by the exopodal shields and terminate caudad of coxae IV as in fig. 233.

Spermatheca (fig. 234): The major duct, length 22 μ, of the spermatheca is broad where it opens between coxae III and IV, but tapers to a very narrow tube. The first half of the atrium, 8 μ in length, is narrow. The second half is bulged and almost completely occupied by big lips, 4 μ in diameter. The cervix consists of a disc with a diameter of 13 μ, slightly hollowed towards the vesicle. The centre of the disc is joined to the atrium by a very short tube.

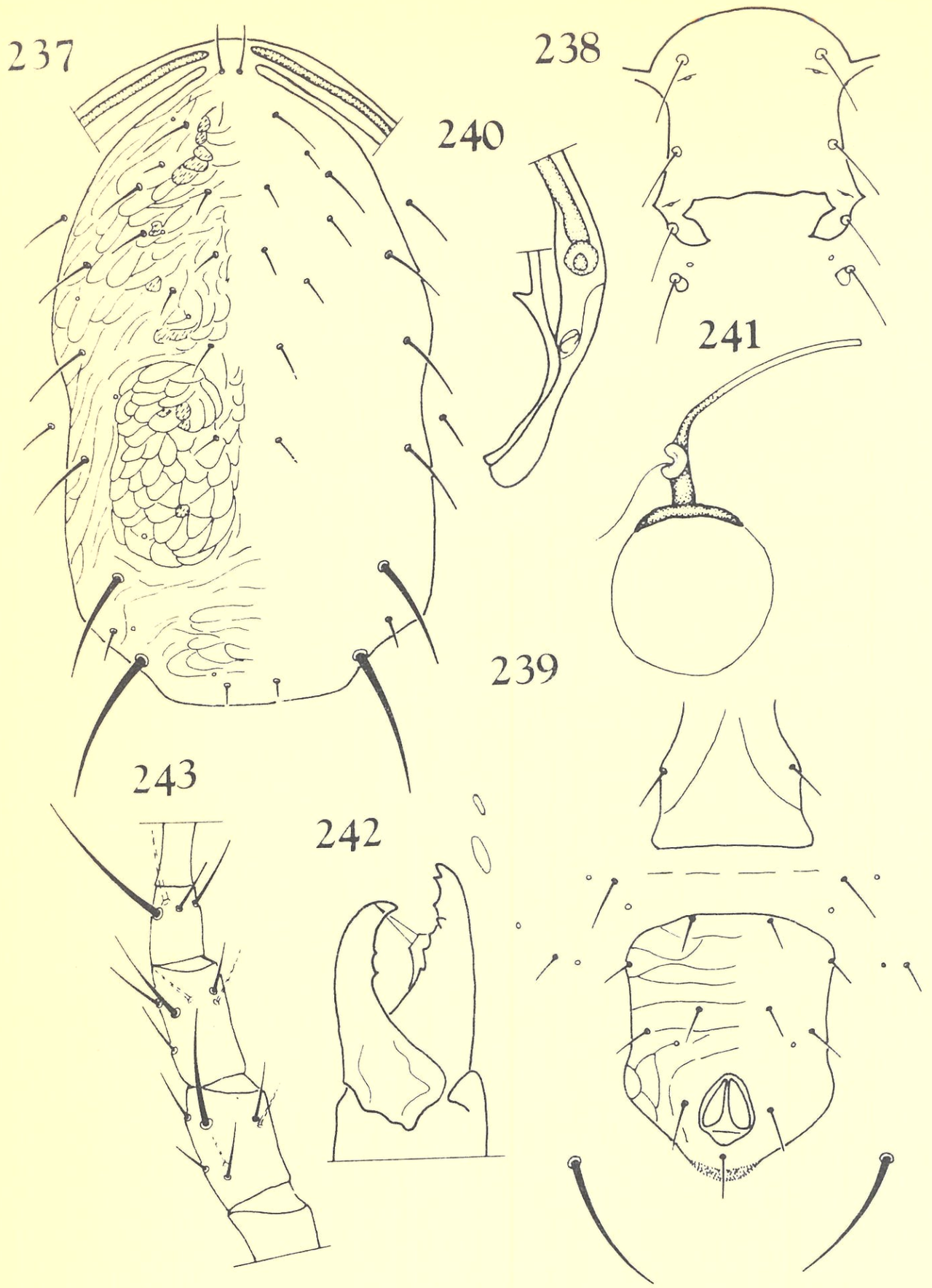
Chelicera (fig. 235): The movable and fixed digits of the chelicerae are of equal length, 34(32-) μ. The fixed digit is provided with seven teeth and a pilus dentilis on its inner margin and the movable digit bears two recurved teeth.

Legs: The chaetotaxy of the legs is normal, except for genu II being of the VIII-type. Leg IV (fig. 236) has three macrosetae, measuring in length; 51(50-52) μ on the genu, 42(41-45) μ on the tibia and 60(58-65) μ on the basitarsus.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/255/1) and one ♀-paratype from leaves of Metalasia muricata, Langkloof (C.P.) 26.I.1965 (G.G. v.d. Merwe). Two

♀-paratypes/.....



FIGS. 237-243. Typhlodromus (Meyerius) collativus spec. nov., female

Fig.237, dorsum; fig.238, sternal shield; fig. 239, posterior ventral surface; fig.240, peritrematal shield; fig.241, spermatheca; fig.242, chelicera; fig.243, leg IV.

♀-paratypes from Microglossa nespilifolia, van Stadens Pass (C.P.) 18.I.1965 (M.K.P. Meyer). Two ♀-paratypes from Rubus rigidus, Hartenbos (C.P.) 25.I.1965 (M.K.P. Meyer). One ♀-paratype from Pinus species, Tsitsikama Seacoast National Park (C.P.) 21.I.65 (G.G. v.d. Merwe) and one ♀-paratype from grass, Natures Valley, Dist. Knysna (C.P.) 21.I.1965 (G.G. v.d. Merwe).

Typhlodromus (Meyerius) collativus spec. nov.

(Figs. 237-243)

This species differs from its closest relative, T.(M.) convallis, in having the chaetotaxy of genu II of the IX-type. This character also renders this species unique amongst other related species.

Female: Dorsum (fig. 237): The mildly imbricated dorsal shield, length 358(-369) μ and breadth 205(-212) μ with seven pairs of pores and dorsomedian rugose patches. The shield bears 17 pairs of setae distributed as follows: six dorsal, two median (one anterior and one posterior), six prolateral (L_4 well median), and three postlateral (the seta usually paired with M_2 is absent). These setae measure in length: D_1, 25(24-26) μ; D_2, D_3 and M_1, 16(-18) μ; D_4 and L_4, 23(22-25) μ; D_5, 18(-20) μ; D_6, 13(12-14) μ; M_2, 62(56-64) μ; L_1 and L_3, 32(31-34) μ; L_2, 14(-16) μ; L_5 and L_6, 41(39-44) μ; L_7, 46(44-47) μ; L_8, 20(19-22) μ and L_9, 84(75-84) μ. Seta L_2 is thus much shorter than seta L_4. Setae L_1 and L_3 respectively longer than the distances between their bases and those of setae L_2 and L_4. Seta M_2 is longer than the distance between its base and the base of seta L_9. All setae are short or of moderate length.

Setae/.....

Setae S_1 and S_2 are on the dorsal interscutal membrane. Seta S_1, 32(31-34) μ, is equal in length to seta L_1 and longer than seta S_2, 22(19-23) μ.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes reach to a position anterolateral to the bases of setae D_1.

Venter: The sternal shield (fig. 238) of equal length and width, 68(66-70) μ, bears three pairs of sternal setae. The anterior margin of the shield is convex and the slightly sinuous posterior margin lies anterior to the third pair of sternal setae. The latter are thus placed on lateral lobes. These lobes are rather slender due to broad incisions which cut mediolaterally into them. Sternal setae IV are placed on small metasternal shields. The lyriform pores usually present on these shields are on the interscutal membrane.

Genital shield (fig. 239), width 71(-74) μ, posteriorly somewhat broader than across the setae.

The ventri-anal shield (fig. 239) is lightly imbricated, 113(111-115) μ long and 93(91-95) μ wide. The anterior margin of the shield is slightly convex and the lateral margins are evenly concave. Four pairs of pre-anal setae are present on the shield with a pair of pores caudolateral to the inner posterior pair of setae. Para-anal setae normal.

The ventral interscutal membrane bears three pairs of setae, VL_1 being 63(56-) μ long, and two pairs of metapodal plates. Between the genital and ventri-anal shields lie four slender platelets and laterally four small round platelets are scattered.

Posteriorly/.....

Posteriorly the peritrematal shields (fig. 240) are fused with the exopodal plates and end broad caudomedial to coxae IV.

Spermatheca (fig. 241): The major duct of the spermatheca is 22 μ long and slender. Big lips, 4 μ in diameter, occupy the whole atrium. The first portion, 3 μ long, of the cervix is tubelike, 2 μ in diameter, and the second portion is broad and disc-like. This disc is slightly hollowed towards the vesicle and 12 μ in diameter.

Chelicera (fig. 242): The fixed digit, length 33 μ, bears six teeth and a pilus dentilis on its inner margin. The movable digit, 29 μ in length, bears two teeth on its inner margin.

Legs: Chaetotaxy of the legs normal, except for genu II being of the IX-type. Leg IV (fig. 243) with three macrosetae, measuring in length on the genu 42(38-43) μ, on the tibia 36(33-38) μ and on the basitarsus 58(53-) μ.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/256/1) and one ♀-paratype from unidentified undergrowth, Kirstenbosch (C.P.) 27.I.1955 (P.A.J. Ryke). Two ♀-paratypes from unidentified bush, Grabouw (C.P.) 7.I.1955 (P.A.J. Ryke).

1. Subgenus Typhloseiopsis De Leon.

Typhloseiopsis De Leon, 1959a, Ent. News 70: 150; Chant, 1959b, Can. Ent. 91 (suppl. 12): 113; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 294; Muma, 1963a, Fla Ent. 46: 13; Schuster & Pritchard, 1963, Hilgardia 34: 205. Type: Typhloseiopsis theodoliticus De Leon, 1959, monotypic.

Typhlodromus (Typhloseiopsis); Pritchard & Baker, 1962, Hilgardia 33: 222.

Chanteius (Typhloseiopsis); Wainstein, 1962a, Acarologia 4: 20.

Paraseiulella Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 294; Muma, 1963a, Fla Ent. 46: 13. Type: Typhlodromus burrelli Chant, 1959, by original designation.

Clavidromina Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5:296; Muma, 1963a, Fla Ent. 46: 14. Type: Typhlodromus ellipticus De Leon, 1958, by original designation.

Amblydromus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 297; Muma, 1963a, Fla Ent. 46: 14. Type: Typhlodromus smithi Schuster, 1957, monotypic.

Typhlodromina Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 297; Muma, 1963a, Fla Ent. 46: 14. Type. Iphidulus conspicuus Garman, 1948, by original designation.

Chanteius/.....

Chanteius (Evanseius) Wainstein, 1962a, Acarologia 4:20; Muma, 1963a, Fla Ent. 46: 13. Type of subgenus: Typhlodromus anchialis Kennett, 1958, by original designation. New synonymy.

The subgenus Typhloseiopsis is characterized by having six pairs of prolateral setae and only two pairs of postlateral setae, the last two caudolateral pairs. Two pairs of median setae are on the dorsal shield and two pairs of scapular setae on the dorsal interscutal membrane.

The subgenus Evanseius Wainstein differs from Typhloseiopsis only in the details of the ventral characters, which are not considered of supraspecific importance.

The subgenus Typhloseiopsis is not yet known from South Africa.

m. Subgenus Chantia Pritchard & Baker, new status.

Chantia Pritchard & Baker, 1962, Hilgardia 33: 230; Schuster & Pritchard, 1963, Hilgardia 34: 198; Chant, 1965, Can. Ent. 97: 369. Type: Chantia paradoxa Pritchard & Baker, 1962, monotypic.

Chantiini Schuster & Pritchard, 1963, Hilgardia 34: 198.

The subgenus Chantia bears five pairs of dorsal setae, two pairs of median setae, five pairs of prolateral setae and two pairs of postlateral setae, one pair anterolaterally and one pair caudolaterally,

on the/.....

on the dorsal shield. The two pairs of scapular setae are also on the dorsal shield.

This subgenus is known only from the type species; the ♀-holotype collected from Baphia sp., Stanleyville, Belgian Congo.

n. Subgenus Phytoseius Ribaga

Phytoseius Ribaga, 1902, Riv. Patol. veg. 10: 177; Nesbitt, 1951, Zool. Verh., Leiden 12: 56; Womersley, 1954, Aust. J. Zool. 2: 187; Athias-Henriot, 1957a, Bull. Soc. Hist. nat. Afr. N. 48: 341; Chant, 1957b, Can. Ent. 89: 362; Wainstein, 1959, Zool. Zh. 38: 1361; Chant, 1959b, Can. Ent. (suppl. 12): 105; Chant & Athias-Henriot, 1960, Entomophaga 5: 213; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 293; González & Schuster, 1962, Bull. Univ. Chile agric. Exp. Stn. 16:20; Wainstein, 1962a, Acarologia 4:26; Pritchard & Baker, 1962, Hilgardia 33: 223; Muma, 1963a, Fla Ent. 46: 13; Schuster & Pritchard, 1963, Hilgardia 34: 119, 279; Chant, 1965, Can. Ent. 97: 370. Type: Gamasus plumifer Canestrini & Fanzago, 1876 (= Phytoseius (Dubininellus) ribagai Chant & Athias-Henriot, 1960), by original designation.

Phytoseius (Phytoseius) Wainstein, 1959, Zool. Zh. 38: 1361; Chant, 1959b, Can. Ent. (suppl. 12): 105; Chant & Athias-Henriot, 1960, Entomophaga 5: 216. Swirski & Shechter, 1961, Ktavim 11: 113; Muma, 1963a, Fla Ent. 46: 13.

Phytoseius/.....

Phytoseius (Dubininellus) Wainstein, 1959, Zool. Zh. 38: 1362; Chant, 1959b, Can. Ent. (Suppl. 12): 106; Chant & Athias-Henriot, 1960, Entomophaga 5: 218; Swirski & Shechter, 1961, Ktavim 11:99; Muma, 1963a, Fla Ent. 46: 13. Type of subgenus: Phytoseius (Dubininellus) corniger Wainstein, 1959, by original designation.

Dubininellus; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 293.

Phytoseius (Pennaseius) Pritchard & Baker, 1962, Hilgardia 33: 223. Type: Phytoseius (Pennaseius) amba Pritchard & Baker, 1962, by original designation.

Pennaseius; Schuster & Pritchard, 1963, Hilgardia 34: 279.

The subgenus Phytoseius is characterized by having six pairs of prolateral setae, a single pair of postlateral setae, the last pair of caudolaterals, two pairs of median setae and five or six pairs of dorsal setae. The first pair of scapular setae is located on the dorsal shield and the second pair is on the dorsal interscutal membrane or may be absent.

Ribaga (1902) designated Gamasus plumifer Canestrini & Fanzago, 1876, as the type of his genus Phytoseius. Nesbitt (1951) recognized this designation, but stated that Typhlodromus spoofi Oudemans, 1915, was the only authentic species in the genus Phytoseius and based his redescription of the latter on P. spoofi. This species was subsequently synonymized with

Sejus macropilis Banks, 1909, by Womersley (1954).

In 1957 Athias-Henriot described a female from Algeria as Phytoseius plumifer (Can. & Fan.). This female has a single pair of pre-anal setae and lacks the second pair of scapular setae. Chant (1957b) described P. plumifer from four specimens on two slides, nos. 224/41 and 224/42, in the Berlese collection, Italy, and some specimens from fig leaves, Italy. These specimens, however, have three pairs of pre-anal setae and the second pair of scapular setae present on the dorsal interscutal membrane. Chant (1957b) believed that the identification of the four specimens in Berlese's collection was correct, on the assumption that Berlese had access to the collection of Canestrini & Fanzago. Wainstein (1959) abided by this assumption and erected the subgenera Phytoseius and Dubininellus, the former with the second pair of scapular setae present and the latter without such setae.

Chant & Athias-Henriot (1960) argued that Ribaga actually misidentified his specimen as P. plumifer, since he, Ribaga, described the latter as having only one pair of pre-anal setae. Ribaga therefore had an undescribed specimen before him, having only one pair of pre-anal setae. The female from Algeria, described by Athias-Henriot (1957a) as P. plumifer, therefore complies with the description of the type of Phytoseius. This female specimen was subsequently designated by Chant & Athias-Henriot (1960) as the neotype of Phytoseius and was given the name Phytoseius (Dubininellus) ribagai.

Pritchard & Baker (1962), being unaware of the

paper/.....

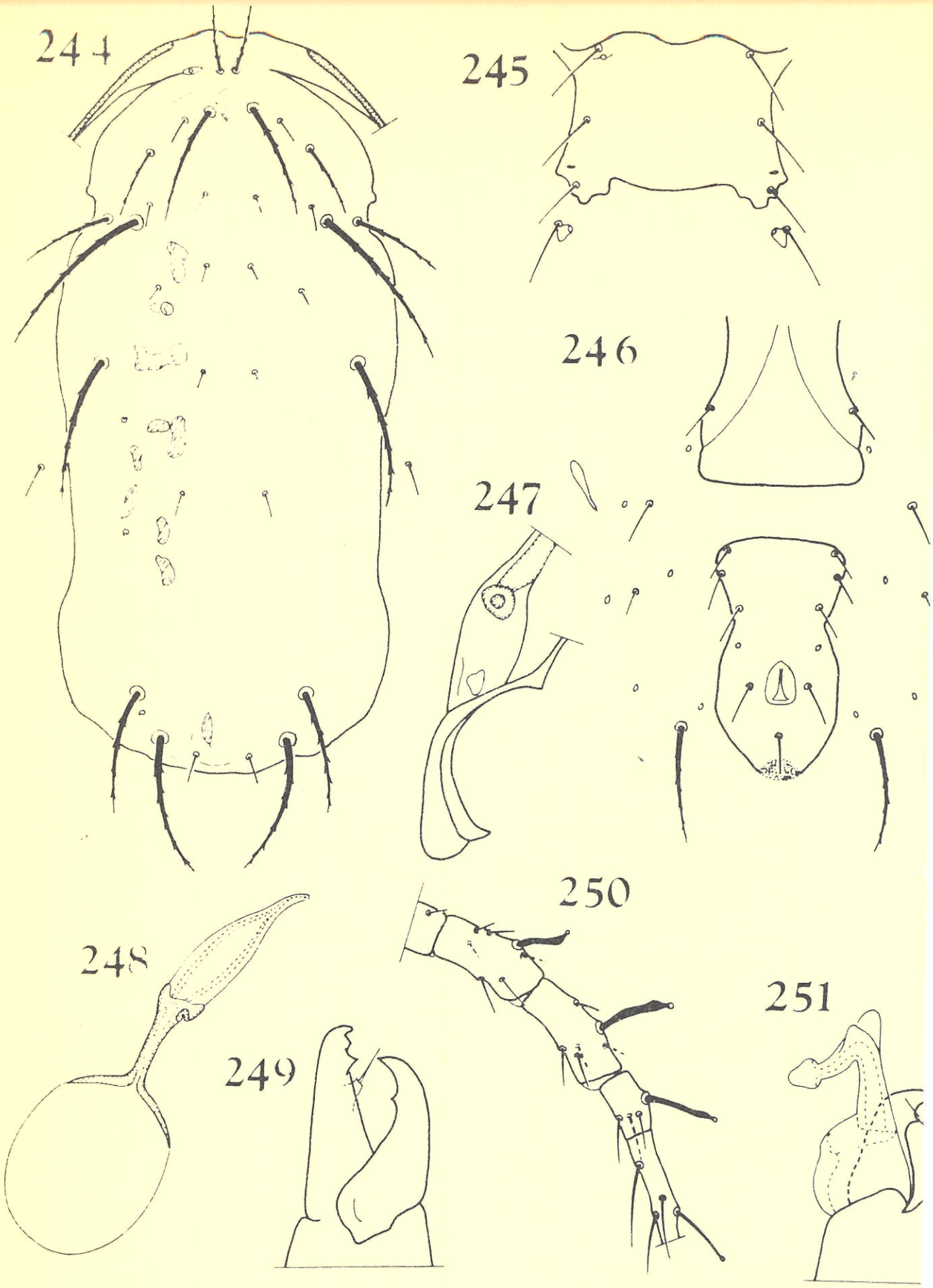
paper of Chant & Athias-Henriot (1960), stated that the identifications by Wainstein (1959) and Chant (1959b) of P. plumifer were in error. Pritchard & Baker (1962) concluded that since Ribaga (1902) indicated that the specimen he had before him had a single pair of pre-anal setae and that the fifth pair of prolateral setae are longer than the sixth pair of prolateral setae, the latter specimen must be similar to P. bakeri Chant, 1959, and the species identified by Athias-Henriot (1957a) i.e. P.(D.) ribagai. They further concluded that the specimens fugured by Chant (1959b) as P. plumifer must be P. finitimus Ribaga, 1902. They also restricted specimens which lack the second pair of scapular setae to the subgenus Phytoseius, with Dubininellus a synonym of the latter, proposing the new name Pennaseius for those species in posession of the second pair of scapular setae.

The recognition of P.(D.) ribagai as neotype of Phytoseius is therfore beyond the power of the present author and the case should be referred to the International Commission of Zoological Nomenclature by the authors Chant & Athias-Henriot.

The above definition of the subgenus Phytoseius is therefore intended to include specimens commonly referred to the genus Phytoseius.

The following species is the only species known from the South African fauna.

Typhlodromus/.....



FIGS. 244-251. Typhlodromus (Phytoseius) amba (Pritchard and Baker)

Fig.244, dorsum, female; fig.245, sternal shield, female; fig.246, posterior ventral surface, female; fig.248, spermatheca, female; fig.250, leg IV, female; fig.251, chelicera, male.

Typhlodromus (Phytoseius) amba (Pritchard & Baker), comb. nov.

(Figs. 244-251)

Phytoseius (Pennaseius) amba Pritchard & Baker, 1962, Hilgardia 33: 224.

This species resembles T. nahuatlensis (De Leon). It differs from the latter in having the third prolateral seta much shorter than the long first prolateral and the fifth prolateral approximately equal in length to the sixth prolateral.

The following description of T.(P.) amba differs from that of Pritchard & Baker (1962) in that the fixed digit of the chelicerae is bidentate and not unidentate and the movable digit is not smooth but bears a single tooth.

Female: Dorsum (fig. 244): Dorsal shield rather slender, length 264-284 μ and breadth 130-145 μ, laterally lightly imbricated and with dorsomedian rugose patches. The lateral margins are notched opposite the fifth lateral setae and posteriorly somewhat bulged. Three pairs of small pores are present postlaterally on the shield. A pair of large pores lies caudomedial to the first median setae and lateral to setae D_1 is a pair of lyriform pores. The shield is provided with 16 pairs of setae, arranged as follows: six dorsal, two median, six prolateral (the fourth seta being somewhat median), one additional prolateral lateral to the fifth (designated the first scapular) and a single postlateral (the extreme caudolateral). These setae measure in length: D_1, 24-26 μ; D_2, D_3, D_4 and M_1, 7 μ; D_5, L_2 and L_4, 9-11 μ; D_6, 11-14 μ; M_2, 50-70 μ; L_1, 46-50 μ; L_3, 26-29 μ; L_5, 70-85 μ; L_6, 60-80 μ and L_7,/.....

and L_7, 57-80 μ. Seta D_1 is serrated, slightly shorter in length than seta L_3 but longer than the distance between its base and the base of seta L_1. The latter is serrated and longer than the distance between its base and the base of seta L_4. Seta L_2 is short, smooth and seta L_3, serrated, in length equals the distance between its base and the base of seta L_5. Seta L_4 is short but placed just anteromedial to seta L_5. The latter is serrated and longer than the distance between its base and the base of seta L_6. Seta L_5 is also the longest seta on the dorsal shield. The serrated seta L_6, on the same level as seta D_4, is the second longest seta on the dorsal shield, but may be equal in length to the serrated seta L_7. The latter and the serrated slightly shorter seta M_2, together with the short smooth setae D_5 and D_6, are the only setae on the postscutum.

Seta S_1, serrated and paired with seta L_5, is on the dorsal shield and measures 37-45 μ in length. The smooth seta S_2, length 12-16 μ, is on the dorsal interscutal membrane just anterior to the level of setae D_5.

The peritrematal shields fuse anteriorly with the dorsal shield. The peritremes terminate well anterolateral of the bases of setae D_1.

Venter: The sternal shield (fig. 245), length 68-75 μ and width 56-60 μ, bears three pairs of setae. The anterior margin of the shield is medially indented. The posterior margin is slightly convex and is just anterior to the level of the third pair of sternal setae, thus forming two lateral lobes with irregular posterior margins. Sternal setae IV are placed anteriorly on small triangular metasternal shields.

The genital/.....

The genital shield, width 67-72 μ, is normal with a pair of setae.

The slender ventri-anal shield (fig. 246), length 90-98 μ and width 48-55 μ, has an almost straight anterior margin and constricted lateral margins. The shield bears three pairs of laterally aligned pre-anal setae and a pair of pores well caudal to the posterior pair of pre-anal setae. The anus is just posterior to these pores. The para-anal setae are normal.

The ventral interscutal membrane is provided with three pairs of setae; the caudal pair is long and serrated, measuring 45-51 μ. A single pair of posteriorly tapered metapodal plates and six pairs of scattered circular platelets are present on the membrane.

The exopodal plate overlaps posteriorly and fuses with the peritrematal shield (fig. 247) and terminates posterior to coxa IV with a rounded posterior margin and an anteromedially directed point.

Spermatheca (fig. 248): The major duct, length 22-24 μ, is strongly broadened towards the atrium. The duct is thin walled but gives the impression of being lined with a thicker inner wall. The atrium is broad, 7 μ, but short, 4 μ, with small lips. The cervix measures, from the lips to the vesicle, 16-18 μ in length. The first two-thirds of the cervix is slender and tubelike but the last third, towards the vesicle, is strongly flared. The cervix has a diameter of 14-16 μ where it joins the vesicle.

Chelicera (fig. 249): The fixed digit measures 24 μ in length and is provided with two subapical teeth

and a/.....

and a pilus dentilis. The movable digit, length 24 μ, has a single tooth on its inner margin.

Legs: The chaetotaxy of the legs is normal, except for genu III being of the VI-type. Leg IV (fig. 250) bears four macrosetae. Those on the genu, tibia and basitarsus are irregularly expanded and distally knobbed but the one on the tarsus is only distally knobbed. These setae measure in length: 24-28 μ on the genu, 30-35 μ on the tibia, 33-38 μ on the basitarsus and 26-30 μ on the tarsus.

Male: The chaetotaxy of the dorsal shield, length 230 μ and breadth 127 μ, resembles that of the female as do the pores. The longer setae are however shorter than those on the female, measuring: D_1, 21 μ; M_2, 40 μ; L_1, 44 μ; L_3, 26 μ; L_5, 53 μ; L_6, 45 μ and L_7, 38 μ.

Setae S_1 and S_2, 31 μ and 11 μ long respectively, are on the dorsal shield.

The peritrematal shields are fused anterolaterally to the dorsal shield and the peritremes reach just beyond the level of setae L_2.

Venter: The genitosternal shield is normal with five pairs of setae and the genital opening on its anterior margin.

The triangular ventri-anal shield, length 100 μ and width 144 μ, is provided with three pairs of pre-anal setae and a pair of very small pores caudal to the inner posterior pair of setae. Para-anal setae are normal.

The/.....

The interscutal membrane bears a single pair of serrated setae (VL_1), 24 μ long.

The peritrematal shield terminates posterior to coxa IV and is thus not fused with the ventri-anal shield.

Chelicera (fig. 251): The fixed digit, length 17 μ, bears two subapical teeth and a pilus dentilis. The movable digit, length 17 μ, with a single tooth and a spermatophoral process. The main stem of the process, is 14 μ long, and distally bilobed. Thence it is bent ventrally and is provided with a strong distal knob. This branch measures 9 μ in length. The spermatophoral process is provided proximally with a thin walled sack; its purpose is unknown.

Legs: The chaetotaxy of the legs is normal and resembles that of the female in having genu III of the VI-type. Leg IV also bears four knobbed macrosetae, but they are less expanded than in the female. These setae measure in length: 20 μ on the genu, 24 μ on the tibia, 28 μ on the basitarsus and 26 μ on the tarsus.

Distribution: This species was previously only known from the Belgian Congo and Ruanda-Urundi (Central Africa).

Material studied: Two ♀♀ and one ♂ from leaves of Cydonia vulgaris, Potchefstroom (Tvl.) 16.IV.1955 (P.A.J. Ryke). Three ♀♀ from Combretum glomeruliflorum, Potgietersrus (Tvl.) 5.XI.1964 (G.G. v.d. Merwe). Two ♀♀ from Lonchocarpus capassa, Georges Valley near Tzaneen (Tvl.) 3.XI.1964 (G.G. v.d. Merwe). One ♀ from Bauhinia sp., Letsitele Valley near Tzaneen (Tvl.) 16.I.1964 (M.K.P. Meyer). Two ♀♀ from Flemingia grahamiana, Letsitele Valley near Tzaneen (Tvl.) 14.I.1964/.....

14.I.1964 (P. Jordaan) and one ♀ from Phytolacca sp., Inzuzi Dift (Natal) 28.XI.1962 (G.G. v.d. Merwe).

VII. GENUS IPHISEIUS BERLESE

Iphiseiini Pritchard & Baker, 1962, Hilgardia 33: 211; Schuster & Pritchard, 1963, Hilgardia 34: 198, 199.

The genus Iphiseius contains those species having four pairs of prolateral setae and the sclerotized dorsal interscutal membrane bearing two pairs of scapular setae. There are four, five or six pairs of dorsal setae and either three or five pairs of postlateral setae.

Muma (1961) erected the genus Phytoseiulella for the species Iphiseius grovesae Chant, on the absence of the first two pairs of anterolateral setae on the postscutum. Muma (1961) did not recognize the sclerotized interscutal membrane of this species and of Iphiseius dengenerans as being of generic importance.

Pritchard & Baker (1962) utilized the number of postlateral setae for subgeneric separation and restricted those species having five pairs of postlateral setae to Iphiseius sens. str., and erected a new subgenus Trochoseius for those species having only three pairs of postlateral setae. These authors however referred I. grovesae to Amblyseius sens. str.

The genus Phytoseiulella and the subgenus Trochoseius are here recognized as subgenera of Iphiseius sens. lat.

Key to/.....

Key to the subgenera of the world: females

1. Postscutum with three pairs of lateral setae 2

Postscutum with five pairs of lateral setae .... Iphiseius sens. str.

2. Postscutum with the first pair of lateral setae present ..... Trochoseius

Postscutum with the first pair of lateral setae absent ..... Phytoseiulella

a. Subgenus Iphiseius Berlese

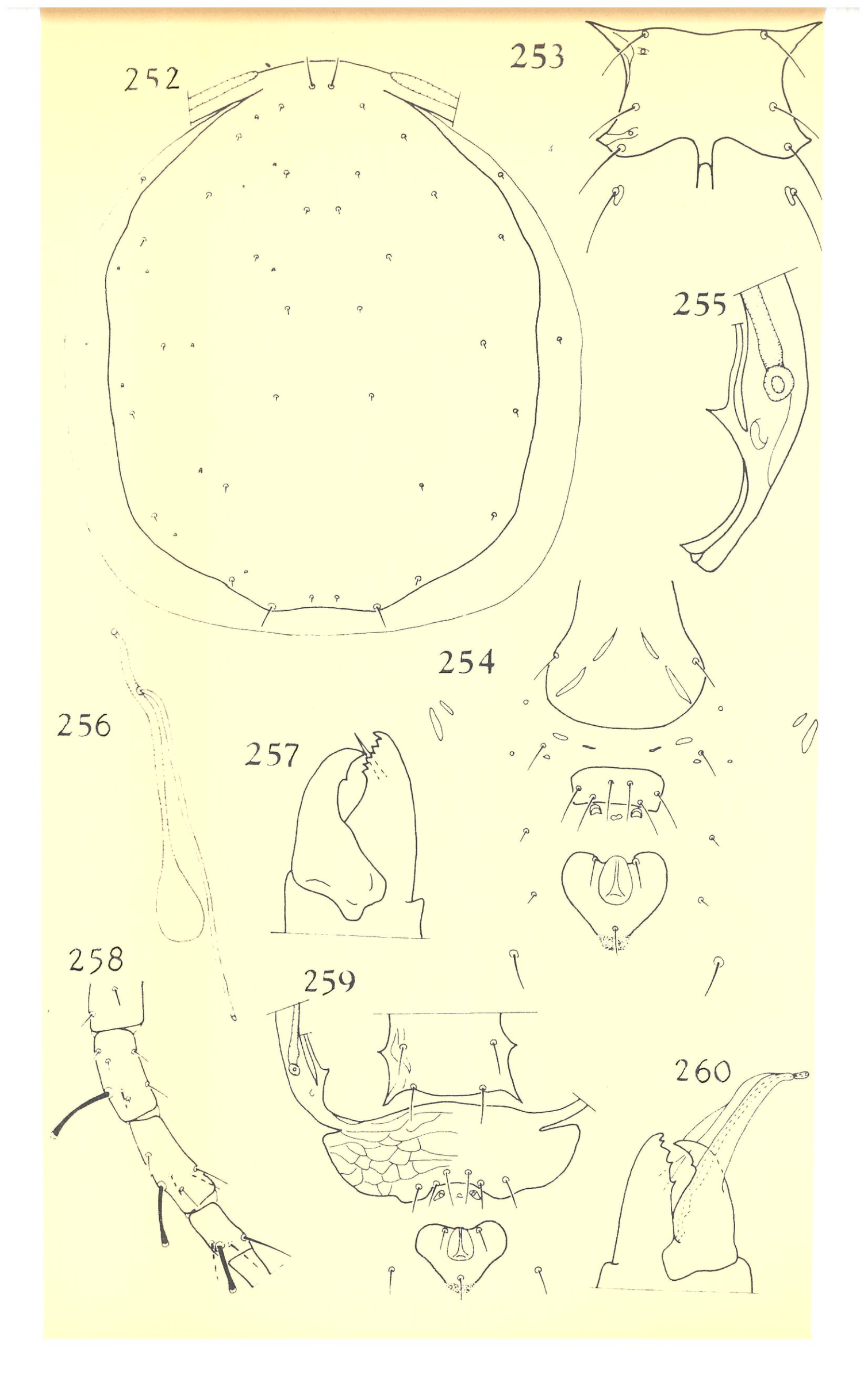
Iphiseius Berlese, 1916, Redia 12: 33 (nomen nudum); Berlese, 1921, Redia 14: 95; Vitzthum, 1941, In Bronns Klassen und Ordenungen des Tierreichs 5(iv): 764; Evans, 1954, Proc. zool. Soc. Lond. 124: 517; Athias-Henriot 1957a, Bull. Soc. Hist. nat. Afr. N. 48: 334; Chant, 1959b, Can. Ent. 91 (suppl. 12): 109; Muma 1963a, Fla Ent. 46: 12; Westerboer & Bernhard, 1963, In Beiträge zur Systematik und Ökologie Mitteleuropäischer Acarina. Band II, Acad. Verlags., Leipzig: 740. Type: Seius degenerans Berlese, 1889, monotypic.

Iphiseius (Iphiseius) Pritchard & Baker, 1962, Hilgardia 33: 298.

Amblyseius (Iphiseius); Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 288; Muma, 1963a, Fla Ent. 46: 12.

In Iphiseius sens. str. the dorsal shield bears

six pairs/.....


252
253
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six pairs of dorsal setae, two pairs of median setae and five pairs of postlateral setae. Two pairs of scapular setae are present on the sclerotized dorsal interscutal membrane.

Iphiseius (Iphiseius) degenerans (Berlese)

(Figs. 252-260)

Seius degenerans Berlese, 1889, Acari Myr. Scorp., fasc. 54, No. 9.

Iphiseius degenerans; Berlese, 1921, Redia 14: 95; Evans, 1954, Proc. zool. Soc. Lond. 124: 517; Athias-Henriot, 1957a, Bull. Soc. Hist. nat. Afr. N. 48: 335; Chant, 1959b, Can. Ent. 91 (suppl. 12): 110; Pritchard & Baker, 1962, Hilgardia 33: 299.

Iphiseius degenerans is characterized by having the setae on the dorsal shield minute, except for the first dorsal and the caudolateral setae which are short. The ventri-anal shield in both sexes is divided transversely into a ventral and an anal shield.

Figs. 252-260 Iphiseius (Iphiseius) degenerans (Berlese)

Fig. 252, dorsum, female; fig. 253, sternal shield, female; fig. 254, posterior ventral surface, female; fig. 255, peritrematal shield, female; fig. 256, spermatheca, female; fig. 257, chelicera, female; fig. 258, leg IV, female; fig. 259, posterior ventral surface, male, fig. 260, chelicera, male.

Female: Dorsum (fig. 252): The broadly ovate dorsal shield, length 430-470 μ and breadth 330-340 μ, covers the idiosoma and is weakly to strongly sclerotized. (The illustration of the shield shows the shield totally flattened). The shield is provided with 11 pairs of pores and 17 pairs of setae. These setae are arranged as follows: six dorsal, two median, four prolateral and five postlateral. Seta D_1 is of moderate length, 30-34 μ and seta L_9 is short, measuring 17-21 μ. The other setae are minute, measuring 5-8 μ.

The interscutal membrane is sclerotized and united with the dorsal shield. The minute setae S_1 and S_2 are on this sclerotized membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes terminate anterolateral to the bases of setae D_1.

Venter: The sternal shield (fig. 253), length 70-76 μ and breadth 74-80 μ, bears three pairs of sternal setae. The posterior margin is provided medially with a narrow posteriorly-forked lobe. Sternal setae IV are placed on small metasternal shields.

The broad genital shield, width 110-118 μ, is rounded posteriorly and bears a pair of setae.

The ventri-anal shield (fig. 254) is divided transversely into a ventral and an anal shield. The ventral shield is oblong transversely, measuring 20-30 μ in length and 75-82 μ in width and bears three pairs of setae. Posterior to this shield and caudal to the inner posterior pair of setae is a pair of large pores. The anal shield is 70-75 μ long and 76-80 μ wide. The shield bears the normal three para-anal setae.

The ventral/.....

The ventral interscutal membrane bears four pairs of setae. The caudal pair is of moderate length, 23-28 μ. The membrane is provided with two pairs of metapodal plates and five pairs of small scattered platelets.

The peritrematal shield fuses posteriorly with the exopodal plate (fig. 255) and terminates broadly posterior to coxa IV with a sharp point medially.

Spermatheca (fig. 256): The major duct of the long slender spermatheca is 14 μ long. The presence of an atrium is marked by very small lips, 2 μ in diameter. The cervix is narrow, tubelike and measures 34 μ in length. The vesicle is small compared to those of other phytoseiid species. The minor duct is strongly developed in this species.

Chelicera (fig. 257): The fixed digit, length 28-30 μ, bears six teeth and a pilus dentilis on the distal half of its inner margin. The movable digit, length 28-30 μ, bears a single tooth on its inner margin.

Legs: The chaetotaxy of the legs is normal. Knobbed macrosetae are present on the following segments: genu II, 22-26 μ; genu III, 33-38 μ; tibia III, 26-30 μ; genu IV, 45-52 μ; tibia IV, 35-40 μ and basitarsus IV, 33-38 μ (fig. 258).

Male: Dorsum: The dorsal shield measures 353-376 μ in length and 282-294 μ in width. The chaetotaxy of the shield resembles that of the female. Seta D_1 is 28-31 μ long and seta L_9, 15-19 μ. The other setae are minute.

The minute/.....

The minute setae S_1 and S_2 are on the dorsal shield.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes reach laterally to the level of setae D_1.

Venter: The genitosternal shield is normal with five pairs of setae. The genital opening is on its anterior margin.

The imbricated triangular ventri-anal shield (fig. 259) is, anterior to the anus, transversely divided into a ventral and an anal shield. The ventral shield measures 68-73 μ in length and 188-195 μ in width. Its anterior margin is laterally fused to the peritrematal shield. The ventral shield bears three pairs of setae and a pair of pores lies off the shield posterior to these setae. The anal shield, length 49-53 μ and width 65-69 μ, bears the normal three pairs of para-anal setae.

The ventral interscutal membrane bears a single pair of setae, measuring 21-24 μ in length.

Chelicera (fig. 260): The fixed digit, length 23 μ, is provided with four teeth and a pilus dentilis on the distal half of its inner margin. The movable digit, length 23 μ, bears a single tooth and a spermatophoral process, 28 μ long, which is distally bent slightly ventrad and bilobed.

Legs: The chaetotaxy of the legs is normal. Knobbed macrosetae are present on the following segments: genu II, 26-28 μ; genu III, 35-38 μ; tibia III, 26-28 μ; genu IV, 44-48 μ; tibia IV, 34-38 μ and basitarsus IV, 31-35 μ.

Distribution:/.....

Distribution: The type locality of I.(I.) degenerans is leaves and moss, Italy. This species is also recorded from Portugal, Israel, Hong Kong, Algeria, Tanganyika, Ruanda-Urundi and Belgian Congo, on a variety of plants. Ryke & Meyer (1958) recorded this species from Natal and the Eastern Transvaal.

Material studied: Five ♀♀ and one ♂ from Psidium guayava, Munster (Natal) 20.IV.1955 (M.K.P. Meyer). One ♀ from Hibiscus tiliaceus, Umkomaas (Natal) 3.XII.1962 (G.G. v.d. Merwe). One ♂ from Carica papaya, Loskop Dam, Groblersdal Dist. (Tvl.) 23.I.1963 (G.G. v.d. Merwe). Five ♀♀ and four ♂♂ from Carica papaya, Barberton (Tvl.) 6.IV.1955 (P.A.J. Ryke). One ♀ from Gossypium sp., Barberton (Tvl.) 10.V.1963 (M.K.P. Meyer). One ♂ from Morus sp., Barberton (Tvl.) 10.V.1963 (G.G. v.d. Merwe). Two ♀♀ and four ♂♂ from Canna sp., Nelspruit (Tvl.) 8.V.1963 (G.G. v.d. Merwe). One ♀ and two ♂♂ from Carica papaya, Nelspruit (Tvl.) 1.IV.1955 (P.A.J. Ryke). Five ♀♀ and two ♂♂ from Carica papaya, Nelspruit (Tvl.) 10.V.1963 (G.G. v.d. Merwe). Two ♀♀ and one ♂ from Sclerocarya caffra, Kaap Muiden (Tvl.) 5.IV.1955 (P.A.J. Ryke). Three ♀♀ and one ♂ from Erythrina caffra, Kaap Muiden (Tvl.) 5.IV.1955 (P.A.J. Ryke). One ♂ from Citrus sp., Malelane (Tvl.) 15.II.1965 (Hofmeyer). One ♀ and one ♂ from Heeria paniculosa, Graskop (Tvl.). 17.II.1965 (M.K.P. Meyer). Two ♀♀ from Carica papaya, Tzaneen (Tvl.) 7.VII.1959 (M.K.P. Meyer) and one ♀ from Jacaranda sp., Tzaneen (Tvl.) 18.II.1965 (M.K.P. Meyer).

b. Subgenus/.....

b. Subgenus Trochoseius Pritchard & Baker.

Iphiseius (Trochoseius) Pritchard & Baker, 1962, Hilgardia 33: 299. Type of subgenus: Iphiseius (Trochoseius) gongylus Pritchard & Baker, 1962, by original designation.

The subgenus Trochoseius is characterized by having four pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and three pairs of postlateral setae. The latter consists of the first pair of prolateral setae and two pairs of caudolateral setae. Two pairs of scapular setae are on the sclerotized dorsal interscutal membrane.

This subgenus is known only from the Belgian Congo, Central Africa.

c. Subgenus Phytoseiulella Muma, new status

Phytoseiulella Muma, 1961, Fla Sta. Mus. Bull. Biol. Sci. 5: 276; Muma, 1963a, Fla Ent. 46: 12. Type: Iphiseius grovesae Chant, 1959; monotypic.

The subgenus Phytoseiulella is characterized by having five pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and three pairs of postlateral setae. The first two pairs of postlateral setae are absent and only the three caudolateral pairs are present. Two pairs of scapular setae are present on the sclerotized dorsal interscutal membrane.

This subgenus differs from the subgenus Trochoseius

in the/.....

in the absence of the first pair of postlateral setae.

The subgenus Phytoseiulella is known only from the type specimen, a female, collected from moss at Kent, England.

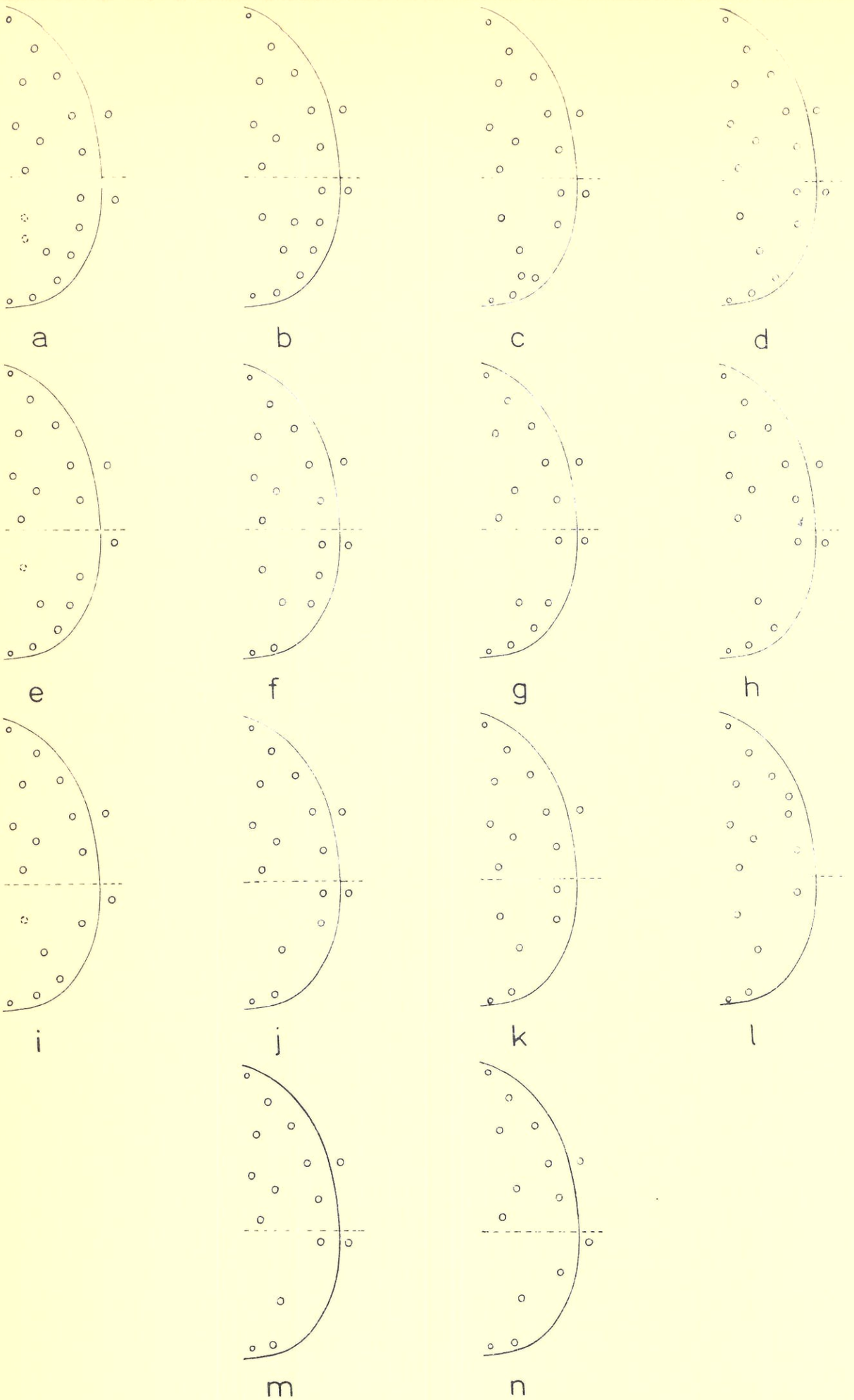
VIII. GENUS AMBLYSEIUS BERLESE.

Amblyseiinae Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 273; Muma, 1963a, Fla Ent. 46: 11. Type genus: Amblyseius Berlese, 1914, by original designation.

Amblyseiini Wainstein, 1962a, Acarologia 4:26; Pritchard & Baker, 1962, Hilgardia 33: 211; Schuster & Pritchard, 1963, Hilgardia 34: 198, 225.

The genus Amblyseius sens. lat. is characterized by having four to seven pairs of dorsal setae, two or three pairs of median setae, four pairs of prolateral setae and two to five pairs of postlateral setae. One or two pairs of scapular setae are present, located on either the dorsal interscutal membrane or the dorsal shield.

Pritchard & Baker (1962) hinted at the possibility that the genus Iphidulus Ribaga 1902 (type: I. communis Ribaga, by subsequent designation of Vitzthum, 1941) might have precedence over Amblyseius, although the former is a nomen dubium. Vitzthum (1941) recognized the genus Iphidulus and was probably followed by Garman (1948) who included the genus Phytoseius Ribaga in the genus Iphidulus. Nesbitt (1951), however, gave an excellent account of the validity of the latter. This discussion is in essence the following: Ribaga himself was uncertain of the limits of the genera Seiulus and



FIGS. 261, a-n. Diagrammatic representation of the setal insertion for subgenera in the genus Amblyseius Berlese

a. Amblyseius b. Typhlcseius c. Typhloseiella d. Kampimodromus
e. Propriopsis f. Amblyseiella g. Phytoscutus h. Phytoseiulus
i. Proprioseius j. Asperoseius k. Amblyscutus l. Platyseiella
m. Paraphytoseius n. Mesoseiulus

Iphidulus, because he placed Gamasus vepallidus in the genus Seiulus while it should, according to his own descriptions of these genera, have been placed in Iphidulus. The description of these genera and species are very vague and type material, drawings and ecological data are not available. Furthermore, the name Iphidulus was used by Berlese (1882-1898) in his description of Laelaps (Iphidulus) vepallidus Koch and is thus pre-occupied. Nesbitt (1951) therefore placed the genus Iphidulus on the nomina dubia list.

It is thus clear that the recognition of the genus Iphidulus by Vitzthum (1941) and Garman (1948) is not valid and Pritchard & Baker's suggestion that this genus might have prededence over Amblyseius can not be taken seriously. The number and/or relative postions of the scapular setae and/or the number and relative positions of the postlateral setae (fig. 261 a-n) are considered subgeneric characters since relationships within the genus are expressed by these characters.

Key to the subgenera of the world: females

1. Postscutum with five pairs of lateral setae 2

   Postscutum with less than five pairs of lateral setae 3

2. Postscutum with one pair of median setae (fig. 261 a) ..... Amblyseius

   Postscutum with two pairs of median setae (fig. 261 b) ..... Typhloseius

3. Postscutum/.....

3. Postscutum with four pairs of lateral setae 4

Postscutum with less than four pairs of lateral setae 8

4. Postscutum with one pair of median setae 5

Postscutum with two pairs of median setae (fig. 261 c) ..... Typhloseiella

5. Postscutum with the median setae transversely paired with one of the lateral pairs of setae ... 6

Postscutum with the median setae not transversely paired with any of the lateral pairs of setae (fig. 261 d) .... Kampimodromus

6. Postscutum with first pair of anterolateral setae present 7

Postscutum with first pair of anterolateral setae absent but with the second pair present (fig. 261 e) ..... Proprioseiopsis

7. Postscutum with the second pair of anterolateral setae present (fig. 261 f) .... Amblyseiella

Postscutum with the second pair of anterolateral setae absent (fig. 261 g) ..... Phytoscutus

8. Postscutum with three pairs of lateral setae 9

Postscutum with two pairs of lateral setae 12

9. Postscutum with two pairs of caudolateral setae 10

Postscutum with one pair of caudolateral setae .. 11

10. Postscutum/.....

10. Postscutum with the first pair of anterolateral setae present (fig. 261 h) ..... Phytoseiulus

Postscutum with the first pair of anterolateral setae absent, but with the second pair present (fig. 261 i) ..... Proprioseius

11. Second pair of scapular setae present on the dorsal interscutal membrane (fig. 261 j) ... . Asperoseius

Second pair of scapular setae absent (fig. 261 k) ..... Amblyscutus

12. Both pairs of scapular setae present on the dorsal interscutal membrane 13

First pair of scapular setae present on the dorsal shield and the second pair absent (fig. 26 l) ..... Platyseiella

13. Postscutum with the first pair of anterolateral setae present (fig. 261 m) .... Paraphytoseius

Postscutum with the first pair of anterolateral setae absent, but with the second pair present (fig. 261 n) ..... Mesoseiulus

a. Subgenus Amblyseius Berlese

Amblyseius Berlese, 1914, Redia 10: 143; Garman, 1948, Bull. Conn. agric. Exp. Stn. 520: 6, 16; Evans, 1952, Bull. ent. Res. 43: 397; Womersley, 1954, Aust. Zool. 2: 188; Muma 1955, Ann. ent. Soc. Am. 48: 263; Athias-Henriot, 1957a,

Bull. Soc. Hist. nat. Afr. N. 48: 336; Garman, 1958, Ann. ent. Soc. Am. 51: 70; Athias-Henriot, 1959, Bull. Acad. r. Belg. (Classe Sci., sér. 5) 45: 132; Ehara, 1959, Acarologia 1: 285; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 287; González & Schuster, 1962, Bull. Univ. Chile agric. Exp. Stn. 16:8; Wainstein, 1962a, Acarologia 4:12; Pritchard & Baker, 1962, Hilgardia 33:235; Muma, 1963a, Fla Ent. 46:12; Schuster & Pritchard, 1963, Hilgardia 34: 225; van der Merwe & Ryke, 1963, J. ent. Soc. sth. Afr. 26: 89; Chant, 1965, Can. Ent. 97: 371. Type: Zercon obtusus Koch, 1839, by original designation.

Amblyseius (Amblyseius); Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 287; Wainstein, 1962a, Acarologia 4: 15; Pritchard & Baker, 1962, Hilgardia 33: 237; Muma, 1963a, Fla Ent. 46; 12.

Typhlodromus (Amblyseius); Chant, 1957a, Can. Ent. 89: 299; Chant, 1957b, Can. Ent. 89: 528; Chant, 1959b, Can. Ent. 91 (suppl. 12): 66.

Amblyseius (Seiopsis) Berlese, 1923, Redia 15: 255. Type of subgenus: A.(S.) brevipilis Berlese, 1923, monotypic.

Amblyseius (Amblyseiopsis) Garman, 1948, Bull. Conn. agric. Exp. Stn. 520: 17. Type of subgenus: A.(A.) americanus Garman, 1948, monotypic.

Amblyseiopsis; Muma, 1955, Ann. ent. Soc. Am. 48: 264; Garman, 1958, Ann. ent. Soc. Am. 51: 69.

Phyllodromus/.....

Phyllodromus De Leon, 1959e, Ent. News. 70: 260; Muma, 1961, Fla St. Mus. Bull. Sci. 5: 290; Muma, 1963a, Fla Ent. 46: 12. Type: P. leiodis De Leon, 1959, monotypic.

Typhlodromus (Typhlodromopsis) De Leon, 1959c, Fla Ent. 42: 113. Type of subgenus: T. cucumeris Oudemans, 1930, by original designation.

Amblyseius (Typhlodromopsis); Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 288; van der Merwe & Ryke, 1963, J. ent. Soc. sth. Afr. 26: 90; Muma, 1963a, Fla Ent. 46: 12.

Amblyseius (Amblyseialus) Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 288; van der Merwe & Ryke, 1963, J. ent. Soc. sth. Afr. 26: 90; Muma, 1963a, Fla Ent. 46: 12. Type of subgenus: A.(A.) largoensis (Muma), 1955, by original designation.

Amblyseius (Typhlodromalus) Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 288; van der Merwe & Ryke, 1963, J. ent. Soc. sth. Afr. 26: 90; van der Merwe & Ryke, 1964, J. ent. Soc. sth. Afr. 26: 263. Type of subgenus: A.(T.) peregrinus (Muma), 1955, by original designation.

Phytoscutella Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 275; Muma, 1963a, Fla Ent. 46: 11. Type: Typhlodromus salebrosus Chant, 1960, monotypic.

Amblyseiulus/.....

Amblyseiulus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 278; Muma, 1963a, Fla Ent. 46: 12. Type: Typhlodromus okanagensis Chant, 1957, by original designation.

Cydnodromus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 290; Muma, 1963a, Fla Ent. 46: 12. Type: Lasioseius marinus Willmann, 1952, by original designation.

Phytodromus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 291; Muma, 1963a, Fla Ent. 46: 12. Type: Amblyseius leucophaeus Athias-Henriot, 1959, monotypic.

Paraamblyseius Muma, 1962, Fla Ent. 45: 8; Muma, 1963a, Fla Ent. 46: 12; Chant, 1965, Can. Ent. 97: 371. Type: Paraamblysieus lunatus Muma, 1962, monotypic. New synonymy.

Amblyseius (Arrenoseius) Wainstein, 1962a, Acarologia 4: 12; Muma, 1963a, Fla Ent. 46: 12. Type of subgenus: Typhlodromus (Amblyseius) palustris Chant, 1960, monotypic. New synonymy.

Amblyseius sens. str. is characterized by having two pairs of median setae, four pairs of prolateral setae, five pairs of postlateral setae and two pairs of scapular setae on the dorsal interxcutal membrane. The number of dorsal setae is variable, being usually either five of six.

Amblyseius scapilatus deviates from the above definition in that the second pair of scapular setae is

placed on/.....

placed on the dorsal shield. This feature is here rendered an anomaly in this species and therefore of no supraspecific importance.

The species groups proposed by Athias-Henriot (1957a); Finlandicus Group (Phyllodromus De Leon), Cucumerus Group (Typhlodromopsis De Leon) and Obtusus Group (Amblyseius sens. str.) and by Chant (1959b); Newsami Group and the sections by Wainstein (1962a); Amblydromus, Euseius, Italoseius and Afrodromus are all based on the nature of the setae on the dorsal shield and/or the shape of the ventri-anal shield and the setae on it. These characters are considered as of specific value only and are therefore not substantiated here.

The genus Paraamblyseius is proposed as a synonym of Amblyseius as discussed under the family Phytoseiidae.

The subgenus Arrenoseius Wainstein differs from Amblyseius sens. str. only in the number of dorsal setae. The latter has already been proved to be of specific value only and Arrenoseius is therefore proposed as a synonym of Amblyseius sens. str.

Key to the species of Amblyseius sens. str. in South Africa: females.

1. Dorsal shield with five pairs of dorsal setae ... 2

   Dorsal shield with six pairs of dorsal setae 6

2. Seta L_2 longer than the distance between its base and the base of seta L_3 3

   Seta L_2 shorter than the distance between its base and the base of seta L_3 .....
   ..... pascuus spec. nov.

3. Atrium of spermatheca incorporated in the cervix 4

Atrium of spermatheca well defined and distinct from cervix ..... peltatus spec. nov.

4. Setae L_7 and L_8 equal or almost equal in length 5

Seta L_7 half as long as seta L_8 .... apheles spec. nov.

5. Seta L_2 longer than seta L_3 .... eurynotus spec. nov.

Seta L_2 equal in length to seta L_3 .... chilosus spec. nov.

6. Dorsal shield with lateral setae, L_8 excluded, shorter than the distance between their bases and the bases of the setae following next 7

Dorsal shield with at least one seta, L_8 excluded, equal to or longer than the distance between its base and the base of the seta following next 20

7. Seta M_2 equal to or longer than the distance between its base and the base of seta L_8 8

Seta M_2 shorter than the distance between its base and the base of seta L_8 12

8. Setae L_1, L_2 and L_3 not equal in length 10

Setae L_1, L_2 and L_3 equal in length 9

9. Seta/.....

9. Seta S_2 on the dorsal shield .....
..... scapilatus spec. nov.

Seta S_2 on the dorsal interscutal membrane .....
..... exiguus spec. nov.

10. Setae L_5 and L_6 very nearly equal in length ... 11

Seta L_5 much shorter than seta L_6 .....
..... krugeri spec. nov.

11. Prolateral setae much shorter than the distances between their bases and the bases of setae following next.....
..... culmulus spec. nov.

Two of the prolateral setae, L_1 and L_4, equal or almost equal in length to the distance between their bases and the bases of setae following next ..... largoensis (Muma)

12. Seta L_1 much longer than seta L_2 17

Setae L_1 and L_2 equal or almost equal in length 13

13. Ventri-anal shield oblong; laterally constricted 16

Ventri-anal shield triangular or subtriangular; not laterally constricted 14

14. Cervix of spermatheca longer than its greatest width 15

Cervix of spermatheca short, disclike .....
..... insignitus spec. nov.

15. Leg/.....

15. Leg IV with one macroseta; first portion of cervix bulged ..... *usitatus* spec. nov.

Leg IV with two macrosetae; cervix smooth .. .. *vanderlindei* spec. nov.

16. Setae L_1, L_2 and L_3 equal in length to more than half the distances between their respective bases and the bases of the setae following next; tibia IV with three macrosetae ..... *macrosetosus* spec. nov.

Setae L_1, L_2 and L_3 shorter than half the distances between their respective bases and the bases of setae following next; tibia IV with a single macroseta .... *rhusi* spec. nov.

17. Seta L_9 longer than seta D_1 18

Seta L_9 shorter than seta D_1 .... *grabouwensis* (v.d. Merwe & Ryke)

18. Seta L_3 less than twice the length of seta L_2; ventri-anal shield anteriorly narrower than across the anus 19

Seta L_3 twice the length of seta L_2; ventri-anal shield anteriorly broader than across the anus ..... *aferulus* (Chant)

19. Seta L_4 at least twice the length of seta L_3.. ..... *rubicolus* (v.d. Merwe & Ryke)

Seta L_4 not much longer than seta L_3 .... *munsteriensis* spec. nov.

20. Seta/.....

20. Seta L_2 longer than the distance between its base and the base of seta L_8 21

Seta M_2 shorter or equal to, but not longer than the distance between its base and the base of seta L_3 24

21. Setae L_2 and L_3 much shorter than the distances between their bases and the bases of the setae following next 34

Setae L_2 and L_3 longer than the distances between their bases and the bases of the setae following next 22

22. Seta L_2 clearly shorter than seta L_3 23

Seta L_2 equal or almost equal in length to seta L_3 ..... teke Pritchard & Baker

23. Spermatheca short and bulged .....
..... transvaalensis (v.d. Merwe & Ryke)

Spermatheca long and slender .....
..... tutsi Pritchard & Baker

24. Seta L_3 longer than the distance between its base and the base of seta L_4 32

Seta L_3 shorter or equal to but not longer than the distance between its base and the base of seta L_4 25

25. Seta D_1 shorter than seta L_4 26

Setae D_1 and L_4 equal in length .....
..... raptor (v.d. Merwe & Ryke)

26. Seta/.....

26. Seta L_2 shorter than seta L_1 27

Setae L_2 and L_1 equal in length .....
..... natalensis spec. nov.

27. Seta D_1 shorter than seta L_1 30

Setae D_1 and L_1 equal in length 28

28. Metapodal plates present 29

Metapodal plates absent .....
..... anneckei (v.d. Merwe & Ryke)

29. Seta L_4 the longest seta on the dorsal shield ..... citri (v.d. Merwe & Ryke)

Seta L_9 the longest seta on the dorsal shield ...
..... plebeius spec. nov.

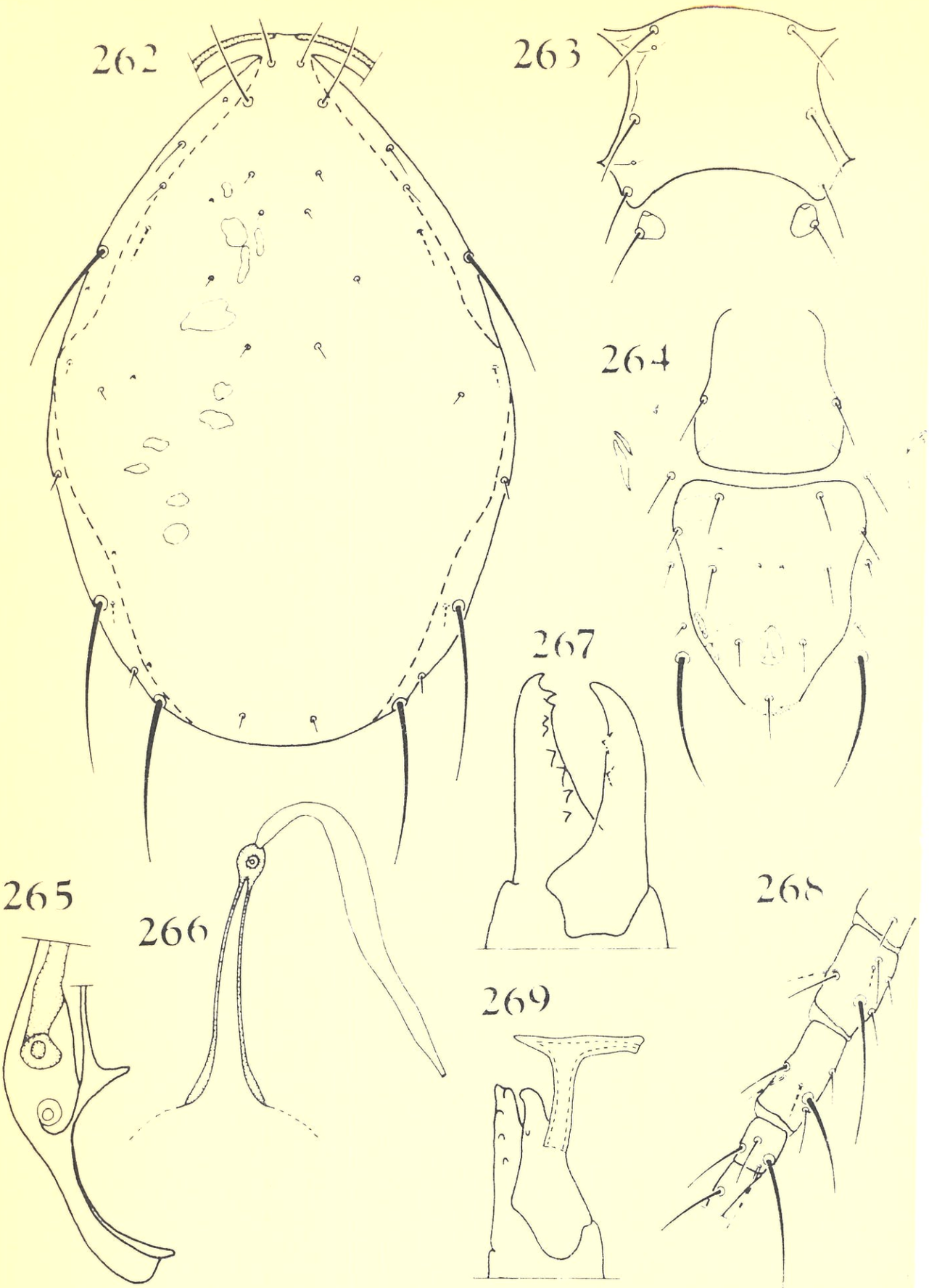
30. Seta L_3 slightly shorter than or equal in length to the distance between its base and the base of seta L_4 31

Seta L_3 equal in length to half the distance between its base and the base of seta L_4 ....
..... pafuriensis spec. nov.

31. Posterior margins of lateral lobes of sternal shield smooth .....
..... addoensis (v.d. Merwe & Ryke)

Posterior margins of lateral lobes of sternal shield with small lobes .....
..... undulatus (v.d. Merwe & Ryke)

32. Seta/.....



FIGS. 262-269. Amblyseius (Amblyseius) pascuus spec. nov.

Fig.262, dorsum, female; fig.263, sternal shield, female; fig.264, posterior ventral surface, female; fig.265, peritrematal shield, female; fig.266, spermatheca, female; fig.267, chelicera, female; female; fig.268, leg IV, female; fig.269, chelicera, male.

32. Seta L_2 equal to or longer than the distance between its base and the base of seta L_3 33

Seta L_2 much shorter than the distance between its base and the base of seta L_3 .... capensis (v.d. Merwe & Ryke)

33. Setae D_2, L_5 and M_2 shorter than the respective distances between their bases and the bases of seta D_3, L_6 and L_8 .... erugatus (v.d. Merwe & Ryke)

Setae D_2, L_5 and M_2 equal in length to the respective distances between their bases and the bases of setae D_3, L_6 and L_8 .... prolixus spec. nov.

34. Ventri-anal shield oblong; laterally constricted 35

Ventri-anal shield triangular .... ovalitectus spec. nov.

35. Cervix of spermatheca long and tubelike .... neolargoensis spec. nov.

Cervix of spermatheca short, disclike .... anomalus spec. nov.

Amblyseius (Amblyseius) pascuus spec. nov.

(Figs. 262-269)

A.(A.) pascuus closely resembles A. oregonensis (Garman). Judging from the illustrations of the latter species by Garman (1958) and subsequently by Chant (1959b), seta D_1 is shorter than or equal in

length/.....

length to seta L_2, strong platelets lie between the genital and ventri-anal shields and the pores on the ventri-anal shield are widely spaced and somewhat caudad of the posterior pair of pre-anal setae. A.(A. pascuus differs from A. oregonensis in all these respects and also in the shape of the ventri-anal shield, the latter being more clearly triangular in A.(A.) pascuus than in A. oregonensis.

Female: Dorsum (Fig. 262): The strongly convex dorsal shield measures 353 μ in length and 235 μ in width and is smooth but for some dorsomedian rugose patches and six pairs of small pores. The shield bears 16 pairs of setae, arranged as follow: five dorsal (seta in D_5 position is absent), two median, four prolateral and five postlateral. These setae measure in length: D_1, 26 μ; D_2, D_3 and M_1, 7 μ; D_4, D_5 and L_5, 9 μ; M_2, 90 μ; L_1, 44 μ; L_2, 22 μ; L_3, 15 μ; L_4, 71 μ; L_6, L_7 and L_8, 12 μ and L_9, 83 μ. The majority of the setae are thus minute or very short. Seta L_3 is two-thirds as long as seta L_2. Seta D_1 equals in length the distance between its base and the base of seta L_1. The latter and seta M_2 are longer than the distances between their respective bases and the bases of setae L_2 and L_9. Setae M_2 and L_9 are faintly serrated and the former, slightly longer than the latter, is the longest seta on the dorsal shield.

Seta S_1, 24 μ long, and seta S_2, 16 μ long, are on the dorsal interscutal membrane. These setae are shifted underneath the dorsal shield due to the pressure of the cover glass on the strongly convex shield.

The peritrematal/.....

The peritrematal shields are fused anterodorsally to the dorsal shield. The peritremes terminate very nearly anterior to the bases and setae D_1.

Venter: The sternal shield (fig. 263), length 61 μ and breadth 74 μ, bears three pairs of setae. The anterior margin of the shield is slightly convex but the posterior margin is strongly concave causing the shield to be broader than long. Sternal seta IV are placed on large metasternal shields.

The genital shield (fig. 264) is 82 μ wide and provided with the normal pair of setae.

The triangular ventri-anal shield (fig. 264) is mildly imbricated and has a slightly concave anterior margin and rounded anterolateral corners. The shield measures 123 μ in length and 102 μ in width and bears three pairs of widely spaced pre-anal setae. A pair of small, closely placed pores is present on the same level as the posterior pair of pre-anal setae. The para-anal setae are normal.

The ventral interscutal membrane bears four pairs of setae; the caudal pair being long, 74 μ. Two pairs of metapodal plates are present on the membrane.

The peritrematal shield (fig. 265) is fused posteriorly with the exopodal plate and ends posterior to coxa IV with a rounded posterior margin and a short medially directed anterior lobe.

Spermatheca (fig. 266): The major duct of the spermatheca is thin walled, tubelike and very long, measuring 38 μ. The atrium is bulbous, 5 μ in length,

with small/.....

with small lips located at its centre. The cervix is long, 28 μ, and thick walled but rather slender. The lateral margins of the cervix gradually diverge towards the vesicle. The latter could not be distinguished.

Chelicera (fig. 267): The fixed digit, length 23 μ is provided with eight sharp teeth along its inner margin. A pilus dentilis could not be discerned. The movable digit, length 28 μ, bears two teeth on its inner margin.

Legs: The chaetotaxy of the legs is normal. Leg IV (fig. 268) bears three macrosetae, measuring 66 μ on the genu, 49 μ on the tibia and 66 μ on the basitarsus.

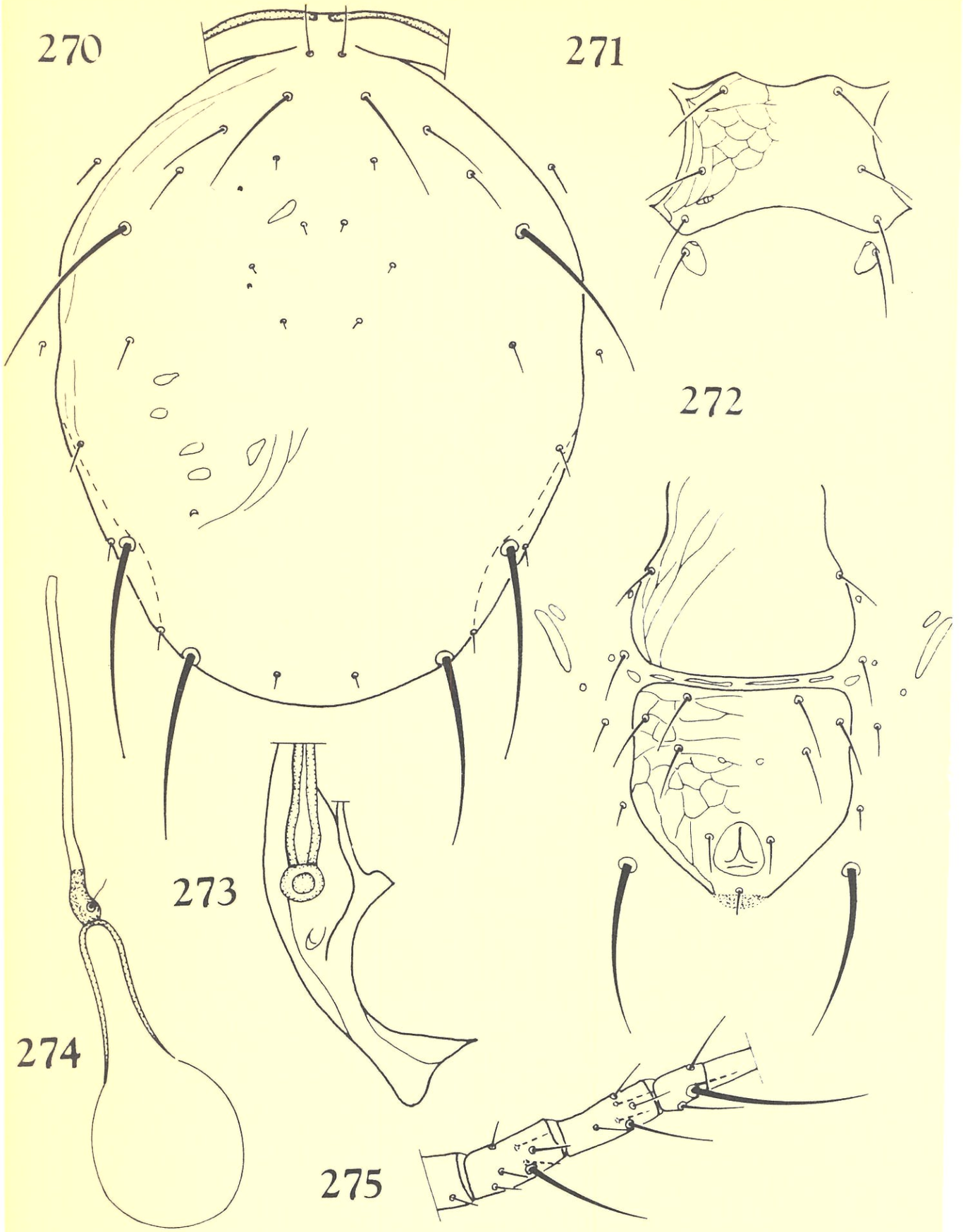
Male: Dorsum: The dorsal shield measures 265 μ in length and approximately 165 μ in width (the lateral margins are folded). The dorsal chaetotaxy of the male resembles that of the female. The setae are however relatively shorter than in the female; D_1, 21 μ; D_2, D_3, D_4, D_5, M_1 and L_5, 5 μ; M_2, 56 μ, L_1, 28 μ; L_2, 15 μ; L_3, 10 μ; L_4, 44 μ; L_6, L_7 and L_8, 8 μ and L_9, 52 μ.

Seta S_1, 18 μ long, is on the dorsal shield. The position of seta S_2, 12 μ in length, could not be determined due to the folded lateral margins of the dorsal shield.

The peritrematal shields are fused anterolaterally to the dorsal shield and the peritremes terminate anterior to setae D_1.

Venter: The genitosternal shield is normal with five pairs of setae and the genital opening on its anterior margin.

The ventri-anal/.....



FIGS. 270-275. Amblyseius (Amblyseius) peltatus spec. nov. female

Fig.270, dorsum; fig.271, sternal shield; fig.272, posterior ventral surface; fig.273, peritrematal shield; fig.274, spermatheca; fig.275, leg IV.

The ventri-anal shield is triangular and bears three pairs of pre-anal setae and a pair of very small pores on the same level as the posterior pair of pre-anal setae. Para-anal setae are normal. The shield is somewhat folded and distorted and an illustration thereof is not worthwhile.

Chelicera (fig. 269): The chelicera is illustrated in an oblique position. The fixed digit bears four teeth. A pilus dentilis could not be discerned.

The movable digit bears a single tooth on its inner margin and a T-shaped spermatophoral process on its ventral surface. The horizontal bar of the T measures 18 µ in length and one extremity is sharp but the other longer extremity is slightly knobbed distally.

Legs: The legs resemble the legs of the females in having normal chaetotaxy. The three macrosetae on leg IV measure 34 µ on the genu, 26 µ on the tibia and 48 µ on the basitarsus.

Material studied: ♀-Holotype (serial no. AcY 66/257/1) and ♂-allotype from soil covered with Eragrostis curvula, Potchefstroom (Tvl.) 1963 (L.J. Erasmus).

Amblyseius (Amblyseius) peltatus spec. nov.

(Figs. 270-275)

A.(A.) peltatus closely resembles A. ovatus (Garman) in most of its characters. However it differs from the latter in having seta L_9 much longer than seta L_1. Judging from the original drawing made by Garman and the redescription of A. ovatus by Schuster & Pritchard,/.....

Pritchard, these setae are approximately equal in length in the latter species. The posterior extremity of the peritrematal shield differs markedly in these two species; in A.(A.) peltatus it is strongly lobed posteriorly whereas it is smooth in A. ovatus.

A.(A.) peltatus also resembles A. rotundus (Muma) in many respects, but differs from the latter in having seta L_1, L_4, L_9 and M_2 relatively longer and setae L_5 and L_6 equal in length. It further differs from A. rotundus in the imbrications on the dorsal shield of the latter which are almost absent in A.(A.) peltatus.

This species has all its shields and plates strongly sclerotized.

Female: Dorsum (fig. 270): Dorsal shield broadly ovate, length 358(-362) μ and breadth 313(-294) μ, covering the whole idiosoma. The shield is smooth but for faint anterolateral imbrications, a few dorsomedian rugose patches and three pairs of pores. The shield is provided with 16 pairs of setae arranged as follows: five dorsal (seta in D_5 position is absent), two median, four prolateral and five postlateral. These setae measure in length: D_1 and L_3, 28(30) μ; D_2, D_3 and M_1, 6 μ; D_4, D_5, L_7 and L_8, 9-13 μ; L_5 and L_6, 21(19) μ; M_2, 122 μ; L_1, 66 μ; L_2, 45(-43) μ; L_4 and L_9, 105(-110) μ. Seta M_2 is the longest seta on the dorsal shield. Setae L_4 and L_9 are equal in length and slightly shorter than seta M_2. Seta L_1 in length exceeds the distance between its base and the base of seta L_2 and is equal or almost equal to the distance between its base and the base of seta L_3. Seta L_2 is

longer than/.....

longer than the distance between its base and the base of seta L_3, but the latter is shorter than the distance between its base and the base of seta L_4.

Setae S_1 and S_2, 20 μ and 10 μ long respectively, are on the dorsal interscutal membrane.

The broad peritrematal shields are fused anteriorly to the dorsal shield and the peritremes meet each other anterior to setae D_1.

Venter: The anteriorly and posteriorly concave sternal shield (fig. 271) is much broader, 82(78-84) μ, than long, 48(52) μ. The shield is imbricated and bears three pairs of sternal setae. Sternal setae IV are placed on large metasternal shields.

The broad, 115(111-) μ, laterally imbricated genital shield (fig. 272) bears the normal pair of genital setae.

The ventri-anal shield (fig. 272), as long as wide, 115(110-) μ, is equal in width to the genital shield. The former is imbricated and bears three pairs of long pre-anal setae and a pair of pores medially and just caudal to the posterior pair of pre-anal setae. The anterior margin of the shield is slightly concave with round lateral corners. The lateral margins are also slightly concave but reach posteriorly only for half the length of the shield. Thence the lateral margins are tapered to a point caudal to the anus. The para-anal setae are normal but shorter than the pre-anal setae.

The interscutal membrane bears four pairs of setae, decreasing posteriorly in length, except for the caudal pair which is very long, 93(89-) μ. Between the

genital/.....

genital and ventri-anal shields are four oblong plates and lateral four round to oval platelets in addition to the two pairs of metapodal plates.

The peritrematal shield is fused posteriorly with the exopodal plate (fig. 273) and terminates, caudomedial to coxa IV, with a distinct posterior lobe and a sharp point medially.

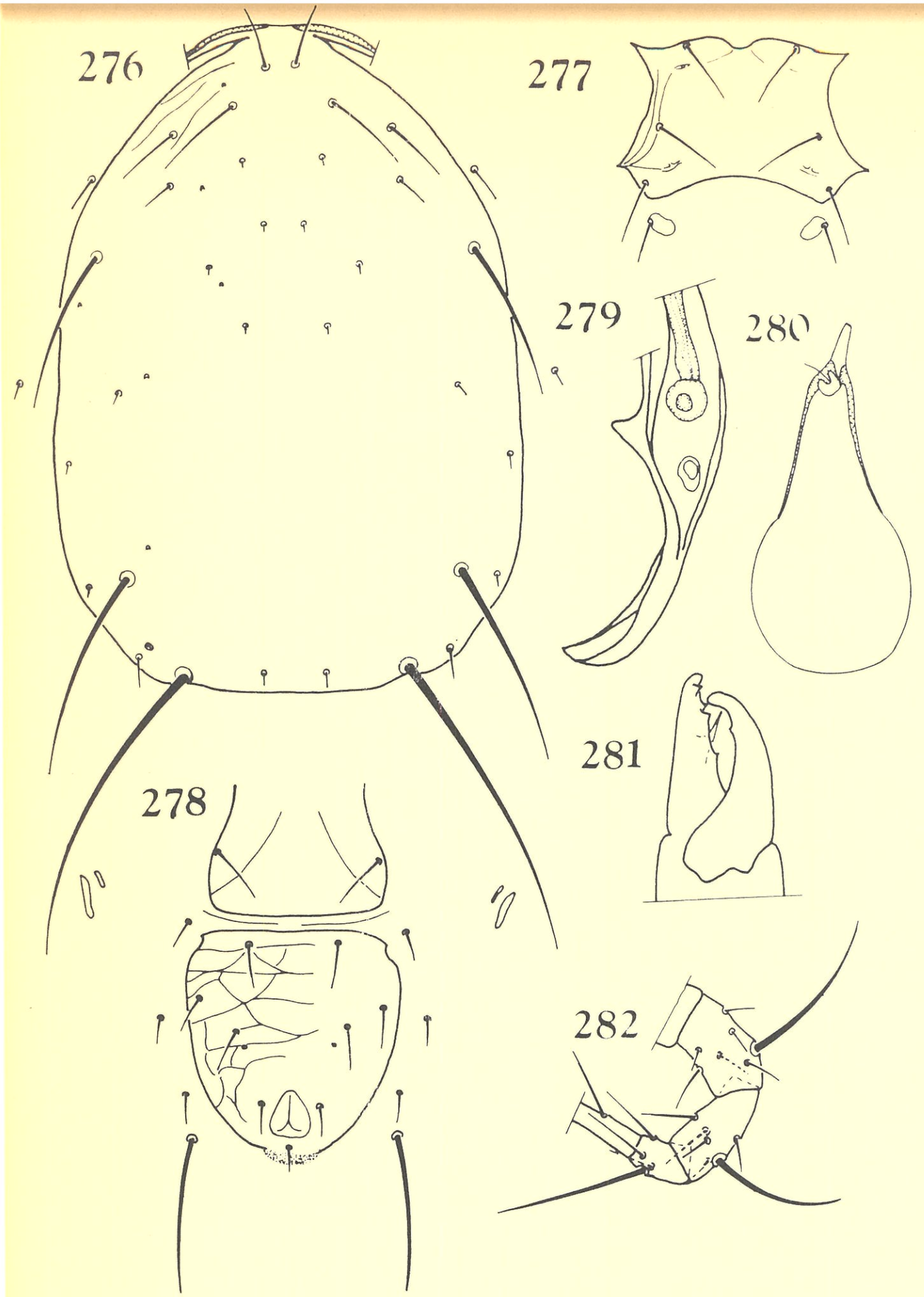
Spermatheca (fig. 274): The major duct of the spermatheca is very long, 47(-51) µ, and like a slender tube. The atrium is narrow but slightly bulged across the very small lips and is discernible due to its dark appearance. The cervix is elongated, bell-shaped, 24 µ long and 6 µ wide, and thick walled. The rim of the bell towards the vesicle is 10 µ in diameter.

Chelicerae: The position of the chelicerae renders an illustration thereof worthless. The movable digit, however, is 35 µ in length and bears at least one tooth. The fixed digit is 33 µ in length and bears not less than five teeth.

Legs: Leg III bears a macroseta on the genu, 33 µ in length. Leg IV (fig. 275) bears three macrosetae, measuring 66 µ on the genu, 45 µ on the tibia and 90 µ on the basitarsus. The other setae are relatively short. The chaetotaxy of the legs is normal.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/258/1) and one ♀-paratype from Verronia ampla, Tzaneen (Tvl.) 19.II.1965 (M.K.P. Meyer). One ♀-paratype from an unidentified shrub, Tzaneen (Tvl.) 25.II.1964 (G.G. v.d. Merwe)./.....



FIGS. 276-282. Amblyseius (Amblyseius) apheles spec. nov., female

Fig.276, dorsum; fig.277, sternal shield; fig.278, posterior ventral surface; fig. 279, peritrematal shield; fig.280, spermatheca; fig.281, chelicera; fig.282, leg IV.

(G.G. v.d. Merwe).

Amblyseius (Amblyseius) apheles spec. nov.

(Figs. 276-282)

This species is closely related to A. lindquisti Schuster & Pritchard. The following characters however distinguish A.(A.) apheles from A. lindquisti: seta L_8 being not minute, the spermatheca being more strongly flared towards the vesicle, the fixed digit of the chelicera bearing four teeth and the peritremes terminating anterior to the base of setae D_1.

Female: Dorsum (fig. 276): The broadly oval dorsal shield, length 392(383-) μ and breadth 289(280-) μ is smooth but for faitn anterolateral imbrications and seven pairs of pores. The pair of pores just anterior to seta L_8 are large compared to the other pair which are very small. The shield bears 16 pairs of setae, arranged as follows: five dorsal (seta in D_5 position is absent), two median, four prolateral and five postlateral. These setae measure in length: D_1, 36(33-) μ; D_2, D_3, D_4 and M_1, 5-8 μ; D_5, L_5, L_6 and L_7, 10(-12) μ; M_2, 140(130-) μ; L_1, 56(54-) μ; L_2, 45(40-) μ; L_3 and L_8, 22(20-) μ; L_4, 102(95-) μ and L_9, 20(193-) μ. Setae L_1 and L_2 are longer than the distances between their respective bases and the bases of the setae following next in the series. The other setae are much shorter. Setae D_1, L_4 and M_2, however, are longer than the distances between their respective bases and the bases of seta L_1, L_5 and L_9. The latter is twice as long as seta L_4 and seta L_2 is twice as long as seta L_3.

Seta/.....

Seta S_1, length 22(20-) μ, and seta S_2, length 10(-12) μ, are on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally to the dorsal shield and the peritremes reach anterior to the bases of setae D_1.

Venter: The sternal shield (fig. 277) is broader, 87 μ, than long, 65 μ, with a concave posterior margin and a medially indented anterior margin. The shield bears three pairs of setae. Sternal setae IV are situated on big oval metssternal shields.

The genital shield, width 100 μ, (fig. 278) is normal and bears a pair of setae.

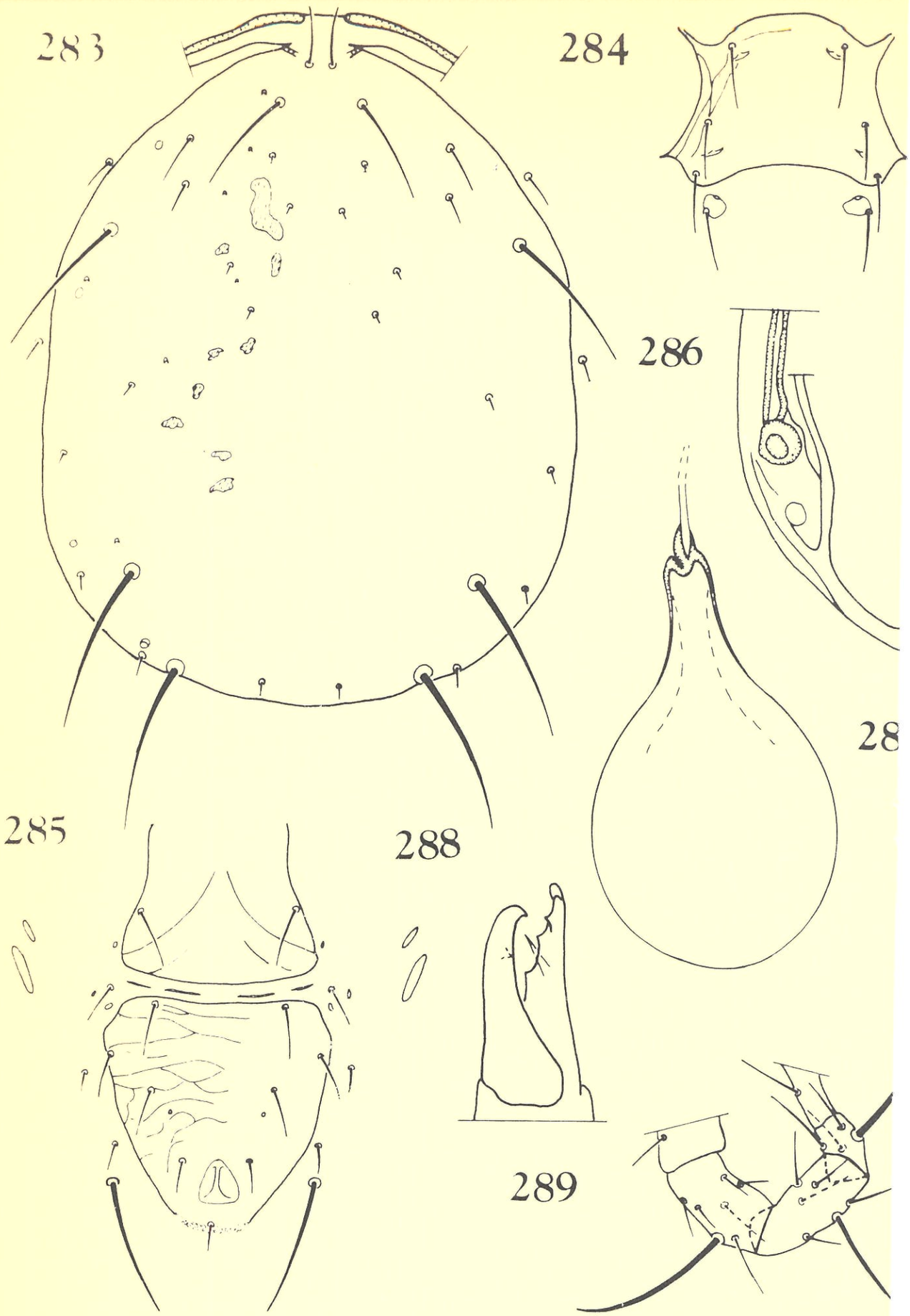
The imbricated triangular ventri-anal shield (fig. 278), length 130 μ and breadth 120(115-) μ, has a straight anterior margin and somewhat convex lateral margins. The lateral anterior corners are notched. The shield bears three pairs of widely spaced pre-anal setae and a pair of small pores just caudomedial to the caudal pair of setae. The normal three para-anal setae are present.

The ventral interscutal membrane bears four pairs of setae, the caudal pair (VL_1) being very long, 90 μ. The membrane is also provided with two pairs of oblong metapodal shields. Between the genital and ventri-anal shields are two long slender platelets.

The peritrematal shield fuses with the exopodal plate (fig. 279) and curves posteriorly around coxa IV ending medially in a sharp point.

Spermatheca (fig. 280): The bell-shaped spermatheca, length 19 μ, has a straight short major duct. The atrium

and the/.....



FIGS. 283-289. Amblyseius (Amblyseius) eurynotus spec. nov., female

Fig.283, dorsum, fig.284, sternal shield; fig.285, posterior ventral surface; fig.286. peritrematal shield; fig.287, spermatheca; fig.288, chelicera; fig.289, leg IV.

and the lips are incorporated in the broad cervix. The latter, 19 µ long, diverges slightly towards the vesicle.

Chelicera (fig. 281): The fixed digit, length 32 µ, bears four teeth and a pilus dentilis. Three of these teeth are subapical and one is proximal to the pilus dentilis. The movable digit, length 36 µ, bears a single tooth on its inner margin.

Legs: Leg IV (fig. 282) is provided with three long macrosetae. The one on the genu is 90 µ long, on the tibia 73 µ and on the basitarsus 77 µ. The chaetotaxy of the legs is normal, except for genu II being of the VIII-type.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/259/1) and one ♀-paratype (on the same slide) from Populus sp., Stellenbosch (C.P.) 12.I.1955 (P.A.J. Ryke).

Amblyseius (Amblyseius) eurynotus spec. nov.

(Figs. 283-289)

In general appearance A.(A.) eurynotus bears a resemblance to A. asetus (Chant). It can, however, be easily distinguished from the latter in having a triangular ventri-anal shield and the cervix of the spermatheca being not very broad.

Female: Dorsum: (fig. 283): The broad ovate dorsal shield is 372(367-) µ long and 282(276-) µ wide. The shield is smooth but for three small circular rugose

patches/.....

patches laterally, some larger median ones and nine pairs of scattered pores. The anterior pair of these pores is lyriform and the posterior pair is large in comparison to the remaining small pores. The shield is provided with 16 pairs of setae, distributed as follows: five dorsal (seta in D_5 position is absent), two median, four prolateral and five postlateral. These setae measure in length: D_1, 30(-33) μ; D_2, D_3, D_4 and M_1, 5 μ; D_5, L_5 and L_6, 8(-10) μ; M_2 and L_9, 94(-100) μ; L_1, 61(-64) μ; L_2, 28(-30) μ, L_3, 19(-21) μ; L_4, 85(-90) μ; L_7, 10(-12) μ and L_8, 14(-15) μ. Setae D_1, L_1, L_2 and M_2 are longer than the respective distances between their bases and the bases of setae L_1, L_2, L_3 and L_9. Seta L_4 is slightly shorter than the distance between its base and the base of seta L_5. Seta D_1 is almost equal in length to seta L_2, and seta L_3 is two thirds of the length of the latter seta. The other setae are minute or very short.

Seta S_1 and S_2, 19 μ and 12 μ long respectively, are placed on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally to the dorsal shield and the peritremes reach almost anterior to the bases of setae D_1.

Venter: The sternal shield (fig. 284) is broader, 74 μ, than long, 65 μ, and bears three pairs of setae. The anterior margin is convex and the posterior margin is concave. Sternal setae IV are placed on large metasternal shields.

The genital shield (fig. 285) is broad, 102(-104) μ, and provided with a pair of setae.

The triangular/.....

The triangular ventri-anal shield (fig. 285) length 120(-124) μ and width 116(-120) μ, has an almost straight anterior margin and oblique anterolateral corners. The tapered lateral margins are slightly convex. The shield is imbricated and provided with three well spaced pre-anal setae. A pair of small pores lie caudomedial to the posterior pair of pre-anal setae. Para-anal setae are normal.

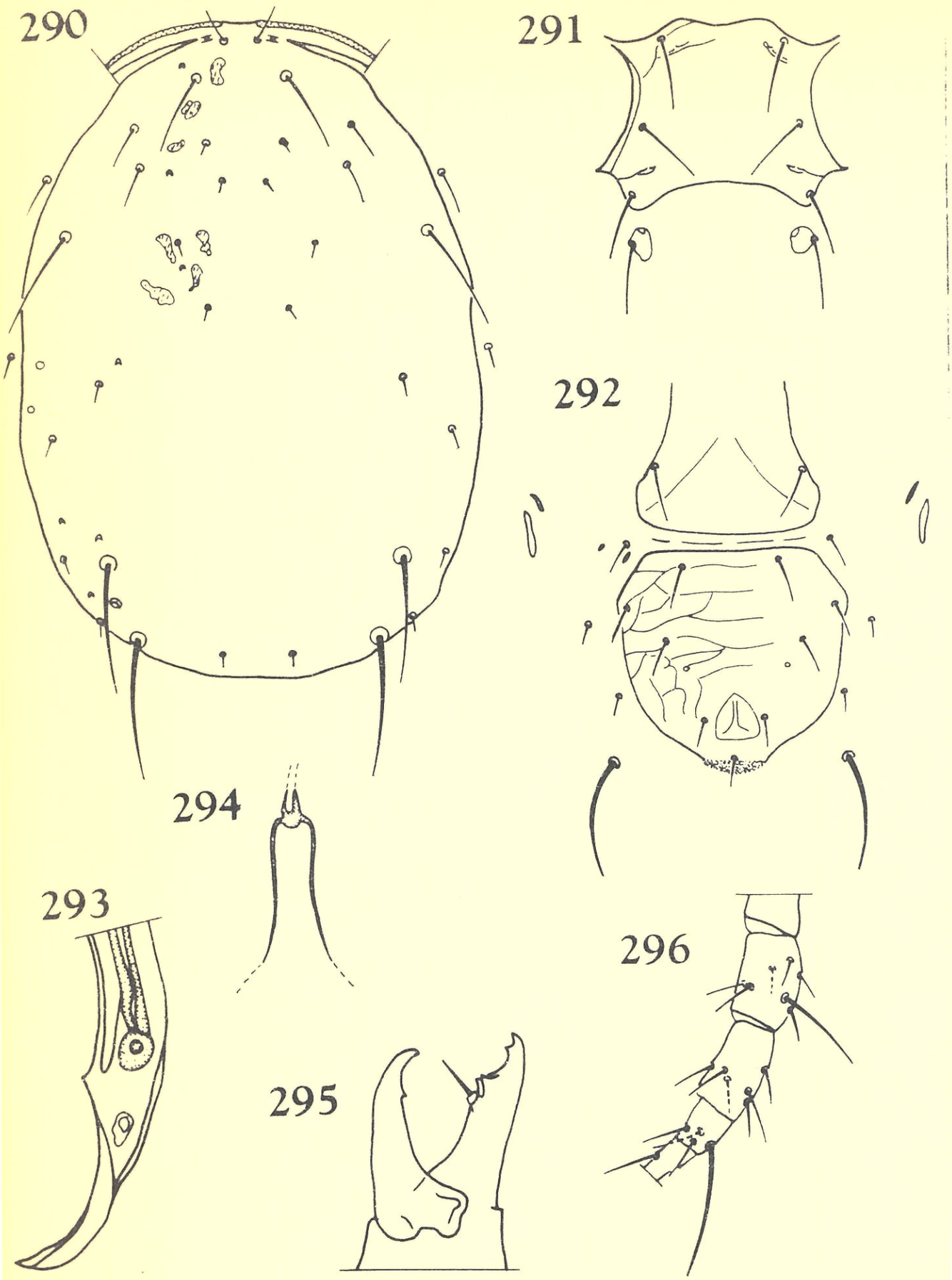
The ventral interscutal membrane bears four pairs of setae, the caudal pair being long, 76(-80) μ. Between the genital and ventri-anal shields are four slender platelets with, laterally, three small circular platelets. Two pairs of metapodal plates are present caudal to coxae IV.

The peritrematal shield is fused posteriorly with the exopodal plate (fig. 286). The portion posterior to coxa IV is slender and terminates in a sharp point directed medially.

Spermatheca (fig. 287): The major duct is thin walled and could not be followed along its whole length. The atrium measures 6 μ in length, but approximately half of its length, including the lips, is incorporated in the cervix. The broad cervix, 18 μ long, is slightly flared towards the large vesicle.

Chelicera (fig. 288): The fixed digit of the chelicera, in a somewhat oblique position, is 33 μ long and bears four teeth and a pilus dentilis on its inner margin. The movable digit, length 33 μ, bears a single tooth.

Legs:/.....



FIGS. 290-296. Amblyseius (Amblyseius) chilosus spec. nov., female

Fig.290, dorsum; fig.291, sternal shield; fig.292, posterior ventral surface; fig.293, peritrematal shield; fig.294, spermatheca; fig.295, chelicera; fig.296, leg IV.

Legs: The chaetotaxy of the legs is normal, except for genu II which is of the VIII-type. Leg IV (fig. 289) bears three macrosetae, measuring 66 μ on the genu, 52 μ on the tibia and 74(70-) μ on the basitarsus.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/260/1) from Medicago sativa, Potchefstroom (Tvl.) April 1956 (P.A.J. Ryke) and one ♀-paratype from grass, Potchefstroom (Tvl.) 20.X.1954 (P.A.J. Ryke).

Amblyseius (Amblyseius) chilosus spec. nov.

(Figs. 290-296)

A.(A.) chilosus is related to A.(A.) eurynotus and A. asetus. It differs from the latter in having the cervix of the spermatheca more slender and in the triangular shape of the ventri-anal shield. It differs from A.(A.) eurynotus in having seta M_2 slightly shorter than seta L_8 and the fixed digit of the chelicera bearing only three teeth. A.(A.) chilosus also differs from both species in having setae L_2 and L_3 equal in length.

Female: Dorsum (fig. 290): The ovate dorsal shield, length 376(-388) μ and breadth 247(240-) μ, is smooth but for two small circular lateral and some larger dorsomedian rugose patches. There are eight pairs of pores on the shield; the anterior pair of pores is lyriform and the posterior pair is much larger than the remainder small ones. The shield bears 16 pairs of setae, distributed on the shield as follows: five dorsal (seta in D_5 position is absent), two median,

four/.....

four prolateral and five postlateral. These setae measure in length: D_1, 23 μ; D_2, D_3, D_4, D_5, M_1, L_7 and L_8, 9 μ; L_5 and L_6, 12 μ; M_2, 70(-72) μ; L_1, 44 μ; L_2 and L_3, 25 μ; L_4, 64 μ and L_9, 80(-83) μ. Setae L_1 and L_2 are equal in length to the respective distances between their bases and the bases of setae L_2 and L_3. The latter two setae are equal in length. Setae D_1 and L_4 are clearly shorter, and seta M_2 is much longer, than the respective distances between their bases and the bases of setae L_1, L_5 and L_9. The latter seta is the longest seta on the dorsal shield. The remaining seta are minute or very short.

Setae S_1 and S_2, 21(-23) μ and 14(-15) μ long respectively, are placed on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally to the dorsal shield and the peritremes terminate anterior to the bases of setae D_1.

Venter: The broad sternal shield (fig. 291), length 60(-63) μ and width 70(-72) μ, has a slightly concave anterior margin. The lateral margins are more strongly concave than the posterior margin. The shield bears three pairs of setae. Sternal seta IV are placed on large metasternal shields.

The genital shield (fig. 292) bears the normal pair of setae and measures 97(-93) μ in width.

The imbricated subtriangular ventri-anal shield (fig. 292), length and breadth 117(-120) μ, has a straight anterior margin and oblique anterolateral corners. The tapered lateral margins are strongly

convex./.....

convex. The shield bears three pairs of well spaced pre-anal setae and a pair of pores caudomedial to the posterior pair of setae. Para-anal setae are normal.

The ventral interscutal membrane is provided with four pairs of setae; VL_1 is long and measures 74(-70) μ. Between the genital and ventri-anal shields are four slender platelets with two small oval pairs of platelets laterally. Two pairs of metapodal plates are present caudal to coxa IV.

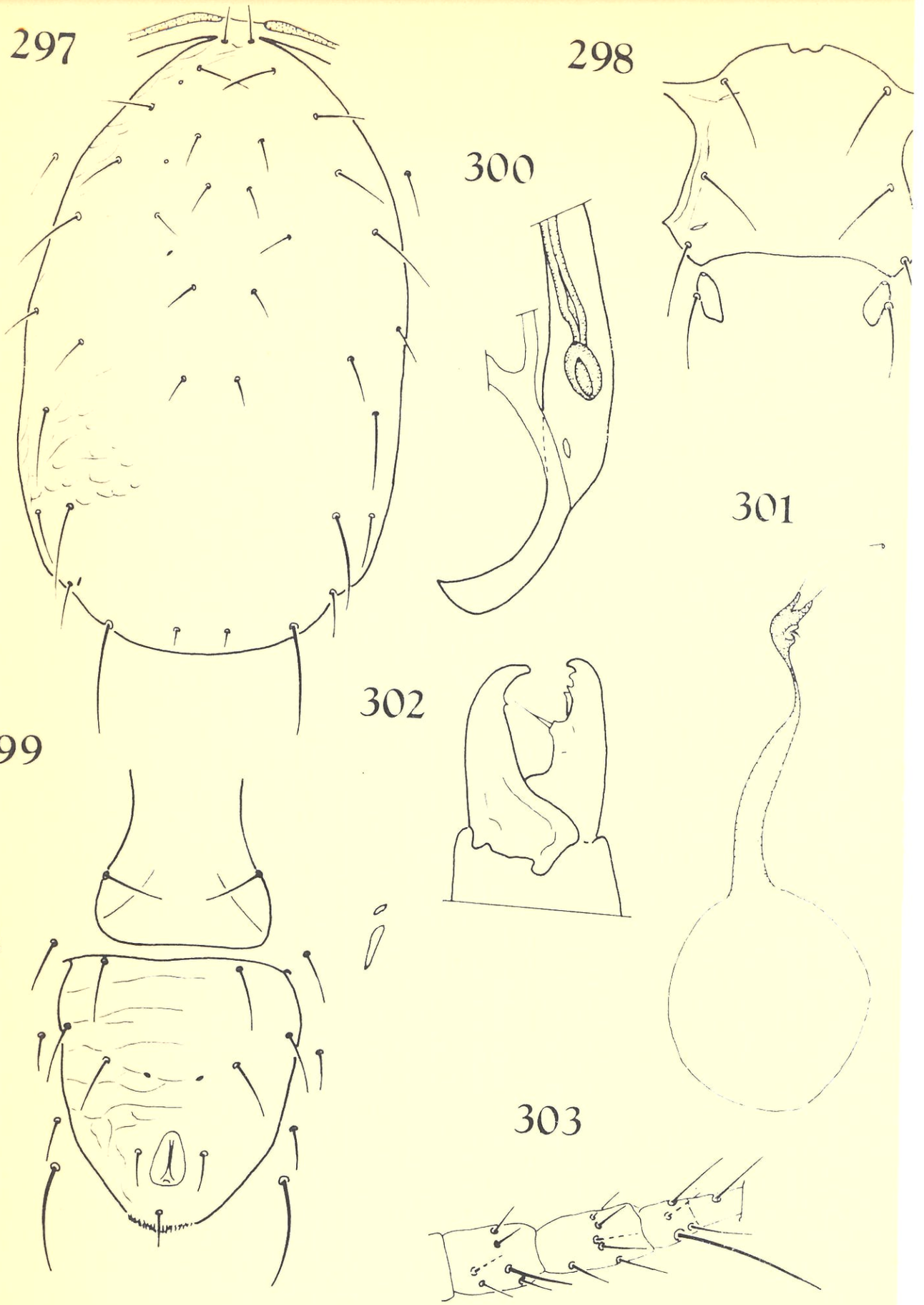
The peritrematal shield (fig. 293) is fused posteriorly with the exopodal plate and terminates in a sharp point medially.

Spermatheca (fig. 294): The major duct is slender and very thin walled. Being therefore obscure, its length could not be determined. The atrium is 6 μ long, and one third is incorporated in the cervix. Lips could not be distinguished. The cervix is relatively broad, 6 μ, and tubelike. It is 18 μ long. The vesicle is obscure.

Chelicera (fig. 295): The fixed digit, length 28 μ, bears three sharp teeth and a pilus dentilis on the distal half of its inner margin. The proximal two teeth are paired. The movable digit, length 31 μ, bears a single recurved tooth on its inner margin.

Legs: The chaetotaxy of the legs is normal, except for genu II which is of the VIII-type. The genu and basitarsus of leg IV (fig. 296) each bear a macroseta respectively 49 μ and 68 μ long. The macroseta on the tibia, 28 μ long, is not much longer than the other setae on the segment.

Male:/.....



FIGS. 297-303. Amblyseius (Amblyseius) scapilatus spec. nov., female

Fig.297, dorsum; fig.298, sternal shield; fig. 299, posterior ventral surface; fig.300, peritrematal shield; fig.301, spermatheca; fig.302, chelicera; fig.303, leg IV.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/261/1) and one ♀-paratype from grass, Potchefstroom (Tvl.) 20.X.1954. (P.A.J. Ryke).

Amblyseius (Amblyseius) scapilatus spec. nov.

(Figs. 297-303)

This species closely resembles Amblyseius umbraticus (Chant), but can easily be distinguished from the latter by having seta M_2 approximately equal to seta L_9 in length, the genital shield being much narrower than the ventri-anal shield and by having seta S_2 on the dorsal shield. It also resembles A. collyerae (Chant) but can be separated from the latter by having setae L_7 and L_8 longer and subequal in length.

Female: Dorsum (fig. 297): The mildly imbricate dorsal shield, length 326(322-336) μ and breadth 205(190-210) μ, bears 17 pairs of setae. The lengths of these setae are: D_1, D_2, D_3, D_4, D_5 and M_1, 21(18-22) μ; D_6, 13(10-14) μ; M_2, 61(58-64) μ; L_1, L_2, L_3 and L_7, 33(30-34) μ; L_4, 46(44-48) μ; L_5, 27(25-28) μ; L_6, 42(40-44) μ; L_8, 23(22-26) μ; and L_9, 64(62-68) μ. Although the setae are of moderate length, none reaches to the bases of consecutive setae. Seta M_2 is paired with seta L_7 and reaches well beyond the base of seta L_8.

Seta S_1, 25(24-27) μ long, is on interscutal membrane and seta S_2, 23(22-25) μ long, is on the dorsal shield anterior to seta L_5.

The peritrematal/.....

The peritrematal shields fuse anterodorsally with the dorsal shield. The peritreme reaches anteriorly to the level of seta L_1.

Venter: Sternal shield (fig. 298), length and breadth 73(70-74) μ, bears three pairs of sternal setae. Sternal setae IV on elongate oval metasternal shields, Genital shield, width 77(75-80) μ, normal with a pair of setae.

The triangular mildly imbricate ventrianal shield (fig. 299), length 120(112-122) μ and breadth 106(100-108) μ, has a straight anterior margin. Three pairs of widely spaced pre-anal setae and a pair of pores are placed on the anterior half of the shield.

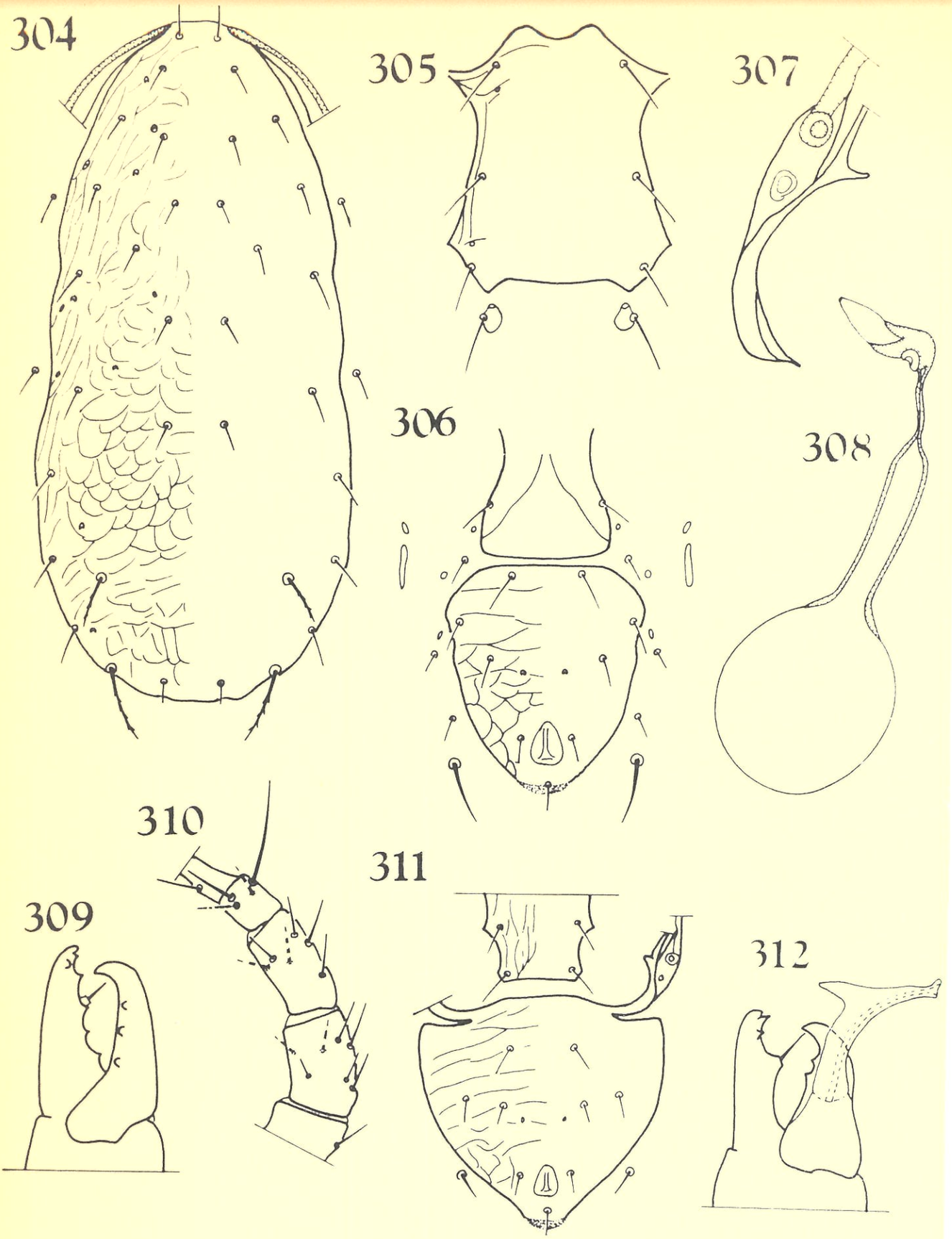
The ventral interscutal membrane is provided with four pairs of setae, VL_1 being 53(50-55) μ long, and two pairs of metapodal plates. The secondary pair lies anterior to the primary pair.

The peritrematal shield fuses posteriorly with the exopodal plate (fig. 300) and terminates posterior to coxa IV in a rounded posterior margin and a sharp point anteromedially.

Spermatheca (fig. 301): The long spermatheca, 47 μ in length, has a wide faint major duct and a swollen bifid atrium with the lips close to the cervix. The cervix is constricted for one-fourth of its length adjacent to the atrium.

Chelicera (fig. 302): The fixed digit, length 28 μ, bears three subapical teeth and a pilus dentilis. The movable digit, length 33 μ, bears a single denticle.

Legs:/.....



FIGS. 304-312. Amblyseius (Amblyseius) exiguus spec. nov. Fig.304, dorsum, female; fig.305, sternal shield, female; fig.306, posterior ventral surface, female; fig.307, peritrematal shield, female; fig.308, spermatheca, female; fig.309, chelicera, female; fig.310, leg IV, female; fig.311, posterior ventral surface, male; fig.312, chelicera male.

Legs: The chaetotaxy of the legs is normal. Leg IV (fig. 303) bears a macroseta on the genu, length 33(32-36) µ and one on the basitarsus, length 68(66-70) µ. The setae on the tibia are normal.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 64/78/1) and on ♀-paratype from Prunus persica, Potchefstroom (Tvl.) 20.IV.1954 (P.A.J. Ryke). One ♀-paratype from Ficus sp., Potchefstroom (Tvl.) 21.IV.1954 (P.A.J. Ryke), three ♀-paratypes from an unidentified plant, Potchefstroom (Tvl.) March, April and May 1954 (P.A.J. Ryke), one ♀-paratype from Malvacea sp., Potchefstroom (Tvl.) 19.IV.1954 (P.A.J. Ryke) and one ♀-paratype from an unidentified plant, Ladysmith (Natal) 18.I.1956 (P.A.J. Ryke).

Amblyseius (Amblyseius) exiguus spec. nov.

(Figs. 304-312)

A.(A.) exiguus is unique amongst related species in having the following combination of characters: Dorsal shield long and slender, the setae on the shield short but seta M_2 equal to the distance between its base and the base of seta L_8, ventri-anal shield triangular, first portion of the cervix of the spermatheca very slender and the fixed digit of the chelicera multidentate. A. aurescens Athias-Henriot is probably the closest relative of A.(A.) exiguus but differs from the latter in the relatively shorter length of seta M_2 and in having only two minute

subapical/.....

subapical teeth on the fixed digit of the chelicera.

Female: Dorsum (fig. 304): The long, 339(320-) μ, and narrow, 162(153-) μ, dorsal shield is mildly imbricated with 11 pairs of pores. The shield bears 17 pairs of aciculate setae, arranged as follows: six dorsal, two median, four prolateral and five postlateral. These setae measure in length: D_1, D_2, D_3, D_4, D_5 and M_1, 13(-16) μ; D_6, 11(-12) μ; L_1, L_2, L_3 and L_5, 17(-19) μ; M_2, 28(-30) μ; L_4, L_6, L_7 and L_8, 21(-23) μ and L_9, 42(-44) μ. All these setae are thus short and reach to less than half the distances between their respective bases and the bases of the setae following next in the series. Seta M_2 is serrated and equals in length the distance between its base and the base of seta L_8. Seta L_9, also serrated, is the longest seta on the dorsal shield.

Setae S_1 and S_2, 17(-19) μ in length, are on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally to the dorsal shield and the peritremes reach anterolaterally to the bases of setae D_1.

Venter: The sternal shield (fig. 305) is longer, 76(-79) μ, than broad, 54(-56) μ, and bears three pairs of sternal setae. The anterior margin of the shield is anteriorly indented and the posterior margin is straight with two small lateral lobes. Sternal setae IV are placed on prominent oval metasternal shields.

The genital shield (fig. 306) is normal with a pair of setae but much narrower, width 65(63-) μ, than

the ventri-anal/....

the ventri-anal shield.

The ventri-anal shield (fig. 306), length 119(112-) μ and breadth 97(94-) μ, is triangular with a straight anterior margin but oblique towards the lateral pair of pre-anal setae. The imbricated shield bears three pairs of well spaced pre-anal setae and a pair of pores medial and just caudal to the posterior pair of pre-anal setae. Para-anal setae normal.

The ventral interscutal membrane is provided with four pairs of setae; the caudal pair being long, 33(-35) μ. Three pairs of platelets in addition to the two pairs of metapodal plates are also present on the membrane.

The peritrematal shield fuses posteriorly with the exopodal plate (fig. 307) and ends caudomedial to coxa IV with a sharp point.

Spermatheca (fig. 308): The long spermatheca has a short, 6 μ, and broad major duct. The bulged difid atrium, length 8 μ, has the lips close to the cervix. The latter, 30 μ long, is for one third of its length very slender, then suddenly broadens to become tubelike. The cervix is thick walled and abruptly flared before it joins the vesicle.

Chelicera (fig. 309): The fixed digit of the chelicera, at a somewhat oblique angle, measures 27 μ in length and is provided with six teeth spread along its inner margin and a pilus dentilis. The movable digit, length 30 μ, bears three well spaced teeth on its inner margin.

Legs:/.....

Legs: The chaetotaxy of the legs is normal. Only the basitarsus of leg IV (fig. 310) bears a macroseta, 42 μ in length.

Male: Dorsum: The dorsal shield is 279(276-) μ long and 141(-148) μ wide and the chaetotaxy resembles that of the female. The lengths of the setae are: D_1, D_2, D_3, D_4, D_5, M_1, L_1, L_2, L_3, L_5 and L_8, 13(-15) μ; D_6, 9 μ; M_2, 26(-28) μ; L_4, L_6 and L_7, 17(-18) μ and L_9, 33(-35) μ.

Setae S_1 and S_2, 14 μ in length, are on the dorsal shield.

The peritrematal shields are broadly fused anterolaterally with the dorsal shield. The peritremes reach anterolaterally to the bases of setae D_1.

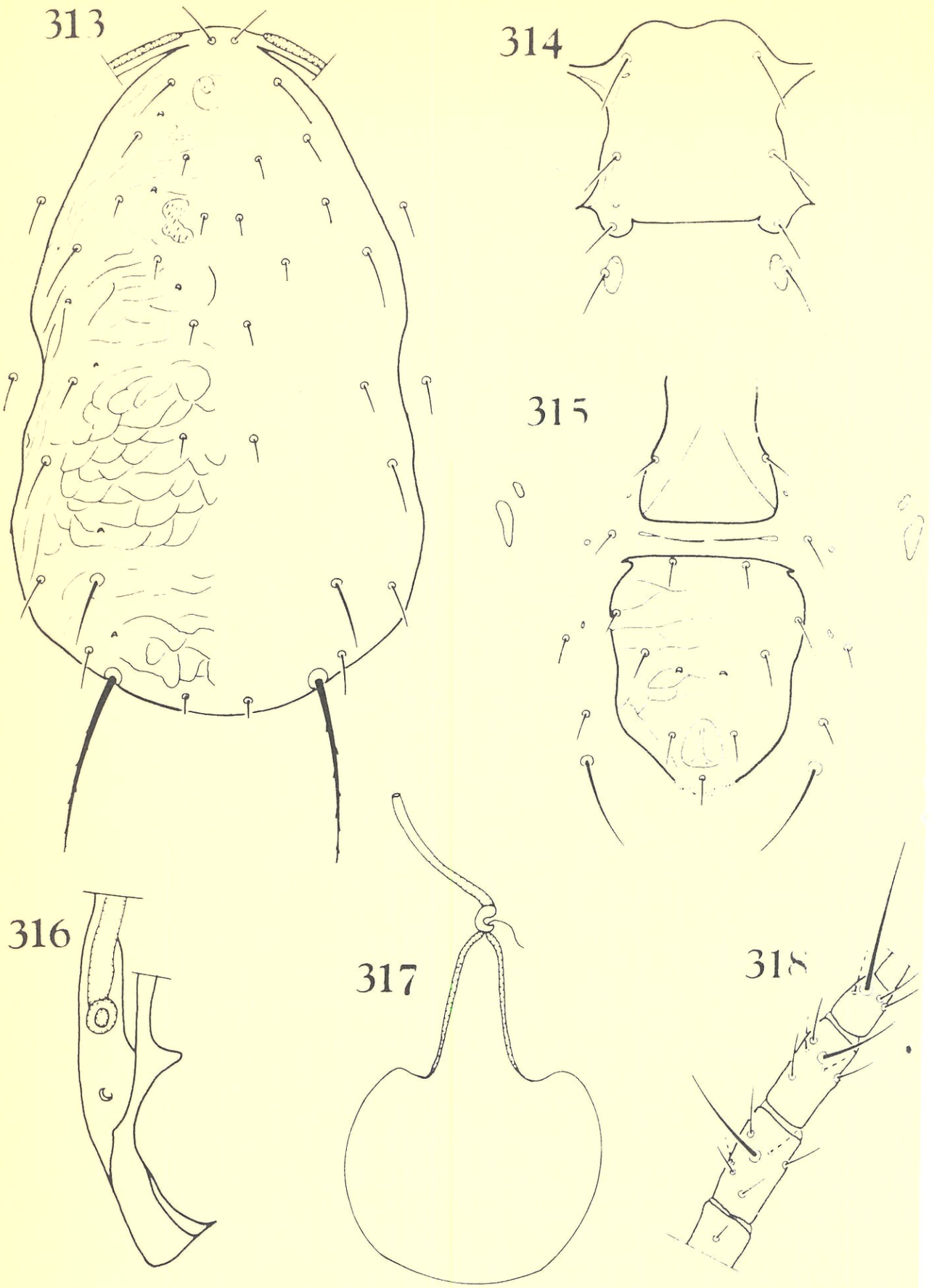
Venter: The genitosternal shield is mildly imbricated and bears five pairs of setae. The genital opening is on the anterior margin of this shield.

The triangular ventri-anal shield (fig. 311), length 95 μ and width 118 μ, is mildly imbricated. The anterolateral corners are free but the peritrematal shields are fused medially to the anterior margin. The shield bears three pairs of pre-anal setae and a pair of pores. Para-anal setae are normal.

The ventral interscutal membrane bears a single pair of caudal setae, 16 μ in length.

Chelicera (fig. 312): The fixed digit, length 18 μ, bears two subapical teeth and a pilus dentilis. The movable digit is provided with two teeth and a spermatophoral bearer. The latter is T-shaped, with

the dorsal/....



FIGS. 313-318. Amblyseius (Amblyseius) krugeri spec. nov., female

Fig.313, dorsum; fig.314, sternal shield; fig.315, posterior ventral surface; fig.316, peritrematal shield; fig.317, spermatheca; fig.318, leg IV.

the dorsal process sharp and shorter than the ventral one. The ventral process is distally provided with a small knob.

Legs: Chaetotaxy of the legs is normal. Leg IV bears a macroseta, length 33(-35) μ, on the basitarsus.

Material studied: ♀-Holotype (serial no. AcY 66/262/1) ♂-allotype and two ♀-paratypes from soil, Potchefstroom (Tvl.) October 1962 (G.C. Loots).

Amblyseius (Amblyseius) krugeri spec. nov.

(Figs. 313-318)

A.(A.) krugeri resembles A. kennetti Schuster & Pritchard in many respects. It differs however from the latter in having seta L_9 more than twice as long as seta M_2 and in having tibia IV provided with a macroseta.

Female: Dorsum (fig. 313): The mildly imbricated dorsal shield, length 369 μ and width 218(-221) μ, has a few median rugose patches on the proscutum and seven small scattered pairs of pores. The shield bears 17 pairs of setae, arranged on the shield as follows: six dorsal, two median, four prolateral and five postlateral. These setae measure in length: D_1 and L_7, 26(24-) μ, D_2, D_3 and M_1, 10(9-) μ; D_4 and D_6, 12 μ; D_5, L_1 and L_2, 15(13-) μ; M_2, 40(38-) μ; L_1 and L_6, 29(27-) μ; L_4, 33 μ; L_5, 18(16-) μ; L_8, 23(21-) μ and L_9, 105(102-) μ. The setae on the dorsal shield are thus short, except for setae M_2 and L_9. Seta L_8, although short, is the only seta which

is longer/.....

is longer than the distance between its base and the base of the setae following next in the series. Seta M_2 is equal in length to the distance between its base and the base of seta L_8. Seta L_9, faintly serrated, is the longest seta on the dorsal shield and is at least four-fifths as long as the distance between its base and the base of the other seta L_9.

Setae S_1 and S_2, both 19 μ long, are placed on the dorsal interscutal membrane.

The narrow peritrematal shields are fused anteriorly with the dorsal shield. The peritremes terminate lateral to the bases of setae D_1.

Venter: The sternal shield (fig. 314), length 78(-81) μ and breadth 67(-69) μ, has a medially indented anterior margin. The posterior margin is straight except for two small, posteriorly rounded, lateral lobes. The shield bears three pairs of setae; the third pair are on these lateral lobes. Sternal setae IV are present on oval metasternal shields.

The genital shield (fig. 115) is 74 μ wide and has a straight posterior margin and the normal pair of setae.

The oblong, imbricated, ventri-anal shield (fig. 315), length 126 μ and width 104(-106) μ, bears three pairs of well spaced pre-anal setae. A pair of pores is present medial and slightly posterior to the level of the third pair of setae. These pores are more closely spaced than the bases of the first pair of pre-anal setae. Para-anal setae are normal. The anterior margin of the shield is straight and

slightly/.....

slightly extended beyond the anterolateral corners of the shield, forming small lateral projections. The anterolateral corners are otherwise rounded. The lateral margins are slightly constricted anterior to the anus.

The ventral interscutal membrane is provided with four pairs of setae. The caudal pair is long, measuring 52(48-) µ. Between the genital and ventri-anal shields are four slender platelets in a line with three small circular platelets laterally. Caudal to coxae IV are two pairs of metapodal plates.

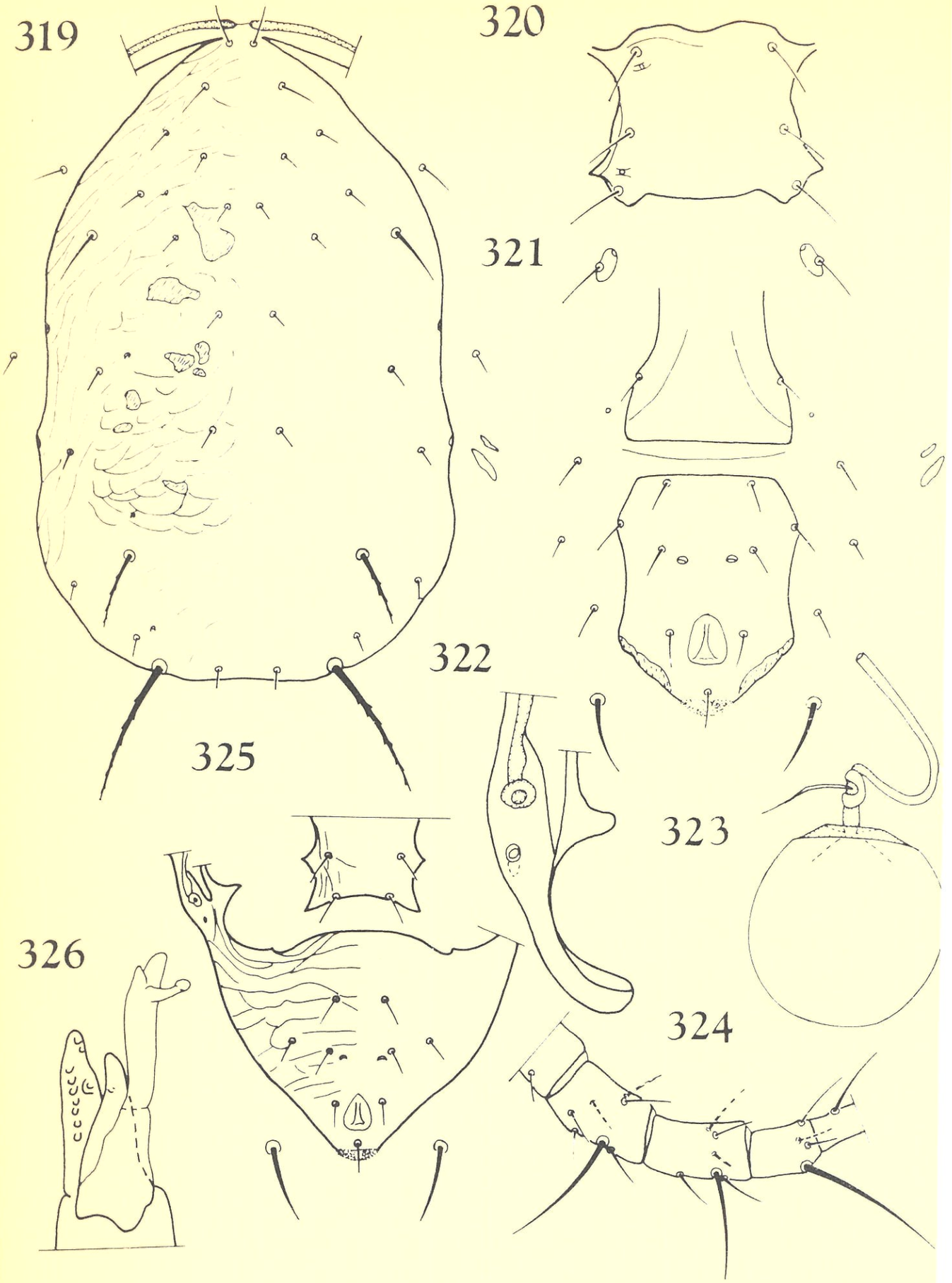
The peritrematal shield (fig. 316) is overlapped posteriorly by and fused to the exopodal plate. This fused plate terminates posterior to coxa IV in a rounded posterior margin and a sharp anteromedially directed point.

Spermatheca (fig. 317): The slender, tubelike, major duct is 15 µ long. The atrium is fully occupied by the lips, 3 µ long. The lips are clearly distinguishable from the major duct and the cervix. The latter is bell-shaped and 17 µ long. The lateral margins of the cervix are abruptly flared where they meet the large vesicle.

Chelicerae: The chelicerae are impossible to examine due to their position.

Legs: The chaetotaxy of the legs is normal, except for genu II being of the VIII-type. Leg IV (fig. 318) bears three macrosetae measuring in length, 47 µ on the genu, 40 µ on the tibia and 75 µ on the basitarsus.

Male: /.....



FIGS. 319-326. Amblyseius (Amblyseius) culmulus spec. nov. Fig.319, dosrum, female; fig.320, sternal shield, female; fig.321, posterior ventral surface, female; fig. 322, peritrematal shield female; fig.323, spermatheca, female; fig.324, leg IV, female; fig.325, posterior ventral surface, male; fig.326, chelicera, male.

Male: Unknown.

Material studied: ♀-Holotype (serial No. AcY 66/263/1) and one ♀-paratype from Ficus sycomorus, Malambane, Kruger National Park (Tvl.) 4.X.1963 (G.G. v.d. Merwe).

Amblyseius (Amblyseius) culmulus spec. nov.

(Figs. 319-326)

A.(A.) culmulus, A. scyphus Schuster & Pritchard and A.(A.) insignitus spec. nov. are unique in having setae L_1 and L_2 shorter than the respective distances between their bases and the bases of setae L_2 and L_3 and the cervix of the spermatheca very short and disc-like. A.(A.) culmulus differs from these species in having an oblong ventrianal shield, leg IV with three macrosetae and the disclike cervix of the spermatheca joined to the atrium by a short stalk.

Female: Dorsum (fig. 319): The dorsal shield, length 355 μ and breadth 235 μ, is mildly imbricated with some dorsomedian rugose pathes and six pairs of pores. Two pairs of these pores are on the lateral margins of the shield. The shield is laterally slightly bulged at the position of the posterior pair of these pores. The shield bears 17 pairs of setae, arranged as follows: six dorsal, two median, four prolateral and five postlateral. These setae measure in length: D_1, 21 μ; D_2, D_3, D_4, D_6, M_1, L_6, L_7 and L_8, 11 μ, D_5, L_5, L_2 and L_3, 15 μ; M_2, 44 μ; L_1, 24 μ; L_4, 38 μ and L_9, 82 μ. All the dorsal setae are thus short, except for setae L_4, M_2 and L_9 which are moderately long.

None of/....

None of these setae are equal to or longer than the distances between their respective bases and the bases of the setae following next in the series. Seta L_4, however, equals the distance between its base and the base of seta L_3. The serrated seta M_2 almost equals in length the distance between its base and the base of seta L_8. Seta L_9 is also serrated and is the longest seta on the dorsal shield.

Setae S_1 and S_2, 19 μ and 15 μ long respectively, are on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes almost meet each other anteromedial to the bases of setae D_1.

Venter: The sternal shield (fig. 320) is equal in length and width, 65 μ, and bears three pairs of setae. The anterior margin of the shield is medially slightly indented. The posterior margin is almost straight with small lateral lobes. Sternal setae IV are placed on large oval metasternal shields.

The genital shield (fig. 321) is normal, width 85 μ, and provided with a pair of setae.

The ventri-anal shield (fig. 321), length 115 μ and breadth 90 μ, with lateral margins slightly concave and angular opposite the anus where they meet the tapered posterior margins. The anterior margin is straight, but deflects laterally towards the lateral pair of pre-anal setae. The shield is provided with three pairs of well spaced pre-anal setae and a pair of big pores caudomedial to the third pair of setae.

The normal/....

The normal para-anal setae are present.

Lateral to the ventri-anal shield are four pairs of setae on the membrane. The caudal pair is long, 39 μ. Two pairs of metapodal plates are present caudal to coxae IV.

The peritrematal shield (fig. 322) fuses with the exopodal plate and ends caudomedially obtuse.

Spermatheca (fig. 323): The spermatheca has a long, 26 μ, narrow major duct and the big lips, 5 μ x 3 μ, completely occupy the atrium. The cervix resembles a hollow disc, 12 μ in diameter, joined at its centre to the lips by a short stalk. The minor duct is exceptionally clearly visible in this specimen.

Chelicerae: Due to their position, a worthwhile drawing could not be made of the chelicerae. The fixed digit however is provided with eight teeth and a pilus dentilis and the movable digit has three teeth.

Legs: Leg IV (fig. 324) bears three long macrosetae. The lengths of these setae are: 54 μ on the genu, 45 μ on the tibia and 66 μ on the basitarsus. Leg III is also provided with one macroseta on the genu and one on the tibia, measuring 33 and 30 μ long respectively, as are the genus of legs I and II, the setae being 33 μ and 30 μ long respectively. The chaetotaxy of the legs is normal.

Male: Dorsum: The dorsal shield is 289 μ long and 192 μ wide and its chaetotaxy resembles that of the female. The lengths of these setae are: D_1, 23 μ,

D_2, D_3,/.....

D_2, D_3, D_4, D_6, M_1, L_5, L_6, L_7 and L_8, 10 μ; D_5, L_2 and L_3, 14 μ; M_2, 40 μ; L_1, 28 μ; L_4, 33 μ and L_9, 62 μ. Seta S_1, 19 μ long, is on the dorsal shield and one of the pair of S_2, 15 μ long, is on the dorsal shield and the other on the interscutal membrane.

The peritrematal shields are broadly fused anteriorly to the dorsal shield. The peritremes terminate wider apart than in the female, well anterolateral to setae D_1.

Venter: The genitosternal shield is normal with the genital opening on its anterior margin.

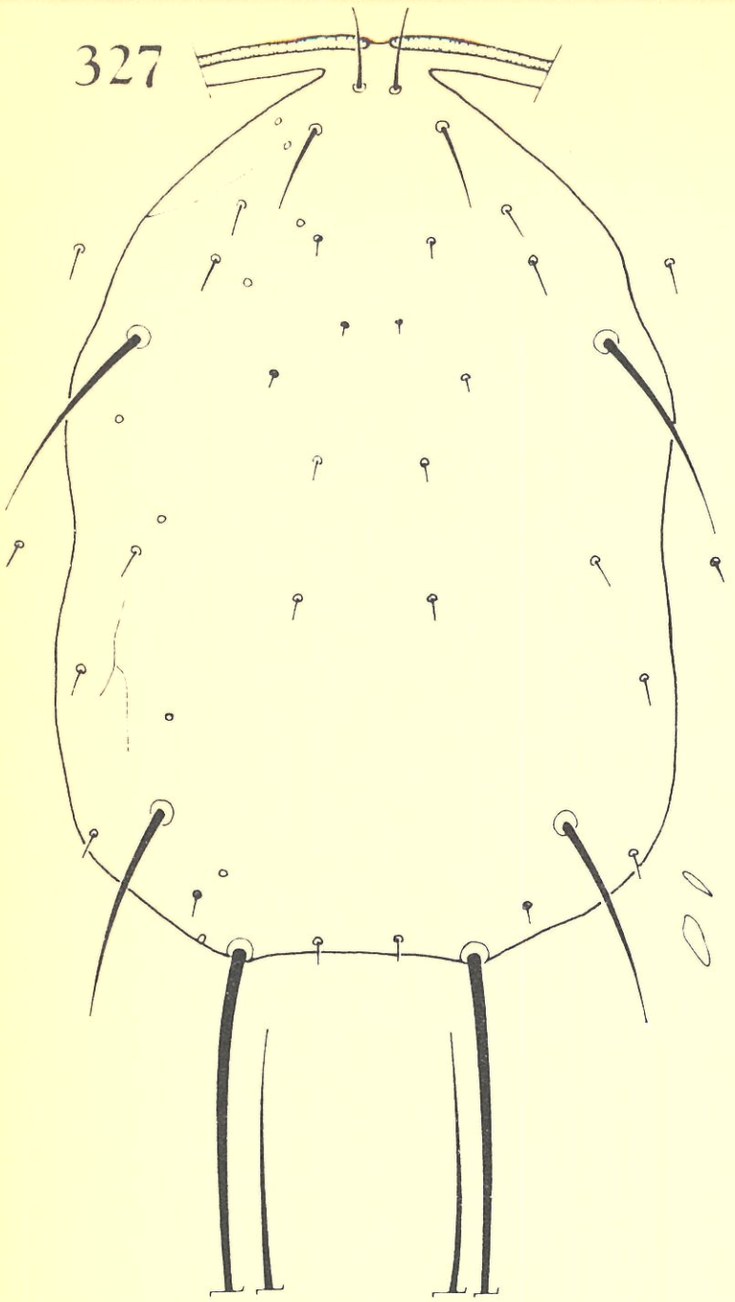
The triangular ventri-anal shield (fig. 325), length 115 μ and breadth 90 μ, is lightly imbricated and bears three pairs of setae. Just caudomedial to the inner posterior pair of these setae are a pair of pores. Para-anal setae are normal. The anterolateral corners of the shield are fused to the peritrematal shields and exopodal plates.

The interscutal membrane bears a single pair of caudolateral setae, 39 μ in length.

Chelicera (fig. 326): The fixed digit, 20 μ long, bears eight teeth and a pilus dentilis on its inner margin. The movable digit, 20 μ long, bears a single tooth and a spermatophoral bearer. The latter measures 20 μ in length and is distally bilobed. A slender knobbed process, 6 μ long, arise perpendicular to the main axis at the base of the two distal lobes.

Legs: The chaetotaxy of the legs is normal. The

macrosetae/.....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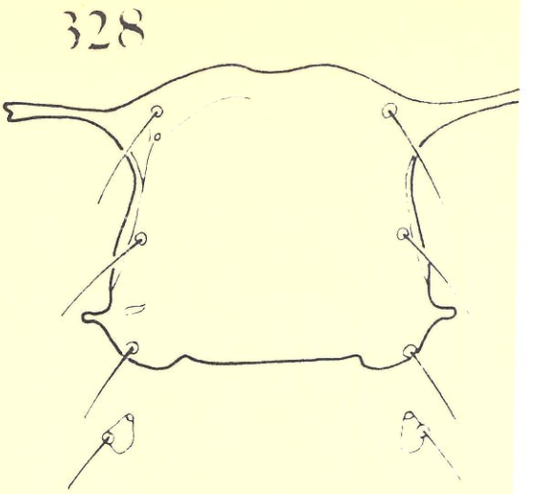
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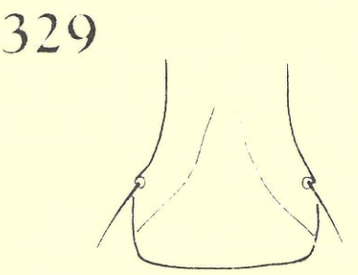
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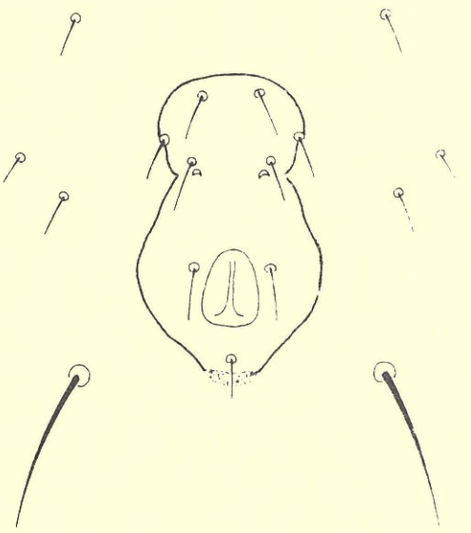

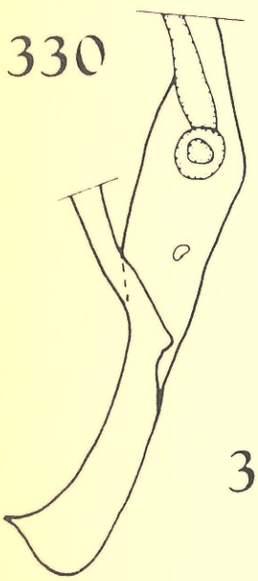
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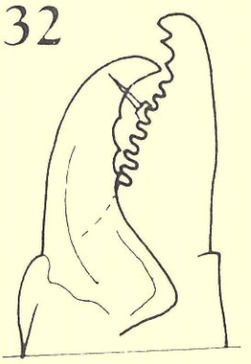
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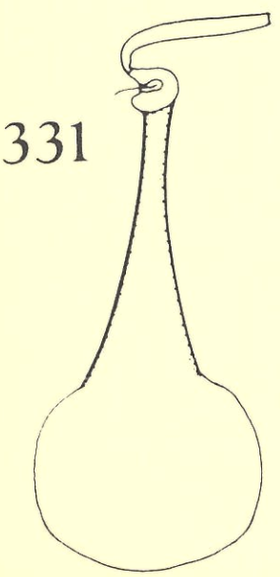
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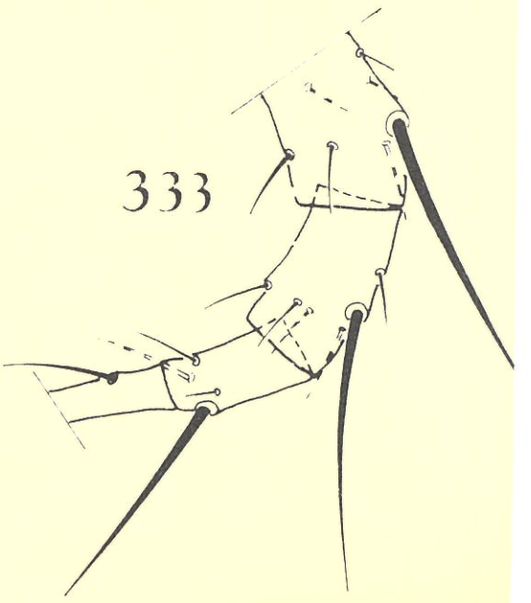

333

macrosetae present on the legs measure in length: genu III, 24 μ; tibia III, 24 μ; basitarsus III, 24 μ; genu IV, 42 μ; tibia IV, 36 μ and basitarsus IV, 62 μ.

Material studied: ♀-Holotype (serial no. AcY 66/264/1) and ♂-allotype from unidentified plant, Munster (Natal) 15.IV.1955 (P.A.J. Ryke).

Amblyseius (Amblyseius) largoensis (Muma), comb. nov.

(Figs. 327-333)

Amblyseiopsis largoensis Muma, 1955, Ann. ent. Soc. Am. 48: 266; Garman, 1958, Ann. ent. Soc. Am. 51: 76.

Amblyseius largoensis (Muma); Ehara, 1959, Acarologia 1: 293; Ehara, 1961, Annot. Zool. jap. 34: 96; Ehara, 1962, Jap. J. appl. Ent. Zool. 6:54; Schuster & Pritchard, 1963, Hilgardia 34: 237.

Typhlodromus (Amblyseius) largoensis (Muma); Chant 1959b, Can. Ent. 91: (suppl. 12): 96; Swirski, 1960, Bull. nat. Univ. agric., Rehovot, No. 32; Swirski & Shechter, 1961, Ktavim 11: 38; Swirski & Amitai, 1961, Ktavim 11: 196.

Figs. 327-333. Amblyseius (Amblyseius) largoensis (Muma), female.

Fig. 327, dorsum; fig. 328, sternal shield; fig. 329, posterior ventral surface; fig. 330, peritrematal shield; fig. 331, spermatheca; fig. 332, chelicera; Fig. 333, leg IV.

Amblyseius (Amblyseialus) largoensis (Muma); Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 287; Muma, 1964, Fla agric. Exp. Stn., Tech. Bull. 685: 22.

A.(A.) largoensis resembles A.(A.) schusteri (Chant) and A.(A.) aerialis (Muma). It differs from the former in having the atrium of the spermatheca of greater diameter than the adjoining portion of the cervix. A.(A.) largoensis differs from A.(A.) aerialis in having the ventri-anal shield sharply constricted posterior to the pre-anal setae.

Female: Dorsum (fig. 327): The dorsal shield, length 380-390 μ and breadth 260-280 μ, is practically smooth with nine pairs of pores. The shield bears 17 pairs of setae, arranged as follows: six dorsal, two median, four prolateral and five postlateral. These setae measure in length: D_1, 36-39 μ; D_2, D_3, D_4, D_5, M_1 and L_8, 7-10 μ; M_2 and L_4, 96-100 μ; L_1, 40-43; L_2, L_3, L_5, L_6 and L_7, 13-16 μ and L_9, 250-260 μ. All the setae, except L_1 and L_4, are shorter than the respective distances between their bases and the bases of the setae following in the same series. Setae L_1 and L_4 are equal or almost equal in length to the respective distances between their bases and the bases of setae L_2 and L_5. Setae D_1 and M_2 are longer than the respective distances between their bases and the bases of setae L_1 and L_9. The latter seta is approximately two-thirds of the length of the dorsal shield. The remaining setae are very short or minute.

Setae S_1, 13-16 μ long, and S_2, 8-10 μ long, are present/....

present on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes terminate anterior to the bases of setae D_1.

Venter: The sternal shield (fig. 328) is slightly longer, 80-84 μ, than broad, 75-78 μ, and bears three pairs of setae. The posterior margin of the shield is almost straight but for two small lateral lobes. Sternal setae IV are placed on metasternal shields.

The genital shield, width 70-74 μ, is normal with a pair of setae.

The ventri-anal shield (fig. 329) measures 112-118 μ in length and bears three pairs of widely spaced pre-anal setae and a pair of pores close to the posterior pair of pre-anal setae. The lateral margins of the shield are strongly constricted in the region of the pre-anal pores. The pre-anal portion of the shield is 54-58 μ wide and the anal portion 70-74 μ wide across the anus. The para-anal setae are normal.

The ventral interscutal membrane bears three pairs of [illegible] setae and a longer caudal pair, 60-65 μ long. Two pairs of metapodal plates are present on the membrane.

The peritrematal shield (fig. 330) is posteriorly overlapped by and fused to the exopodal plate. The shield terminates posterior to coxa IV with a rounded posterior margin and a sharp median point.

Spermatheca (fig. 331): The major duct is poorly sclerotized and narrow. The atrium is bulbous,

5 μ x 6 μ,/.....

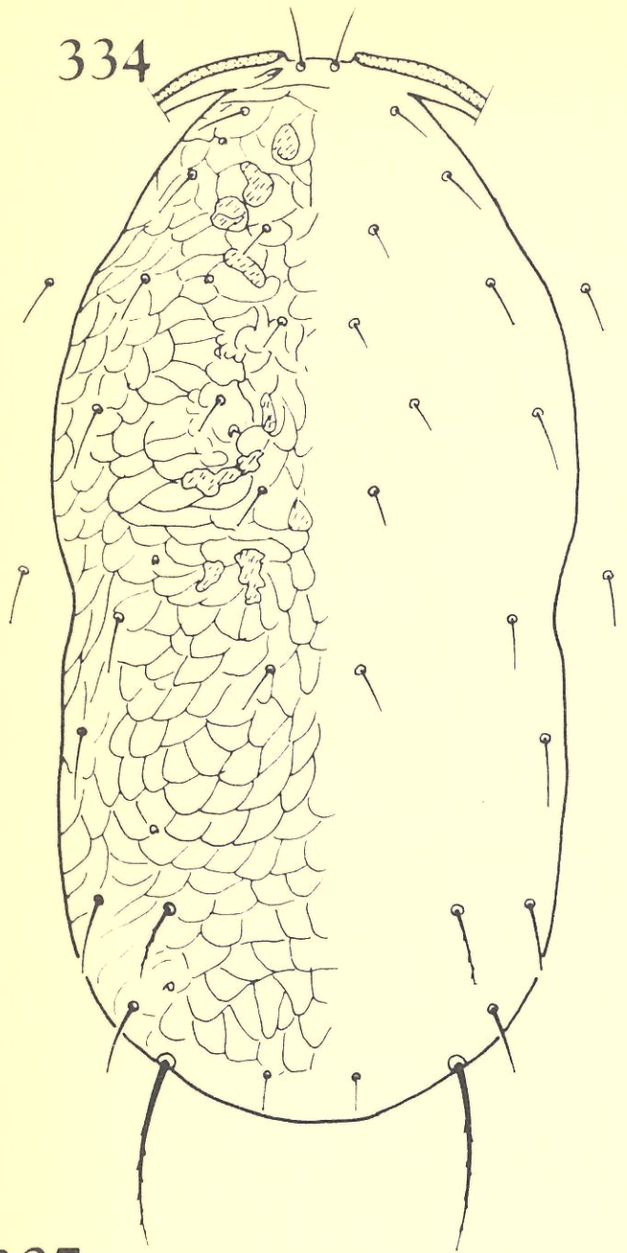
5 μ x 6 μ, and almost occupied by large lips. The cervix, 22-24 μ long, is narrow where it joins the atrium but gradually increases in diameter towards the vesicle.

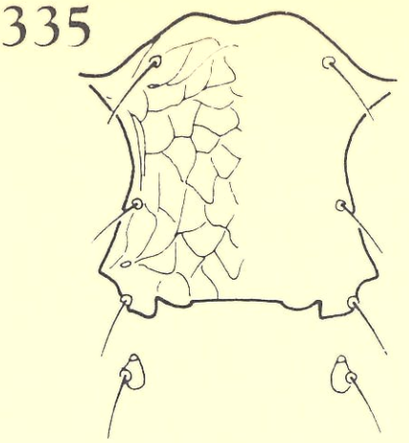
Chelicera (fig. 332): The fixed digit, 30-32 μ long, bears nine to ten teeth and a pilus dentilis on its inner margin. The distal two teeth are sharp but the remainder are blunt. The movable digit, 33-35 μ long, bears three small teeth on its inner margin.

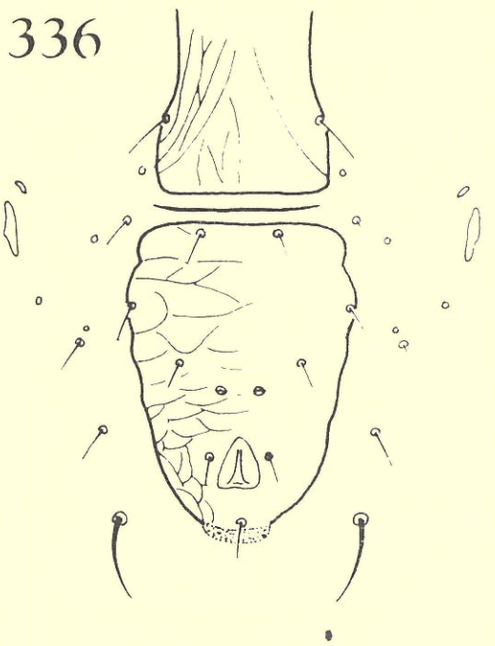
Legs: The chaetotaxy of the legs is normal. Macrosetae present on the legs are: genu I, 43-46 μ; genu II, 38-41 μ; genu III, 45-49 μ; tibia III, 38-41 μ; basitarsus III, 30-33 μ; genu IV, 105-112 μ; tibia IV, 88-93 μ and basitarsus IV, 70-74 μ. The macrosetae on leg IV are illustrated in fig. 333.

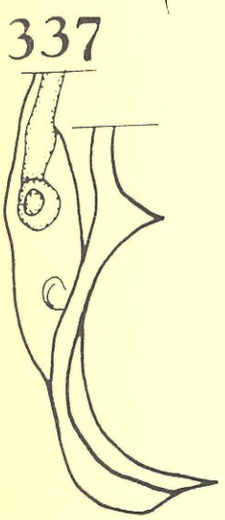
Male: The male of this species was not encountered during this study. It is interesting to note that Muma (1955-1964) and Swirski & Shechter (1961) reported collections of males. The present author reared this species in the laboratory and since no males were observed five females were isolated in Huffaker cells. After the first egg of each female was laid, the female was removed. The eggs were kept in isolation until they emerged and moulted through the instars into females. These females were kept in their different cells until they had laid their first eggs. This process was repeated for three generations and there can therefore be no doubt that this species is able to reproduce parthenogenetically. Chance fertilization was eliminated by the use of the modified Huffaker cell

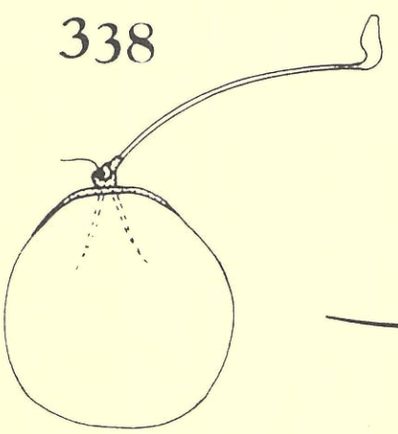
described/.....

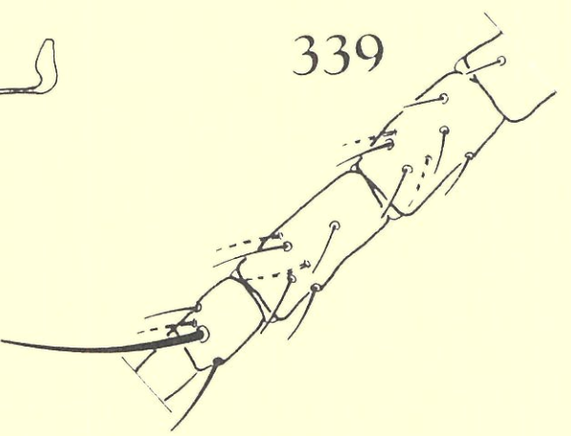












FIGS. 334-339. Amblyseius (Amblyseius) insignitus spec. nov., female

Fig.334, dorsum; fig.335, sternal shield; fig.336, posterior ventral surface; fig. 337, peritrematal shield; fig.338, spermatheca; fig.339, leg IV.

described in section II of this paper. Three of these females were furthermore fed solely on pollen. The absence of another mite was therefore guaranteed by this technique.

Distribution: Muma (1955) described this species from the ♀-holotype, male allotype and two female paratypes taken from Key lime leaves, Key Largo, Florida, Dec., 1952 by himself. These specimens were deposited in the United States National Museum, Washington, D.C. Further specimens from citrus were collected by Muma (1964) in Florida. A number of specimens found on various plants were recorded by Chant (1959b), Guatemala and Mexico; Ehara (1959-1962), Japan; Swirski (1960) and Swirski & Shechter (1961), Hong-Kong. Swirski & Amitai (1961) released specimens in Israel imported from Hong-Kong. Schuster & Pritchard (1963) recorded this species from California.

Material studied: One ♀ from Citrus sp., Nelspruit (Tvl.) 2.IV.1955 (P.A.J. Ryke). A number of females from an unidentified plant, Tzaneen (Tvl.) 25.II.1964 (G.G. v.d. Merwe) and a number of females from an unidentified plant, Houtboschloop, dist. Nelspruit (Tvl.) Jan., 1964 (G.G. v.d. Merwe).

Amblyseius (Amblyseius) insignitus spec. nov.

(Figs. 334-339)

This species resembles A. scyphus as discussed under A.(A.) culmulus. A.(A.) insignitus differs from A. scyphus in having a strongly reticulated dorsal shield and the peritremes reaching almost to the bases

of setae/....

of setae D_1. It further differs from A. scyphus in having large, closely spaced, pores on the ventri-anal shield.

Female: Dorsum (fig. 334): The strongly reticulated dorsal shield is much longer, 402(393) μ, than broad, 200(190) μ, and is provided with six pairs of pores and 17 pairs of aciculate setae. The lengths of these setae are: D_1, 25(24) μ; D_2, D_3, D_4, D_6 and M_1, 17(15) μ; D_5, L_2 and L_3, 21(22) μ; L_1 and L_5, 24 μ; M_2, 35(33) μ; L_4, 26(28) μ; L_6, L_7 and L_8, 28(31) μ and L_9, 72(69) μ. These setae are thus relatively short, none equalling or exceeding the distances between their bases and those of the setae following next, except for seta L_8 which is slightly longer than the distance between its base and the base of setae L_9.

Setae S_1 and S_2, both 24 μ long, are situated on the interscutal membrane.

The peritremes reach almost to the bases of setae D_1 and the peritrematal shields are broadly fused anteriorly to the dorsal shield.

Venter: The imbricated sternal shield (fig. 335), length 93(91) μ and breadth 66(69) μ, bears three pairs of setae. The posterior margin of the shield is straight except for two small lateral lobes. Sternal setae III are situated on the lateral margins of these lobes and setae IV on prominent metasternal shields.

The genital shield, width 76(78) μ, is imbricated and bears a pair of setae.

The imbricated/.....

The imbricated triangular ventri-anal shield (fig. 336) bears three widely spaced pairs of short pre-anal setae. A pair of large closely spaced pores are present posterior to the level of the third pair of pre-anal setae. The shield is much longer, 144(139) μ, than wide, 109(106) μ, and has a almost straight anterior margin. The lateral margins are slightly constricted anterolaterally.

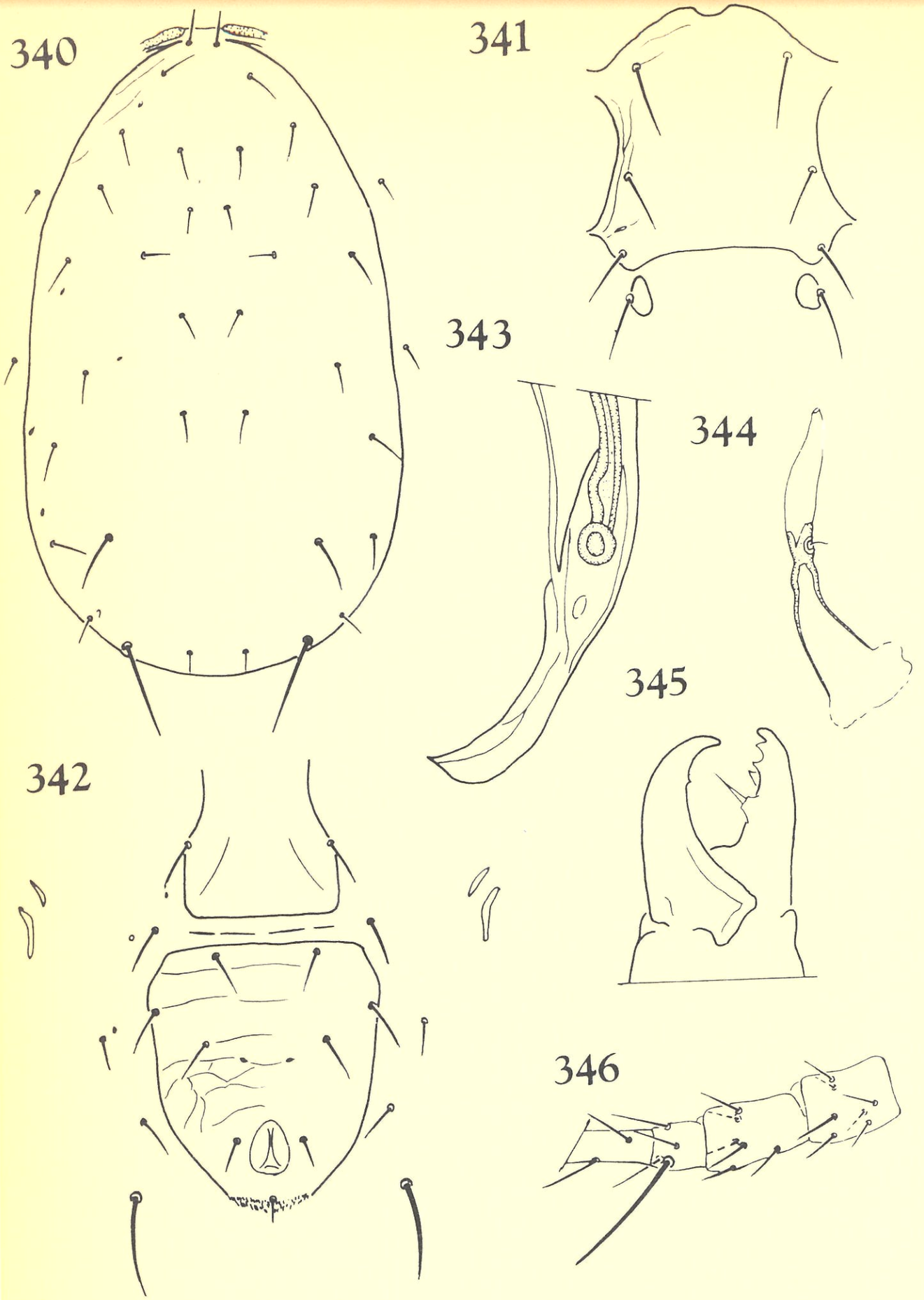
On the interscutal membrane, between the genital and ventri-anal shields, lies a long slender platelet. Two pairs of metapodal plates are present; the secondary ones are approximately one-fourth of the length of the primary ones. The membrane is also provided with three pairs of short setae and a long, fourth, caudal pair, 42(39) μ. The peritrematal shield (fig. 337) is pointed medially.

Spermatheca (fig. 338): The spermatheca has a very slender major duct, 26 μ long. It has a short dilated portion where it is attached between coxae III and IV. The small atrium is almost completely occupied by the lips. The cervix is shallowly domed, being 5 μ long and 14 μ broad.

Chelicerae: Due to its position it is impossible to give an accurate drawing of the chelicera. The fixed digit, however, bears six to seven teeth and a pilus dentilis. The movable digit is probably devoid of teeth.

Legs: Leg IV (fig. 339) is provided with a single macroseta, length 67(64) μ, on the basitarsus. The

chaetotaxy/.....



FIGS. 340-346. Amblyseius (Amblyseius) usitatus spec. nov., female

Fig. 340, dorsum; fig.341, sternal shield; fig.342, posterior ventral surface; fig. 343, peritrematal shield; fig.344, spermatheca; fig.345, chelicera; fig.346, leg IV.

chaetotaxy of the legs is normal.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/265/1) and one ♀-paratype from Eragrostis curvula, Boskopdam near Potchefstroom (Tvl.) 20.I.1964 (G.G. v.d. Merwe).

Amblyseius (Amblyseius) usitatus spec. nov.

(Figs. 340-346)

This species is related to A. mckenziei and A. huffakeri Schuster & Pritchard. It differs from the former by the shorter length of seta M_2 and from the latter by the longer dorsal setae and from both by the shape of the spermatheca. A. usitatus also closely resembles A. aequisetus Wainstein. It differs from the latter in having seta L_9 longer and in the shape of the spermatheca. In A. aequisetus the cervix, 30 μ in length, is tubelike but stromgly flared towards the vesicle (personal communication with Dr. Wainstein).

Female: Dorsum (fig. 340): The smooth dorsal shield, length 336(330-340) μ and breadth 192(184-196) μ, is provided with 17 pairs of setae. The lengths of these setae are: D_1, D_2, D_3, D_4, M_1 and L_8, 19(17-20) μ; D_6, 13 μ; D_5, L_2, L_3, L_5, L_6 and L_7, 22(20-24) μ; M_2, 35(33-36) μ; L_1 and L_4, 25(23-26) μ, and L_9, 53(52-55) μ. All setae thus short, none reaching the bases of consecutive setae. Seta M_2 is paired with seta L_7.

Setae S_1 and S_2, 21(19-23) μ long, are placed on the interscutal membrane.

The/.....

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes reach anterodorsally to the bases of setae D_1.

Venter: Sternal shield (fig. 341), length 80(78-84) μ and breadth 70(68-72) μ, with three pairs of setae and a slightly concave posterior margin. Metasternal shields distinct, bearing sternal setae IV.

Genital shield (fig. 342), width 74(70-78) μ, normal and provided with a pair of setae.

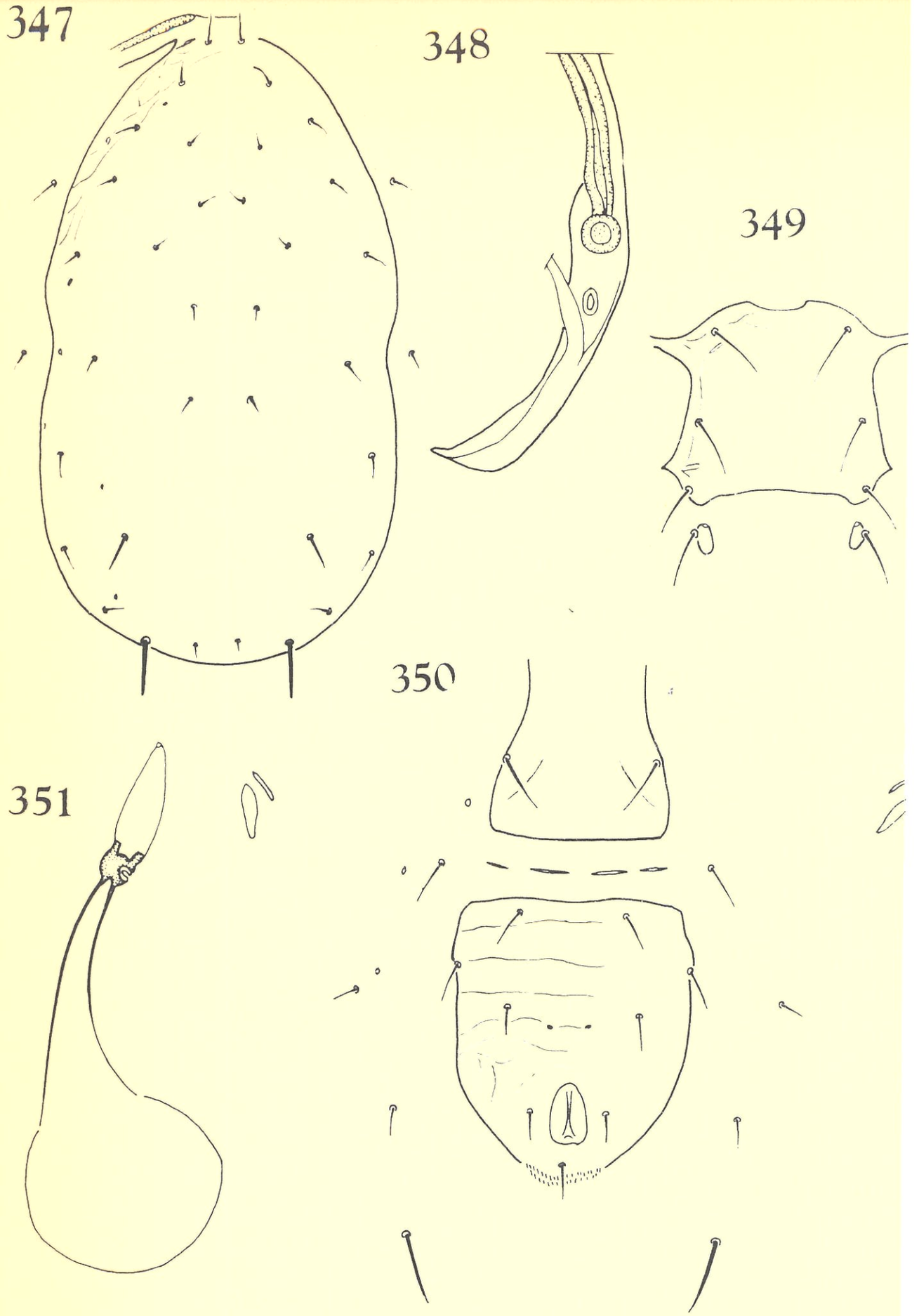
The triangular imbricated ventri-anal shield (fig. 342), length 115(112-117) μ and breadth 102(98-104) μ, is provided with three widely spaced pre-anal setae and a pair of pores between and slightly posterior to the caudal pair of setae.

The interscutal membrane is provided with four pairs of setae, VL_1 being 45(43-46) μ long, and two pairs of metapodal plates; the primary pair being twice as long as the anterior secondary pair. Four slender platelets are present between the genital and ventri-anal shields.

The peritrematal shield (fig. 343) fuses posteriorly with the exopodal plate and ends with a sharp median point.

Spermatheca (fig. 344): The spermatheca has a broad faint major duct and a bifid atrium, 5 μ in length, with small lips. The cervix, 22 μ long, has a swollen area where it joins the atrium.

Chelicera/.....



FIGS. 347-351. Amblyseius (Amblyseius) vanderlindei spec. nov., female

Fig.347, dorsum; fig.348, peritrematal shield; fig.349, sternal shield; fig.350, posterior ventral surface; fig.351, spermatheca.

Chelicera (fig. 345): The fixed digit, 30 μ long, of the chelicera bears three teeth and a pilus dentilis. The movable digit, 34 μ long, is provided with a single denticle.

Legs: Only the basitarsus of leg IV (fig. 346) is provided with a macroseta, 66 μ long. The chaetotaxy of the legs is normal.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 64/77/1) from grass, Potchefstroom (Tvl.) March 1955 (P.A.J. Ryke), four ♀-paratypes from grass, Potchefstroom (Tvl.) October 1954 and March 1955 (P.A.J. Ryke) and one ♀-paratype from Prunus persica, Potchefstroom (Tvl.) April 1955 (P.A.J. Ryke).

Amblyseius (Amblyseius) vanderlindei spec. nov.
(Figs. 347-355)

This species is related to A. brevispinus (Kennett), A. marinus (Willmann) and A. huffakeri Schuster & Pritchard by having the dorsal setae short and the dorsal shield smooth but differs from these species by having two macrosetae on leg IV. It further differs from A. brevispinus by the presence of pre-anal pores and the peritreme reaching to seta D_1. It differs from A. marinus and A. huffakeri by the male having six pair of pre-anal setae and also from the latter by having the pre-anal pores in the female closely placed and a much longer cervix of the spermatheca.

Female: Dorsum/.....

Female: Dorsum (fig. 347): The smooth dorsal shield, length 338(330-340) μ and breadth 193(185-195) μ, is provided with 17 pairs of setae, arranged as follows: six dorsal, two median, four prolateral and five postlateral. The lengths of these setae are as follows: D_2, D_3, D_4, D_5, D_6 and M_1, 11(10-13) μ; D_1, L_1, L_2, L_3, L_5, L_6, L_7 and L_8, 15(14-16) μ; M_2, 23(22-24) μ; L_4, 17(-19) μ; and L_9, 35(34-36) μ. All the setae are thus short and reach to less than half the distances between their bases and those of the setae next following.

Setae S_1, 18(16-) μ long, and S_2, 15(14-) μ long, are on the interscutal membrane.

The peritrematal shield fuses anterodorsally with the dorsal shield and curves posteriorly around coxa IV ending in a sharp point (fig. 348). The peritremes reach anterodorsally to the basis of setae D_1.

Venter: The sternal shield (fig. 349), 63(-65) μ long and 67(-69) μ wide, has a slightly concave posterior margin and bears three pairs of setae. The oval metasternal shields are provided with a pair of setae.

The genital shield (fig. 350), width 67(-71) μ, is normal and provided with a pair of setae.

The subtriangular imbricated ventri-anal shield (fig. 350), length 108(-110) μ and breadth 93(90-95) μ, has a straight anterior margin and ovate lateral margins, three pairs of pre-anal setae widely spaced on the shield and a pair of closely placed pores between and slightly posterior to the caudal pair of setae.

The ventral/.....

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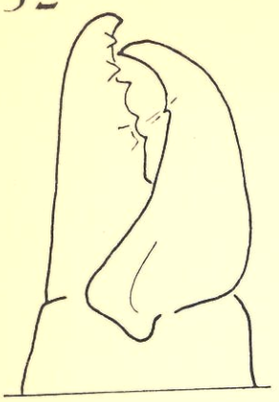

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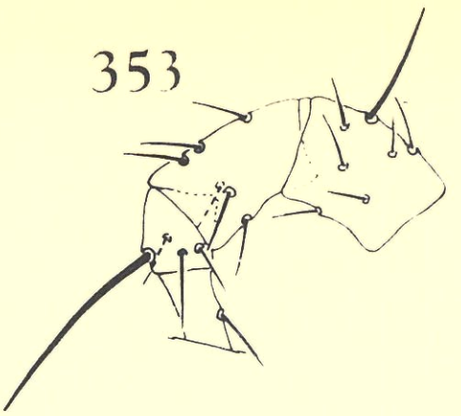

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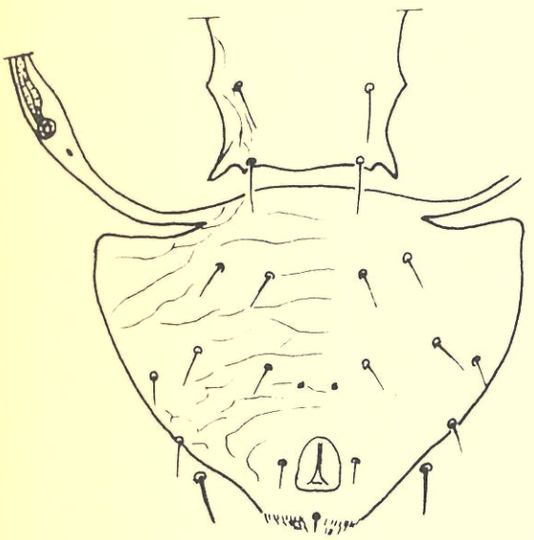

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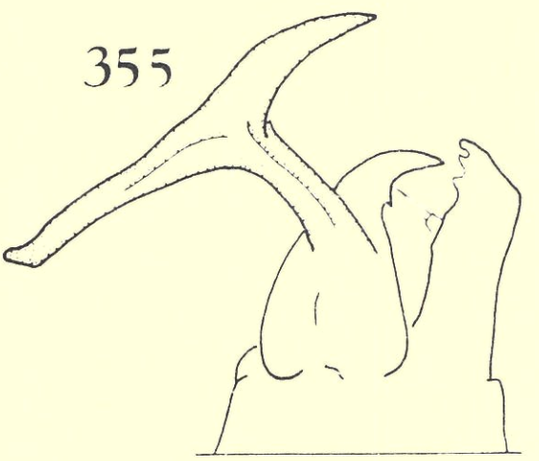


FIGS. 352-355. Amblyseius (Amblyseius) vanderlindei spec. nov.

Fig.352, chelicera, female; fig.353, leg IV. female; fig.354, posterior ventral surface, male; fig.355, chelicera, male.

The ventral interscutal membrane flanking the ventri-anal shield is provided with four pairs of setae, one pair (VL_1) being long, 28(26-30) μ, and two pairs of metapodal plates, the primary one being broad. Four slender platelets are situated between the genital and ventri-anal shields.

Spermatheca (fig. 351): The spermatheca has a broad faint major duct and a bifid atrium 5.6 μ long with distinct lips. The cervix, 26(-28) μ long, is slender and flares slightly towards its distal end.

Chelicera (fig. 352): The fixed digit, length 32 μ, of the chelicera bears five teeth and a pilus dentilis. The movable digit, length 34 μ, bears a single denticle.

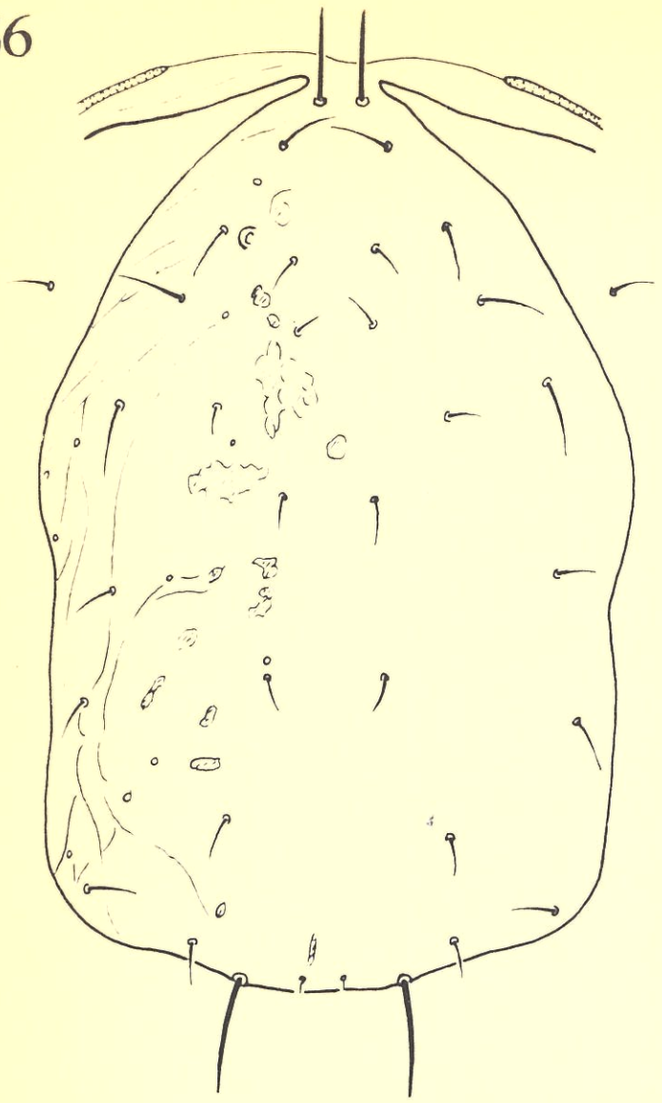
Legs: The chaetotaxy of the legs is normal. The genu of leg IV (fig. 353) is provided with a macroseta 36(34-38) μ long. The tibia is devoid of macrosetae and the macroseta on the basitarus is 58(-64) μ long.

Male: Dorsum: Chaetotaxy of the dorsal shield, length 272(-280) μ and breadth 175(-182) μ, resembles that of the female, but for seta L_9 which is slightly shorter, 21-24 μ. Setae S_1 and S_2 are on the dorsal shield.

Venter: The ventri-anal shield (fig. 354), length 110 μ and breadth 134(-136) μ, bears six pairs of pre-anal setae and a pair of pores. Only seta VL_1, 35 μ long, is on the interscutal membrane.

Chelicera/.....

356



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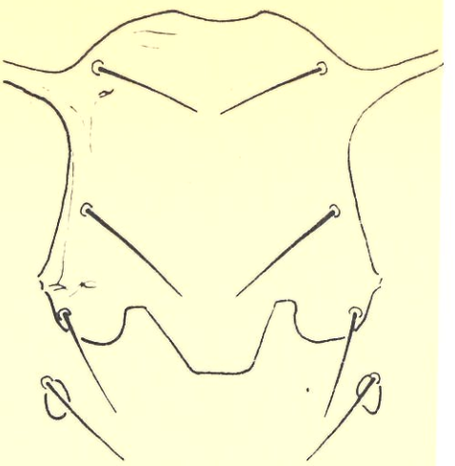

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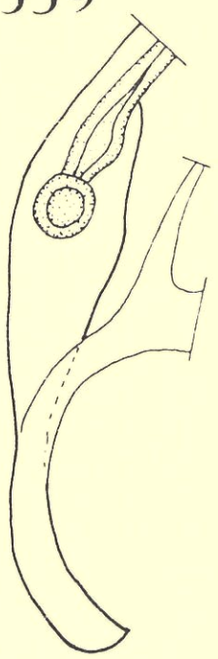

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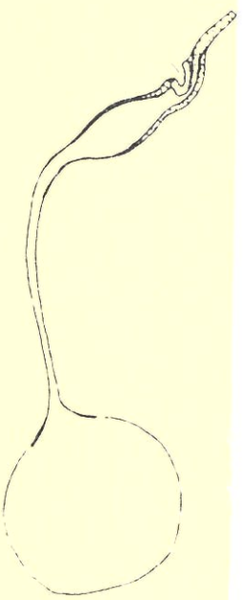

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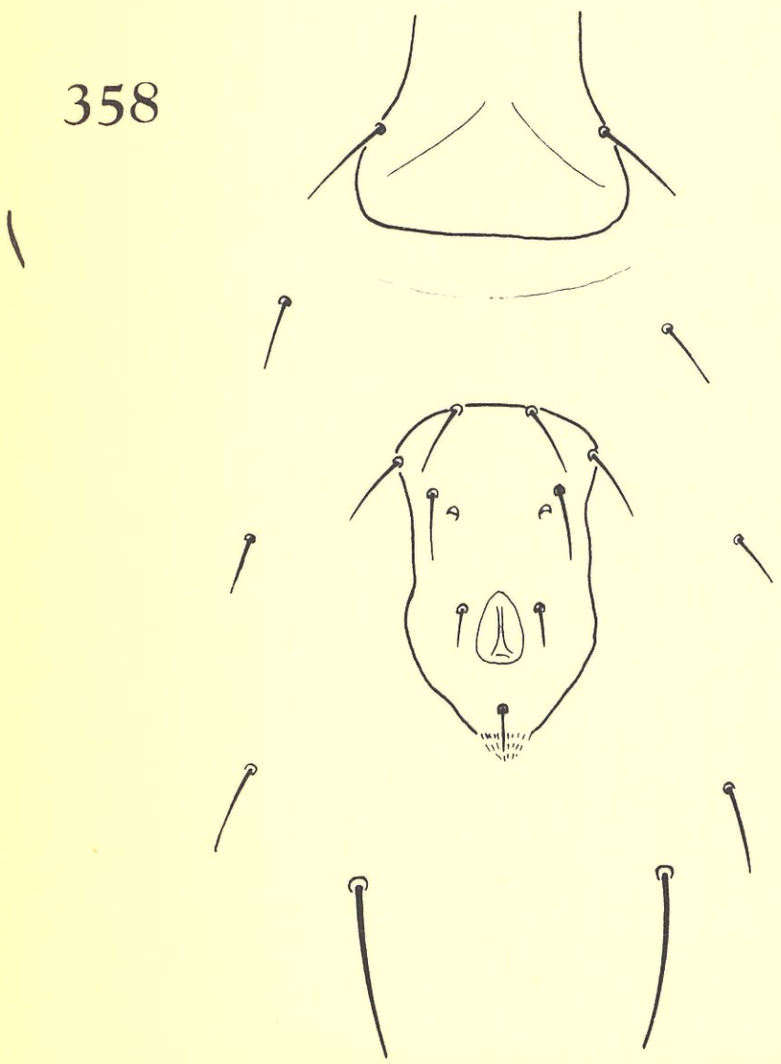

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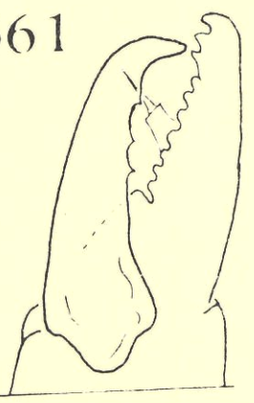

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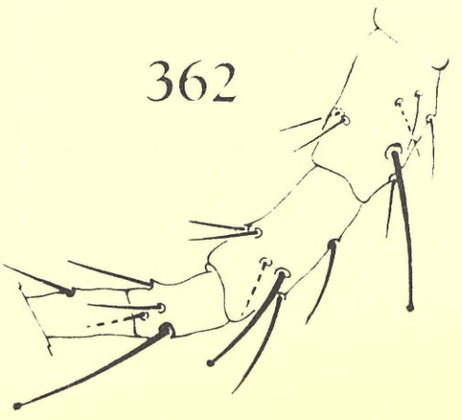

Chelicera (fig. 355): The fixed digit of the chelicera bears only one tooth and a pilus dentilis. The spermatophoral process is T-shaped; the base is 14 μ long and the horizontal bar 38(-40) μ.

Legs: The macrosetae on leg IV measure 26(22-) μ in length on the genu and 43(40-) μ on the basitarsus. The chaetotaxy of the legs is normal.

Material studied: ♀-Holotype (serial no. AcY 64/79/1) from grass, Grabouw (C.P.) 30.XII.1954 (P.A.J. Ryke). ♂-Allotype, six ♀-paratypes and three ♂-paratypes from grass, Grabouw (C.P.) 30.XII.1954 (P.A.J. Ryke). This species is named in honour of Dr. W.J. van der Linde, Assistant Chief, Plant Protection Research Institute, Pretoria.

Amblyseius (Amblyseius) macrosetosus spec. nov.

(Figs. 356-362)

This species is related to A.(A.) havu Pritchard & Baker by having all the setae on the dorsal shield moderately long and having three macrosetae on tibia IV. It differs from the latter species in having the lateral setae shorter and by the ventral interscutal

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Figs. 356-362 Amblyseius (Amblyseius) macrosetosus spec. nov. female.

Fig. 356, dorsum; fig. 357, sternal shield; fig. 358, posterior ventral surface; fig. 359, peritrematal shield; fig. 360, spermatheca; fig. 361, chelicera; fig. 362, leg IV.

membrane bearing four pairs of setae.

Female: Dorsum (fig. 356): The laterally mildly imbricated dorsal shield, length 385(-405) μ and breadth 255(-280) μ, bears 17 pairs of setae arranged as follows: six dorsal, two median, four prolateral and five postlateral. The lengths of these setae are: D_1, (thick), 40(39-42) μ; D_2, D_3, D_4, D_5, M_1, M_2, L_5, L_7 and L_8, 22(20-24) μ; D_6, 8 μ; L_1, 28(-30) μ; L_2 and L_6, 26(25-28) μ; L_3, 32(29-34) μ; L_4, 37(-41) μ and L_9, 54(52-56) μ. None of these setae are long enough to reach the bases of consecutive setae. Setae L_1, L_2 and L_3 equal in length more than half the respective distances between their bases and the bases of setae L_2, L_3 and L_4.

Setae S_1 and S_2, both 26(23-) μ in length, are placed on the interscutal membrane.

The peritrematal shields fuse anterodorsally with the dorsal shield. The peritreme reaches to the level of seta L_1.

Venter: The posteriorly lobate sternal shield (fig. 357), length 93(-95) μ and breadth 80(-85) μ, bears three pairs of setae. The median lobe is wedge-shaped with a straight posterior margin. The lateral lobe is smooth and the incision is broad. Sternal setae IV are situated on the anterior margin of oval metasternal shields.

The genital shield, width 98(-104) μ, is normal and provided with a pair of setae.

The ventri-anal/.....

The ventri-anal shield (fig. 358), length 125(-135) μ, is broadest, 74(-84) μ, across the second pair of pre-anal setae. The lateral margins are slightly constricted. Three pairs of pre-anal setae are separately grouped anteriorly on the shield with a pair of distinct pores caudomedial to the third pair of setae.

The ventral interscutal membrane bears four pairs of setae, one pair (VL_1) being long, 67(-74) μ. A pair of very slender metapodal platelets is present.

The peritrematal shield (fig. 359) fuses posteriorly with the exopodal plate and terminates caudal to coxa IV in a rounded posterior margin, obtuse anteromedially.

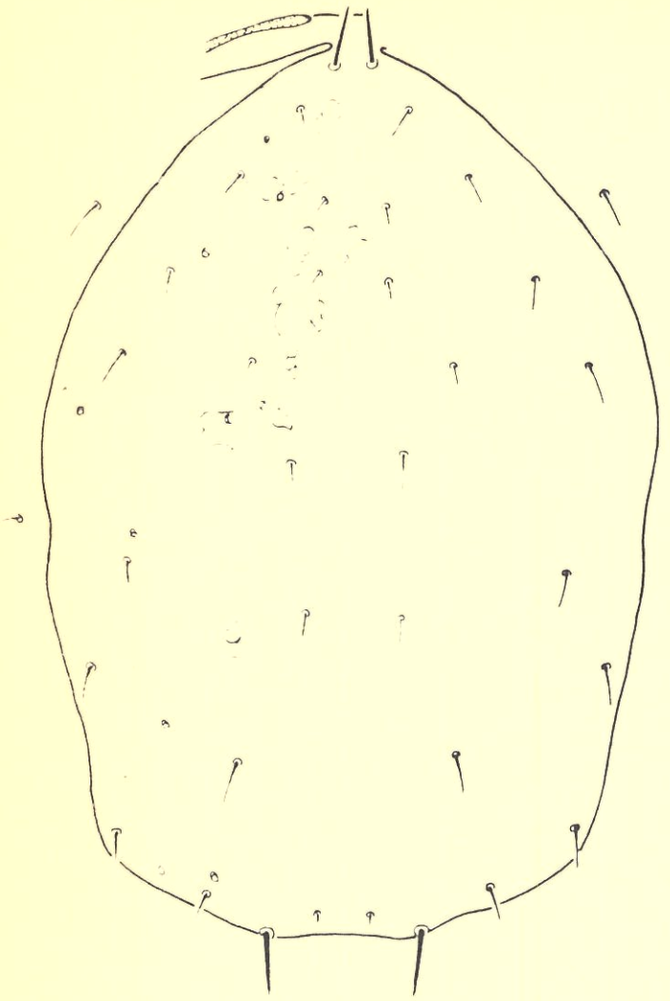
Spermatheca (fig. 360): The slender spermatheca, length 40 μ, has distinct lips in the centre of a slightly bulged atrium. The major duct is slender. The very thin cervix has a prominent bulge for a third of its length where it joins the atrium and is flared where it meets the vesicle. The cervix of the holotype female is broken, giving the impression that the spermatheca is much longer than 40 μ.

Chelicera (fig. 361): The fixed digit, length 34 μ, bears two sharp subapical teeth, seven blunt teeth and a pilus dentilis on its inner margin. The movable digit, length 38 μ, is provided with three recurved denticles.

Legs: The chaetotaxy of the legs is normal. Leg IV (fig. 362) bears three knobbed macrosetae; the one on the genu measures 66(-71) μ, on the tibia 54(-56) μ and on the basitarsus 66(-73) μ. The tibia also bears two additional pointed macrosetae.

Male:/.....

363



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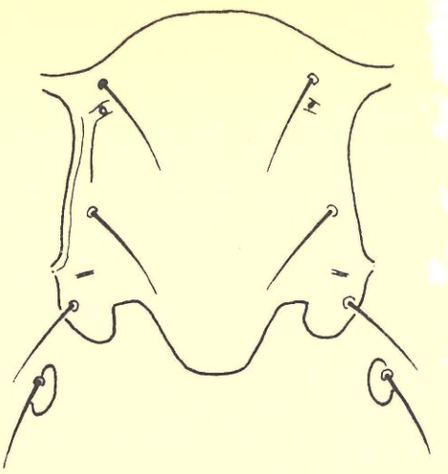

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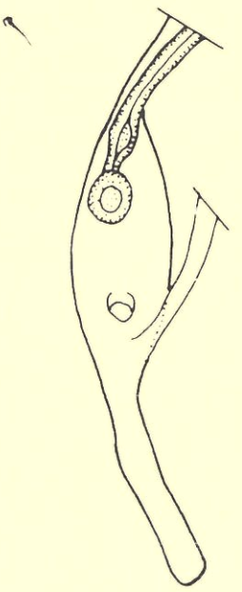

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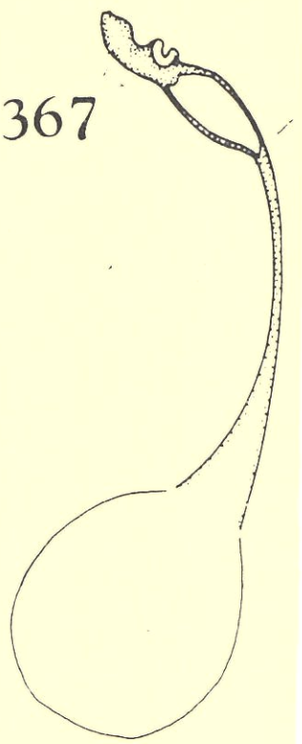

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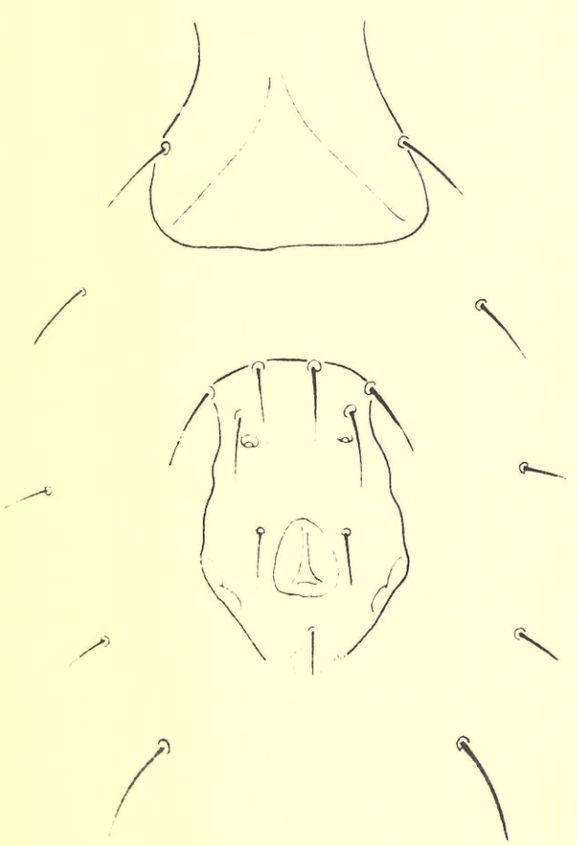

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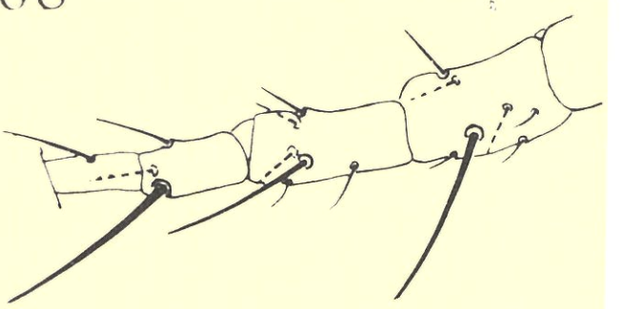

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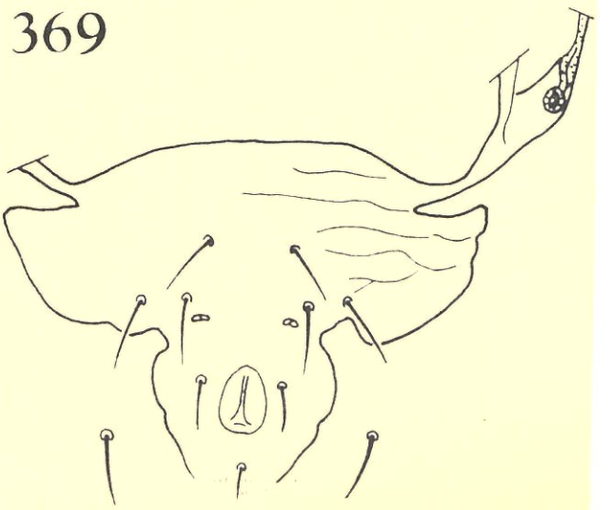

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 64/74/1) and one ♀-paratype from Lycopersicus sp., Munster (Natal) 20.IV.1955 (M.K.P. Meyer). Three ♀-paratypes from Citrus sp., Munster (Natal) 21.IV.1955 (M.K.P. Meyer) and five ♀-paratypes from an unidentified plant, Glenmore (Natal) 22.IV.1955 (M.K.P. Meyer).

Amblyseius (Amblyseius) rhusi spec. nov.

(Figs. 363-369)

This species closely resembles A.(A.) macrosetosus, but can easily be distinguished from it by having much shorter dorsal setae and only one macroseta on tibia IV. This species is also very weakly sclerotized.

Female: Dorsum (fig. 363): The dorsal shield bears 17 pairs of setae and measures 353(350-355) μ in length and 233(226-236) μ in width. The lengths of these setae are: D_1, 25 μ; D_2, D_3 and D_6, 9 μ; D_4, D_5 and M_1, 12 μ; L_1, L_2, L_3, L_5 and L_8, 15 μ; M_2, L_6 and L_7,

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Figs. 363-369. Amblyseius (Amblyseius) rhusi spec. nov.

Fig. 363, dorsum, female; fig. 364, sternal shield, female; fig. 365, posterior ventral surface, female; fig. 366, peritrematal shield, female; fig. 367, spermatheca, female; fig. 368, leg IV, female; fig. 369, posterior ventral surface, male.

18(17-19) μ; L_4, 20 μ and L_9, 28(26-29) μ. All setae thus short and much shorter than the distances between the consecutive setae.

Setae S_1 and S_2, both 17 μ long, are on the interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes reach anterodorsally to the bases of setae D_1.

Venter: The posteriorly lobate sternal shield (fig. 364) length 83(80-84) μ and breadth 69(67-70) μ, bears three pairs of setae. The median and lateral lobes are smooth and the incisions are broad. Sternal setae IV are situated on oval metasternal shields.

The genital shield is normal, width 82(-84) μ, and provided with a pair of setae.

The narrow ventri-anal shield (fig. 365), length 93 μ and breadth 65 μ, has three pairs of anteriorly grouped pre-anal setae and a pair of big pores almost caudal to the third pair of setae.

The ventral interscutal membrane is provided with four pairs of setae, VL_1 being long, 37(-39) μ. Metapodal plates are absent.

The peritrematal shield (fig. 366) is fused posteriorly with the exopodal plate and terminates broad and blunt.

Spermatheca (fig. 367): The slender spermatheca, length 33(-38) μ, has a swollen major duct, a rather small atrium and a very thin cervix. One fourth of

the cervix/.....

the cervix is however swollen where it meets the atrium and flares slightly towards the vesicle.

Chelicerae: The position of the chelicerae renders them difficult to examine.

Legs: The chaetotaxy of the legs is normal. Leg IV (fig. 368) bears three macrosetae, that on the genu being 66(-68) μ long, on the tibia 54(-56) μ and on the basitarsus 66(-70) μ. Leg III also bears macrosetae on the genu, tibia and basitarsus and leg II has one on the genu.

Male: Dorsum: The chaetotaxy of the dorsal shield resembles that of the female. The scapular setae, however, are on the dorsal shield.

Venter: The ventri-anal shield (fig. 369) is fused anterolaterally with the peritrematal shields and is sharply constricted anterior to the anus. The shield bears three pairs of pre-anal setae and a pair of pores. The interscutal membrane bears one pair of setae.

Chelicerae: The position of the chelicera and spermatophoral bearer renders them difficult to examine.

Legs: The chaetotaxy of the legs is normal. Legs III and IV each bear a macroseta on the genu, tibia and basitarsus.

Material studied: ♀-Holotype (serial no. AcY 64/73/1), ♂-allotype and four ♀-paratypes from Rhus rehmanniana, Amanzimtoti (Natal) 1.XII.1962 (G.G. van der Merwe).

Amblyseius (Amblyseius) grabouwensis (v.d. Merwe & Ryke), comb. nov.

Amblyseius (Typhlodromalus) grabouwensis v.d. Merwe & Ryke, 1964, J. ent. Soc. sth. Afr. 26: 264.

This species is distinct amongst related species in having seta D_1 the longest seta on the dorsal shield. Seta L_1 is slightly shorter and seta L_9 is shorter still than seta D_1. All the other setae are short and approximately equal in length. Van der Merwe & Ryke omitted to mention that the macroseta on genu IV is distally knobbed and that the macrosetae on tibia IV and basitarsus IV are blunt.

This species is known from leaves of Passiflora sp., Grabouw (C.P.)

Amblyseius (Amblyseius) aferulus (Chant)

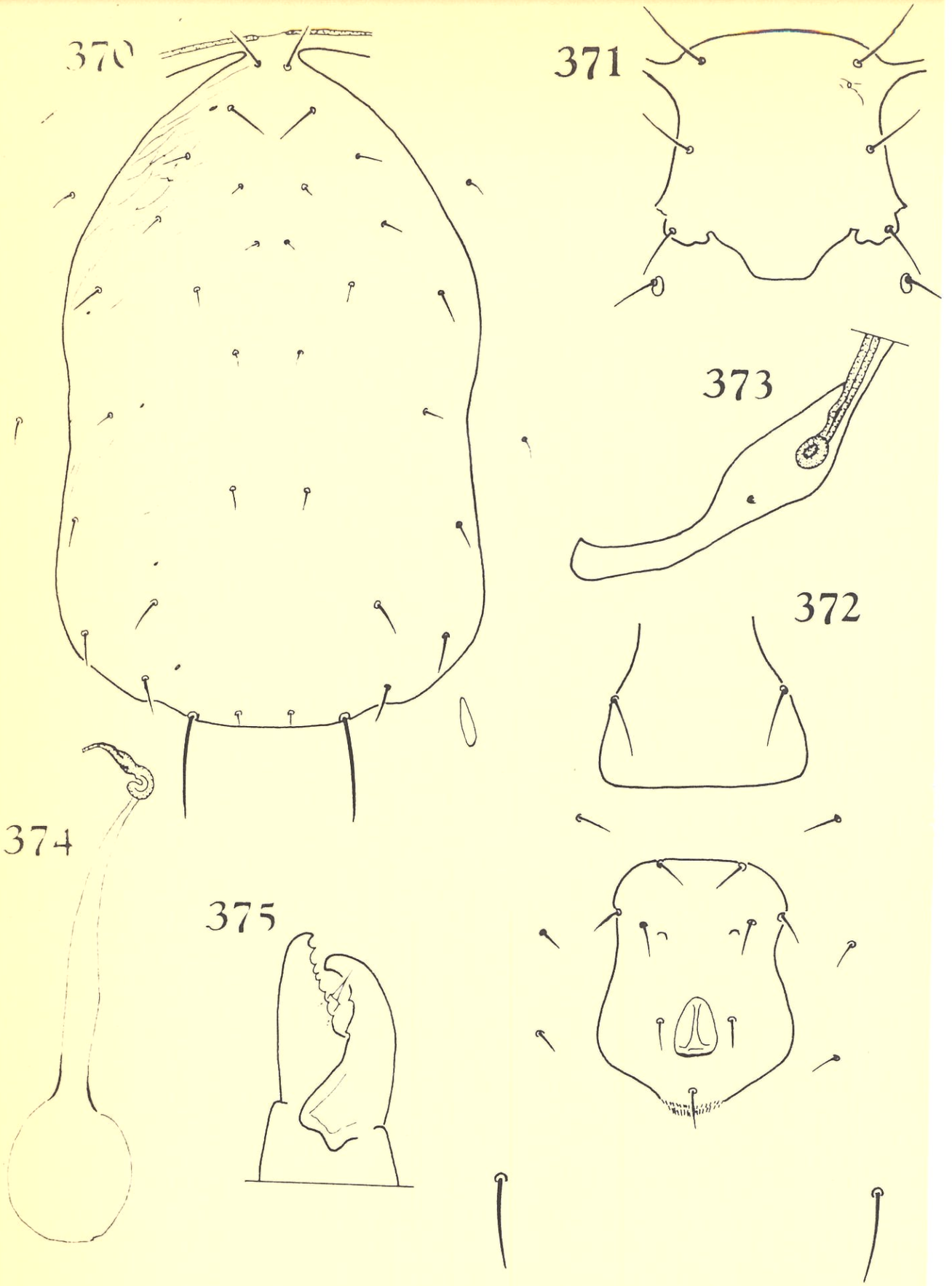
Typhlodromus (Amblyseius) aferulus Chant, 1959b, Can. Ent. 91 (suppl. 12): 69.

Amblyseius (Amblyseius) aferulus (Chant), Pritchard & Baker, 1962, Hilgardia 33: 266.

This species is distinct amongst related species having none of the prolateral setae long enough to reach the base of the seta following next, in that the ventri-anal shield is broader anteriorly than across the anus.

A. aferulus is known from Citrus sp., Crocodile Valley Citrus Estates, Nelspruit, (Tvl.).

Amblyseius/.....



FIGS. 370-375. Amblyseius (Amblyseius) munsteriensis spec. nov., female

Fig.370, dorsum; fig.371, sternal shield; fig.372, posterior ventral surface; fig.373, peritrematal shield; fig.374, spermatheca; fig.375, chelicera.

Amblyseius (Amblyseius) rubicolus (v.d. Merwe & Ryke), comb. nov.

Amblyseius (Typhlodromalus) rubicolus v.d. Merwe & Ryke, 1964, J. ent. Soc. sth. Afr. 26: 266.

Amonst species having setae D_1, L_1, L_4 and L_9 long with the remaining setae rather short, this species is distinct in having seta D_1 longer than seta L_1. It is further characterised by having the posterior margin of the sternal shield lobed; the lateral lobes are smooth and the median lobe is scalloped.

A.(A.) rubicolus is known from leaves of Rubus sp., Grabouw (C.P.).

Amblyseius (Amblyseius) munsteriensis spec. nov. (Figs. 370-378)

This species resembles A.(A.) mba Pritchard & Baker but differs mainly from the latter by having setae D_1 and L_1 equal in length and a markedly different spermatheca.

Female: Dorsum: (fig. 370): The laterally mildly imbricated dorsal shield, length 380(370-382) μ and breadth 241(233-243) μ, bears 17 pairs of setae arranged as follows: six dorsal, two median, four prolateral and five postlateral. The lengths of these setae are: D_1, and L_1, 29(26-30) μ; D_2, D_3, D_4 and M_1, 12(11-13) μ; D_5 and L_5, 14(-15) μ; D_6, 9-10 μ; M_2, L_4 and L_6, 22(21-24) μ; L_2, 19(-21) μ; L_3, 16(-18) μ; L_7 and L_8, 26(24-27) μ and L_9, 67(65-69) μ. All setae thus short, none reaching to the base of consecutive setae.

Setae/.....

Setae S_1 and S_2, 15(-18) μ long, are placed on the dorsal interscutal membrane.

The peritrematal shields fuse anterodorsally with the dorsal shield. The peritremes reach anterior to the bases of setae D_1.

Venter: The posteriorly lobate sternal shield (fig. 371), length 82(79-84) μ and breadth 76(75-77) μ, bears three pairs of sternal setae. The prominent median lobe is posteriorly straight and the lateral lobes are undulate. The incision is narrow. Sternal setae IV are situated on small round metasternal shields.

The genital shield, width 91(86-93) μ, is normal with a pair of setae.

The first of the three pairs of pre-anal setae on the slightly waisted ventri-anal shield (fig. 372), length 110(103-114) μ and breadth 86(80-90) μ, is placed well anterior to the second and third pairs. A pair of pores is placed just inside and slightly posterior to the third pair of setae. Para-anal setae are normal.

The ventral interscutal membrane is provided with four pairs of setae; the first pair is slightly longer than the second and third, and the fourth (VL_1) is 38(36-39) μ long. A pair of elongate oval metapodal plates is present on the membrane.

The peritrematal shield (fig. 373) terminates posterior to coxa IV in a rounded posterior margin and an obtuse median angle.

Spermatheca (fig. 374): The very long slender spermatheca has a distinct, twisted major duct and the

atrium/....

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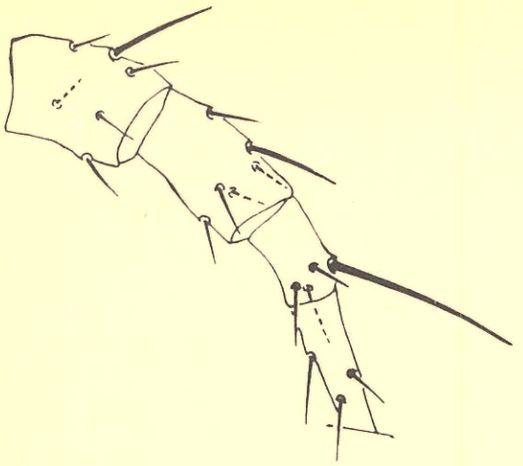

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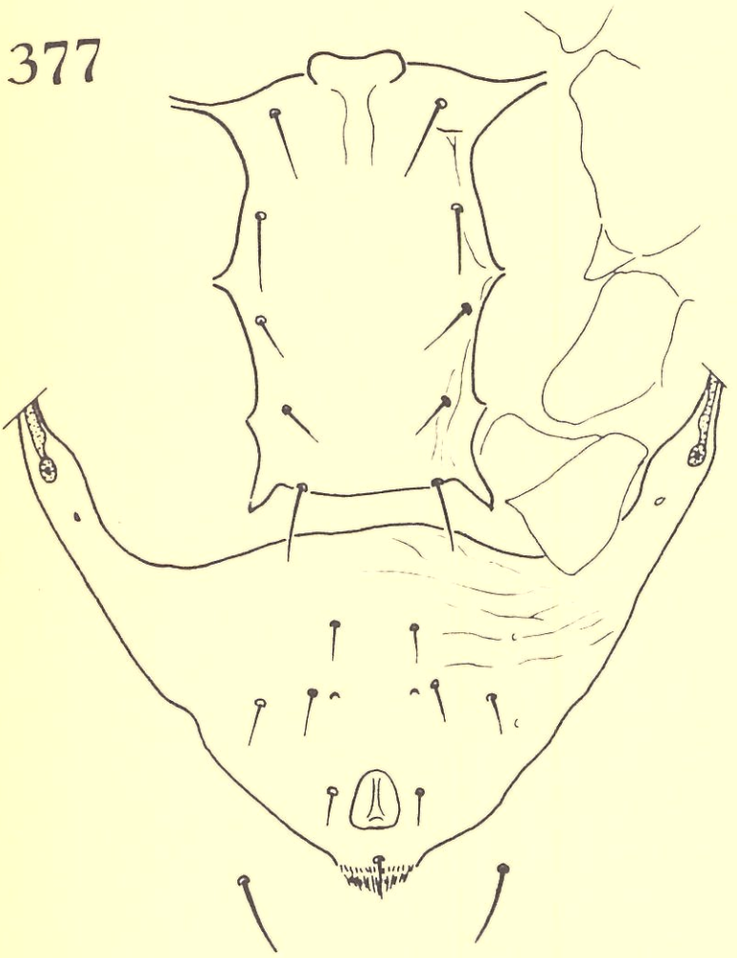

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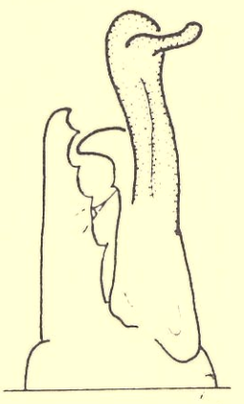


FIGS. 376-378. Amblyseius (Amblyseius) munsteriensis spec. nov.

Fig.376, leg IV, female; fig.377, posterior ventral surface, male; fig.378, chelicera, male.

atrium is almost completely occupied by the lips. The long faint cervix measures 38 μ in length and is obscure in the holotype.

Chelicera (fig. 375): The fixed digit, length 26 μ, of the chelicera bears seven teeth on its inner margin and a pilus dentilis. The movable digit, length 28 μ, bears two or three teeth.

Legs: Leg IV (fig. 376) bears three macrosetae, the one on the genu being 37(36-38) μ long, on the tibia 34(33-35) μ and on the basitarsus 73(70-75) μ. Leg III with three short macrosetae. The chaetotaxy of the legs is normal.

Male: Dorsum: The dorsal shield is 295 μ long and 228 μ wide. The chaetotaxy of the shield resembles that of the female, but the setae are slightly shorter. The longer setae measure in length: D_1, 24 μ; L_1, 28 μ and L_9, 47 μ.

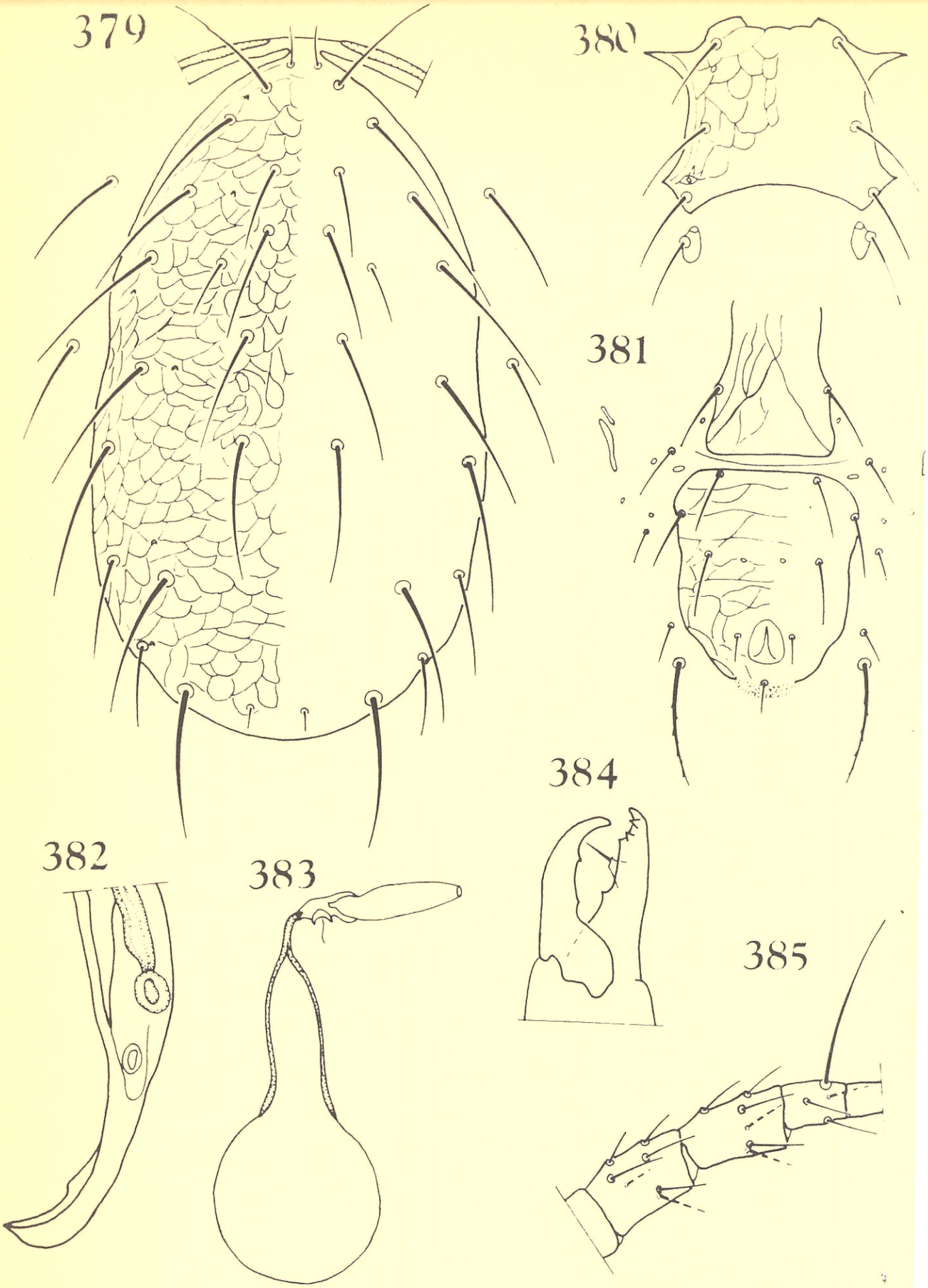
Setae S_1 and S_2 are on the dorsal shield.

The peritrematal shields fuse anterolaterally with the dorsal shield and the peritremes reach anterolaterally to the bases of setae D_1.

Venter: The genito-sternal shield is normal with the genital opening on its anterior margin and five pairs of lateral setae.

The triangular ventri-anal shield (fig. 377), length 102 μ, is anteriorly mildly imbricated. The anterolateral corners of the shield are fused with the posterior extremities of the peritrematal shields.

The ventri-anal/.....



FIGS. 379-385. Amblyseius (Amblyseius) teke Pritchard and Baker, female

Fig.379, dorsum; fig.380, sternal shield; fig.381, posterior ventral surface; fig. 382, peritrematal shield; fig.383, spermatheca; fig.384, chelicera; fig.385, leg IV.

The ventri-anal shield bears three pairs of pre-anal setae and a pair of pores just medial to the inner posterior pair of setae. Para-anal setae are normal.

The ventral interscutal membrane bears a single pair of setae 24 μ long.

Chelicera (fig. 378): The fixed digit, length 20 μ, is provided with four teeth and a pilus dentilis. The movable digit, length 23 μ, bears a single tooth on its inner margin and a spermatophoral process on its outer margin. This process, length 16 μ, is distally blunt and provided with a slender, short, 5 μ, appendix near its distal extremity.

Legs: The chaetotaxy of the legs is normal. Leg IV bears three macrosetae; measuring 29 μ on the genu, 26 μ on the tibia and 52 μ on the basitarsus.

Material studied: ♀-Holotype (serial no. AcY 64/75/1), ♂-allotype and three ♀-paratypes from an unidentified plant, Munster (Natal) 22.IV.1955 (M.K.P. Meyer). One ♀-paratype from Citrus sp., Munster (Natal) 15.IV.1955 (M.K.P. Meyer).

Amblyseius (Amblyseius) teke Pritchard & Baker

(Figs. 379-385)

Amblyseius (Amblyseius) teke Pritchard & Baker, 1962, Hilgardia 33: 239.

A.(A.) teke resembles A.(A.) longispinosus (Evans) in having relatively long setae on the dorsal shield. It can be distinguished from the latter by seta L_8

being/....

being of moderate length and the ventri-anal shield being broad instead of triangular. A.(A.) teke also resembles A.(A.) tutsi Pritchard & Baker and A.(A.) transvaalensis (v.d. Merwe & Ryke). It differs from these species in having a clearly imbricated dorsal shield, longer dorsal setae and only one macroseta on leg IV. The spermathecae are also remarkably different in these species.

An examination of the ♀-holotype of A.(A.) teke proved the South African specimens identical to it. The author was first of the opinion that his specimens represented a new species, since they have seta M_1 much shorter than seta M_2 and the imbrications on the dorsal shield more dense. The examination of the ♀-holotype however proved Pritchard & Bakers' description and illustration of these characters to be incorrect.

The following redescription of A.(A.) teke is based on the ♀-holotype and the South African specimens.

Female: Dorsum (fig. 379): The clearly imbricated dorsal shield measures 332-341 μ in length and 190-203 μ in width. A few dorsomedian rugose patches and six pairs of scattered small pores are on the shield. The shield bears 17 pairs of setae, arranged as follow: six dorsal, two median, four prolateral and five postlateral. These setae measure in length: D_1, 19-23 μ; D_2, 38-45 μ; D_3, 47-54 μ; D_4, 62-66 μ; D_5, 68-75 μ; D_6, 12-14 μ; M_1, 33-44 μ; M_2, 66-74 μ; L_1, 62-67 μ; L_2, 66-71 μ; L_3, 68-75 μ; L_4, 75-82 μ; L_5, 71-77 μ; L_6, 72-80, L_7, 56-63 μ; L_8, 46-52 μ and L_9,/.....

and L_9, 80-90 μ. The setae on the shield are relatively long, except for setae D_1 and D_6, and reach beyond the bases of consecutive setae in the series (the M-series excluded). Setae L_5 and M_2 are however much longer than the distance between their respective bases and the bases of setae L_6 and L_8. Seta M_1 is shorter than or equal in length to, but not longer than the distance between its base and the base of seta D_4.

Setae S_1 and S_2, 54-66 μ long, are on the dorsal interscutal membrane.

The peritrematal shields are fused anteriorly with the dorsal shield and the peritremes terminate anterior to the level of the bases of setae L_1.

Venter: The imbricated sternal shield (fig. 380), length 56-59 μ and breadth 63-67 μ, bears three pairs of setae. The anterior margin is medially broadly notched and the posterior margin concave. Sternal setae IV are on prominent metasternal shields.

The genital shield is relatively narrow, width 70-74 μ, imbricated and provided with a pair of setae. The posterior margin of the shield is straight.

The ventri-anal shield (fig. 381), length 115-122 μ and width 95-100 μ, is imbricated and bears three pairs of well spaced setae and a pair of pores almost medial to the posterior pair of setae. The anterior margin of the shield is almost straight with oblique to slightly rounded lateral corners. The lateral margins are slightly concave. Para-anal setae are normal.

The ventral interscutal membrane is provided with four pairs of setae; the caudal pair is long,

measuring/.....

measuring 66-72 μ, and serrated. Two pairs of metapodal plates are situated laterally on the membrane with five pairs of small scattered platelets closer to the genital and ventri-anal shields. Between the latter two shields is a long very slender platelet.

The peritrematal shield (fig. 382) fuses posteriorly with the exopodal plate and terminates caudal to coxa IV in a sharp medially directed point.

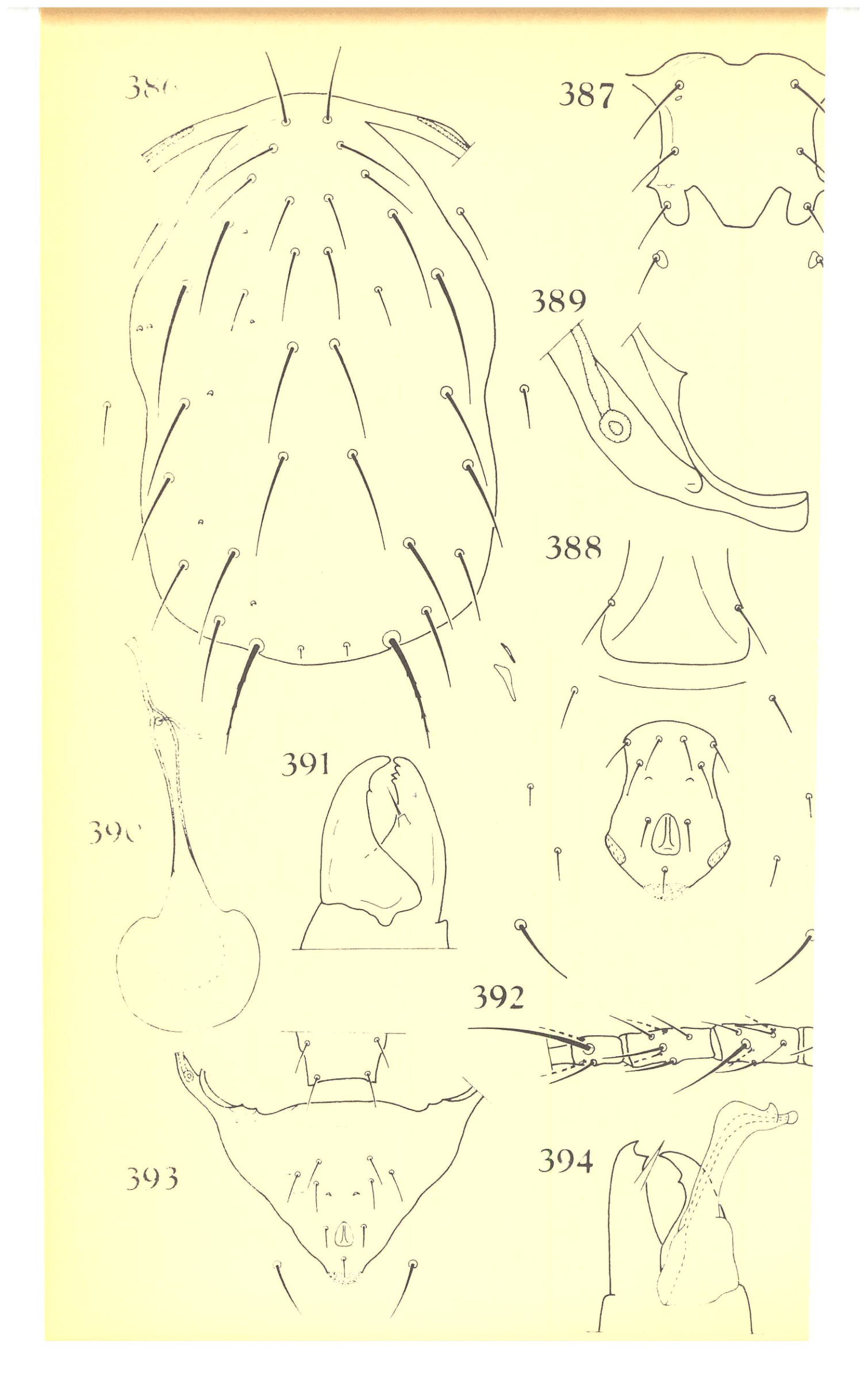
Spermatheca (fig. 383): The major duct is thin walled and broad. It measures 14 μ in length. The bifid atrium, length 6 μ, has the lips close to its centre. The cervix, length 27 μ, is broad and tubelike, but strongly constricted for about 7 μ of its length where it meets the atrium. The cervix is slightly flared before it joins the vesicle.

Chelicera (fig. 384): The fixed digit, length 24 μ, bears four teeth and a pilus dentilis on its inner margin. Three of these teeth are subapical and one is proximal to the pilus dentilis. The movable digit, length 26 μ, bears two widely spaced teeth on its inner margin.

Legs: The chaetotaxy of the legs is normal. Only the basitarsus of leg IV (fig. 385) bears a macroseta, measuring 75-78 μ in length.

Male: Unknown.

Material studied: The ♀-holotype of A.(A.) teke from grass, Leopoldville, Belgian Congo, April 12, 1955 (E.W. Baker); type no. 2700 in the U.S. National Museum./.....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Museum. The South African females examined are: one ♀ from an unidentified plant, Glenmore (Natal) 22.IV.1955 (M.K.P. Meyer); one ♀ from Citrus sp., Munster (Natal) 21.IV.1955 (M.K.P. Meyer); one ♀ from Hibiscus sp., Munster (Natal) 16.IV.1955 (P.A.J. Ryke) and one ♀ from Ipomoca purpurea, near Port Edward (Natal) 13.V.1965 (M.K.P. Meyer).

Amblyseius (Amblyseius) transvaalensis (v.d. Merwe & Ryke), comb. nov.

Amblyseius (Typhlodromalus) transvaalensis v.d. Merwe & Ryke, 1964, J. ent. Soc. sth. Afr. 26: 286.

A.(A.) transvaalensis is distinct amongst related species having long setae on the dorsal shield, except for seta D_6, and in having a short thick spermatheca.

This species is known from Musa sp., Tzaneen (Tvl.)

Amblyseius (Amblyseius) tutsi Pritchard & Baker (Figs. 386-394)

Amblyseius (Amblyseius) tutsi Pritchard & Baker, 1962, Hilgardia 33: 266.

Figs. 386-394. Amblyseius (Amblyseius) tutsi Pritchard & Baker.

Fig. 386, dorsum, female, fig. 387, sternal shield, female; fig. 388, posterior ventral surface, female; fig. 389, peritrematal shield, female; fig. 390, spermatheca, female; fig. 391, chelicera, female; fig. 392, leg IV, female; fig. 393, posterior venter, male; fig. 394, chelicera, male.

A.(A.) tutsi resembles A.(A.) transvaalensis (v.d. Merwe & Ryke) in many respects. The former differs from the latter in having a long slender spermatheca and shorter peritremes.

An examination of the ♀-paratype of A.(A.) tutsi proved the South African specimens identical to it. Pritchard and Baker omitted setal measurements in their publication and their statement "mediolateral setae all similar in length" is incorrect. In the ♀-paratype the posterior margin of the sternal shield is lobed and the ventri-anal shield is narrower anteriorly than across the anus.

The following redescription of A.(A.) tutsi is based on the ♀-paratype and the South African specimens.

Female: Dorsum(fig. 386). The dorsal shield measures 330-345 μ in length and 210-223 μ in width. The shield is mildly imbricated anterolaterally and has seven pairs of pores and 17 pairs of setae. These setae are arranged as follows: six dorsal, two median, four prolateral and five postlateral and measure in length: D_1, 45-47 μ; D_2, 35-38 μ; D_3, 37-43 μ; D_4, 56-63 μ; D_5, 60-66 μ; D_6, 8-10 μ; M_1, 23-28 μ; M_2, 58-64 μ; L_1, 49-52 μ; L_2, 37-41 μ; L_3, 60-66 μ; L_4, 80-92 μ; L_5 and L_6, 62-68 μ; L_7, 48-54 μ; L_8, 50-56 μ and L_9, 75-85 μ. All the setae on the dorsal shield are relatively long, except seta D_6 which is very short. The lateral setae are longer than the distances between their respective bases and the bases of the setae following next in the serie. Seta M_2 is longer than the distance between its base and the base of seta L_8.

Setae/....

Setae D_1, D_2 and D_5 are equal to or slightly shorter than the respective distances between their bases and the bases of setae D_2, D_3 and M_2. Setae D_3 and D_4 are not much shorter than the respective distances between their bases and the bases of setae D_4 and D_5. Seta M_1 equals less than half the distance between its base and the base of seta L_5.

Seta S_1, 35-38 μ long, and seta S_2, 20-24 μ long, are placed on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes are wider apart than the distance between setae L_3. In the unflattened specimens the peritremes reach posterior to the level of setae L_1.

Venter: The sternal shield (fig. 387), length 80-84 μ and width 76-82 μ, bears three pairs of setae. The anterior margin of the shield is medially dented and the posterior margin is lobed. The incisions are broad and reach anterior to the level of the third pair of sternal seta. The lateral lobes are smooth and the large tapered median lobe has a short straight posterior margin.

The broad, 88-93 μ, genital shield (fig. 388) bears the normal pair of setae.

The ventri-anal shield (fig. 388) is 105-111 μ long, 60-65 μ wide anteriorly and 68-75 μ across the anus. The anterior margin of the shield is slightly convex and the lateral margins are evenly constricted. The shield bears three pairs of pre-anal setae and a

big pair of pores caudomedial to the posterior pair of setae. Para-anal setae are normal.

The interscutal membrane is provided with four pairs of setae, the caudal pair being long, 48-56 μ. The membrane bears two pairs of metapodal plates and between the genital and ventri-anal shields lies a long slender platelet.

The peritrematal shield (fig. 389) is fused posteriorly to the exopodal plate and terminates posteriorly to coxa IV in a rounded posterior margin; it is angular medially.

Spermatheca (fig. 390): The major duct is slender and 10 μ long. The small lips are close to the major duct. An atrium is not distinct but appears swollen and merges evenly with the cervix. The latter is laterally smoothly constricted and flared towards the vesicle. The cervix is 26 μ long from the lips to the vesicle. The cervix is thick walled but the last one-fourth towards the vesicle is thin walled.

Chelicera (fig. 391): The movable and fixed digits are equal in length, 28 μ. The fixed digit bears three subapical teeth and a pilus dentilis. The movable digit has a single tooth on its inner margin.

Legs: The chaetotaxy of the legs is normal. Leg IV (fig. 392) bears three macrosetae, measuring 58-64 μ on the genu; 47-52 μ on the tibia and 80-85 μ on the basitarsus.

Male:/....

Male: Dorsum: The dorsal shield measures 276-290 μ in length and 193-205 μ in width. The chaetotaxy of the shield resembles that of the female but the setae are shorter: D_1, L_2 and L_8, 35-38 μ; D_2 and D_3, 28-31 μ; D_4, 37-40 μ; D_5, 40-43 μ; D_6, 8-10 μ; M_1, 21-24 μ; M_2 and L_1, 44-48 μ; L_3, 52-56 μ; L_4, 62-67 μ; L_5 and L_6, 46-50 μ; L_7, 32-35 μ and L_9, 59-63 μ.

Setae S_1 and S_2, 28-31 μ and 23-25 μ long respectively, are on the dorsal shield.

The peritrematal shields fuse anterolaterally with the dorsal shield and the peritremes reach anterior to the level of the bases of setae L_3.

Venter: The genito-sternal shield is normal with the genital opening on its anterior margin and five pairs of lateral setae.

The triangular ventri-anal shield (fig. 393), length 113-117 μ, is mildly imbricated. The antero-lateral corners of the shield are fused with the posterior extremities of the peritremetal shields. The ventri-anal shields bears three pairs of pre-anal setae and a pair of pores caudomedial to the inner posterior pair of pre-anal setae. Para-anal setae are normal.

The ventral interscutal membrane bears a single pair of setae, measuring 37-40 μ in length.

Chelicera (fig. 394): The fixed digit, length 24 μ, bears a single tooth and the pilus dentilis on its inner margin. The movable digit, length 25 μ, also bears a single tooth and a spermatophoral process.

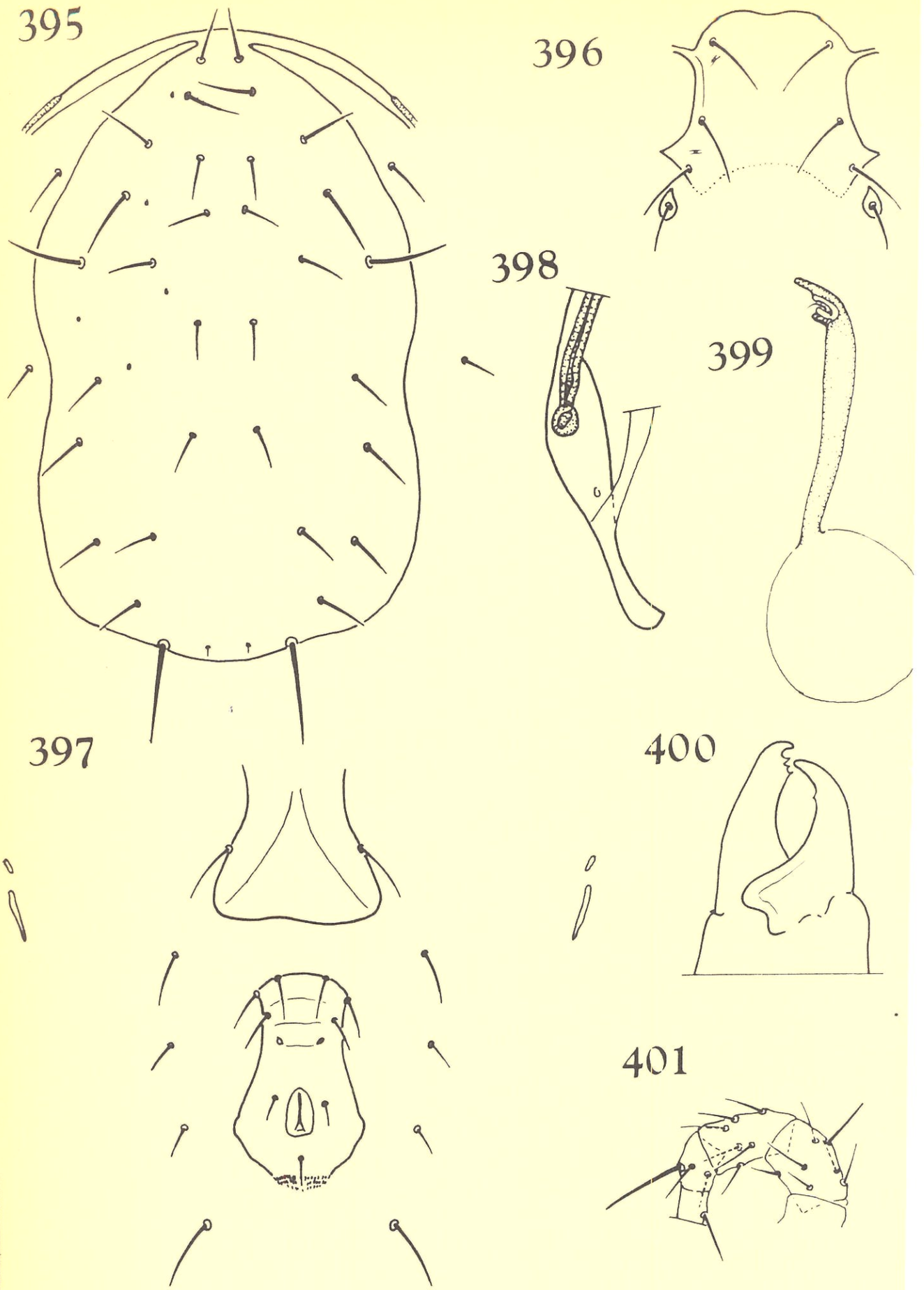
This/....

This process measures longitudinally 20 μ, but is distally bent ventrad and terminates in a small knob with a short anterolaterally directed protuberance close to the knob.

Legs: The chaetotaxy of the legs is normal. Leg IV bears three macrosetae, measuring 53-56 μ on the genu, 43-46 μ on the tibia and 70-75 μ on the basitarsus.

Material studied: The ♀-paratype of A.(A.) tutsi Pritchard & Baker, on Ivy, Astrida, Ruanda-Urundi, May 22, 1955 (E.W. Baker). The South African material consists of: four ♀♀ from Citrus sp., three ♀♀ from Passiflora quadrangularis and two ♀♀ from Poinsettia sp., Pretoria (Tvl.) October 1963 and April 1964 (G.G. v.d. Merwe and P. Luus). Three ♀♀ from grass under Ficus pretoriae and six ♀♀ from the latter, Pretoria (Tvl.) 26 and 27.I.1956 (P.A.J. Ryke). The author also collected from this tree several females and males, whose biology was studied as reported in Part II of this paper. Three ♀♀ from Prunus sp., two ♀♀ from Zantedeschia aethiopica, two ♀♀ from Sclerocarya caffra, four ♀♀ from Beaumontia sp. and six ♀♀ from Privulet sp., Pretoria North (Tvl.) 1963-1964 (M.K.P. Meyer, G.G. v.d. Merwe and P. Jordaan). One ♀ from Pyrus sp., one ♀ from Prunus armeniaca, one ♀ from Passiflora quadrangularis, one ♀ from Carica papaya and one ♀ from Citrus sp., Loskop Dam and Groblersdal Dist. (Tvl.) January 1963 (G.G. v.d. Merwe). One ♀ from Citrus sp., Rustenburg (Tvl.) 3.I.1964 (G.G. v.d. Merwe). One ♀ from an unidentified plant, Tzaneen (Tvl.) 18.II.1965 (P. Luus). One ♀ from Eriosema psoraleoides, Letsitele Valley, near Tzaneen

(Tvl.) /....



FIGS. 395-401. Amblyseius (Amblyseius) natalensis spec. nov., female

Fig.395, dorsum; fig.396, sternal shield; fig. 397, posterior ventral surface; fig.398, peritrematal shield; fig.399, spermatheca; fig.400, chelicera; fig.401, leg IV.

(Tvl.) 14.I.1964 (P. Jordaan). One ♀ from Celtis kraussiana, Louis Trichardt (Tvl.) 6.I.1964 (P. Jordaan). One ♀ from Gossypium sp., Barberton (Tvl.) 10.V.1963 (M.K.P. Meyer) and one ♂ from Ehretia rigida, grid N. 216 Kruger National Park (Tvl.) 13.I.1964 (P. Jordaan).

Amblyseius (Amblyseius) raptor (v.d. Merwe & Ryke), comb. nov.

Amblyseius (Typhlodromalus) raptor v.d. Merwe & Ryke, 1964, J. ent. Soc. sth. Afr. 26 : 270.

This species differs from related species having setae D_1, L_1, L_4 and L_9 longer than the remaining setae, in having setae D_1, L_1 and L_4 equal in length. Seta L_9 is approximately one quarter longer than these setae. Seta L_2 is short and seta L_3 equal half the length of seta L_4.

A. raptor is known from leaves of Passiflora sp., Grabouw (C.P.).

Amblyseius (Amblyseius) natalensis spec. nov. (Figs. 395-401).

Amblyseius natalensis is closely allied to A. hibisci (Chant) but the dorsal setae are longer, specially the D-series, the pre-anal setae on the ventri-anal shield are widely spaced and the spermatheca is short.

Female: Dorsum (fig. 395): The mildly imbricated dorsal shield, length 292(280-300) μ and breadth 186(180-190) μ, is provided with five pairs of pores and 17 pairs of setae. The lengths of these setae are: D_1 to D_5, M_1, M_2, L_5, L_7 and L_8, 24(20-26) μ; D_6, 8 μ, L_1, L_2 and L_6, 28(-30) μ, L_3, 38 μ; L_4, 42 μ and

L_9,/....

L_9, 52 μ. Setae L_1 and L_3 are slightly shorter than, but setae L_2 and L_8 are equal to or slightly longer than, the respective distances between their bases and the bases of the setae next following. Seta D_1 is longer than the distance between its base and the base of seta L_1. Seta M_2 is paired with L_7, but is shorter than the distance between its base and the base of the latter. Setae S_1 and S_2, 28 μ and 30 μ long respectively, are on the intersoutal membrane.

The peritrematal shields fuse anterodorsally with the dorsal shield. The peritreme reaches anteriorly past the level of seta L_2.

Venter: Sternal shield (fig. 396), breadth 63 μ; has a weekly sclerotized posterior margin and bears the normal three pairs of sternal setae. Metasternal shields oval and provided with the fourth pair of sternal setae.

The genital shield, width 72(70-74) μ, bears a pair of setae. The ventri-anal shield (fig. 397), length 95 μ and breadth 60 μ, is narrowed anteriorly (43 μ) and bears three pairs of widely spaced pre-anal setae and a pair of pores caudomedial to the third pair of setae.

The ventral interscutal membrane bears four pairs of setae, VL_1 measuring 33 μ in length, and two pairs of metapodal plates. The smaller secondary pair lies anterior to the primary pair.

The peritrematal shield (fig. 398) fuses posteriorly with the exopodal plate and terminates posterior to coxa IV with a rounded posterior margin, pointed anteromedially.

Spermatheca/.....

Spermatheca (fig. 399): The spermatheca, length 26-28 μ, has a short major duct and the atrium is almost completely occupied by the lips. The cervix is tube-like and measures 21-23 μ in length.

Chelicera (fig. 400): The fixed digit, length 23 μ, of the chelicera bears three subapical teeth. A pilus dentilis could not be traced. The movable digit, equal in length to the fixed digit, is provided with a single denticle.

Legs: The chaetotaxy of the legs is normal. Leg IV (fig. 401) bears a short macroseta measuring 28 μ in length on the genu and a long macroseta 40 μ in length on the basitarsus. The setae on the tibia are normal.

Male: Unknown.

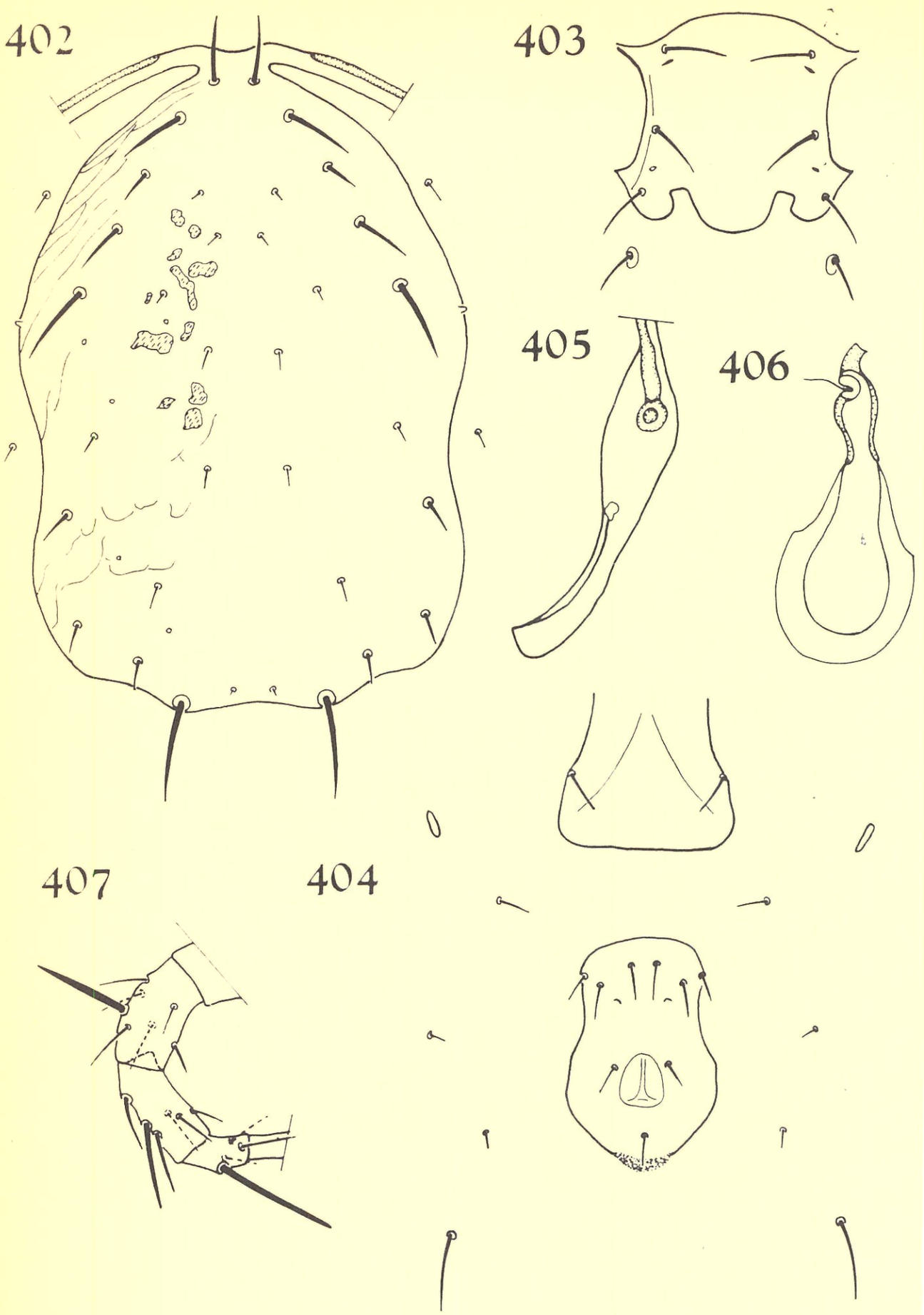
Material studied: ♀-Holotype (serial no. AcY 64/75/1) from Poinsettia sp., Munster (Natal) 15.IV.1955 (M.K.P. Meyer) and two ♀-paratypes from an unidentified plant, Munster (Natal) 1955 (M.K.P. Meyer).

Amblyseius (Amblyseius) anneckei (v.d. Merwe & Ryke), comb. nov.

Amblyseius (Typhlodromalus) anneckei v.d. Merwe & Ryke, 1964, J. ent. Soc. sth. Afr. 26: 268.

This species differs from related species in having setae D_1 and L_1 equal in length and setae L_4 and L_9 progressively longer. The posterior margins of the lateral lobes of the sternal shield are undulate and the ventral interscutal membrane lacks metapodal plates.

A. anneckei/.....



FIGS. 402-407. Amblyseius (Amblyseius) plebeius spec. nov., female

Fig.402, dorsum; fig.403, sternal shield; fig. 404, posterior ventral surface; fig.405, peritrematal shield; fig.406, spermatheca; fig.407, leg IV.

A. anneckei is known from leaves of Quercus sp., Grabouw (C.P.).

Amblyseius (Amblyseius) citri (v.d. Merwe & Ryke), comb. nov.

Amblyseius (Typhlodromalus) citri v.d. Merwe & Ryke, 1964, J. ent. Soc. sth. Afr. 26: 273.

This species differs from other members of the genus in that seta L_4 is longer than seta L_9 and setae D_1 and L_1 are equal in length. The posterior lobes of the sternal shield are smooth.

This species is known from Citrus sp., Rustenburg (Tvl.).

Amblyseius (Amblyseius) plebeius spec. nov.
(Figs. 402-407)

A.(A.) plebeius resembles A. finlandicus (Oudemans) and A. aferulus. It differs from both these species in having seta M_2 shorter than the postlaterals and from the former in having seta L_2 much shorter than seta L_3. It differs from the latter in having seta L_1 equal to or longer than the distance between its base and the base of seta L_2 and in the shape of the ventri-anal shield. A.(A.) plebeius also closely resembles A. concordis (Chant). It differs from the latter in being a larger species and in having seta D_1 and the prolateral setae longer.

Female: Dorsum (fig. 402): The laterally imbricated dorsal shield, length 345(332-348) µ and breadth 243(233-245) µ, has five pairs of pores and some

dorsomedian/.....

dorsomedian rugose patches. The shield bears 17 pairs of setae arranged as follows: six dorsal, two median, four prolateral and five postlateral. These setae measure in length: D_1 and L_4, 39(37-43) μ; D_2, D_3 and M_1, 8(-9) μ; D_4, D_5 and L_5, 10(-13) μ; D_6, 7 μ; M_2, 14(13-15) μ; L_2, L_6, L_7 and L_8, 21(20-23) μ; L_3, 34(32-35) μ; L_4, 49(46-52) μ and L_9, 56(54-58) μ. Only seta L_1 is equal to, or slightly longer than, the distance between its base and the base of the seta following next in the series. Seta M_2 is shorter than the postlateral setae and seta L_9 is the longest seta on the dorsal shield.

Seta S_1, 14(-16) μ long, and seta S_2, 11(-13) μ long, are placed on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes terminate anteriorly wider apart than the distance between the bases of setae L_1.

Venter: The sternal shield (fig. 403), length 74(-80) μ and width 69(-74) μ, bears three pairs of sternal setae. The anterior margin is slightly convex and the posterior margin is lobed. The lateral and median lobes are smooth and the incisions are square. Sternal setae IV are on small metasternal shields.

The broad, 84(-87) μ, genital shield (fig. 404) is normal with a pair of setae.

The ventri-anal shield (fig. 404) is anteriorly narrower, 56(-58) μ, than across the anus, 69(-74) μ. The anterior margin is rounded and the lateral margins are slightly constricted. The shield measures

102(-108)/.....

102(-108) μ in length. The three pairs of pre-anal setae are closely grouped with a pair of pores caudomedial to the posterior pair of setae. Para-anal setae normal.

Four pairs of setae, the caudal pair being 34(-39) μ long, and a single pair of metapodal plates are present on the interscutal membrane.

The peritrematal shield (fig. 405) ends caudal to coxa IV in a rounded posterior margin and an anteromedian blunt angle.

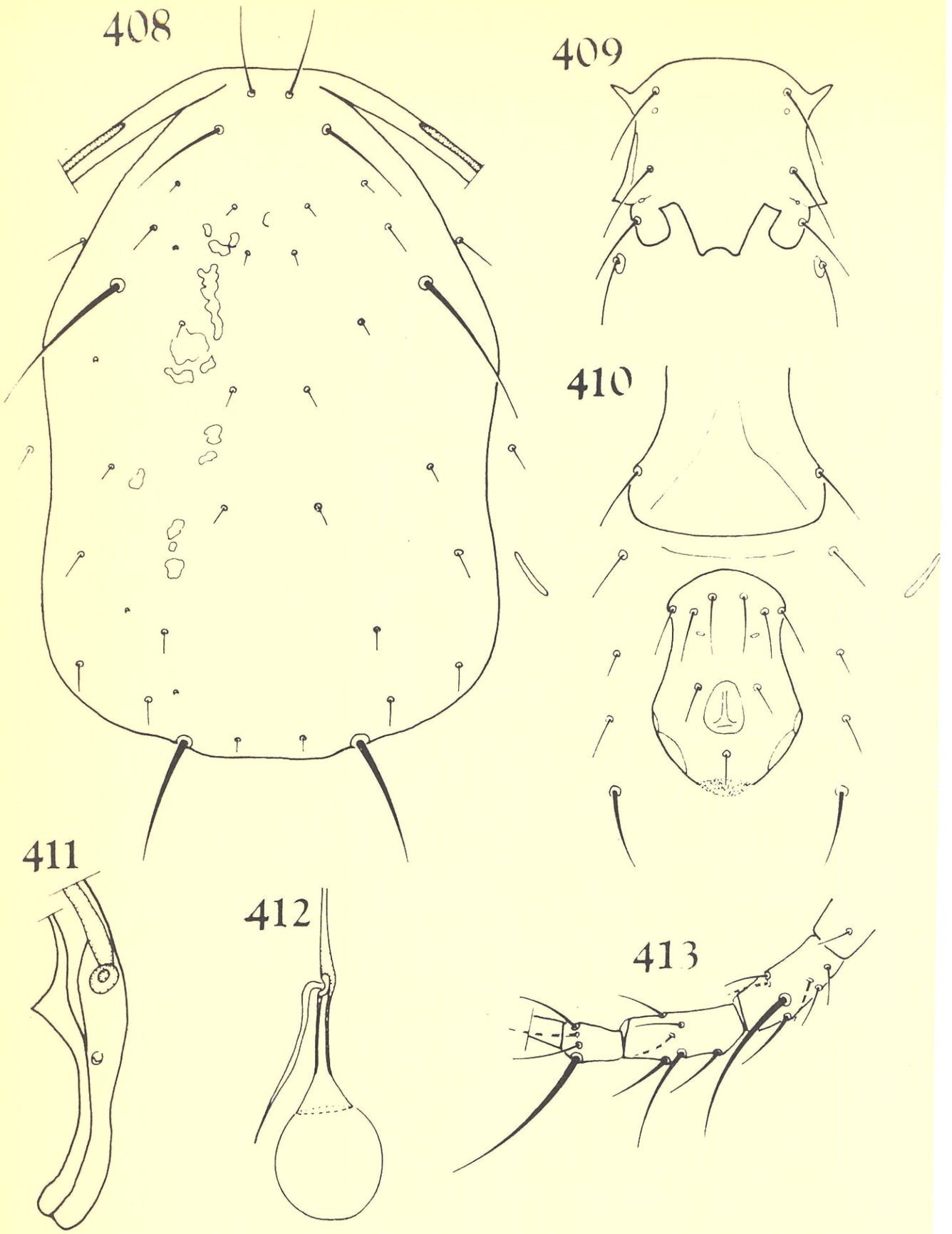
Spermatheca (fig. 406): The lips, 3 μ in diameter, are close to the short major duct. The atrium is not distinct from the cervix. The latter is bulged, very short, 10 μ, thick walled and gives the impression that it is extended in a flared shape towards the vesicle. This portion is however very thin walled and may be part of the vesicle.

Chelicerae: The chelicerae are in such a position that they could not be examined.

Legs: The chaetotaxy of the legs is normal. Leg IV (fig. 407) bears three macrosetae, measuring 50(47-52) μ on the genu, 44(42-46) μ on the tibia and 59(56-61) μ on the basitarsus.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/266/1) and three ♀-paratypes from Citrus sp., Munster (Natal) 15.IV.1955. (P.A.J. Ryke). One ♀-paratype from an unidentified tree, Munster (Natal) 15.IV.1955 (P.A.J. Ryke)./.....



FIGS. 408-413. Amblyseius (Amblyseius) pafuriensis spec. nov., female

Fig.408, dorsum; fig.409, sternal shield; fig.410, posterior ventral surface; fig.411, peritrematal shield; fig.412, spermatheca; fig.413, leg IV.

(P.A.J. Ryke).

Amblyseius (Amblyseius) pafuriensis spec. nov.

(Figs. 408-413)

This species resembles A.(A.) addcensis (v.d. Merwe & Ryke) and A.(A.) undulatus (v.d. Merwe & Ryke). A.(A.) pafuriensis differs from these two species in having seta L_2 minute and seta L_3 equal in length to half the distance between its base and the base of seta L_4. The short setae, setae D_1, L_1, L_4 and L_9 excluded, are shorter than in the above mentioned two species. Seta L_4 is longer than in these two species.

Female: Dorsum (fig. 408): The dorsal shield, length 330(322-341) µ and breadth 220(-242) µ, is smooth but for a few dorsomedian rugose patches and four pairs of pores. The shield bears 17 pairs of setae arranged as follows: six dorsal, two median, four prolateral and five postlateral. These setae measure in length: D_1, 41(38-) µ; D_2, D_3, D_6 and M_1, 6-8 µ; D_4, D_5, M_2, L_2 and L_5, 10-12 µ; L_1, 48(47-50) µ; L_3, 16(13-) µ; L_4, 82(79-85) µ; L_6, L_7 and L_8, 13(12-) µ and L_9, 63(-66) µ. Only setae D_1, L_1, L_4 and L_9 are thus of moderate length. Setae D_1 and L_1 are respectively longer than the distances between their bases and those of setae L_1 and L_2. Seta L_2 is minute and seta L_3 is about half as long as the distance between its base and the base of seta L_4.

Seta S_1, 19(16-) µ long, and seta S_2, 11(9-12) µ long, are placed on the dorsal interscutal membrane.

The peritrematal/.....

The peritrematal shields are fused anteriorly with the dorsal shield and the peritremes reach laterally to the level of setae L_1.

Venter: The sternal shield (fig. 409) measures 92(87-) µ in length and 76(74-78) µ in breadth. The shield bears three pairs of setae and has a lobate posterior margin. The wedge-shaped median lobe has a concave posterior margin. The incisions are broad and the lateral lobes large and smooth. Sternal setae IV are placed on small oval metasternal shields.

The broad, 93(89-96) µ, genital shield is normal and provided with a pair of setae.

The ventri-anal shield (fig. 410) is 105(103-112) µ long and the anterior portion of the shield is less broad than the anal portion, 70(69-72) µ. The shield bears three pairs of pre-anal setae in an almost straight line. A pair of pores lies caudomedial to the median pair of pre-anal setae. The para-anal setae are normal. The anterior margin of the shield is smoothly rounded and the lateral margins are slightly emarginate.

The ventral interscutal membrane is provided with four pairs of setae; VL_1 measures 37(-43) µ in length. A single pair of slender metapodal plates is present on the membrane and between the genital and ventri-anal shields lies a long narrow platelet.

The peritrematal shield (fig. 411) fuses posteriorly with the exopodal plate and curves around coxa IV ending medially broad and blunt.

Spermatheca/.....

Spermatheca (fig. 412): The slender spermatheca measures 28 μ in length. The atrium is only slightly bulged across the prominent lips and the cervix is funnel shaped. The minor duct is strikingly broad in this species.

Chelicerae: The position of the chelicerae renders it impossible to produce an illustration thereof. The fixed digit, however, is provided with three subapical teeth and a pilus dentilis and the movable digit with a single tooth.

Legs: The chaetotaxy of the legs is normal. Macrosetae present on the legs and their lengths are as follows: genu I, 37(-39) μ; genu II, 30 μ; genu III, 40(38-42) μ; tibia III, 36(33-) μ; genu IV, 66 μ; tibia IV, 55(52-) μ and basitarsus IV, 85(-89) μ (fig. 413).

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/267/1) from Croton sp., Pafuri, Kruger National Park (Tvl.) 21.IX.1963, (M.K.P. Meyer). One ♀-paratype from Pseudocadia zambesiaca. Pafuri, Kruger National Park (Tvl.) 23.IX.1963 (G.G. v.d. Merwe). One ♀-paratype from Pseudocadia zambesiaca, Timbavati, Kruger National Park (Tvl.) 29.IX.1963 (M.K.P. Meyer). One ♀-paratype from Morus sp., Barberton (Tvl.) 10.V.1963 (G.G. v.d. Merwe).

Amblyseius (Amblyseius) addoensis (v.d. Merwe & Ryke), comb. nov.

Amblyseius (Typhlodromalus) addoensis v.d. Merwe & Ryke, 1964, J. ent. Soc. sth. Afr. 26: 275.

This/.....

This species differs from other members of the genus in that seta L_4 is longer than seta L_9 and seta D_1 is shorter than seta L_1, while seta L_3 is slightly shorter than the distance between its base and the base of seta L_4. The posterior margins of the lateral lobes of the sternal shield are smooth.

A.(A.) addoensis is known from Vitis sp., Addo (C.P.).

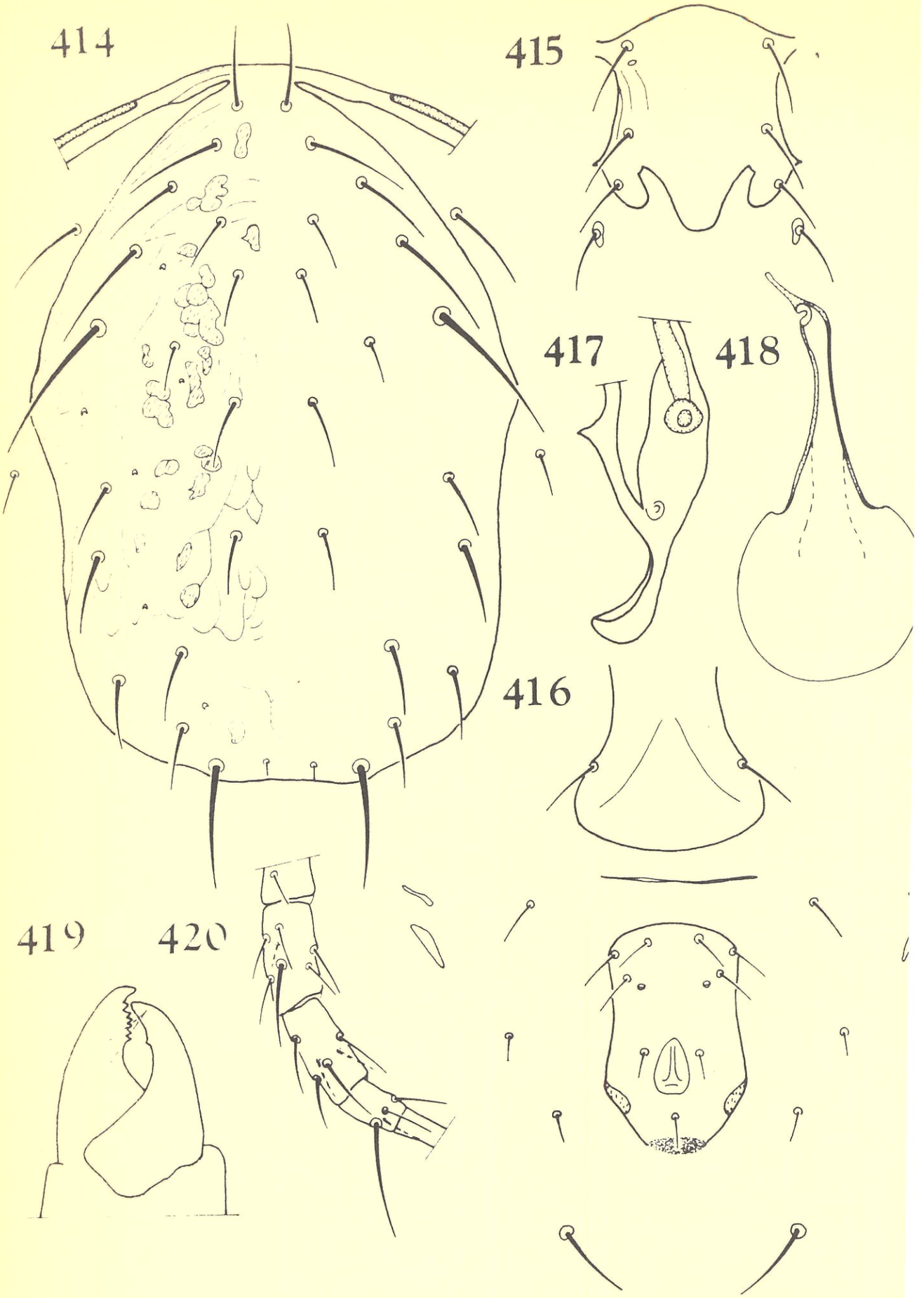
Amblyseius (Amblyseius) undulatus (v.d. Merwe & Ryke), comb. nov.

Amblyseius (Typhlodromalus) undulatus v.d. Merwe & Ryke, 1964, J. ent. Soc. sth. Afr. 26: 278.

A.(A.) undulatus differs from other members of the genus in that seta L_4 is longer than seta L_9 and seta D_1 is shorter than seta L_1, while seta L_3 is as long as the distance between its base and the base of seta L_4. The posterior margins of the lateral lobes of the sternal shield are undulate.

The females of this species are difficult to distinguish from those of A.(A.) addoensis but the males differ markedly. The distal extremity of the spermatophoral process in A.(A.) undulatus is provided with two recurved hooks whereas it is smooth in A.(A.) addoensis.

A.(A.) undulatus is known from Quercus sp., Addo (C.P.).



FIGS. 414-420. Amblyseius (Amblyseius) prolixus spec. nov., female

fig.414, dorsum, fig.415, sternal shield; fig. 416, posterior ventral surface; fig.417, peritrematal shield; fig.418, spermatheca; fig.419, chelicera; fig.420, leg IV.

Amblyseius (Amblyseius) capensis (v.d. Merwe & Ryke), comb. nov.

Amblyseius (Typhlodromalus) capensis v.d. Merwe & Ryke, 1964, J. ent. Soc. sth. Afr. 26: 281.

This species differs from related species having seta L_4 longer than seta L_9 and seta D_1 shorter than seta L_1, in seta L_2 being shorter and seta L_3 being longer than the distances between their respective bases and the bases of the setae following next in the series.

A.(A.) capensis is known from Betula sp., Addo, (C.P.).

Amblyseius (Amblyseius) erugatus (v.d. Merwe & Ryke), comb. nov.

Amblyseius (Typhlodromalus) erugatus v.d. Merwe & Ryke, 1964, J. ent. Soc. sth. Afr. 26: 283.

A.(A.) erugatus differs from related species, having seta L_4 longer than seta L_9 and seta D_1 shorter than seta L_1, in having seta L_2 and L_3 longer, but seta D_2 shorter, than the distances between their respective bases and the bases of the setae following next in the series.

This species is known from Passiflora sp., Grabouw (C.P.).

Amblyseius (Amblyseius) prolixus spec. nov. (Figs. 414-420).

A.(A.) prolixus resembles A.(A.) erugatus in many respects. It differs from the latter in having setae D_2, L_5 and M_2 equal in length to the respective

distances/.....

distances between their bases and the bases of setae D_3, L_6 and L_8 The movable digit of the chelicera bears six teeth in A.(A.) prolixus and only two teeth in A.(A.) erugatus.

Female: Dorsum (fig. 414): The broad ventri-anal shield , length 315(306-) μ and breadth 209(200-) μ, is mildly imbricated with dorsomedian rugose patches and six pairs of pores. The shield bears 17 pairs of setae arranged as follows: six dorsal, two median, four prolateral and five postlateral. These setae measure in length: D_1, 37(35-) μ; D_2 and D_3, 26(24-) μ; D_4, M_2, L_7 and L_8, 33(30-) μ; D_5 and L_5, 30(28-) μ; D_6, 8(6-) μ; M_1, 22(20-) μ; L_1, 47(45-) μ; L_2 and L_6, 39(37-) μ; L_3 and L_9, 58(56-) μ and L_4, 73(70-) μ. Setae D_2 are equal to and setae L_1, L_2, L_3 and L_8 are longer than the distances between their respective bases and the bases of the setae following next in the series. Setae L_5 and M_2 are respectively equal in length to the distances between their bases and the bases of setae L_6 and L_8. Seta L_4, the longest seta on the dorsal shield, is equal to or almost equal to the distance between its base and the base of seta L_5.

Seta S_1, 43(40-) μ long, and seta S_2, 21(19-) μ long, are placed on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes terminate a distance apart that is almost equal to the distance separating setae L_3.

Venter: The sternal shield (fig. 415) is longer, 89(87-93) μ, than broad, 69(67-71) μ, and bears three

pairs/.....

pairs of setae. The anterior margin of the shield is slightly convex and the posterior margin is lobed. The incisions are square cut and reach anterior to the level of the third pair of sternal setae. The lateral lobes are smooth while the median lobe is tapered and terminates bluntly well posterior to the level of the lateral lobes. Sternal setae IV are on small metasternal shields.

The genital shield (fig. 416) is broad, 74(72-76) μ, and has a convex posterior margin. The shield bears the normal pair of setae.

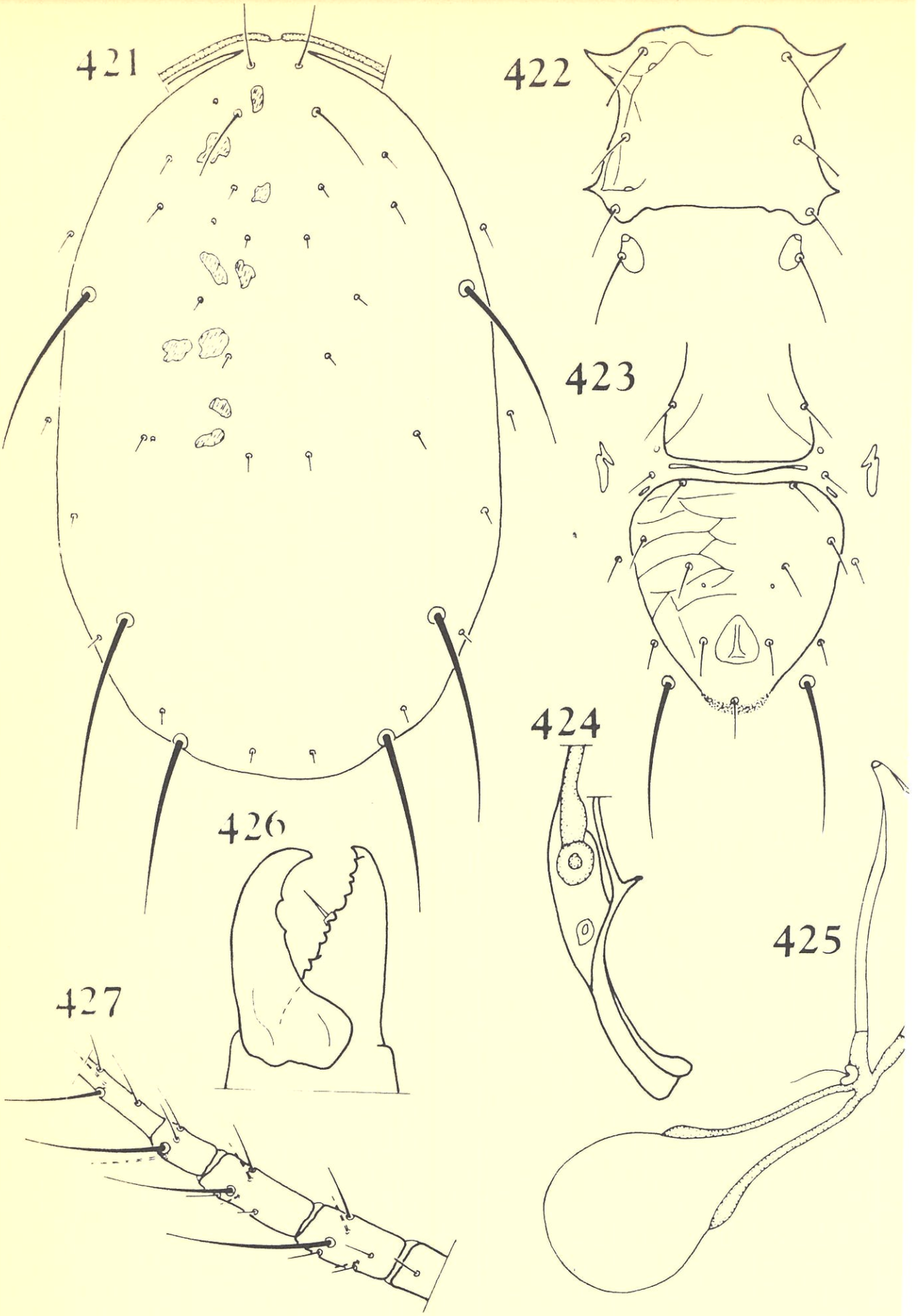
The smooth oblong ventri-anal shield (fig. 416), length 97(96-99) μ and breadth 60(58-61) μ, has a slightly convex anterior margin and evenly constricted lateral margins. The shield is provided with three pairs of pre-anal setae and a pair of pores just caudomedial to the posterior pair of setae. Para-anal setae are normal.

Between the genital and ventri-anal shields lies a long slender platelet on the membrane. Two pairs of metapodal plates and four pairs of setae are lateral to the ventri-anal shield. The caudal pair of these setae is long and measures 37(35-) μ in length.

The peritrematal shield fuses posteriorly with the exopodal plate and curves posteriorly around coxa IV. The shield terminates as in fig. 417.

Spermatheca (fig. 418): The slender major duct measures 8 μ in length and the lips are placed where the duct joins the cervix. The spermatheca lacks a true atrium. The cervix, length 27 μ, is slightly

bulged/....



FIGS. 421-427. Amblyseius (Amblyseius) ovalitectus spec. nov., female

Fig.421, dorsum; fig.422, sternal shield; fig. 423, posterior ventral surface; fig.424, peritrematal shield; fig.425, spermatheca; fig.426. chelicera; fig.427, leg IV.

bulged towards the lips and gradually flared towards the vesicle.

Chelicera (fig. 419): The fixed digit, length 23 µ, bears six small teeth and a pilus dentilis on the distal half of its inner margin. The movable digit, 25 µ in length, has a single tooth on its inner margin.

Legs: The chaetotaxy of the legs is normal. Leg IV (fig. 420) bears three macrosetae, measuring 43(40-) µ on the genu, 36(33-) µ on the tibia and 55(52-) µ on the basitarsus.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/268/1) and two ♀-paratypes from Malvacea sp., Storms River Mouth, Tsitsikama Seacoast National Park (C.P.) 20.I.1965 (G.G. v.d. Merwe).

Amblyseius (Amblyseius) ovalitectus spec. nov.

(Figs. 421-247)

A.(A.) ovalitectus resembles A.(A.) rykei Pritchard & Baker. The former is, however, distinct from the latter in having setae L_4 and L_9 equal in length, but shorter than seta M_2. A.(A.) ovalitectus also differs from A.(A.) rykei in having a triangular ventri-anal shield.

Female: Dorsum (fig. 421): The dorsal shield, length 339 µ and breadth 195 µ, is oval shaped and smooth except for some dorsomedian rugose patches and three pairs of pores. The shield bears 17 pairs of

setae/.....

setae arranged as follows: six dorsal, two median, four prolateral and five postlateral. These setae measure in length: D_1, 30 μ; D_2, D_3, D_4, D_5, M_1 and L_5, 6 μ; D_6, L_2, L_6, L_7 and L_8, 8 μ; M_2, 99 μ; L_1, 38 μ; L_3, 11 μ; L_4 and L_9, 85 μ. The majority of setae are thus minute, with seta L_3 only slightly longer than seta L_2. Seta D_1 is longer than the distance between its base and the base of seta L_1. The latter is equal in length to the distance between its base and the base of seta L_2. Setae L_4 and L_9 are equal in length and the former equals in length approximately three quarters of the distance between its base and the base of seta L_6. Seta M_2 is the longest seta on the dorsal shield and lies just anteromedial of seta L_7.

Setae S_1 and S_2, 11 μ and 8 μ long respectively, are present on the dorsal interscutal membrane.

The peritrematal shields are fused anteriorly with the dorsal shield and the peritremes almost meet each other anteromedial to the widely spaced setae D_1.

Venter: The sternal shield is broad (fig. 422), length 61 μ and breadth 65 μ, with a straight posterior margin and small lateral lobes. The anterior margin is medially slightly indented. The shield is provided with the normal three pairs of sternal setae. Sternal setae IV are situated on large oval metasternal shields.

The genital shield (fig. 423), width 71 μ, is normal with a pair of setae.

The imbricated ventri-anal shield (fig. 423), length 123 μ and breadth 112 μ, is triangular with rounded anterolateral corners and bears three pairs of well spaced pre-anal setae with a pair of pores

caudomedial/.....

caudomedial to the posterior pair of setae. The normal three para-anal setae are present on the shield.

A slender platelet lies between the genital and ventri-anal shields. The interscutal membrane is also provided with four pairs of setae, the caudal pair, VL_1, being very long, 85 μ. The primary and secondary metapodal shields are joined by a small bridge.

The peritrematal shield ends broadly (fig. 424) after curving around coxa IV.

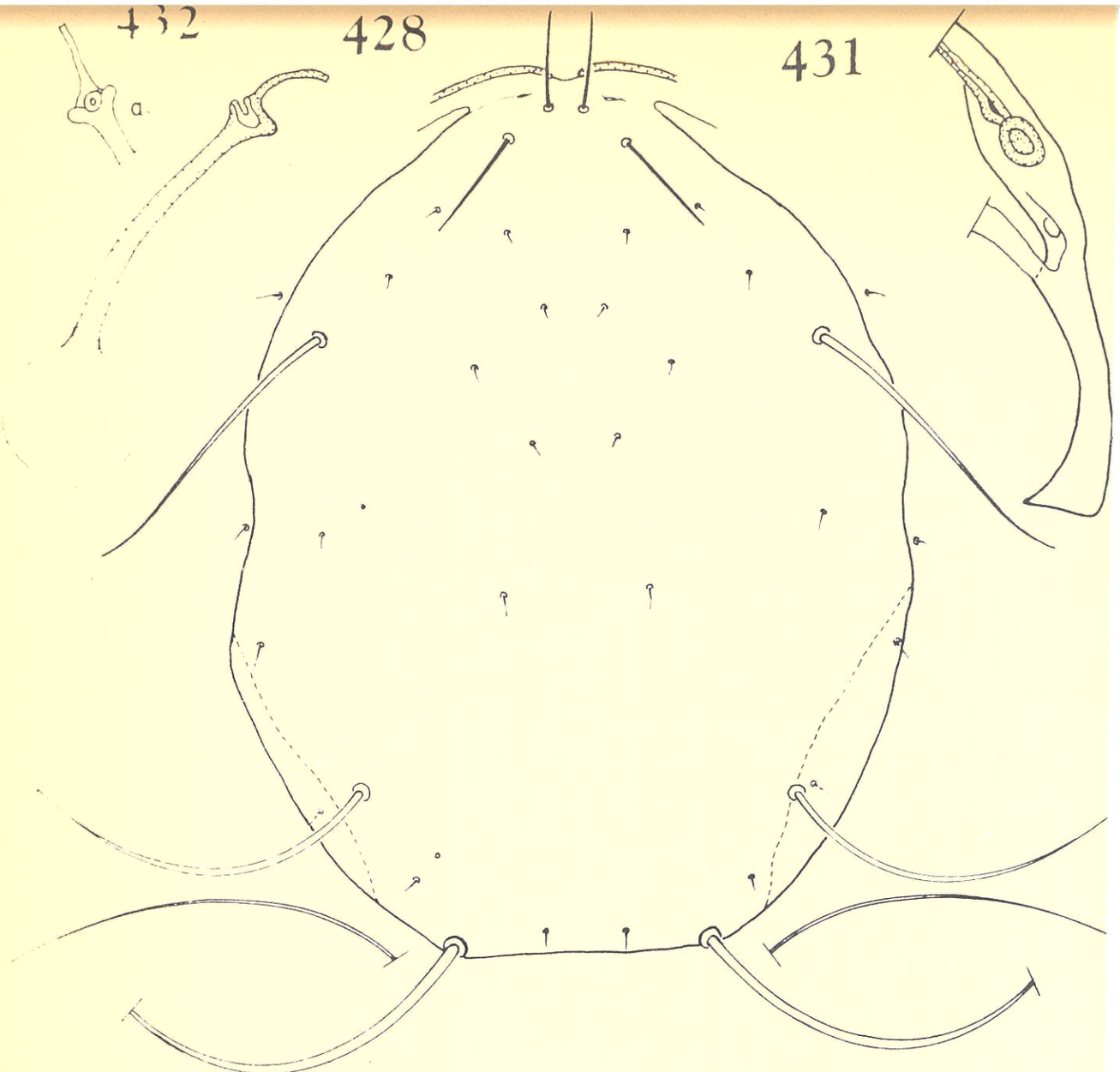
Spermatheca (fig. 425): The stout spermatheca, 72 μ in length, has a long, 38 μ, and broad major duct. The bifid atrium, 9 μ, has its lips close to the cervix. The cervix is 25 μ long and its thick lateral margins diverge towards the vesicle.

Chelicera (fig. 426): The fixed digit, 25 μ long, of the chelicera bears ten teeth on its inner margin and a pilus dentilis. The movable digit, 28 μ long, is provided with two teeth on its inner margin.

Legs: Leg IV (fig. 427) bears four long macrosetae. The one on the genu is 85 μ long, on the tibia 71 μ, on the basitarsus 75 μ and on the tarsus 53 μ. Genu III also bears a macroseta 36 μ long and so does genu II, 26 μ long. The chaetotaxy of the legs is normal.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/269/1) from soil, Potchefstroom (Tvl.) October 1962 (G.C. Loots).



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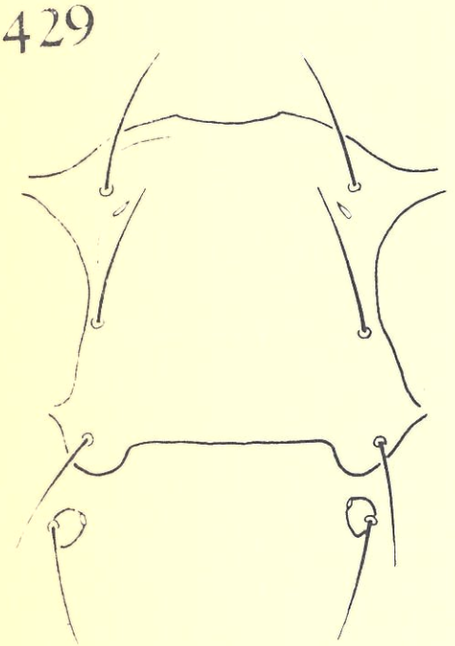

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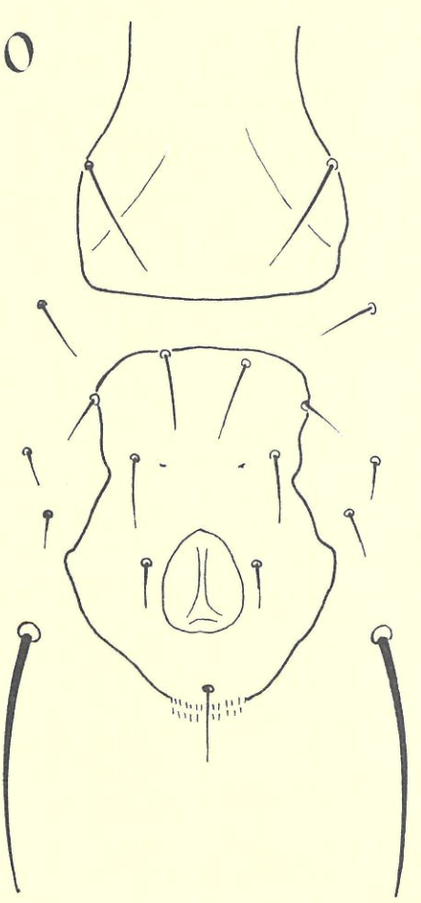

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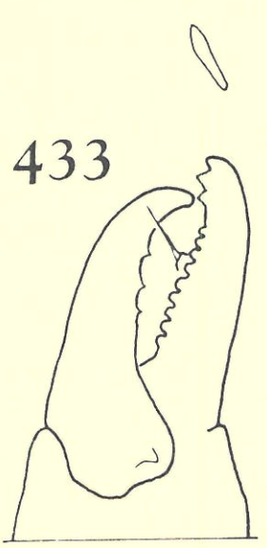

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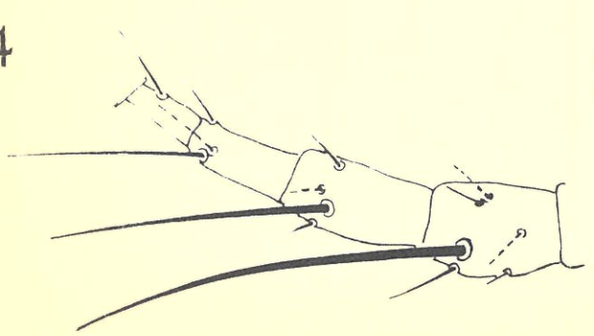


Amblyseius (Amblyseius) neolargoensis spec. nov.

(Figs. 428-434)

This species superficially resembles A.(A.) largoensis (Muma). It differs from the latter by setae D_1 and L_1 being longer and M_2 and L_9 being much longer, and also in the lengths of the macrosetae on leg IV. It differs from other species having these setae long, in the shape of the ventri-anal shield and the spermatheca.

Female: Dorsum (fig. 428): The smooth dorsal shield, length 402(392-405) µ and breadth 304(300-308) µ, is provided with 17 pairs of setae arranged as follows: six dorsal, two median, four prolateral and five postlateral. The lengths of these setae are: D_1, 43(-45) µ; D_2, D_3, D_4, M_1, L_2 and L_3, 8 - 9 µ; D_5, D_6, L_5 and L_8, 11(-13) µ. M_2, 163(158-167) µ; L_1, 58(56-60) µ; L_4, 145(140-148) µ; L_6 and L_7, 14(-16) µ and L_9, 358(355-362) µ. Seta L_1 reaches beyond the base of seta L_2. Seta L_4 is equal in length to the distance between its base and the base of seta L_6.

Setae S_1 and S_2 are on the interscutal membrane.

The peritrematal shields fuse anterodorsally with the dorsal shield. The peritreme reach anterior to the base of seta D_1.

Figs. 428-434. Amblyseius (Amblyseius) neolargoensis spec. nov., female.

Fig. 428, dorsum; fig. 429, sternal shield; fig. 430, posterior ventral surface; fig. 431, peritrematal shield; fig. 432, spermatheca; fig. 432 a, lateral detail of atrium; fig. 433, chelicera; fig. 434, leg IV.

Venter: Sternal shield (fig. 429), length 88(86-92) μ and breadth 76(-78) μ, with three macrosetae. Posterior margin straight with distinct lateral lobes. Sternal setae IV on round metapodal shields.

The genital shield (fig. 430), width 84(-88) μ, is normal and provided with a pair of setae.

The ventri-anal shield (fig. 430) is longer than broad, 117(115-120) μ x 80(-84) μ, and constricted in the region of the caudal pair of pre-anal setae, leaving the broadest part across the anus. The shield bears three pairs of widely spaced pre-anal setae with a pair of pores between the third pair of setae.

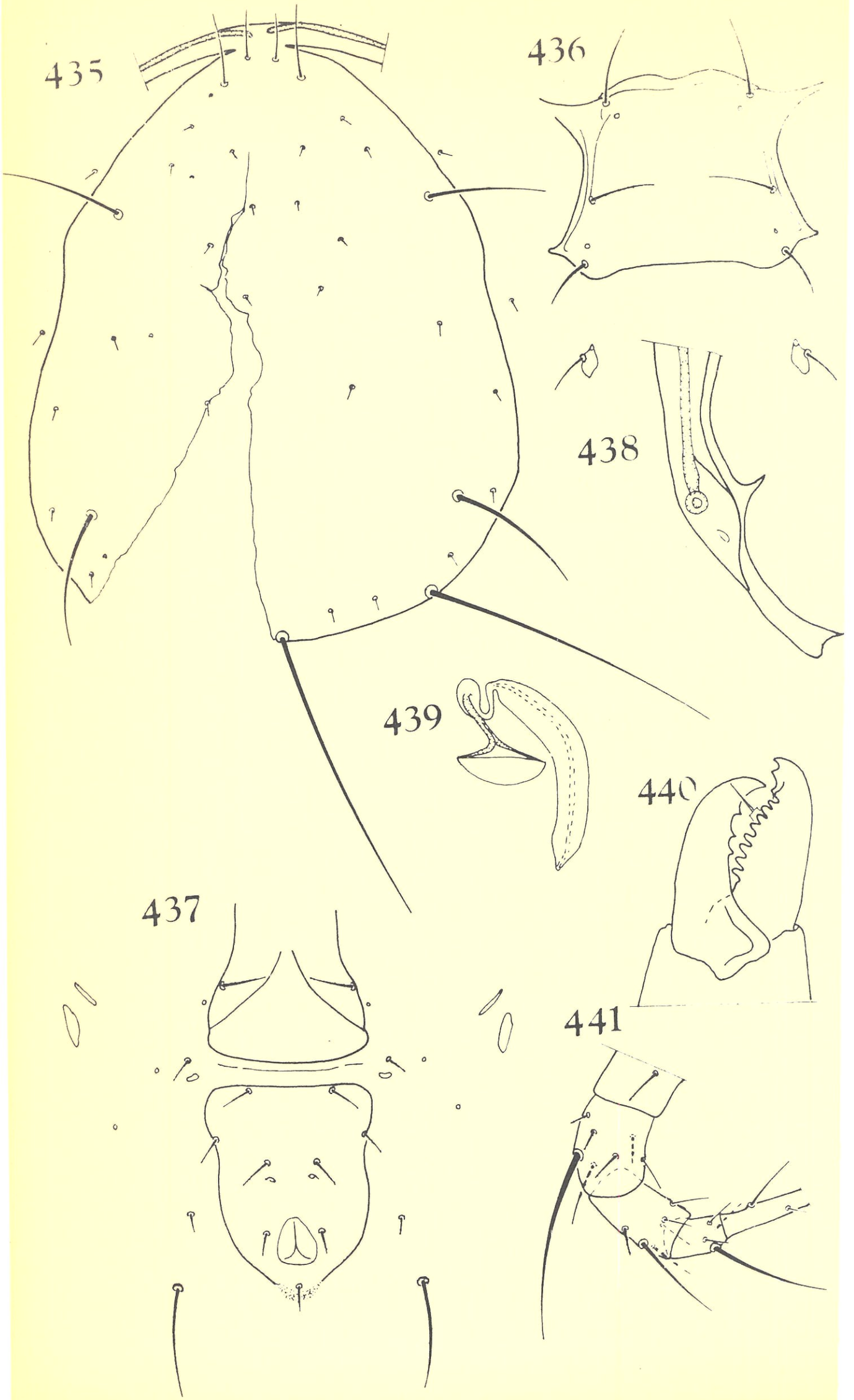
The ventral interscutal membrane is provided with four pairs of setae, the first pair being twice as long as the second and third, the fourth (VL_1) very long, 86(84-88) μ. A pair of metapodal plates is present.

The peritrematal shield fuses posteriorly with the exopodal plate (fig. 431) and terminates caudal to coxa IV with a sharply rounded posterior margin and an anteromedially directed sharp point.

Spermatheca (fig. 432): The slender spermatheca has a thin bent major duct and a knob-like atrium, 4 μ in length, with prominent lips. Fig. 432 as illustrates the lateral detail of the atrium. The smooth slender cervix measures 28(-38) μ in length.

Chelicera (fig. 433): The fixed digit, 31(-33) μ long, bears two subapical teeth and nine blunt teeth on its inner margin together with a pilus dentilis. The movable digit, length 28(-30) μ, has three denticles

on its/....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on its inner margin.

Legs: The chaetotaxy of the legs is normal. Leg IV (fig. 434) is provided with three macrosetae measuring 178(170-186) μ on the genu, 118(115-124) μ on the tibia and 83(80-87) μ on the basitarsus. The macrosetae on leg III in the same sequence measure 60 μ, 52 μ and 38 μ and on leg II, 42 μ, none, and 38 μ and leg I, 52 μ on the genu only.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 64/72) and three ♀-paratypes from an unidentified plant, Munster (Natal) 14.IV.1955 (M.K.P. Meyer).

Amblyseius (Amblyseius) anomalus spec. nov.

(Figs. 435-441)

The shape of the spermatheca of A.(A.) anomalus renders it unique amongst South African species. This species resembles A.(A.) microsetae Muma, but differs from the latter in having setae L_5, L_6, L_7 and L_8 equal in length and the ventri-anal shield smooth. The relative positions of the posterior pair of pre-anal setae and the pair of pores on the ventri-anal shield also differ markedly; they are more closely spaced in A.(A.) anomalus than in A.(A.) microsetae.

Figs. 435-441. Amblyseius (Amblyseius) anomalus spec. nov., female

Fig. 435, dorsum; fig. 436; sternal shield; fig. 437, posterior ventral surface; fig. 438, peritrematal shield; fig. 439, spermatheca; fig. 440, chelicera; fig. 441, leg IV.

Female: Dorsum (fig. 435): The strongly convex dorsal shield, length 364(-388) μ and breadth 294(-282) μ, is smooth but for four pairs of small pores. The shield is provided with 17 pairs of setae, arranged as follows: six dorsal, two median, four prolateral and five postlateral. These setae measure in length: D_1, 29(-31) μ, D_2, D_3, D_4, D_6, M_1, L_2 and L_3, 7(-9) μ; D_5, L_5, L_6, L_7 and L_8, 12(-13) μ; M_2, 93(-98) μ; L_1, 50(48-52) μ; L_4, 78(76-80) μ and L_9, 204(-213) μ. Only setae D_1, L_1, L_4, M_2 and L_9 are long, the latter being whiplike. The other setae are minute. Setae D_1, L_1 and M_2 are longer than the respective distances between their bases and the bases of setae L_1, L_2 and L_8. Seta L_4 is slightly shorter than the distance between its base and the base of seta L_5.

The peritrematal shields are fused anterodorsally to the dorsal shield. The peritremes terminate well anterior to the bases of setae D_1.

Venter: The sternal shield (fig. 436), length 74(70-75) μ and width 76(74-78) μ, bears three pairs of setae. The anterior margin is medially slightly indented and the posterior margin is almost straight. Sternal setae IV are placed on irregular metasternal shields.

The genital shield (fig. 437) is 85(83-88) μ wide and bears a pair of setae. The posterior margin of the shield is slightly convex.

The ventri-anal shield (fig. 437), length 115(113-117) μ and breadth 91(88-93) μ, has a very slightly concave anterior margin and rounded anterolateral corners. The lateral margins are

slightly/.....

slightly constricted. The shield is provided with three pairs of well spaced pre-anal setae and a pair of pores caudomedial to the posterior pair of setae. Para-anal setae are normal.

The interscutal membrane bears only three pairs of setae, the caudal pair being long, 64(61-65) μ. Two pairs of metapodal plates are present posterior to coxae IV. Between the genital and ventri-anal shields lies a long slender platelet with four small scattered platelets laterally.

The peritrematal shield is fused posteriorly with the exopodal plate (fig. 438) and ends broad posterior to coxa IV with a sharp medially directed point.

Spermatheca (fig. 439): The major duct is broad and thick walled for the first 32 μ of its total length, 36 μ. The remaining short portion, which is fused to the atrium, is slender and bent. The atrium is bulbous, approximately 4 μ in diameter, and probably lacks lips. The cervix, length 10 μ, is slender but strongly flared to a diameter of 14 μ towards the vesicle. The latter is deflated, probably due to the females not being fertilized. The spermathecae in all the females examined are of the queer folded shape as illustrated.

Chelicera (fig. 440): The fixed digit is 28 μ long and bears two sharp subapical teeth, nine blunt teeth and a pilus dentilis along its inner margin. The movable digit, length 33 μ, is provided with three sharp teeth on its inner margin.

Legs: The chaetotaxy of the legs is normal. Leg IV

(fig. 441)/....

(fig. 441) bears three macrosetae, measuring 88(-93) μ on the genu, 47(-54) μ on the tibia and 59(-64) μ on the basitarsus.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/270/1) from Monsterosa sp., Munster (Natal) 21.IV.1955 (M.K.P. Meyer). Three ♀-paratypes from grass, Munster (Natal) 19.IV.1955 (M.K.P. Meyer). One ♀-paratype from Curtisia dentata, Tsitsikama Seacoast National Park (C.P.) 19.I.1965 (G.G. v.d. Merwe) and two ♀-paratypes from an unidentified plant, Knysna (C.P.) 22.I.1965 (G.G. v.d. Merwe).

b. Subgenus Typhloseius Muma, new status

Typhloseius Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 291; Muma, 1963a, Fla Ent. 46: 13. Type: Amblyseiopsis sextus Garman, 1958, monotypic.

Subgenus Typhloseius is characterized by having six pairs of dorsal setae, three pairs of median setae, two of which are on the postscutum, four pairs of prolateral setae and five pairs of postlateral setae. Two pairs of scapular setae are present on the dorsal interscutal membrane.

This subgenus resembles Amblyseius sens. str. but for the presence of two pairs of median setae on the postscutum.

The subgenus Typhloseius is known only from the type species, collected on various plants in Texas.

c. Subgenus Typhloseiella Muma, new status

Typhloseiella Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 291; Muma, 1963a, Fla Ent. 46: 13. Type: Seiulus isotrichus Athias-Henriot, monotypic.

Athiaseius Wainstein, 1962a, Acarologia 4: 17. Type; Seiulus isotrichus Athias-Henriot, 1958, by original designation.

The subgenus Typhloseiella is characterized by having six pairs of dorsal setae, three pairs of median setae, two of which are on the postscutum, four pairs of prolateral setae and four pairs of postlateral setae. Two pairs of scapular setae are present on the dorsal interscutal membrane.

This subgenus resembles the subgenus Typhloseius in having two pairs of median setae on the postscutum but differs from the latter in having only four pairs of postlateral setae.

This subgenus is not yet known from South Africa.

d. Subgenus Kampimodromus Nesbitt

Kampimodromus Nesbitt, 1951, Zool. Verh., Leiden 12: 52; Muma, 1963a, Fla Ent. 46: 12; Schuster & Pritchard, 1963, Hilgardia 34: 198, 225. Type: Typhlodromus aberrans Oudemans, 1930 (= Typhlodromus elongatus Oudemans, 1930, by original designation.

Amblyseius (Kampimodromus); Pritchard & Baker, 1962, Hilgardia 33: 294; Wainstein, 1962a, Acarologia 4: 14.

Paradromus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 286. Type: Typhlodromus aberrans Oudemans, monotypic.

Amblyseius (Ricoseius) De Leon, 1965b, Fla Ent. 48: 128. Type of subgenus: Amblyseius (Ricoseius) loxocheles De leon, 1965, monotypic. New synonymy.

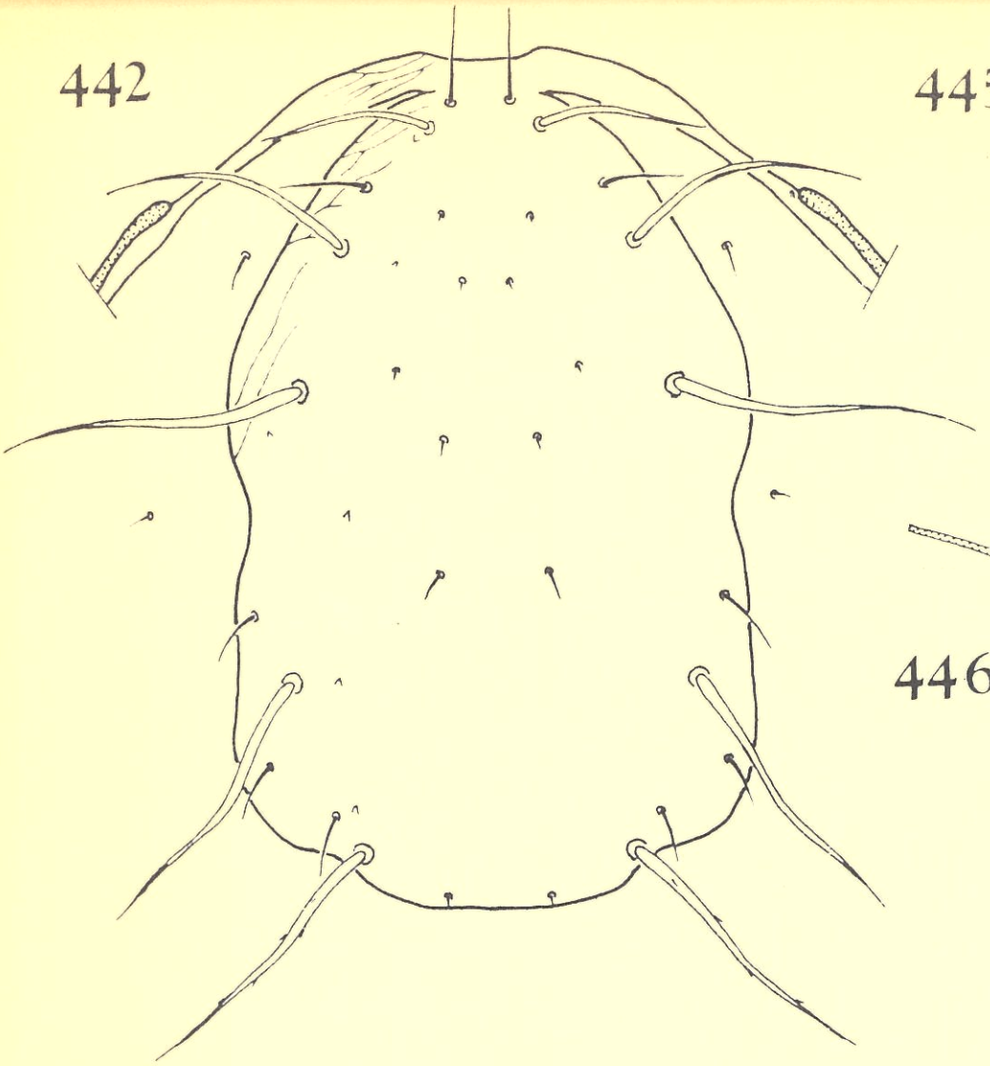
The subgenus Kampimodromus is characterised by having six pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and four pairs of postlateral setae. The third pair of postlateral setae is absent so that the second pair of median setae is not transversely paired with any of the postlateral setae. Two pairs of scapular setae are present on the dorsal interscutal membrane.

De Leon (1965) separated his subgenus Ricoseius from established subgenera on the presence of three pairs of setae lateral to the ventrolateral setae and leg IV having a macroseta on the tibia only. He also mentioned the nature of the dorsal setae and the chelicerae as being distinctive. These characters are however rendered of specific value only in this paper.

The subgenus Kampimodromus is not yet known from South Africa.

e. Subgenus Proprioseiopsis Muma, new status.

Proprioseiopsis Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 277: Muma, 1963a, Fla Ent. 46: 12. Type: Typhlodromus terrestris Chant, 1959, by original/....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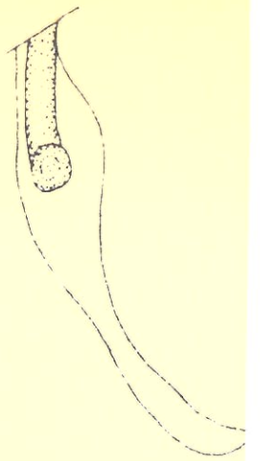
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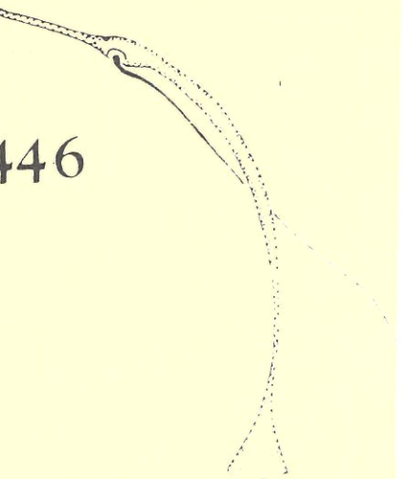
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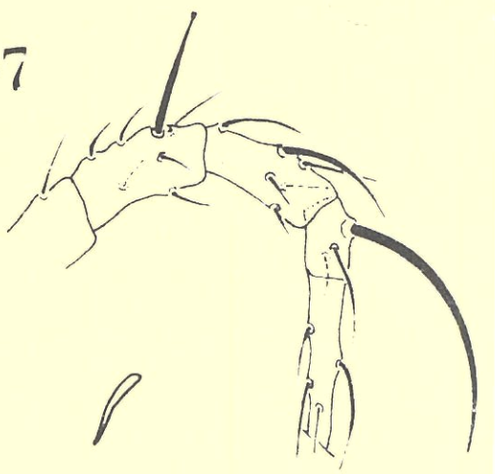
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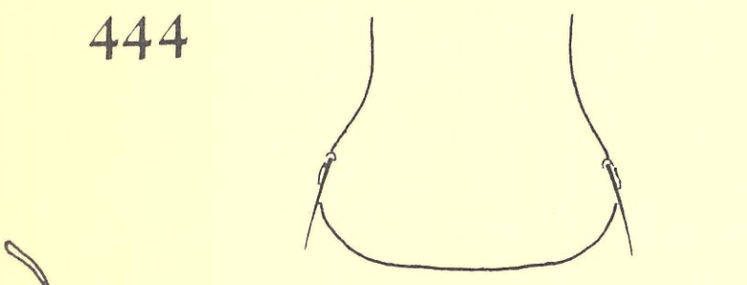
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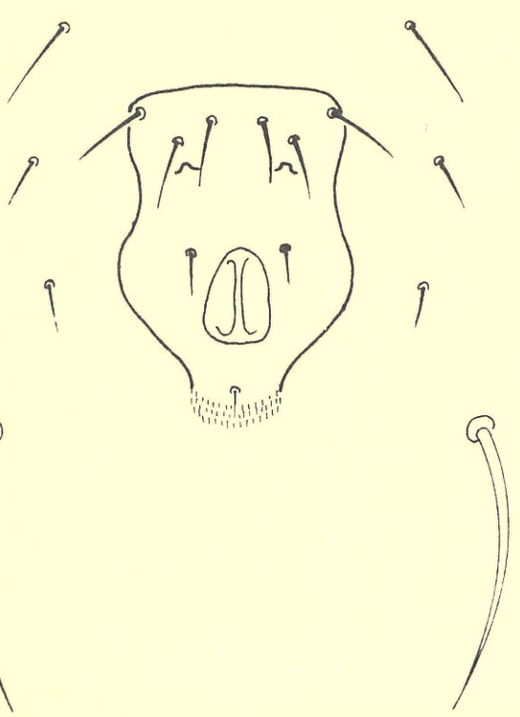

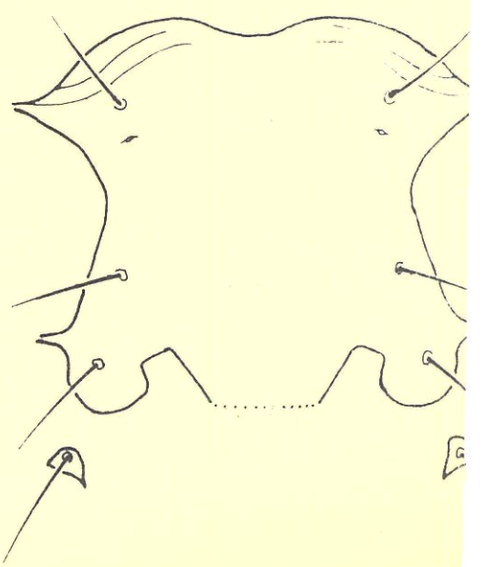
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original designation.

Amblyseius (Skironodromus) Wainstein, 1962a, Acarologia 4: 14; Muma, 1963a, Fla Ent. 46: 12. Type of subgenus: Typhlodromus sandersi Chant, 1959, monotypic. New synonymy.

Amblyseius (Pavlovskeius) Wainstein, 1962a, Acarologia 4: 12. Type of subgenus: Typhlodromus terrestris Chant, 1959, monotypic.

The subgenus Proprioseiopsis is characterised by having five or six pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and four pairs of postlateral setae. The first pair of prolateral setae is absent. Two pairs of scapular setae are present on the dorsal interscutal membrane.

This subgenus includes those species comprising Chant's Sandersi Group, Amblyseius sundi Pritchard & Baker and the following new species.

Amblyseius (Proprioseiopsis) papayana spec. nov.
(Figs. 442-447)

This species can be differentiated from A. sundi by setae M_2 and L_8 which are relatively much shorter than those of the latter species and also by L_4 being

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Figs. 442-447. Amblyseius (Proprioseiopsis) papayana spec. nov., female.

Fig. 442, dorsum; fig. 443, sternal shield; fig. 444, posterior ventral surface; fig. 445, peritrematal shield; fig. 446, spermatheca; fig. 447, leg IV.

the longest seta on the dorsal shield. In contrast to A. sundi, where L_3 is of the same length as L_2, the former is much longer than the latter in A.(P.) papayana.

Female: Dorsum (fig. 442): The dorsal shield, length 348(-353) μ and breadth 219(-224) μ, is provided with 16 pairs of setae. The lengths of these setae are: D_1, 38(-42) μ; D_2, D_3, D_4 and D_6, 5(-10) μ; D_5, 12(-14) μ; M_1, 7(-9) μ; M_2, 130(-136) μ; L_1, 78(-83) μ; L_2, 37(-46) μ; L_3, 112(-120) μ; L_4, 145(-152) μ; L_5, L_6 and L_7, 28(-35) μ and L_8, 130(-136) μ. Seta L_8 is very faintly and sparsely pectinate. Setae L_1, L_2, L_3 and L_7 are longer than the distances between the base of consecutive setae. Seta L_4 is longer than the distance between the bases of L_4 and L_3, and L_8 is longer than the distance between its base and the base of the other member of the L_8 pair. Seta M_2 is not paired with seta L_6.

Setae S_1 and S_2 are placed on the interscutal membrane.

The peritrematal shields are fused anteriorly with the dorsal shield and the peritremes reach just anterior to the level of setae S_1.

Venter: The posteriorly lobate sternal shield (fig. 443), length 83(-89) μ and breadth 76(-79) μ, bears three pairs of setae. The posterior margin of the median lobe is obscure. The lateral lobe is nearly smooth and the incision is broad. Sternal setae IV are situated on nearly triangular metasternal shields.

The genital shield (fig. 444), width 97(-102) μ, is normal and provided with a pair of setae.

The ventri-anal shield (fig. 444) which is much longer than broad, 103(-107) μ x 78(-83) μ, has a nearly straight anterior margin and constricted lateral margins. Three pairs of pre-anal setae are grouped anteriorly on the shield with a pair of pre-anal pores posterior to the posterior pre-anals. Para-anal setae normal.

The ventral interscutal membrane flanking the ventri-anal shield is provided with four pairs of setae, one pair (VL_1) being long, 100(-103) μ, and slightly curved. A pair of slender metapodal plates is present.

The peritrematal shield (fig. 445) curves posteriorly around coxa IV, ending with a sharp point directed medially.

Spermatheca (fig. 446): The slender spermatheca is 45 μ long and has a straight major duct. The lips are located in the centre of the atrium which is only slightly bulged opposite the lips. The lateral margins of the cervix run nearly parallel but diverge towards the distal end, forming a narrow trumpet.

Chelicerae: The position of the chelicerae renders them difficult to examine. However, the fixed digit bears approximately six teeth and a pilus dentilis. The movable digit is provided with one tooth.

Legs: Leg IV (fig. 447) bears three macrosetae; only the one on the genu is knobbed and is 59(-61) μ long, while that on the tibia is 54(-57) μ long and

that on/.....

that on the basitarsus measures 121(-126) µ. The other legs are normal.

Material studied: ♀-Holotype (serial no. AcY 64/71/1) and two ♀-paratypes from leaves of Carica papaya, Nelspruit (Tvl.) 1.IV.1955 (P.A.J. Ryke).

f. Subgenus Amblyseiella Muma

Amblyseiella Muma, 1955, Ann. ent. Soc. Am. 48: 266; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 286; Athias-Henriot, 1957a, Bull. Soc. Hist. nat. Afr. N. 48: 328; Muma, 1963a, Fla Ent. 46: 12; Schuster & Pritchard, 1963, Hilgardia 34: 198, 225. Type: Amblyseiella setosa Muma, 1955, by original designation.

Amblyseius (Amblyseiella); Pritchard & Baker, 1962, Hilgardia 33: 291; Wainstein, 1962a, Acarologia 4: 14.

The subgenus Amblyseiella is characterised by having six pairs of dorsal setae, two pairs of median seta, four pairs of prolateral setae and four pairs of postlateral setae. The fourth pair of postlateral setae is absent while the second pair of median setae is transversely mated with the third pair of postlateral setae. Two pairs of scapular setae are present on the dorsal interscutal membrane.

This subgenus is not yet known from South Africa.

g Subgenus/....

g. Subgenus Phytoscutus Muma, new status

Phytoscutus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 275; Muma 1963a, Fla Ent. 46: 11.

Type: Phytoscutus sexpilis Muma, 1961, monotypic.

The subgenus Phytoscutus is characterised by having four pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and four pairs of postlateral setae. The second pair of postlateral setae is absent. Two pairs of scapular setae are present on the dorsal interscutal membrane.

This subgenus and the subgenus Proprioseiopsis may be combined eventually. Muma (1961) stated in the discussion of his genus Phytoscutus that it lacks the first pair of postlateral setae but in his discussion of the type species of this genus he stated that this species differs from Typhlodromus salebrosus by the apparent lack of the second pair of postlateral setae. It is not clear from the drawings of P. sexpilis which setae are absent. This question will probably only be answered when the developmental stages of this species are known.

The subgenus as here defined is not yet known from South Africa.

h. Subgenus Phytoseiulus Evans

Phytoseiulus Evans, 1952, Bull. ent. Res. 43: 397; Athias-Henriot, 1957a, Bull. Soc. Hist. nat. Afr. N. 48: 345; Chant 1959b, Can. Ent. 91 (suppl. 12); 108; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 276;/....

5: 276; González & Schuster, 1962, Bull. Univ. Chile agric. Exp. Stn. 16: 17; Wainstein, 1962a, Acarologia 4: 17, Schuster & Pritchard, 1963, Hilgardia 34: 198, 279. Westerboer & Bernhard, 1963, In Beiträge zur Systematik und Ökologie Mitteleuropäischer Acarina. Band II, Acad. Verlags., Leipzig: 739; Chant, 1965, Can. Ent. 97: 371.
Type: Laelaps macropilis Banks, 1905 (= Phytoseiulus speyeri Evans, 1952), monotypic.

Amblyseius (Phytoseiulus); Pritchard & Baker, 1962, Hilgardia 33: 294.

Phytoseiulus (Phytoseiulus) Wainstein, 1962a, Acarologia 4: 17.

The subgenus Phytoseiulus is characterised by having five pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and three pairs of postlateral setae. The first pair of postlateral setae is present, but the second and third pairs are absent so that the second pair of median setae is not transversely paired with any of the postlateral setae. Two pairs of scapular setae are present on the dorsal interscutal membrane.

The subgenus is not yet represented in the South African fauna.

i. Subgenus Proprioseius Chant

Proprioseius Chant, 1957b, Can. Ent. 89: 357; Chant, 1959b, Can. Ent. 91 (suppl. 12): 111; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 277; Muma, 1963a, Fla Ent. 46: 12; Schuster & Pritchard,

1963, Hilgardia 34: 198, 225. Type: Proprioseius meridionalis Chant, 1957, by original designation.

Amblyseius (Proprioseius); Pritchard & Baker, 1962, Hilgardia 33: 294.

Phytoseiulus (Proprioseius); Wainstein, 1962a, Acarologia 4: 17; Muma, 1963a, Fla Ent. 46: 11.

Phytoseiulus (Kampimoseius); Wainstein, 1962a, Acarologia 4: 19; Muma, 1963a, Fla Ent. 46: 11. Type of subgenus: Typhlodromus oudemansi Chant, 1959, by original designation. New synonymy.

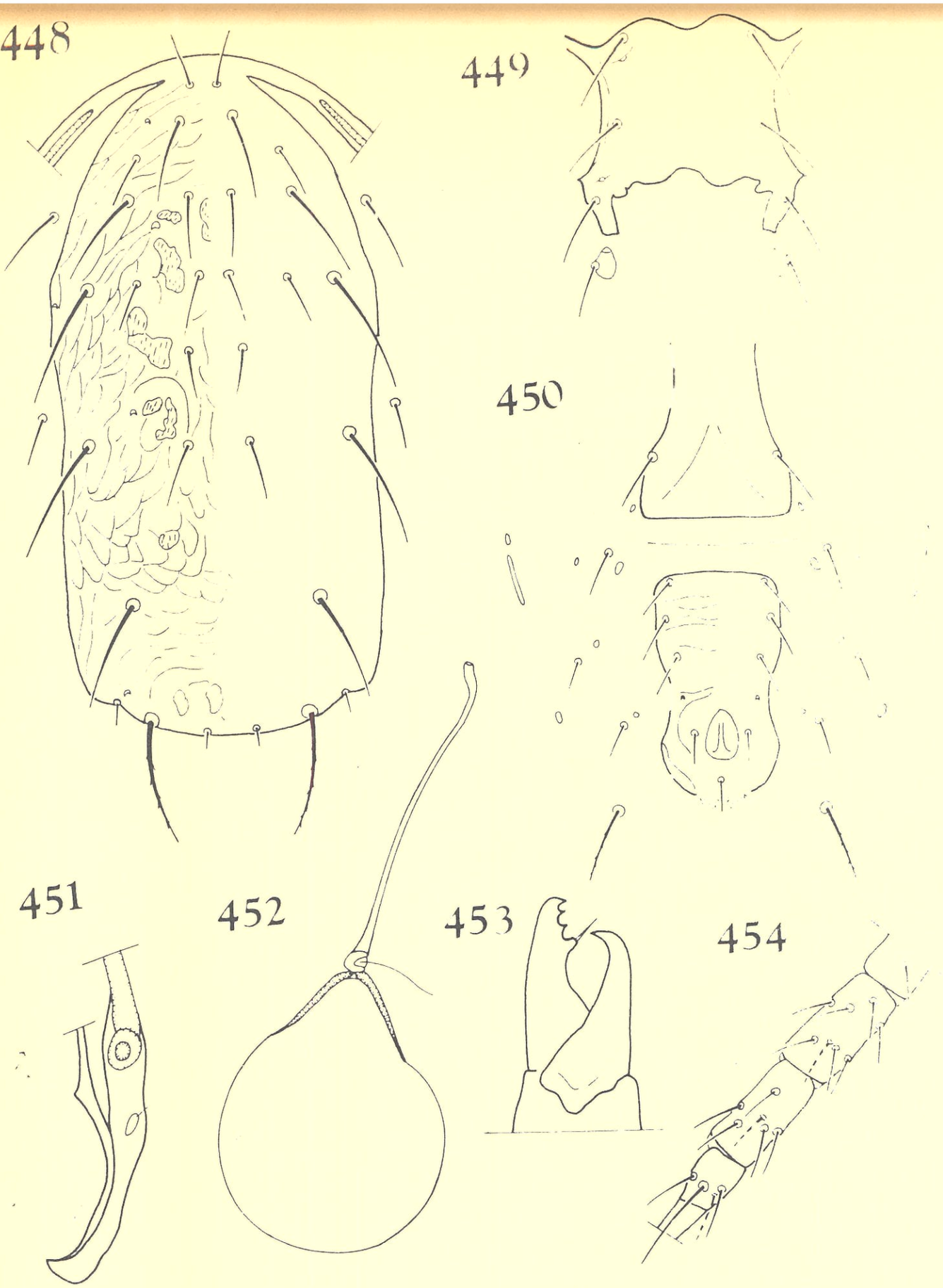
The subgenus Proprioseius is characterised by having five or six pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and three pairs of postlateral setae. The first and third pairs of postlateral setae are absent. The second pair of median setae is therefore not transversely mated with any of the postlateral setae. Two pairs of scapular setae are present on the dorsal interscutal membrane.

The subgenus is represented in South Africa by the following two new species, both having six pairs of dorsal setae.

Key to the South African species of the subgenus Proprioseius: females

1. Dorsal setae D_2, D_3 and D_4 shorter than the distances between their respective bases and the bases of the setae following next in the series ..... altusus spec. nov.

Dorsal/.....



FIGS. 448-454. Amblyseius (Proprioseius) [illegible] spec. nov., female

Fig.448, dorsum; fig.449, sternal shield; fig. 450, posterior ventral surface; fig.451, peritrematal shield; fig.452, spermatheca; fig.453, chelicera; fig.454, leg IV.

Dorsal setae D_2, D_3 and D_4 longer than the distances between their respective bases and the bases of the setae following next in the series ..... reburrus spec. nov.

Amblyseius (Proprioseius) altusus spec. nov.

(Figs. 448-454)

Amblyseius (P.) altusus and A.(P.) reburrus spec. nov. differs from other species in the subgenus in having six pairs of dorsal setae. A.(P.) altusus differs from A.(P.) reburrus in having the setae on the dorsal shield relatively short.

Female: Dorsum (fig. 448): The imbricated dorsal shield, length 323(318-330) μ and width 158(153-160) μ, has five pairs of pores and bears 15 pairs of setae. These setae are arranged on the shield as follows: six dorsal, two median, four prolateral and three postlateral (the first and third postlateral setae are absent). These setae measure in length: D_1, D_3, D_4; M_1 and L_2, 25(24-28) μ; D_2, 32(31-34) μ; D_5, 29(28-32) μ; D_6, 9(-11) μ; M_2, 54(52-56) μ; L_1, 41(40-43) μ; L_3, 50(48-52) μ; L_4 and L_7, 63(61-65) μ; L_5, 60(58-62) μ and L_6, 13(12-14) μ. Setae M_2, L_1, L_3, L_4, L_5 and L_7 are faintly serrated. In some specimens setae D_1 and D_2 are also faintly serrated. The dorsal setae are shorter than the distances between their bases and the bases of the setae following next in the series. Seta L_1 equals in length the distance between its base and the base of seta L_3 while the latter and seta L_2 are longer than the respective distances between their

bases and/....

bases and the bases of the setae next following. Seta M_2 is slightly longer than the distance between its base and the base of seta L_6.

The serrated seta S_1, length 38(35-40) μ, and seta S_2, length 28(26-30) μ, are placed on the dorsal interscutal membrane.

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes terminate anterolateral to the bases of setae L_1.

Venter: The sternal shield (fig. 449), length 60(58-62) μ and breadth 67(65-69) μ, bears three pairs of setae. The anterior margin of the shield is medially indented and the posterior margin is irregular and well anterior to the third pair of sternal setae. The latter are thus on lateral lobes. These lobes are narrow and posteriorly square-cut. Sternal setae IV are placed on oval metasternal shields.

The genital shield (fig. 450), width 65(63-68) μ, is normal with a pair of setae.

The oblong, mildly imbricated ventri-anal shield (fig. 450) measures 115(112-117) μ in length and 58(56-60) μ in width. The anterior margin of the shield is almost straight and the lateral margins are evenly constricted posterior to the three pairs of laterally aligned pre-anal setae. A pair of pores lies posterior to the caudal pair of pre-anal setae. The normal three para-anal setae are present.

The ventral interscutal membrane bears four pairs of setae; the serrated caudal pair measures

40(38-42) μ/....

40938-42) µ in length. Between the genital and ventri-anal shield lies a long slender platelet, with six circular platelets scattered laterally on the membrane. Posterior to coxae IV are two pairs of metapodal plates.

The peritrematal shield fuses posteriorly with the exopodal plate (fig. 451) and terminates posterior to coxa IV with an anteromedially directed point.

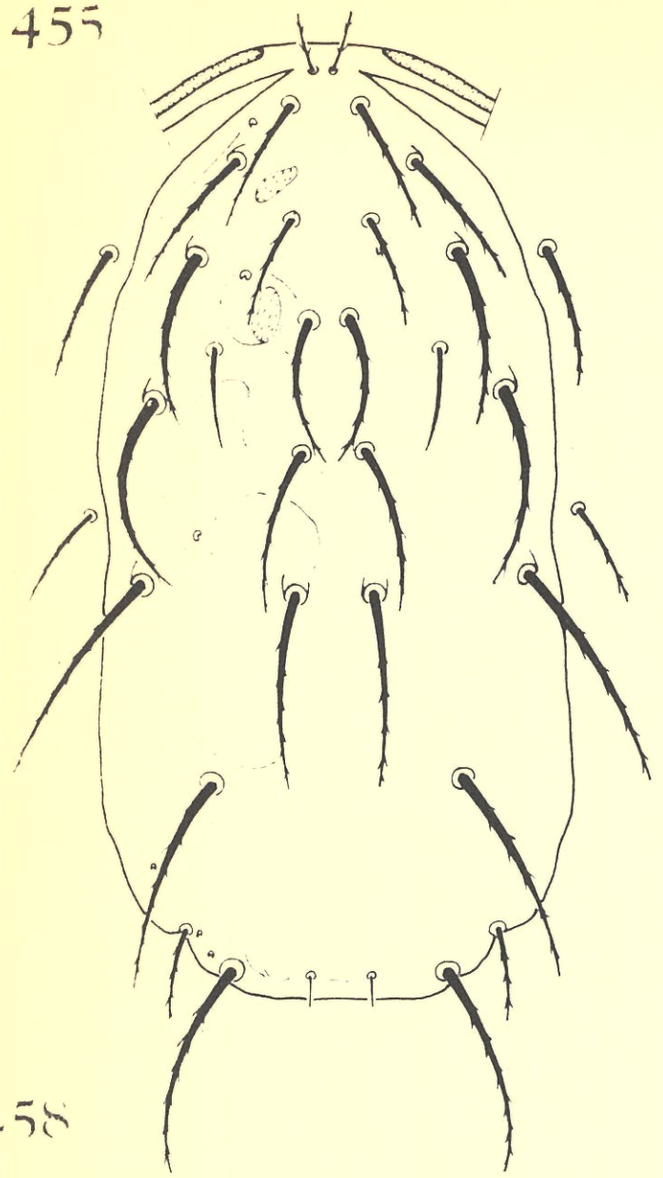
Spermatheca (fig. 452): The long slender major duct measures 42 µ in diameter. The small atrium is occupied by the lips, 4 µ in diameter. The cervix represents a flared bell where it fuses with the vesicle.

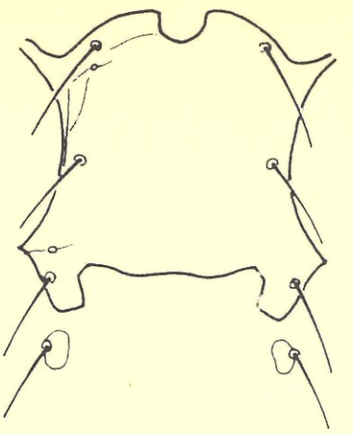
Chelicera (fig. 453): The fixed digit is 30 µ long and bears two subapical teeth and a pilus dentilis. The movable digit is 30 µ long and is devoid of teeth.

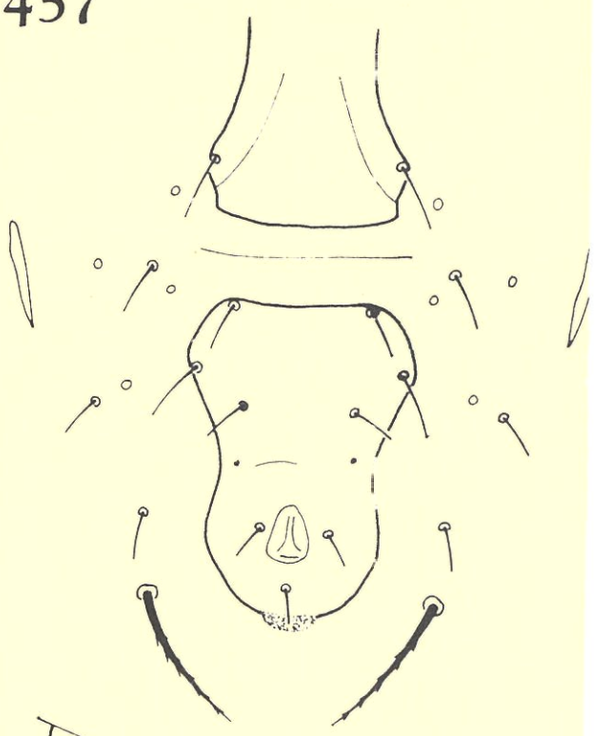
Legs: Genu II is of the VIII-type. The chaetotaxy of the other segments and legs is normal. Only the basitarsus of leg IV (fig. 454) bears a macroseta, 35(34-37) µ long.

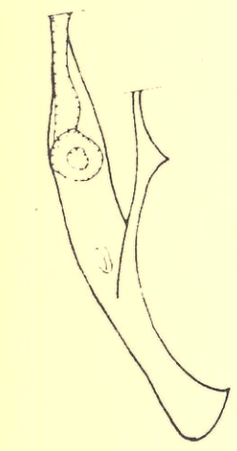
Male: Unknown.

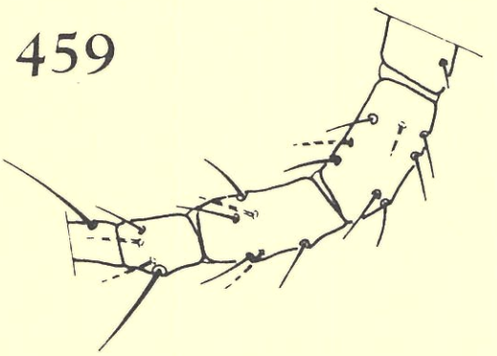
Material studied: ♀-Holotype (serial no. AcY 66/271/1) and seven ♀-paratypes from Berkheya sp., Golden Gate Highland National Park (O.F.S.) 25.X.1962 (M.K.P. Meyer).











Figs. 455-459. Amblyseius (Propriceius) reburrus spec. nov., female

Fig.455, dorsum; fig.456, sternal shield; fig. 457, posterior ventral surfae; fig.458, peritrematal shield; fig.459, leg IV.

Amblyseius (Proprioseius) ruburrus spec. nov.

(Figs. 455-459)

Having six pairs of dorsal setae, this species is related to A.(P.) altusus, but differs from it in having the setae on the dorsal shield strongly serrated and relatively much longer.

Female: Dorsum (fig. 455): The sparsely imbricated dorsal shield, length 334(-341) μ and breadth 176 μ, has six pores and bears 15 pairs of setae. These setae are arranged on the shield as follows: six dorsal, two median and seven lateral. The setae normally in the positions of setae L_5 and L_7 are absent. The setae are of the following lengths: D_1, 24 μ; D_2, 42 μ; D_3, 56(53-) μ; D_4, 62(59-) μ; D_5, 73(69-) μ; D_6, 11 μ; M_1, 38(36-) μ; M_2, 81(75-) μ; L_1, 51(49-) μ; L_2, 53(47-) μ; L_3, 68(66-) μ; L_4, 77(75-) μ; L_5, 87 μ; L_6, 33 μ and L_7, 77(75-) μ. Except for setae D_6 and M_1, all the setae are serrated. Setae D_2, D_3, D_4, L_1, L_2, L_3, L_4 and L_6 are longer than the distances between their respective bases and the bases of the setae following next in the series. Setae M_1 and M_2 reach respectively well beyond the bases of setae L_4 and L_6. Seta D_5 is equal in length to the distance between its base and the base of seta M_2 in the holotype but is shorter in the paratype. Seta L_5, the longest seta on the dorsal shield, reaches beyond the base of seta M_2.

The serrated setae S_1 and S_2, 51(49-) μ and 40(36-) μ long respectively, are placed on the dorsal interscutal membrane.

The /.....

The peritrematal shields are fused anterodorsally with the dorsal shield. The peritremes reach anterolaterally to the bases of setae D_1.

Venter: The anteriorly strongly indented sternal shield (fig. 456), length 74 μ and breadth 65 μ, bears three pairs of sternal setae. The posterior margin of the shield is almost straight but well anterior to the third pair of sternal setae. Two squarish lateral lobes are thus formed on which the third pair of sternal setae are located. Sternal setae IV are on small metasternal shields.

The genital shield (fig. 457), width 71(69-) μ, is posteriorly somewhat narrowed and bears a pair of setae.

The anteriorly broadened ventri-anal shield (fig. 457) measures 111 μ in length and 78(74-) μ in width. The anterior margin of the shield is slightly concave and the lateral margins are strongly concave leaving the shield much narrower across the anus. Three pairs of pre-anal setae are widely spaced on the pre-anal portion of the shield, with a pair of small pores well posterior to the third pair of pre-anal setae. Para-anal setae are normal.

The ventral interscutal membrane bears four pairs of setae, the caudal pair being long and serrated, measuring 60 μ. Between the genital and ventri-anal shields lies a long, very slender platelet with four circular platelets laterally. Lateral to these platelets lies a single pair of long metapodal plates.

The peritrematal shield (fig. 458) fuses

posteriorly/.....

posteriorly with the exopodal plate and terminates posterior to coxa IV in a rounded posterior margin and a short sharp point directed anteromedially.

Spermathecae: The spermathecae are impossible to examine due to their position.

Chelicerae: The chelicerae are also impossible to examine due to their position. The author refrained from remounting the specimens for fear of damaging them.

Legs: The chaetotaxy of the legs is normal except for genu II being of the VIII-type and genu IV being also of the VIII-type. Only the basitarsus of leg IV (fig. 459) bears a macroseta, length 33 μ.

Male: Unknown.

Material studied: ♀-Holotype (serial no. AcY 66/272/1) and one ♀-paratype from Leucosidae csirecea, Golden Gate Highland National Park (O.F.S.) 24.X.1963 (M.K.P. Meyer).

j. Subgenus Asperoseius Chant

Asperoseius Chant, 1957b, Can. Ent. 89: 360; Chant, 1959b, Can. Ent. 91 (suppl. 12): 111; Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 277; Schuster & Pritchard, 1963, Hilgardia 34: 198, 225; Muma, 1963a, Fla Ent. 46: 12. Type: Asperoseius africanus Chant, 1957, monotypic.

Amblyseius (Asperoseius); Pritchard & Baker, 1962, Hilgardia 33: 295.

Phytoseiulus (Asperoseius); Wainstein, 1962a, Acarologia 4: 17.

Amblyseiulella Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 276; Muma, 1963a, Fla Ent. 46: 12. Type: Typhlodromus heveae Oudemans, 1930, monotypic. New synonymy.

The subgenus Asperoseius is characterized by having five pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and three pairs of postlateral setae. Two of the latter pairs of setae are anterolateral and one pair is caudolateral. The posterior median pair of setae is therefcre not paired with any of the postlateral setae. Two pairs of scapular setae are present on the dorsal interscutal membrane.

Chant (1965) synonymysed the genus Amblyseiulella Muma with Amblyseius. Chant, however, did not recognize subgenera and Amblyseiulella is therefore here proposed as a synonym of the subgenus Asperoseius.

Amblyseius (Asperoseius) africanus (Chant)

Asperoseius africanus Chant, 1957b, Can. Ent. 89: 360; Chant, 1959b, Can. Ent. 91 (suppl. 12): 111.

Amblyseius (Asperoseius) africanus (Chant), Pritchard & Baker, 1962, Hilgardia 33: 295.

This species is distinct from related species in having the lateral setae and the first and fourth pairs of dorsal setae serrated and slightly flattened.

A.(A.) africanus is known only from specimens intercepted on cut flowers imported from South Africa into the United States.

k. Subgenus Amblyscutus Muma, new status

Amblyscutus Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 286; Muma, 1963a, Fla Ent. 46: 12. Type: Amblyseius grandis Berlese, 1914, monotypic.

Amblyseius (Megadromus) Wainstein, 1962a, Acarologia 4: 14. Type of subgenus: Amblyseius grandis Berlese, 1914, monotypic.

The subgenus Amblyscutus is characterised by having six pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and three pairs of postlateral setae. Two of the latter pairs of setae are anterolateral and one pair is caudolateral. The first pair of scapular setae is on the dorsal interscutal membrane, but the second pair is absent.

The absence of the second pair of scapular setae distinguishes this subgenus from the subgenus Asperoseius.

The subgenus Amblyscutus is not yet known from South Africa.

l. Subgenus Platyseiella Muma, new status

Platyseiella Muma, 1961, Fla St. Mus. Bull. Biol. Sci. 5: 280; Muma, 1963a, Fla Ent. 46: 12; Chant, 1965, Can. Ent. 97: 370. Type: Phytoseius (Dubininellus)/.....

(Dubininellus) platypilis Chant, 1959, monotypic.

The subgenus Platyseiella is characterised by having six pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and two pairs of postlateral setae. One of the latter pairs of setae is placed anterolaterally and one pair caudolaterally. The first pair of scapular setae is on the dorsal shield and the second pair is absent.

The presence of the first pair of scapular setae on the dorsal shield is not considered to be of generic importance as discussed under the family. Platyseiella is therefore treated here as a subgenus of Amblyseius.

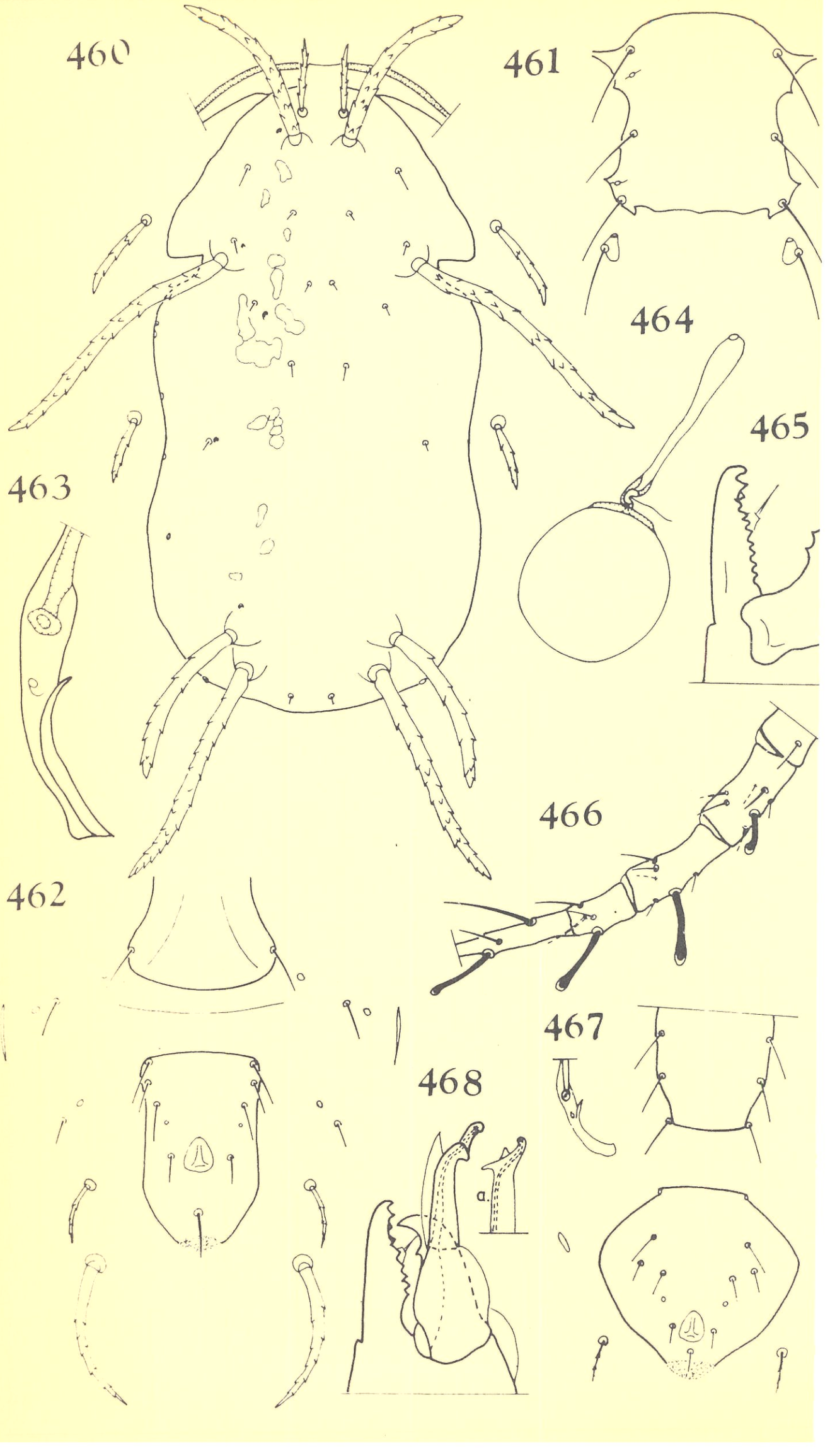
The subgenus Platyseiella is known only from the type species, the ♀-holotype and another female, collected from lantana at Coral Gables, Florida U.S.A.

m. Subgenus Paraphytoseius Swirski & Shechter, new status.

Paraphytoseius Swirski & Shechter, 1961, Ktavim 11: 113; Muma, 1963a, Fla Ent. 46: 12; De Leon, 1965b, Fla Ent. 42: 130. Type: Paraphytoseius multidentatus Swirski & Shechter, 1961, monotypic.

Amblyseius (Ptenoseius) Pritchard & Baker, 1962, Hilgardia 33: 295. Type of subgenus: Amblyseius (Ptenoseius) horrifer Pritchard & Baker, 1962, monotypic.

Ptenoseius; Schuster & Pritchard, 1963, Hilgardia 34: 198, 225.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a.

The subgenus Paraphytoseius is characterised by having five pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and two pairs of postlateral setae. One of the latter pairs of setae is placed anterolaterally and one pair caudolaterally. Two pairs of scapular setae are present on the dorsal interscutal membrane.

This subgenus differs from the subgenus Platyseiella in having both pairs of scapular setae present and situated on the dorsal interscutal membrane. The following species is the only species known from the South African fauna.

Amblyseius (Paraphytoseius) horrifer (Pritchard & Baker), comb. nov.

(Figs. 460-468)

Amblyseius (Ptenoseius) horrifer Pritchard & Baker, 1962, Hilgardia, 33: 295.

Figs. 460-468. Amblyseius (Paraphytoseius) horrifer (Pritchard & Baker).

Fig. 460, dorsum, female; fig. 461, sternal shield, female; fig. 462, posterior ventral surface, female; fig. 463, peritrematal shield, female; fig. 464, spermatheca, female; fig. 465, chelicera, female; fig. 466, leg IV, female; fig. 467, posterior ventral surface, male; fig. 468, chelicera, male; fig. 468 a., ventral view of distal detail of spermatophoral process, male.

The three species representing the subgenus, A.(P.) multidentatus, A.(P.) horrifer and A.(P.) santurcensis (De Leon) are very closely related. A.(P.) horrifer and A.(P.) santurcensis differ from A.(P.) multidentatus in having the dorsal shield anterolaterally distinctly notched. A.(P.) horrifer differs from A.(P.) santurcensis and also from A.(P.) multidentatus in having setae L_1 and M_2 almost equal in length and the setae on leg IV, except the macrosetae, all normal and aciculate. In the latter two species some of these setae are thickened and blunt.

Pritchard & Baker did not describe the male of this species.

Female: Dorsum (fig. 460): The dorsal shield measures 318-339 μ in length and 165-176 μ in width and is smooth but for some dorsomedian rugose patches, six pairs of pores (Pritchard & Baker mentioned five) and five small circular lateral platelets (on the shield). The shield is strongly notched lateral to the fourth prolateral seta and bears 13 pairs of setae, five dorsal, two median, four prolateral and two postlateral. These setae measure in length: D_1, 39-42 μ; D_2, D_3, D_5, M_1, and L_5, 5 μ; D_4 and L_3, 9 μ; M_2, 85-89 μ; L_1, 87-90 μ; L_2, 14 μ; L_4, 136-141 μ and L_6, 122-127 μ. Setae D_1, L_1, L_4, M_2 and L_6 are strongly thickened and serrated. The latter four setae are on tubercles. The remaining setae on the shield are minute or very short. Setae L_1 and M_2 are almost equal in length, seta L_6 is longer and seta L_4 is the longest

seta on/....

seta on the dorsal shield.

Setae S_1 and S_2, on the dorsal interscutal membrane, are also strongly thickened and serrated, being 52 μ and 36 μ long respectively.

The peritrematal shields are fused anterodorsally with the dorsal shield and the peritremes reach anterior to the bases of setae D_1.

Venter: The sternal shield (fig. 461), length 92 μ and breadth 78 μ, bears three pairs of sternal setae. The anterior margin of the shield is convex and the lateral margins are, anterior to the second pair of setae, provided with small sharp lateral lobes. The posterior margin is almost straight with two very small lateral projections. Sternal setae IV are placed on irregularly margined metasternal shields.

The genital shield (fig. 462), width 87 μ, bears a pair of setae lateral of, but close to, the slightly convex posterior margin.

The oblong ventri-anal shield (fig. 462), length 117 μ and width 70 μ, has an almost straight anterior margin and very slightly concave lateral margins. The shield bears laterally three pairs of pre-anal setae and a pair of pores. The anus is well median on the shield and the posterior para-anal seta is longer than the other two para-anals.

The ventral interscutal membrane is provided with four pairs of setae; the first two pairs are aciculate, the second pair is thickened, serrated and longer, 40 μ and the caudal pair is also thickened and

serrated/.....

serrated and much longer, 90-97 μ. Between the genital and ventri-anal shields lies a long, very slender, platelet with laterally three small rounded platelets. A single pair of slender metapodal plates is also present on the membrane.

The peritrematal shield (fig. 463) fuses posteriorly with the slender exopodal plate and terminates posterior to coxa IV with a small posterior lobe and an anteromedially directed sharp point.

Spermatheca (fig. 464): The thin walled major duct measures approximately 20 μ in length and is somewhat dilated towards the opening between coxae III and IV. The atrium, length 5 μ, is not bulged and bears small lips close to the cervix. The latter simulate a hollow disc, approximately 2 μ in depth and 10 μ in diameter.

Chelicera (fig. 465): The fixed digit, length 28 μ, bears ten teeth and a pilus dentilis along its inner margin. The movable digit, length 32 μ, bears two teeth on its inner margin. The figure shows the chelicera in a slightly oblique position. The digits are possibly rather broader than they appear in the figure.

Legs: The chaetotaxy of the legs is normal. Genu II bears a short, 14 μ, distally broadened seta. Leg IV (fig. 466) bears four macrosetae, distally broadened with hyalanous tips. The setae measure in length: 28 μ on the genu and 47 μ on the tibia, basitarsus and tarsus. The other setae on the legs are normal and aciculate.

Male:/.....

Male: Dorsum: The dorsal shield, length 260 μ and breadth 140 μ, differs from that of the female in not being notched lateral to setae L_4. The chaetotaxy of the shield resembles that of the female, but the longer setae are shorter: D_1, 29 μ; M_2, 59 μ; L_1, 59 μ; L_4, 103 μ and L_6, 75 μ.

Seta S_1, length 33 μ, is on the dorsal shield and seta S_2, length 22 μ, is on the dorsal interscutal membrane.

The peritrematal shield fuses anterolaterally with the dorsal shield. The peritremes are shorter than in the female, reaching only past the level of setae L_1.

Venter: The genitosternal shield bears five pairs of setae with the genital opening on its anterior margin. Posteriorly, the genitosternal shield is somewhat reduced (fig. 467) so that the fifth pair of setae are on the margin of the shield or on the membrane just next to the shield.

The ventri-anal shield (fig. 467), length 122 μ and breadth 120 μ, has a relatively short anterior margin and strongly bulged lateral margins. The shield bears three pairs of pre-anal setae and a pair of pores caudal to the inner posterior pair of setae. The position of the anus is normal as are the para-anal setae.

The ventral interscutal membrane bears a pair of caudolateral serrated setae, 28 μ long. The interscutal membrane also bears a pair of short metapodal shields.

The peritrematal shield fuses posteriorly with the

exopodal/.....

exopodal plate and terminates bluntly, caudomedial to coxae IV.

Chelicera (fig. 468): The fixed digit, length 22 µ, bears eight teeth and a pilus dentilis along its inner margin. The movable digit, length 22 µ, is provided with a single recurved tooth on its inner margin and a spermatophoral bearer on its ventro-lateral margin. This process is 18 µ long and its sclerotized portion is distally bilobed. Along almost its entire dorsal length there is a thin walled though rigid structure that terminates sharply distally. Figure 468 a. illustrates the distal detail of this process as seen from the venter.

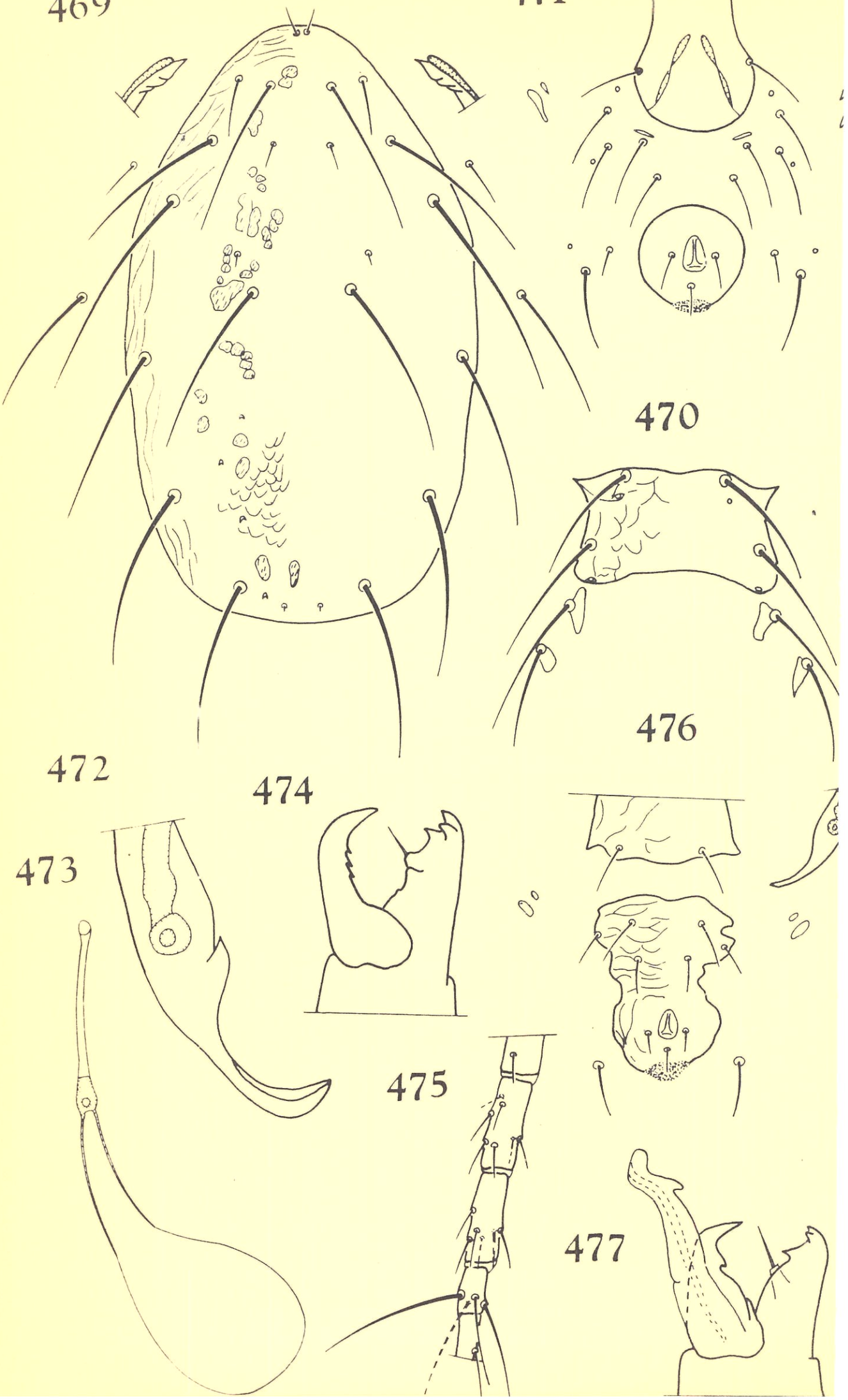
Legs: The chaetotaxy of the legs is normal. Genu II bears a blunt seta 14 µ long, as in the female. The macrosetae on leg IV resemble that of the female except that the one on the tarsus is distally less expanded, being merely blunt. These macrosetae measure in length: 23 µ on the genu, 34 µ on the tibia and tarsus and 37 µ on the basitarsus.

Material studied: One ♀ from an unidentified plant, Glenmore (Natal) 22.IV.1955 (M.K.P. Meyer). One ♀ and two ♂♂ from Ipomoea purpurea, near Port Edward (Natal) 13.V.1965 (M.K.P. Meyer).

n. Subgenus Mesoseiulus González & Schuster, new status

Mesoseiulus González & Schuster, 1962, Bull. Univ. Chile agric. Exp. Stn. 16:18. Type: Phytoseiulus longipes Evans, 1958, monotypic.

The/.....


469
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The subgenus Mesoseiulus is characterised by having four pairs of dorsal setae, two pairs of median setae, four pairs of prolateral setae and two pairs of postlateral seta. The latter two pairs are the second pair and the caudolateral pair. Two pairs of scapular setae are present on the dorsal interscutal membrane.

This subgenus differs from the subgenus Paraphytoseius in that the first pair of anterolateral setae on the postscutum is absent but the second pair is present.

Amblyseius (Mesoseiulus) longipes (Evans), comb. nov.

(Fig. 469-477)

Phytoseiulus longipes Evans, 1958, J. ent. Soc. sth. Afr.

Mesoseiulus longipes (Evans); González & Schuster, 1962, Bull. Univ. Chile, agric. Exp. Stn. 16: 18.

Amblyseius (Phytoseiulus) longipes (Evans); Pritchard & Baker, 1962, Hilgardia 33: 294.

Female: Dorsum (fig. 469): The dorsal shield, length 340-370 μ and breadth 206-224 μ, is laterally clearly imbricated but medially less so, though still visible. Medially on the shield are some strongly sclerotized

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Figs. 469-477. Amblyseius (Mesoseilus) longipes (Evans), comb. nov.

Fig. 469, dorsum, female; fig. 470, sternal shield, female; fig. 471, posterior ventral surface, female; fig. 472, peritrematal shield, female; fig. 473, spermatheca, female; fig. 474, chelicera, female; fig. 475, leg IV, female; fig. 476, posterior ventral surface, male; fig. 477, chelicera, male.

patches and on the post-scutum are four small pores. The shield bears 12 pairs of setae, arranged as follow: four dorsal (the third and fifth are absent), two median, four prolateral and two postlateral (fifth, seventh and eight are absent). These setae measure in length: D_1, 20-22 μ; D_2, 17-19 μ; D_3, 98-106 μ; D_4, 5 μ; M_1, 8-10 μ; M_2, 102-108 μ; L_1, 90-98 μ; L_2, 32-38 μ; L_3, 94-106 μ; L_4, 126-136 μ; L_5, 110-118 μ and L_6, 104-110 μ. The longer setae, although very thin, are serrated. The relative lengths of the setae on the shield are constant, except for seta L_2, which is paired with L_1, in that it may equal in length from only half the distance up to the full distance between its base and the base of seta L_3.

Setae S_1 and S_2, 35-40 μ and 75-80 μ long respectively, are on the dorsal interscutal membrane. Seta S_1 is smooth but S_2 is serrated.

The peritremes are short and terminate just anterior to the level of setae L_2. The peritrematal shields are not fused with the dorsal shield but terminate free on the interscutal membrane just anterior to the peritremes.

Venter: The roughened sternal shield (fig. 470), length 46-52 and breadth 80-87 μ, bears only two pairs of long sternal setae. The anterior margin of the shield is medially slightly indented and the lateral margins reach only to the second pair of lyriform pores. The lateral margins and the slightly concave posterior margin may be irregular. Sternal setae III and IV are on irregularly shaped metasternal shield. The

posterior/....

posterior metasternal shields may be greatly reduced.

The genital shield (fig. 471), width 88-93 μ, has a rounded posterior margin and bears a pair of setae.

The ventri-anal shield (fig. 471) is reduced to an almost circular anal shield, diameter 78-84, without pre-anal setae. Only three para-anal setae are present on the shield. The interscutal membrane bears six pairs of setae. The anterior four pairs are rather long. The first pair of the posterior two pairs is short but the second pair is the longest, 63-69 μ in length, and terminally serrated. Two pairs of metapodal plates are situated laterally on the membrane with one longish and three circular platelets scattered medially.

The exopodal plate is strongly reduced, being represented by a few longish platelets dorsal to the coxae. The posterior fusion of this plate with the peritrematal shield can still be observed (fig. 472). The broad peritrematal shield is posteriorly strongly narrowed as it curves around coxa IV, terminating anteromedially in a sharp point.

Spermatheca (fig. 473): The slender, thin walled major duct is 25 μ long. The atrium is only slightly bulged, measures 5 μ in length, and has small lips close to the cervix. The latter, 23 μ long, is tube-like and increases slightly in diameter towards the vesicle. The cervix has a diameter of 8 μ where it joins the vesicle. The atrium and cervix are more strongly sclerotized than the major duct.

Chelicera/.....

Chelicera (fig. 474): The fixed digit, length 21 μ, bears three teeth and a pilus dentilis. Two of these teeth are subapical and the third lies just proximal to the pilus dentilis. The latter tooth, although large, is difficult to distinguish from the proximal portion of the base of the pilus dentilis. The movable digit, length 21 μ, bears three recurved teeth along its inner margin.

Legs: Tibia I is of the XI-type and genu II of the VIII-type. The chaetotaxy of the other segments and legs is normal. Leg IV (fig. 475) bears a single aciculate macroseta, 106-115 μ long, on the basitarsus.

Male: The male, hitherto unknown, is described below:

Dorsum: The chaetotaxy of the dorsal shield resembles that of the female. The setae are, however, shorter than in the female, measuring in length: D_1, 15-17 μ; D_2, 14-16 μ; D_3, 66-73 μ; D_4, 4 μ; M_1, 6-8 μ; M_2, 65-70 μ; L_1, 63-68 μ; L_2, 27-30 μ; L_3, 67-71 μ; L_4, 87-92 μ; L_5, 71-76 μ and L_6, 68-74 μ.

The peritrematal shields are fused anterolaterally with the dorsal shield at the level of seta S_1. The dorsal shield thus measures 310-320 μ in length. The lateral margins of the shield may be laterally extended so that in some specimens setae S_2 are on the shield and in some specimens on the dorsal interscutal membrane. The shield thus varies in width from 193 μ to 224 μ. Seta S_1 measures 30-34 μ in length and seta S_2, 45-58 μ.

Venter:/.....

Venter: The genitosternal shield bears five pairs of setae and the genital opening on its anterior margin.

The imbricated ventri-anal shield (fig. 476) is laterally much reduced and is very irregularly margined. It measures approximately 130 μ in length, 100 μ in width anteriorly and 75 μ across the anus. The shield bears three pairs of pre-anal setae. No pores could be discerned. The para-anal setae are normal.

The ventral interscutal membrane bears a single pair of serrated caudal setae 40-44 μ long. There are also two pairs of metapodal plates on the membrane.

The peritrematal shield terminates posterior to coxa IV in a sharp, medially directed, point.

Chelicera (fig. 477): The fixed digit, length 19 μ, bears two subapical teeth and a pilus dentilis. The movable digit, length 19 μ, bears a single recurved tooth and a spermatophoral process. This process is 33 μ long and is distally slightly ventrally bent with an anterior lobe. Dorsally and 8 μ from its distal extremity protrudes a small dorsocaudally directed lobe.

Distribution: This species is known from the holotype and paratype females from "Foxglove", Salisbury (Rhodesia) and different females from alfalfa and Merrubium vulgare, Maipú (Chile).

Material studied: Two ♀♀ from an unidentified plant, Cape Town (C.P.) December 1953 (P.A.J. Ryke). One ♀ from Rosa sp. and one ♀ from Pharbitis hispida,

Stellenbosch/.....

Stellenbosch (C.P.) 4.I.1954 (P.A.J. Ryke). Two ♀♀ and one ♂ from Phaseolus vulgaris, Newcastle (Natal) 19.I.1956 (P.A.J. Ryke). One ♀ from Digitalis sp. and two ♀♀ from Beta vulgaris, Potchefstroom (Tvl.) September 1963 (P.A.J. Ryke). One ♀ and one ♂ from an unidentified plant, Potchefstroom (Tvl.) October 1954 (P.A.J. Ryke).

A number of females and males were also collected from Phaseolus vulgaris and Hydrangea hortensia at Pretoria (Tvl.) during 1963-1965. These specimens were used in the biological study of this species which is reported in section II of this paper.

PART II : CONTRIBUTIONS TO THE BIOLOGY OF TWO SPECIES

I. INTRODUCTION

The general acceptance of the fact that the application of insecticides and fungicides has made orchards highly susceptible to certain mite and insect pests (Garman 1961), has led to considerable interest in the possibility of utilizing phytoseiids as controlling agents of phytophagous mites. The abundant increase of phytophagous mite populations and their expensive control by acaricides has initiated and stimulated research on the biological control of these pests. One of the first reports on predacious mite investigations in orchards was that of Herbert (1953) who conducted studies in Nova Scotia, Canada. Because of the important role played by phytoseiids in the control of phytophagous mites, whe undertook studies of the life-histories, behaviour, distribution and relative abundance of these predators. Herbert came to the conclusion that the change in status from minor to major pest is evidently associated with the destructive action of certain sprays on their predators. Previously this had also been observed by Lord (1949) who noticed that red mite populations increased rapidly when the predators were destroyed by certain sprays. This view was also substantiated by Hantsbarger & O'Neill (1954) who collected predacious phytoseiids in the orchards of North-Central Washington, and Fleschner & Ricker (1954) who studied those on citrus and avocado trees in Southern California.

Huffaker & Kennett (1953 a & b, 1956) investigated the possibility of biological control of the cyclamen mite, Tarsonemus pallidus Banks, on strawberries in California.

California. The results of their work showed that the yield from strawberry plants in plots where the predators of the cyclamen mite were present, was seven times higher than those from plants in predator-free plots. The purpose of their extensive population studies was to appraise the degree and consistency of any controlling action under a variety of conditions and to evaluate the possibilities and to determine the means of utilizing natural enemies to better advantage. They showed concl conclusively that predators exert very effective control of the cyclamen mite when their activities are not inhibited by detrimental chemical treatments used for the control of other pests. Malcolm (1955), in his study on the timothy mite, Oligonychus pratensis (Banks), an important pest of grasses in the Western United States, states that it was not unusual to find whole colonies of timothy mites decimated by the Phytoseiids Amblyseius fallacis (Garman) and A. cucumeris (Oudms.). Similar results were obtained by Berker (1955, 1958) who found that eight species of the family Phytoseiidae are important predators of the spider mite Panonychus ulmi (Koch). Chant (1961) found that A. persimilis (Athias-Henriot) exerted remarkable control of Tetranychus telarius (L.) under greenhouse conditions. Anderson & Morgan (1956), however, came to the conclusion that Typhlodromus rhenanus (Oudms.) and T. occidentalis Nesbit are not efficient predators of P. ulmi due to their distribution on the leaves and their incapability of producing populations of the same magnitude as those of the phytophagous mites. This statement was substantiated by Chant (1958a), and Chant & Fleschner (1960).

Chant/.....

Chant (1958b), however, stressed the point that studies of fluctuations in mixed populations are inadequate when only adult mites are accounted for, since developmental stages constitute an integral part of population fluctuations. This data can not be obtained unless specific determinations of the developmental stages of the species concerned are available.

The main aim of this study was therefore to breed and describe the developmental stages of Amblyseius (Amblyseius) tutsi Pritchard & Baker and A. (Mesoseiulus) longipes (Evans).

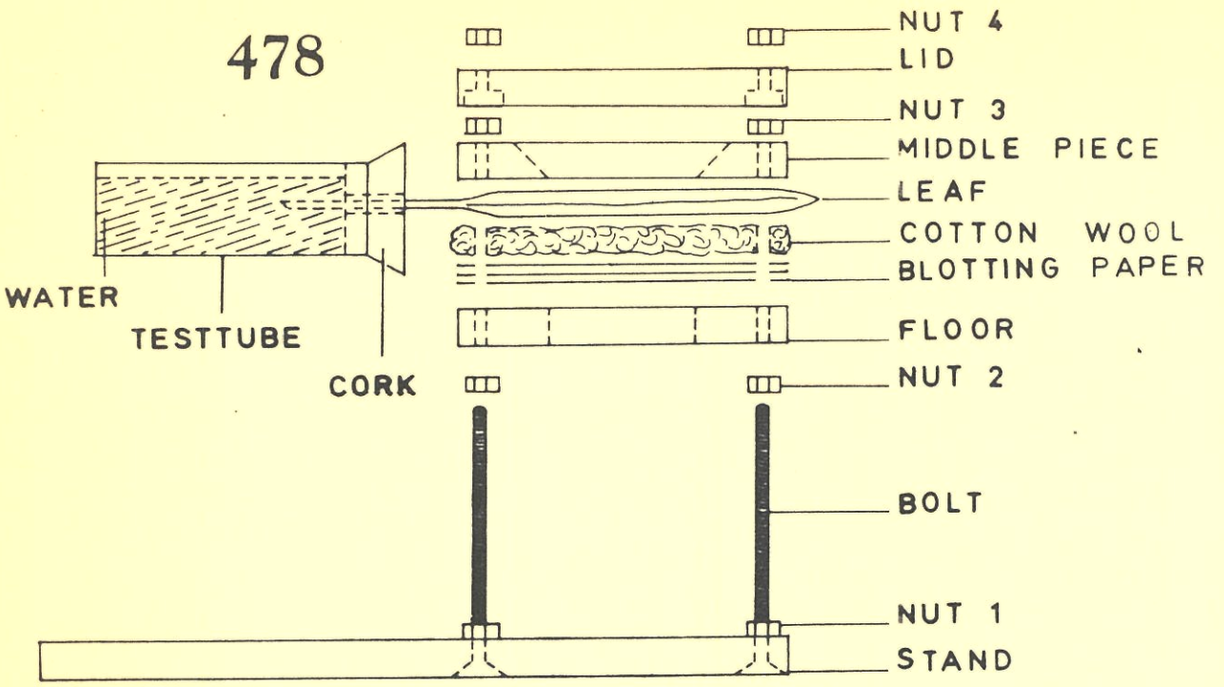
II. MATERIALS AND TECHNIQUE

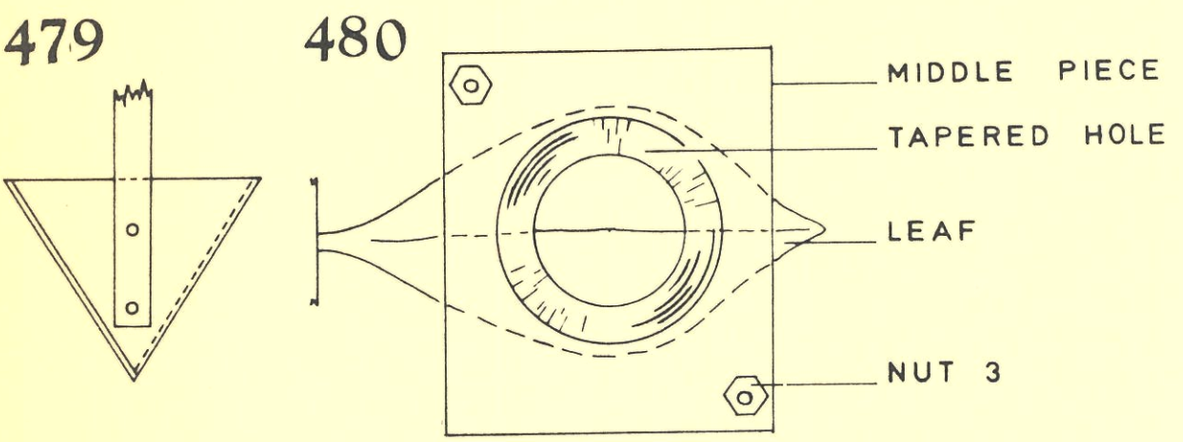
Live material of A. (A.) tutsi was collected from Ficus pretoriae and of A. (M.) longipes from Phaseolus vulgaris and Hydrangea hortensia at Pretoria.

Individual rearing of these mites was achieved by using a modification of the Huffaker cell. The Huffaker cell described by Peterson (1953) was slightly altered by Dosse (1957b), who constructed the cell with a glass bottom and used a coverglass as a lid. He, however, continued to use rubber bands to hold the components of the cell together. The loose parts of this cell are difficult to handle and the pressure exerted by the rubber bands could not be regulated with the requisite accuracy. This resulted in damage to the leaf when the bands were too tight, or the escape of mites when the bands were too loose.

The cell was therefore modified by the present author to eliminate these disadvantages. A cross-section

of this/....





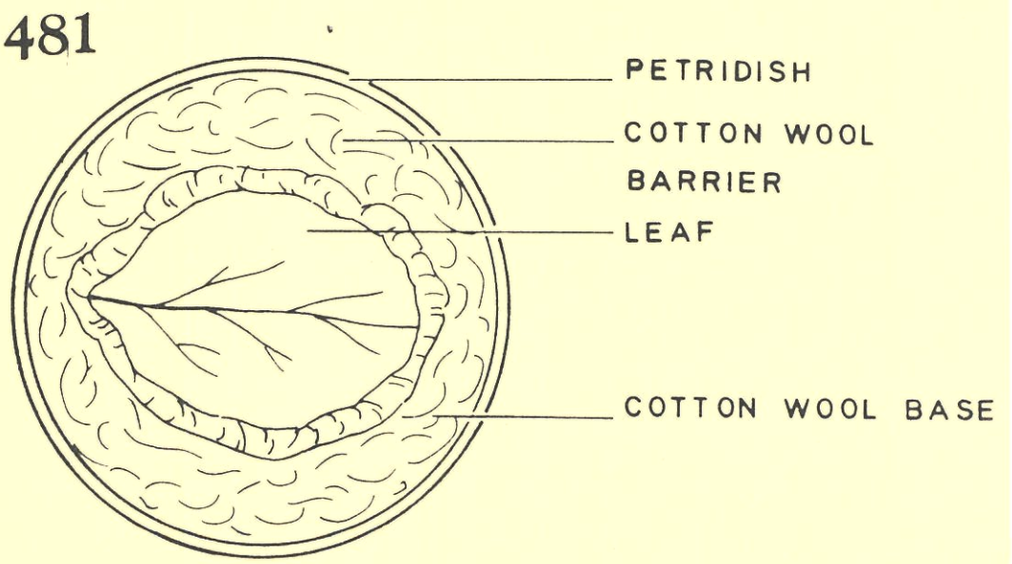


Fig.478, Modified Huffaker cell; fig.479, drill; fig.480, top view of middlepiece; fig.481, mass-rearing unit.

of this modified cell is illustrated in fig. 478. It consists of a hardboard stand, 18 cm. x 7 cm. x 6 mm. The floor, middle piece and lid are made of Plexiglass, 6.5 cm. x 4 cm. x 6 mm. The floor is provided with a central hole 2 cm. in diameter, which is used when wetting the blotting paper. The middle piece (fig. 480) has a counter-sunk hole in its centre, with a top diameter of 3 cm. The hole was drilled with a drill (fig. 479) specially constructed to give a smooth hole with edges at an angle of approximately 55°. Two 3 mm. holes were drilled through two diagonally opposite corners of Plexiglass components and the stand, as illustrated, so that they fitted squarely on top of one another. The two holes in the lid were countersunk to receive nut 3. The bolts were 4 cm. x 3 mm.

The cell is assembled by fitting the bolts to the stand by means of nut 1. Nut 2 is adjusted to the desired height which is determined by the testtube and leaf. The floor is then lowered into position and covered by at least three layers of blotting paper, which is again covered by a layer of cotton wool of approximately 2 mm. thickness when compressed.

The citrus leaf, with its stem in a testtube filled with water and stopperd with a cork, is placed in position. The testtube is held to the stand by means of a rubber band. The middle piece is then screwed down onto the leaf with nut 3, until a tight fit is obtained. Permagum around the bottom rim is very useful in ensuring a tight fit without damaging the leaf. The lid is then placed in position and held fast by nut 4.

The Huffaker/.....

The Huffaker cell thus constructed and assembled has the advantages of being compact, rigit and perfectly isolated. The pressure on the leaf can be adjusted and the insertion of the stem of the leaf in water adds to its longevity. Such a leaf will last at least two weeks, but was replaced each week during the run of the experiments. The lid can easily be taken off to insert or remove mites while the remainder of the cell remains intact. The tapered hole (Peterson, 1953) has the advantage that the whole interior of the cell, including the walls, can easily be examined under the stereomicroscope.

During the experiments the cottonwool and blotting paper were wetted each morning with distilled water. The tests were carried out in the laboratory without temperature regulation. The temperature therefore varied between 18°C and 26°C.

The Huffaker cell has been described in some detail since it was the most successful of the techniques employed for individual rearing.

The method of Herbert (1956) was found unsatisfactory since the pharmaceutical capsules tend to lose their transparency when handled. When live prey is used, such as tetranychids, some tend to escape from the capsule as the two parts are fitted together.

Another method was also investigated. A leaf was inserted in a testtube as described for the Huffaker cell. A tube was then pushed over the leaf and fitted tightly over the cork. The open end of the tube was covered with fine mesh. The activities of the mites within could be followed, but to inspect the large tube and locate the mite wasted a lot of time.

Small/.....

Small cells attached to leaves on the plant were found to be of little use since great difficulty was encountered in manoeuvering the stereomicroscope into position to examine the contents of these cells.

The method employed by McMurtry & Scriven (1965) was used for rearing the stock culture. However, a petri dish and cotton wool (fig. 481) were used instead of a stainless steel pan and foam plastic. A citrus or bean leaf was placed upside down on a wetted layer of cotton wool and the edge of the leaf was covered by a strip of cotton wool. Tetranychid mites, Tetranychus ludeni Zacher, also used as test food, were placed on these bean leaves with 5 to ten predators. This method was found most satisfactory since the red spider multiplied on the leaves and provided abundant food for the predators.

Citrus leaves were used when pollen from Iochroma tubulosum was given as food. These leaves usually lasted longer than a week.

The developmental stages were obtained by inserting one egg into a Huffaker cell. Moulting could easily be observed and each stage was killed in alcohol and mounted just after moulting. The female and male deutonymphs were determined by mounting a number of deutonymphs which were in the act of moulting into adults. Since the features of the adult were clearly visible through the skin of the deutonymph, the sex and features of the dutonymphs could be determined with certainty.

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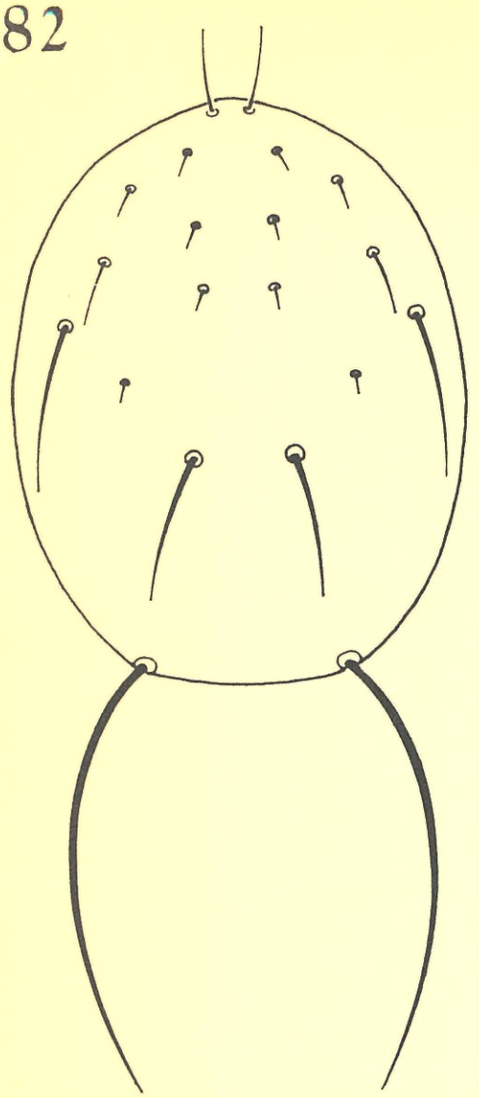

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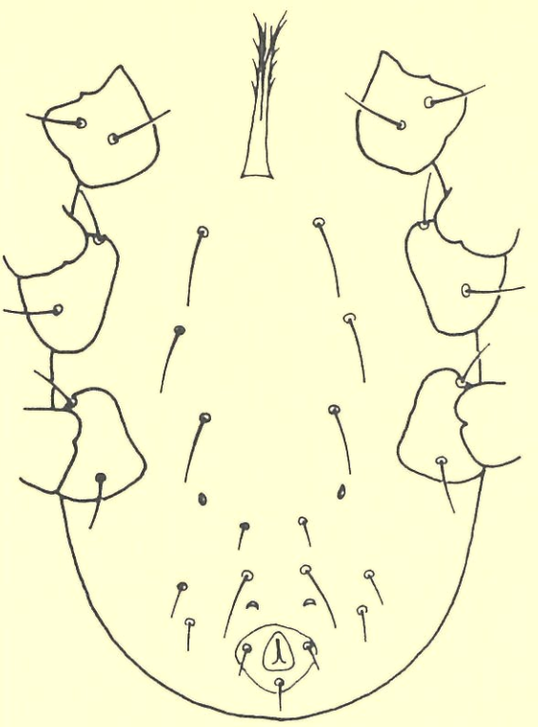

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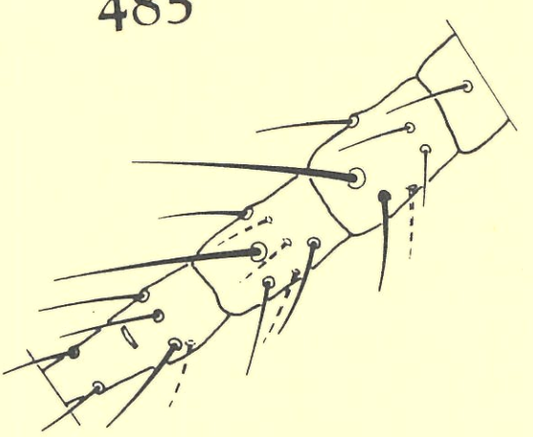

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FIGS. 482-485. Amblyseius (Amblyseius) tutsi Pritchard & Baker, larva

Fig.482, dorsum; fig.483, venter; fig. 484, chelicera; fig.485, leg III.

III. BIOLOGICAL DATA OF AMBLYSEIUS (AMBLYSEIUS) TUTSI PRITCHARD & BAKER

a. Egg: The freshly laid egg is smooth, whitish in colour and somewhat pointed on one side. It is 180 µ long and 145 µ wide. The egg increases in size to 200 µ by 155 µ just before hatching. Development of the embryo is already in an advanced stage when it is laid since hatching occurs within 24 hours. In many females mounted with the egg still in the body, the legs and setae of the developing larva could be observed. The egg shell becomes visible within the female shortly before the egg is laid.

Hatching is proceded by movement of the larva within the eggshell. The latter bursts open transversely, above the dorsum of the larva. The six legged larva pushes itself out and frees itself from the flimsy transparent shell.

b. Larva: Dorsum (fig. 482). The sexes are indistinguishable. The idiosoma of the white, almost transparent larva measures 195-205 µ in length and 170-180 µ in width. In contrast to the findings of Chant (1958b) that the idiosoma of phytoseiid larvae is provided with two shields, the present findings and those of Westerboer & Bernhard (1963) are that this is not so. The latter authors are of the opinion that the larva has a single anterior shield but this could not be distinguished by the present author, even using oil immersion phase contrast objectives.

The smooth idiosoma bears 10 pairs of setae: four dorsal, one median, four prolateral and one

caudolateral./.....

caudolateral. These setae measure in length: D_1, 28-31 μ; D_2, D_3, M_1 and L_1, 9-11 μ; D_4, 54-58 μ; L_2, 13-15 μ; L_3, 24-26 μ; L_4, 61-64 μ and L_5, 168-175 μ. Only seta L_3 reaches to the base of the seta following next in the series.

A stigma or peritreme could not be observed.

Venter (fig. 483): Median to the three pairs of coxae and posterior to the tritosternum are three pairs of setae. The outline of a sternal shield could not be discerned.

A small anal shield with the normal three para-anal setae is present. Anterior and anterolateral to this shield are a pair of pores, with four pairs of setae present on the interscutal membrane. The inner posterior pair of these setae is twice as long as the other short setae. Anterolateral to the anterior pair of setae is another pair of pores on the membrane.

Chelicera (fig. 484): The fixed digit bears a single subapical tooth and a pilus dentilis on its inner margin. The movable digit is provided with a single tooth on its inner margin. Both digits are 19 μ long.

Legs: The larva has three pairs of legs and their chaetotaxy is as follows: coxae I-III, normal; trochanters I-III, 1- $\frac{0}{2}$ - 1; femur I, 2- $\frac{2}{2}$, $\frac{2}{1}$ - 1; femur II, 1- $\frac{2}{1}$, $\frac{2}{0}$ - 1; femur III, 1- $\frac{1}{1}$, $\frac{2}{0}$ - 0; genu I, 1- $\frac{2}{1}$, $\frac{2}{1}$ - 1; genus II and III, 1- $\frac{2}{0}$, $\frac{2}{0}$ - 1; tibia I, 1- $\frac{2}{1}$, $\frac{2}{1}$ - 1 and tibiae II and III, 1- $\frac{1}{1}$, $\frac{2}{1}$ - 1. Macrosetae on the legs measure in length as follows: one on each of genua I and II, 32-35 μ, on genu III, 52-56 μ and on tibia III, 46-50 μ (fig. 485).

The newly/.....

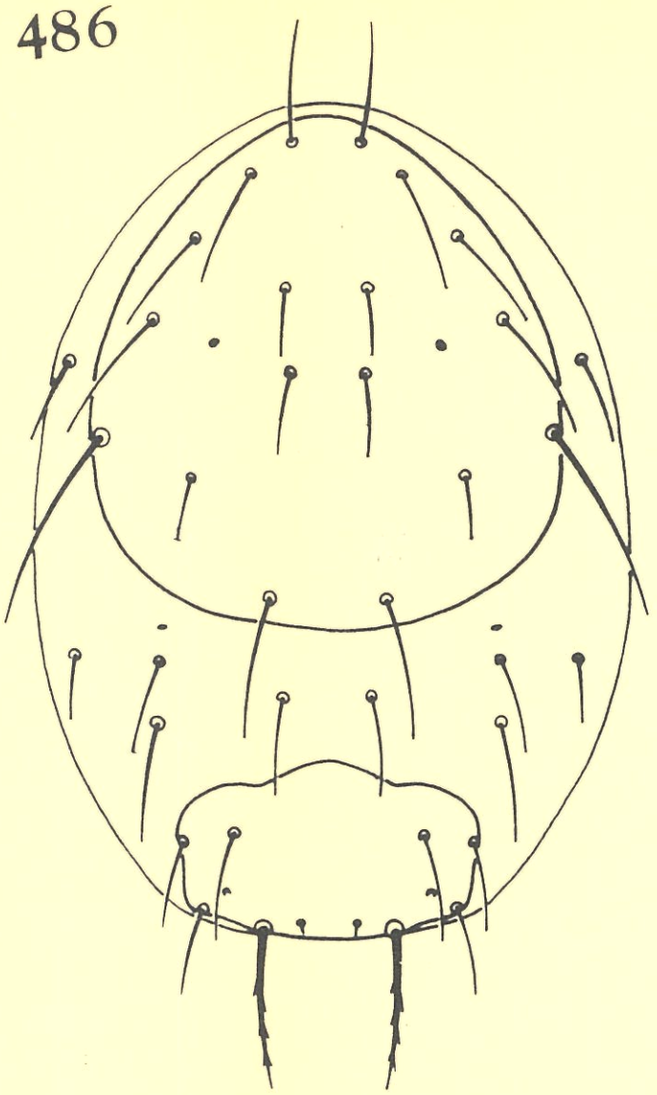
The newly hatched larva does not wander far away from the egg shell and feeds readily on pollen but refuses live prey. They, however, do feed on tetranychids freshly killed by nymphae or adults. Judging from the contents of the gut, showing red through the body, they do not take much food from such a tetranychid.

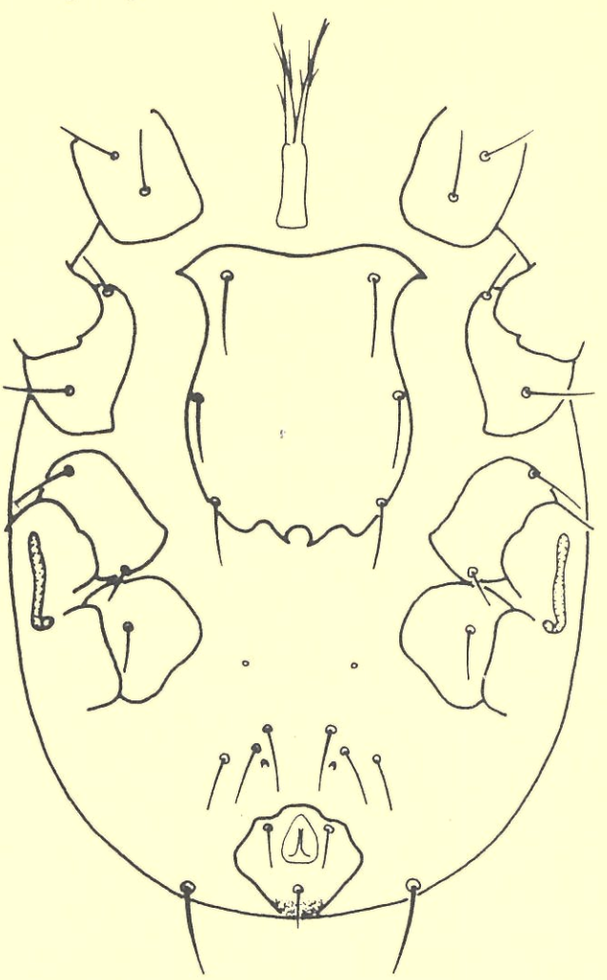
Ecdysis is preceded by a non-feeding period of approximately seven hours. The larva has become whiter and the idiosoma has a rough appearance. Ecdysis starts when the palpi and first pair of legs are stretched foward and pressed onto the leaf surface, while the idiosoma is lifted up. This attitude is succeeded by approximately five up and down movements of the body which cause the old skin of the idiosoma to burst open caudally (Dosse, 1955a). The fourth pair of legs, which have been folded double, appear caudolaterally through this slit. While the fourth pair of legs are being released, the protonymph moves backwards and the gnathosoma is pulled out of the larval gnathosome skin. The protonymph casts the larval skin by pushing it backwards with the first three pairs of legs. When the protonymph is free from the old skin, the fourth pair of legs is stretched out. The cast skin is whitish and transparent but clearly visible against the green of the leaf.

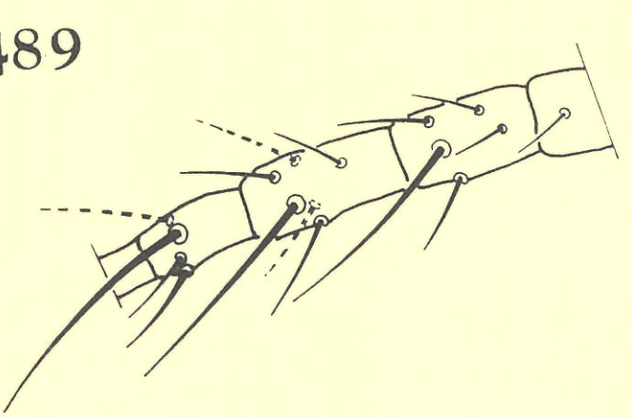
A number of dead larvae, in the act of ecdysis, were observed. This happened when the larval skin is severed just caudal to the gnathosoma. The protonymph is then unable to release itself from the larval skin.

Ecdysis from larva to protonymph takes five minutes.

c. Protonymph:/.....







FIGS. 486-489. Amblyseius (Amblyseius) tutsi Pritchard & Baker, protonymph

Fig.486, dorsum; fig.487, venter; fig. 488, chelicera; fig.489, leg IV.

c. Protonymph: Dorsum (fig. 486): The sexes are indistinguishable. The idiosoma bears two shields as described by Westerboer & Bernhard (1963) for the phytoseiid protonymphs. This is in contrast to the findings of Chant (1958b) that a single dorsal shield is present. The anterior shield, length 150-156 μ and breadth 144-150 μ, is provided with a pair of pores and nine pairs of setae: four dorsal, one median and four prolateral. The posterior shield, length 47-53 μ and breadth 88-93 μ, is provided with a pair of pores and five pairs of setae: one dorsal, one median and three lateral. The fifth dorsal seta and the fifth and sixth lateral setae are on the interscutal membrane between the two shields. Two pairs of scapular setae are present laterally on the membrane. The idiosoma therefore has the same number of setae as the adults. The setae on the dorsum measure in length: D_1, L_1 and L_6, 37-39 μ; D_2 and M_1, 20-23 μ; D_3, L_5, L_7 and L_8, 25-28 μ; D_4 and L_3, 43-45 μ; D_5, M_2 and L_2, 31-33 μ; D_6, 7-9 μ, L_4, 60-65 μ and L_9, 50-55 μ. The dorsal setae, except D_4, are shorter than the respective distances between their bases and the bases of the setae following next in the series. The lateral setae, except L_4 and L_6, are longer than the respective distances between their bases and those of the setae following next in the series. Setae M_1 and D_2 are equal in length while seta M_2 is longer than the distance between its base and the base of seta L_8.

Setae S_1 and S_2 are 27-30 μ and 18-21 μ long respectively.

The peritrematal shields are not yet developed. The stigma and short peritreme measure 34-36 μ in length,

being/.....

being thus shorter than the width of coxae IV.

Venter (fig. 487): The sternal shield bears three pairs of sternal setae. The shield is 90-95 μ long and 70-72 μ wide across the second pair of setae. The posterior margin of the shield is very irregular in outline. An anal shield is present with the normal three para-anal setae. Anterior to this shield, on the interscutal membrane, are three pairs of pre-anal setae and caudal to the inner pair of setae is a pair of pores. Anterior to these setae is another pair of smaller pores. Lateral to the anal shield and almost on the caudal margin of the idiosoma is a pair of longer setae, the caudolaterals.

Chelicera (fig. 488): The fixed digit bears three small sharp subapical teeth and a pilus dentilis. The movable digit bears a single tooth on its inner margin. The digits are equal in length, 21 μ.

Legs: The chaetotaxy of the first three legs resembles that of the larva. The retention of the larval complement of setae in the protonymph was described by Evans (1963) for Pergamasus (Parasitidae). The chaetotaxy of leg IV is as follows: coxa, av; trochanter, 1- $\frac{0}{2}$ - 1; femur, 1- $\frac{2}{0}$ - 1; genu, 1- $\frac{2}{0}$, $\frac{2}{0}$ - 0; tibia, 1- $\frac{1}{1}$, $\frac{2}{0}$ - 1 and basitarsus 1- $\frac{1}{0}$, $\frac{1}{0}$ - 1. The lengths of the macrosetae on the legs are: genu II, 28-30 μ; genu III and tibia III, 40-42 μ; genu IV, 66-68 μ; tibia IV, 74-77 μ and basitarsus IV, 81-86 μ (fig. 489).

The protonymph is whitish with a slightly yellow tint and is more active than the larva. It feeds

readily/....

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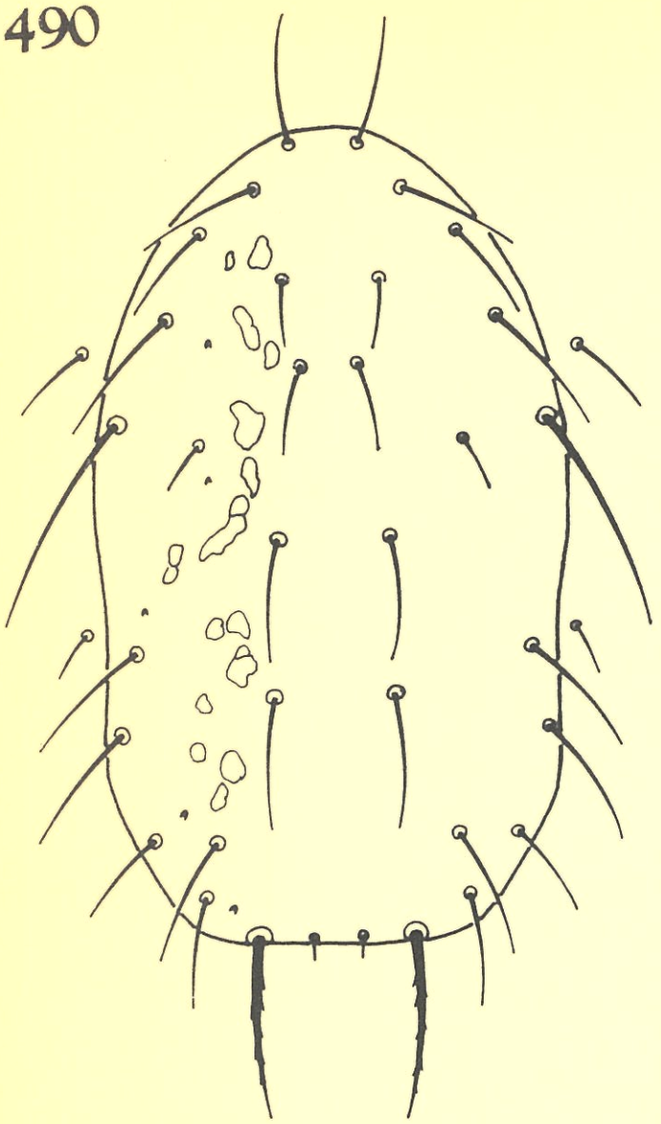

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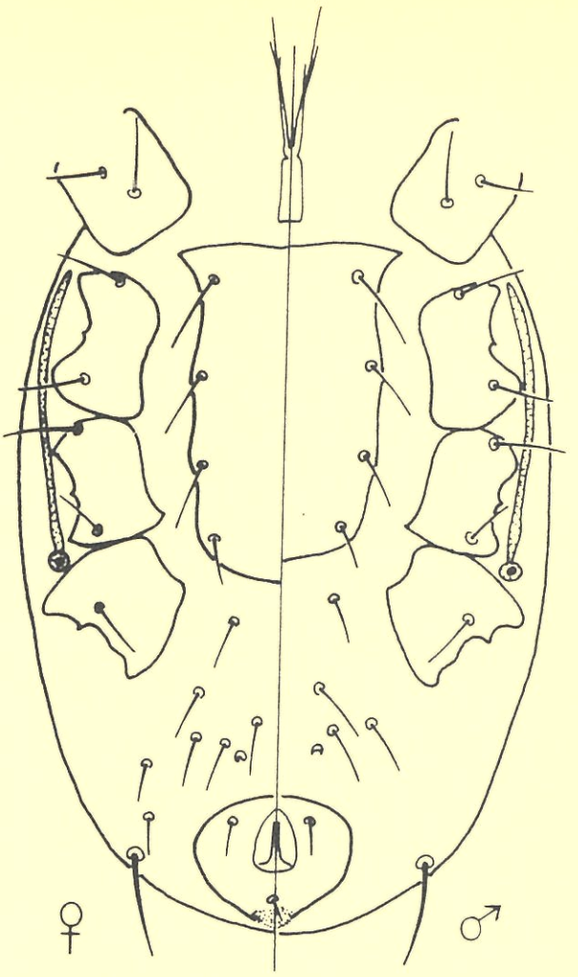

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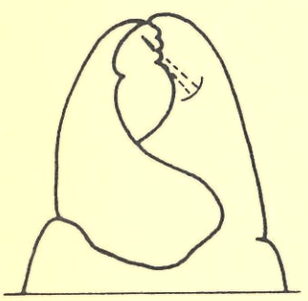

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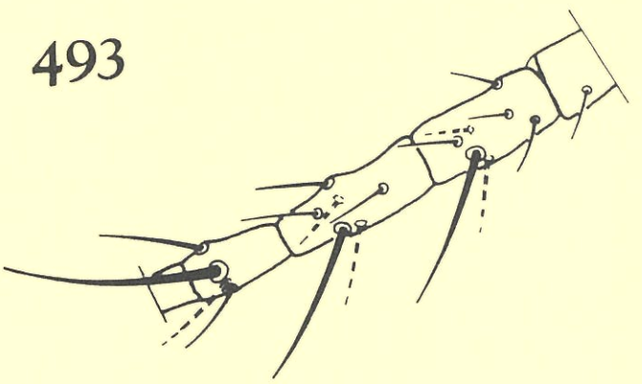

FIGS. 490-493. Amblyseius (Amblyseius) tutsi Pritchard & Baker, deutonymph

Fig.490, dorsum, female; fig.491, venter, female and male; fig.492, chelicera, female; fig.493, leg IV, female.

readily on the eggs, larvae and nymphae of tetranychids. The protonymph, however, prefers pollen when it is added to the diet.

The end of this stage, which lasts two days, is marked by a period of inactivity of approximately four hours. However, during this period it performs a few movements as though pressing something down onto the leaf. Active ecdysis starts when the idiosoma is pushed upwards, first on one side and then on the other. This gives the impression that the nymph is endeavouring to lift the idosoma away from the legs. Actually, these movements are the result of the dentonymphal legs being moved proximally in the leg skins of the protonymph. During the third or fourth of these movements the protonymphal skin of the idiosoma bursts open caudally and the deutonymph pushes itself free. The legs are stretched and the deutonymph moves away from the flimsy cast skin.

Active ecdysis takes from five to 10 minutes.

d. Deutonymph: (i) Female: Dorsum (fig. 490): Dorsal shield entire with five pairs of pores and some dorsomedian rugose patches. The shield is 285-295 μ long and 170-180 μ wide and bears 17 pairs of setae. The length of these setae are: D_1, 42-44 μ; D_2, 26-28 μ; D_3, 33-35 μ; D_4 and L_1, 44-46 μ; D_5, M_2, L_5 and L_6, 46-50 μ; D_6, 6-8 μ; M_1, 20-22 μ; L_2, l_7 and L_8, 36-38 μ; L_3, 52-54 μ; L_4, 67-71 μ and L_9, 59-64 μ. Only the lateral setae, L_4 excluded, are longer than the distances between their respective bases and the bases of the setae following next in the series. Seta M_2 reaches well beyond the base of seta L_8.

Seta S_1, 28-30 μ long and seta S_2, 22-24 μ long, are placed on the dorsal interscutal membrane.

A peritrematal shield could not be discerned. The stigma and peritreme are well developed, the latter reaching to the anterior margin of coxa II.

Venter (fig. 491): The sternal shield, bears four pairs of setae and measures 115-120 μ in length and 66-68 μ in width across the second pair of setae. Posterior to the shield and between coxae IV lies a fifth pair of setae on the interscutal membrane.

Posteriorly, an anal shield with the normal three para-anal setae is present. Anterior to this shield are three pairs of pre-anal setae and a pair of pores on the interscutal membrane. Lateral to these setae and to the anal shield are four pairs of setae, the caudal pair being twice as long as the other setae.

Chelicera (fig. 492): The chelicerae resemble those of the protonymph, but are more strongly developed, the digits each measuring 23 μ in length.

Legs: The chaetotaxy of the legs resembles that of the adult female in being normal. Genu III and tibia III each bears a macroseta 39-42 μ in length. Leg IV (fig. 493) bears three macrosetae, measuring 55-56 μ on the genu, 57-60 μ on the tibia and 80-85 μ on the basitarsus.

(ii) Male: The dorsum of the male resembles that of the female deutonymph, but the dorsal shield is slightly smaller, measuring 268-275 μ in length and 173-178 μ in width. The chaetotaxy also resembles that of the female

deutonymph,/.....

deutonymph, though the longer setae are approximately 5 μ shorter.

Venter (fig. 491): The venter also resembles that of the female deutonymph, except that the sternal shield is smaller, 108-112 μ x 67-70 μ, and that the first three pairs of setae lateral to the pre-anal setae are absent. The absence of these setae is the only major morphological difference between the male and female deutonymphs.

Chelicera: Resembles that of the female deutonymph.

Legs: Resemble those of the female deutonymph and the adult male and female.

The deutonymphs prefer pollen to tetranychids as food, if available.

The deutonymph stage lasts one day. Ecdysis follows the same pattern as that described for the protonymph.

(e) Adult female and male: The adults were described in Part I of this paper.

McMurtry & Scriven (1964) reported that A. hibisci has higher developmental and reproductive rates when fed on pollen. This is also true of A.(A.) tutsi, since females fed on tetranychids laid an average of one egg per day whereas females fed on pollen laid an average of two eggs per day.

Dosse (1959) found that the species tested by him copulated for as long as 24 hours. The time taken for copulation by A.(A.) tutsi was never longer than one hour. The male crawls upside down underneath the female. When the female appears irate the male quickly abandons

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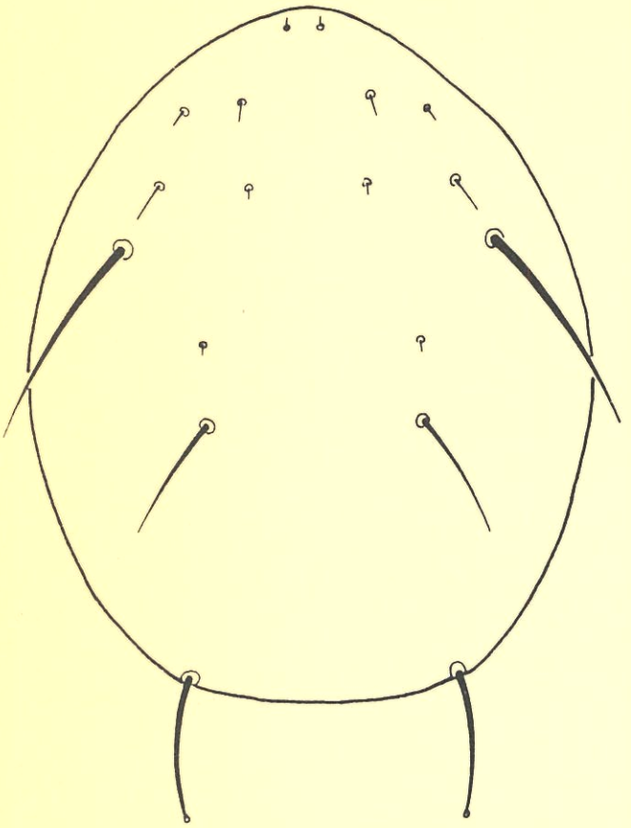

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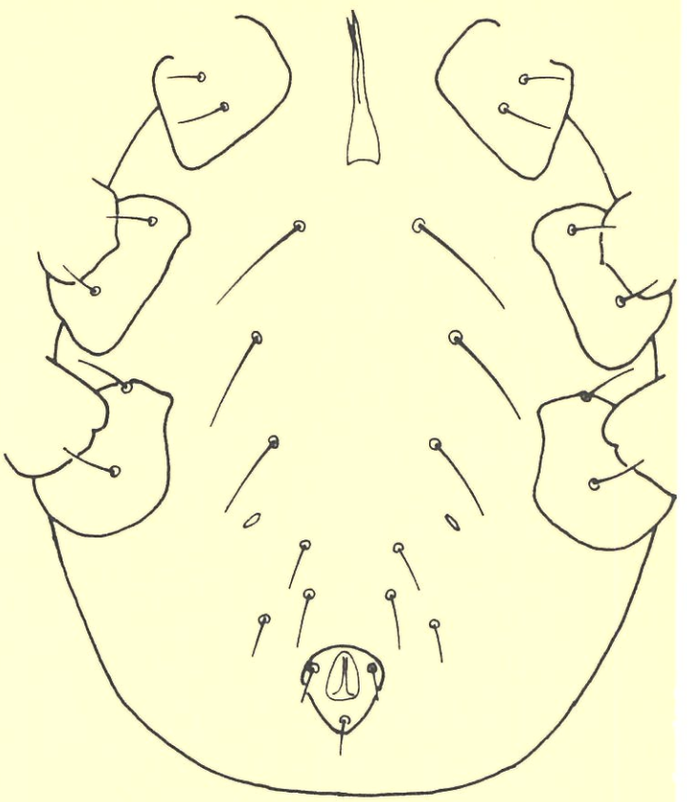

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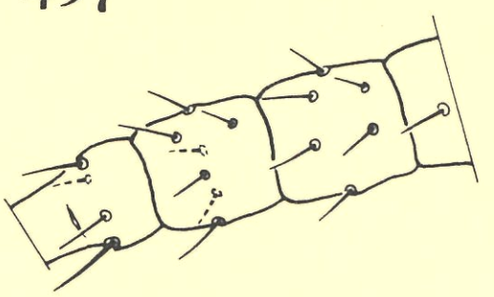

FIGS. 494-497. Amblyseius (Mesoseiulus) longipes (Evans), larva

Fig.494, dorsum; fig.495, venter; fig.496, chelicera; fig.497, leg III.

her, probably due to the fact that she was already fertilized. A female is however fertilized many times during her life of 10-20 days.

IV. BIOLOGICAL DATA OF AMBLYSEIUS (MESOSEIULUS) LONGIPES (EVANS)

The data for the hatching of the egg and ecdysis of the developmental stages is the same for this species as described for A.(A.) tutsi and will therefore not be repeated.

a. Egg: The freshly laid egg is smooth, light orange in colour and somewhat pointed on the one side, but less so than the egg of A.(A.) tutsi. The egg measures 225 x 188 µ after being laid and increases in size to 237 x 200 µ just before hatching. The egg hatches in from one to three days, producing a six legged larva.

b. Larva: Dorsum (fig. 494): The sexes are indistinguishable. The idiosoma of the light orange larva measures 230-338 µ in length and 194-205 µ in width. No shields could be discerned. The dorsum bears nine pairs of setae, three dorsal, one median, four prolateral and one caudolateral. These setae measure in length: D_1, D_2, M_1 and L_2, 4-6 µ; D_3, 42-45 µ; L_1, 9-11 µ; L_3, 14-16 µ; L_4, 75-80 µ and L_5, 51-55 µ. The latter seta is distally distinctly knobbed. Setae D_3 and L_4 may each also be provided with a small distal knob.

Stigmata or peritremes could not be distinghuised.

Venter/.....

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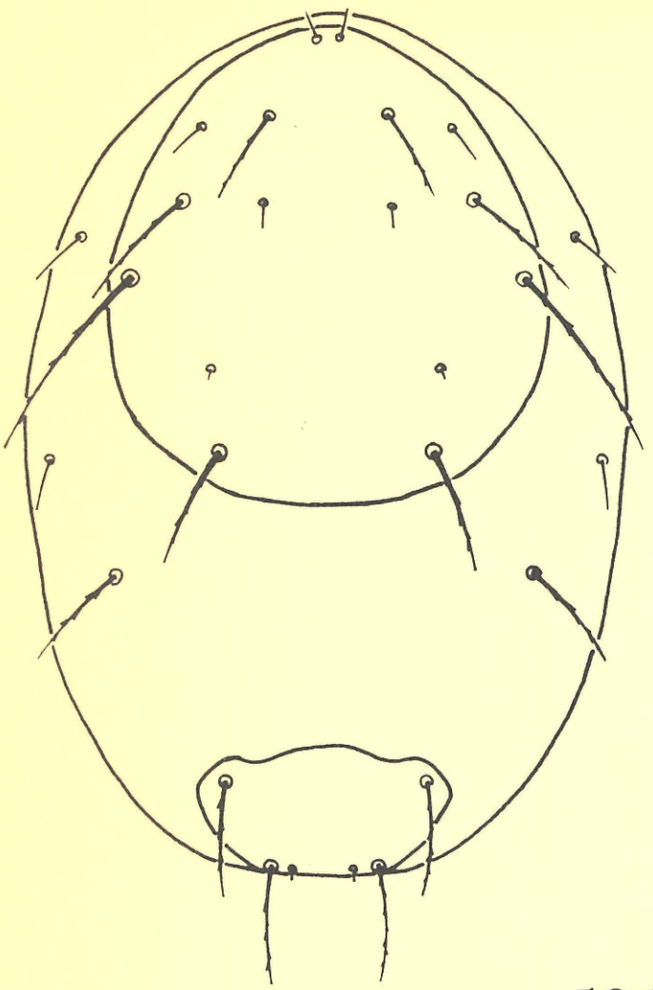

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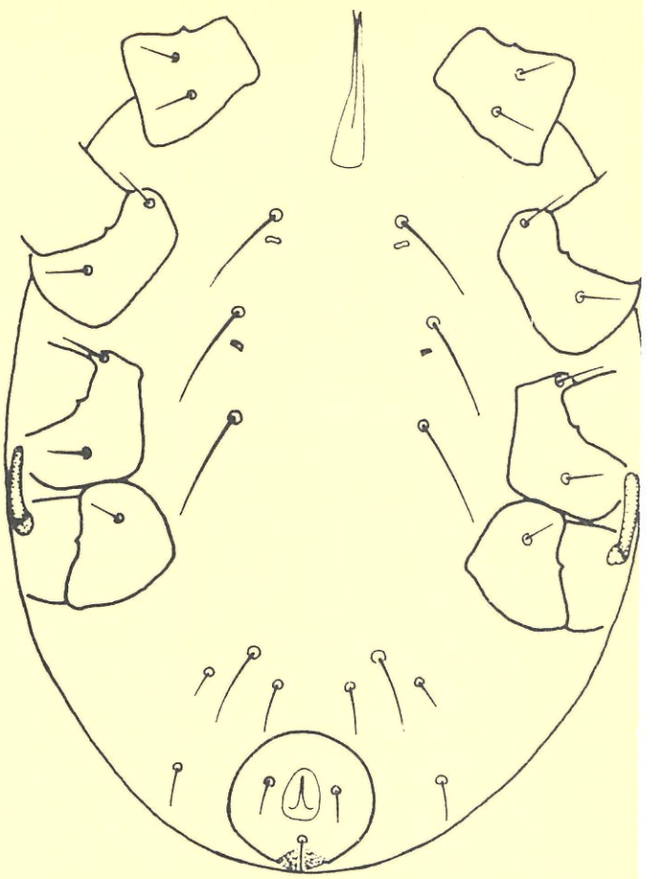

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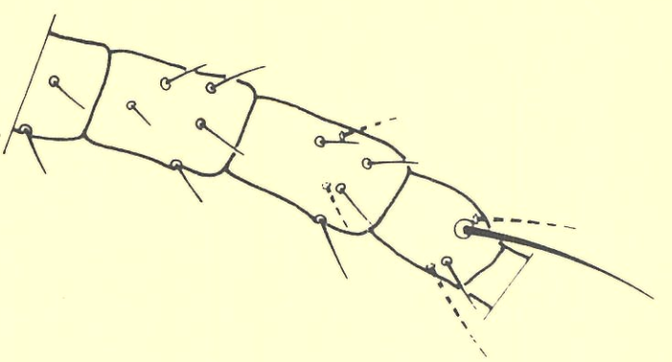

FIGS. 498-501. Amblyseius (Mesoseiulus) longipes (Evans), protonymph

Fig.489, dorsum; fig.499, venter; fig.500, chelicera; fig.501, leg IV.

Venter (fig. 495): Median to the three pairs of coxae and posterior to the tritosternum are three pairs of setae. The outline of a sternal shield could not be discerned.

A small anal shield with the normal three para-anal setae is present. Anterior to this shield are three pairs of pre-anal setae on the membrane. The pair of pre-anal pores is absent, but a pair of large pores is present anterolateral to the pre-anal setae.

Chelicera (fig. 496): The fixed digit, length 20 μ, bears a single blunt subapical tooth and a pilus dentilis. The movable digit, length 17 μ, bears a small tooth on its inner margin.

Legs: Only three pairs of legs are present and their chaetotaxy is the same as that described for the larva of A.(A.) tutsi. The legs bear short setae; the genu, tibia and basitarsus of leg III are illustrated in fig. 497.

The larva feeds very little and then only from freshly killed tetranychids. No larva was observed killing live prey. It refused pollen as food.

c. Protonymph: Dorsum (fig. 498): The sexes are indistinguishable. The idiosoma bears two shields, the anterior one, 165-175 x 145-152 μ, bears eight pairs of setae and the posterior one, 48-56 μ x 84-90 μ, three pairs. The fifth lateral seta is on the interscutal membrane as well as the two parts of scapular setae. The idiosoma thus bears the same complement of setae as in the adult. These setae measure in length: D_1 and D_2, 12-14 μ; D_3, 50-53 μ, D_4 and M_1, 4-6 μ; M_2, L_5 and L_6, 44-48 μ; L_1, 38-43 μ; L_2, 16-18 μ;

L_3, 53-58 μ/.....

53-58 μ and L_4, 78-83 μ. The longer setae, D_3, M_2, L_1, L_3, L_4, L_5 and L_6, are finely serrated.

Setae S_1 and S_2, each measure 23-25 μ in length.

The peritrematal shields are not yet developed. The stigma and short peritreme measure 34-36 μ in length, being thus shorter than the width of coxa IV.

Venter (fig. 499): A sternal shield could not be discerned but three pairs of setae are present between the coxae. A pair of lyriform pores is present caudal to the first and second pairs of setae.

An almost circular anal shield, diameter 54-58 μ, with three para-anal setae, is the only shield present on the venter. Anterior to the shield are three pairs of pre-anal setae on the membrane. The anterior pair of these setae is at least twice as long as the outer pair. Lateral to the anal shield is another pair of setae, the caudolateral setae.

Chelicera (fig. 500): The fixed digit, length 20 μ, bears two subapical teeth and a pilus dentilis. The movable digit, length 18 μ, bears three teeth along its inner margin.

Legs: The chaetotaxy of the legs is the same as that described for the protonymph of A.(A.) tutsi. Legs IV (fig. 501) bears a single macroseta 60-66 μ long.

The active protonymph feeds on all stages of the tetranychid. It feeds on pollen only when live prey is not available.

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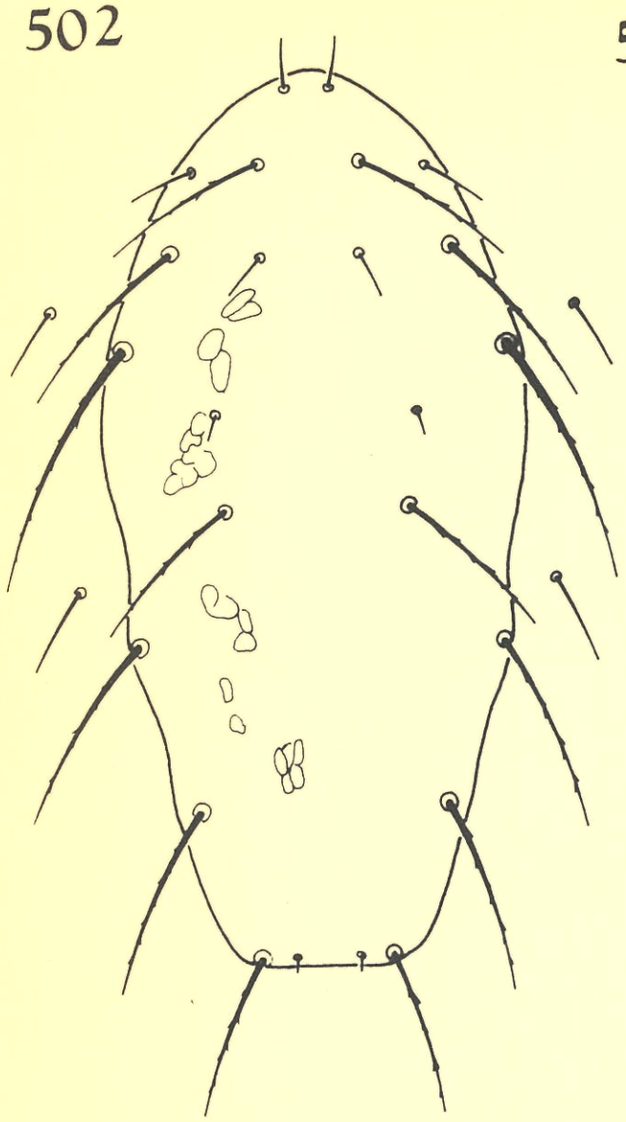

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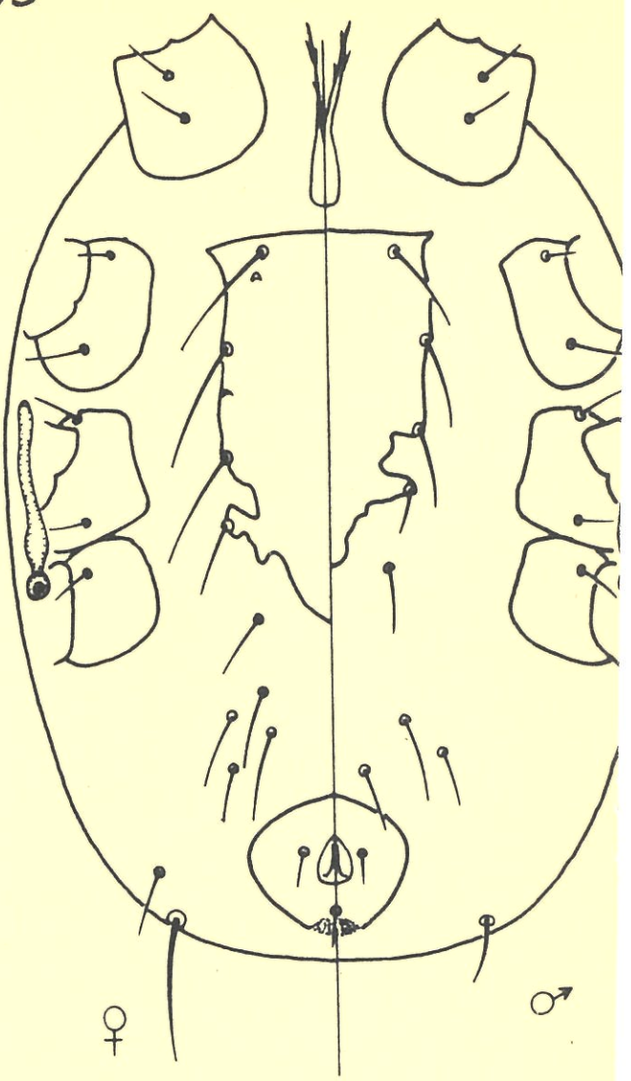

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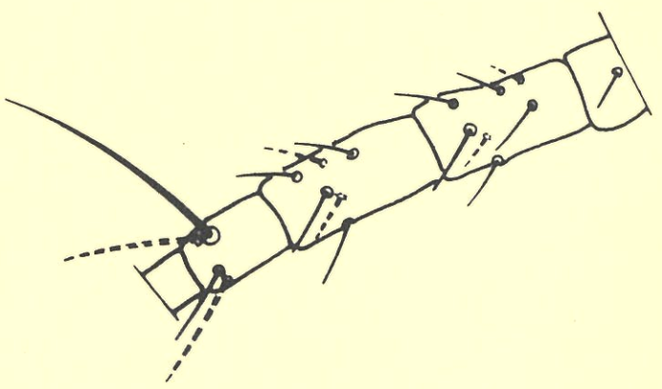

FIGS. 502-505. Amblyseius (Mesoseiulus) longipes (Evans), deutonymph

Fig.502, dorsum, female; fig.503, venter, female and male; fig.504, chelicera, female; fig.505, leg IV, female.

The protonymph moults in two to three days into the deutonymph.

d. Deutonymph: (i) Female: Dorsum (fig. 502): Dorsal shield entire, length 332-345 μ and width 150-160 μ, with a few dorsomedian rugose patches and 12 pairs of setae. The distribution of these setae is the same as on the dorsal shield of the adult female and they measure in length: D_1 and D_2, 19-21 μ; D_3, 72-75 μ; D_4, 4-6 μ; M_1, 8-10 μ; M_2, L_1 and L_5, 68-72 μ; L_2, 24-27 μ; L_3, and L_5, 80-85 μ and L_4, 98-103. The longer setae, D_3, M_2, L_1, L_3, L_4, L_5 and L_6, are finely serrated. Seta D_3 reaches to the base of seta L_5 and seta M_2 reaches beyond the base of seta L_6. Setae L_1 and L_3 are longer than the distances between their respective bases and the bases of setae L_3 and L_4. The latter seta is the longest seta on the dorsal shield.

Setae S_1 and S_2, both on the dorsal interscutal membrane, are 35-38 μ long.

A peritrematal shield could not be discerned. The stigma and peritreme are well developed; the latter reaches anterior to the coxa of leg III.

Venter (fig. 503): The sternal shield bears four pairs of setae and measures 155-165 μ in length and 87-93 μ in width across the second pair of setae. The lateral margins posterior to the third pair of setae and the posterior margin are very irregular in outline. The shield is, however, tapered caudally. A fifth pair of setae lies caudal to the sternal shield on the interscutal membrane.

An oval anal shield, length 64-68 μ and width

69-74 μ, with the normal three para-anal setae, is present. Anterior to this shield are three pairs of pre-anal setae on the interscutal membrane. Lateral to these setae and the anal shield are three pairs of setae. The caudal pair is much longer than the other two pairs, measuring 68-73 μ in length. No pre-anal pores are present.

Chelicera (fig. 504): The fixed digit bears two subapical teeth and a pilus dentilis. The movable digit has three teeth along its inner margin. The digits are both 21 μ long.

Legs: The chaetotaxy of the legs resembles that of the adult female in having tibia I of the XI-type and genu II of the VIII-type, with the other segments normal. Leg IV (fig. 505) bears a single aciculate macroseta, 85-90 μ long, on the basitarsus.

(ii) Male: Dorsum: The chaetotaxy of the dorsal shield, length 280-290 μ and width 135-144 μ, resembles that of the female deutonymph. The setae are however shorter than in the female, measuring in length: D_1, 15-17 μ; D_2, 14-16 μ; D_3, 47-51 μ; D_4, 4 μ; M_1, 6-8 μ; M_2, L_1 and L_5, 56-59 μ; L_2, 23-26 μ; L_3, 66-69 μ; L_4, 83-86 μ and L_6, 52-55 μ.

Setae S_1 and S_2, 23-26 μ and 30-34 μ long respectively, are on the dorsal interscutal membrane.

Peritrematal shields are not developed, the peritreme however reaches anterior to coxa III.

Venter/.....

Venter (fig. 503): The sternal shield bears four pairs of setae. The shield has an irregular posterior margin and measures 126-133 μ in length and 78-81 μ in width across the second pair of setae. A fifth pair of setae lies caudal to the sternal shield on the interscutal membrane.

The male deutonymph differs from the female deutonymph in the absence of the first two pairs of lateral setae on the membrane. Only the three pairs of pre-anal setae and the caudolateral seta are present on the membrane. The anal shield resembles that of the female deutonymph. No pre-anal pores are present.

Chelicera: The chelicerae resemble those of the female deutonymph; the digits each measure 19 μ in length.

Legs: The chaetotaxy of the legs resembles that of the female deutonymph, the adult female and the adult male. The aciculate macroseta on basitarsus IV measures 70-75 μ in length.

The deutonymphs feed on all stages of the tetranychid and moult in from one to two days into adults.

e. Adult female and male: The adults were described in Part I of this paper.

The adults are active predators on all stages of the tetranychid. They will feed on pollen only in the absence of live prey. When fed on live prey the female laid one egg per day but on a diet of pollen, egg laying ceased after a day or two.

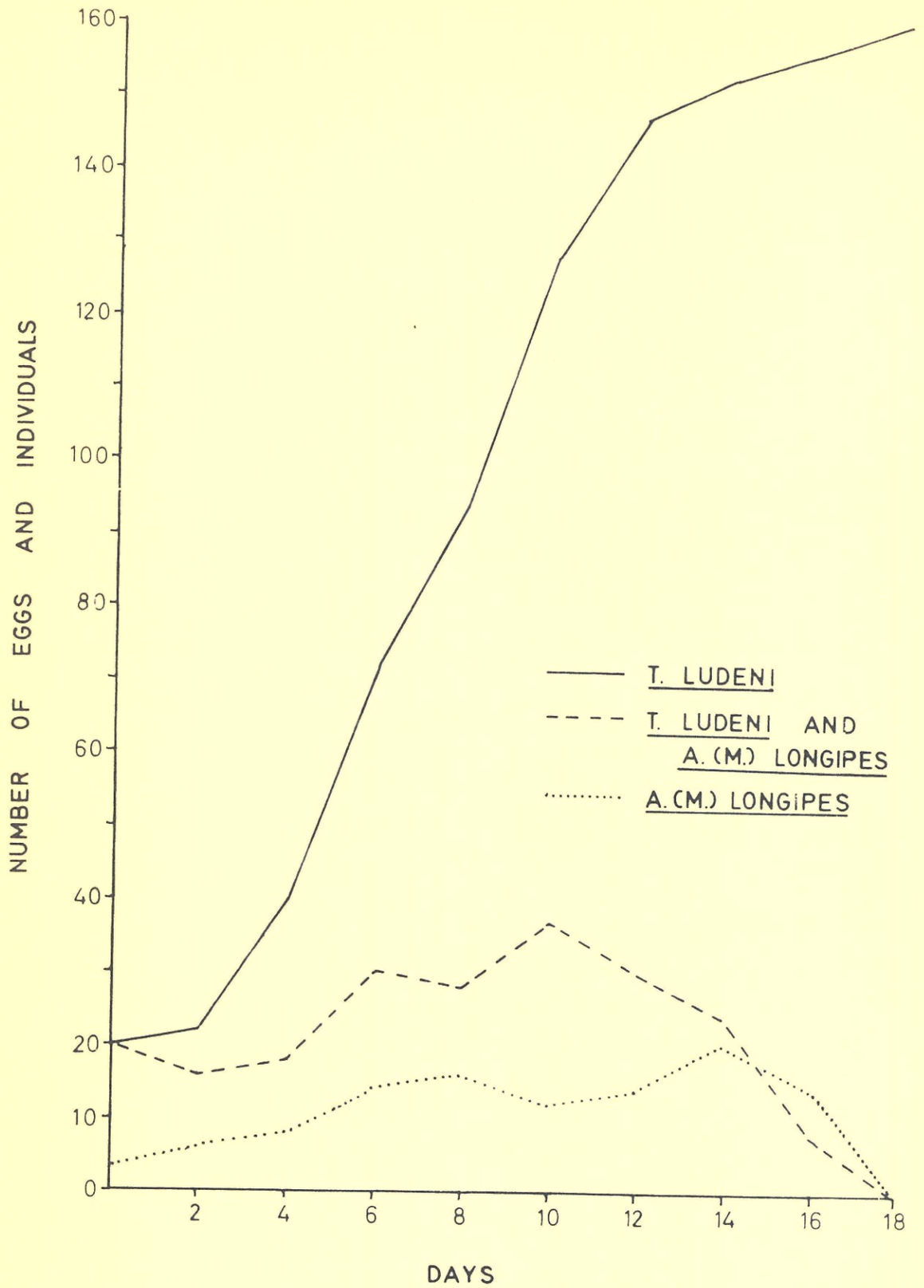

Fig.506, Predacious influence of A. (M.) longipes on T. ludeni.

Adults were kept alive for as long as 40 days on a tetranychid diet but died within ten days when fed on pollen alone.

V. CONCLUSION

A. (M.) longipes was by far the more efficient predator of the two species, since it prefers tetranychids to pollen as food. It is further perfectly adapted to cope with the webbing of the tetranychids, being capable of moving about without getting entangled. It is capable of gathering a few filaments of the web in its palpi and severing them with its chelicerae.

A.(A.) tutsi on the other hand cannot be regarded as more than a minor predator, since it prefers to eat pollen, when available, rather than tetranychids. This species also tends to become entangled in the tetranychid web from which it seldom escapes.

To illustrate the effectiveness of A.(M.) longipes as predator of tetranychids, the following experiment was carried out. Six plants of Phaseolus vulgarus were isolated in organdy cages in the laboratory. A single leaf of each of these plants was isolated from the plant itself by means of a ostico ring around the petiole. Twenty mature females of Tetranychus ludeni were placed on each of these leaves. In addition, three mature A.(M.) longipes females were put on four of the leaves, the remaining two leaves with tetranychids only acting as controls.

Counts were made every second day for a period of 18 days as illustrated in fig. 506. The controls

averaged/.....

averaged 147 tetranychids after 12 days and 160 after 18 days. The leaves with predators averaged 37 live tetranychids after 12 days, the tetranychids being eliminated after 18 days.

When an abundance of tetranychid eggs became available after four days and hatching of these eggs started, the predators increased in number. They could, however, for some unknown reason not cope with the prey. With the second increase of eggs and hatching of larvae, the predator thrived and eliminated the tetranychids completely.

The only drawback of A.(M.) longipes as a predator is that having completely eradicated its prey, it dies out itself, at least on that specific plant, since it does not appear to be able to adapt an alternative diet, e.g. pollen. This was observed on non-isolated Phaseolus vulgarus plants in the greenhouse and also in the field on Hydrangea hortensia. No counts were made of mite numbers in these cases.

This phenomenon illustrates the necessity for knowledge not only of the taxonomy but also of the biology of any phytoseiid whose use in biological control is envisaged. For instance, A. (A.) tutsi, with its ability to use pollen as a alternative source of food, may exert a predation pressure of lower intensity but of longer duration and thus be suitable as a control agent under normal conditions, whereas A.(M.) longipes may be useful when a severe outbreak occurs.

VI. ACKNOWLEDGEMENTS

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VII. REFERENCES

ANDERSON, N.H. & MORGAN, C.V.G. 1965. The role of Typhlodromus spp. (Acarina: Phytoseiidae) in British Columbia Apple Orchards. Proc. Tenth int. Congr. Ent. 4: 659-665.

ATHIAS-HENRIOT, C. 1957 a. Phytoseiidae et Aceosejidae (Acarina, Gamasina) d'Algérie I. Genres Blattisocius Keegan, Iphiseius Berlese, Phytoseius Ribaga, Phytoseiulus Evans. Bull. Soc. Hist. nat. Afr. N. 48 : 319-352.

-- 1957 b. Typhlodromus ornatus n. sp. et Typhlodromus longilaterus n. sp. (Acarina, Phytoseiidae) mesostigmates prédateurs d'Algérie. Rev. Pat. Veg. ent. agric. France 36 : 215-222.

-- 1958 a. Phytoseiidae et Aceosejidae (Acarina, Gamasina) d'Algérie II. Phytoseiidae: clé des genres, genres Amblyseius Berlese (suite) et Seiulus Berlese. Bull. Soc. Hist. nat. Afr. N. 49 : 23-43.

-- 1958 b. Contribution a la connaissance du genre Typhlodromus Scheuten (Acariens Parasitiformes, Phytoseiidae). Description de deux espéces nouvelles d'Algérie et clé des espéces du Groupe Finlandicus. Rev. Pat. Veg. ent. agric. France 37 : 179-186.

-- 1959./.....

-- 1959. Acariens planticoles d'Algérie I. 5e contribution au genre Amblyseius Berlese (Phytoseiidae). II. Premiére liste d'Actinochitinosi (Cheyletidae, Caligonellidae, Hermisarcoptidae). Bull. Acad. r. Belg. (Classe Sci., Ser. 5) 45: 130-153.

-- 1960. Nouveaux Amblyseius d'Algérie (Parasitiformes, Phytoseiidae). Acarologia II : 288-299.

-- 1961. Mésostigmates (Urop. excl.) Édaphiques Méditerranéens (Acaromorpha, Anactinotrichida). Acarologia III : 381-509.

-- 1962. Amblyseius swirskii, un nouveau phytoséiide voisin d' A. andersoni (Acariens anactinotriches). Ann. Ecol. nat. agric. Alger. III : 7 pp.

BAKER, E.W. & WHARTON, G.W. 1952. An introduction to acarology. The MacMillan Co., New York. 465 pp.

BERKER, J. 1955. Über die Bedeutung der Raubmilben innerhalb der Spinnmilben biozönose auf Apfel. 2. Über den Einflusz zweier Raubmilben auf den Populationsverlauf von Metatetranychus ulmi Koch. Mitt. biol. Bd Anst. Berl.-Dahlem 85 : 44-48.

-- 1958. Die natürlichen Feinde der Tetranychiden 2. Aug. ent. BdAnst. 43 : 115-172.

BERLESE, A. 1882-1898. Acari, Mariapoda et Scorpiones hucusque in Italia reperta. Padua, Florence et Portici.

-- 1914. Acari nuovi. Redia 10 : 113-150.

-- 1916. Centuria prima di Acari nuovi. Ibidem 12: 19-67.

-- 1921. Acari, Myriapoda et Pseudoscorpiones Indice Sinchimico. Ibidem 14 : 77-105.

-- 1923. Centuria secunda di Acari nuovi. Ibidem 15 : 255.

BOUDREAUX, H.B. 1954. A simple method of collecting spider mites. J. econ. Ent. 46 : 1102-1103.

CHANT, D.A. 1955. Notes on mites of the genus Typhlodromus Scheuten, 1857 (Acarina: Laelaptidae), with descriptions of the males of some species and the female of a new species. Can. Ent. 87 : 496-503.

-- 1956. Some mites of the subfamily Phytoseiinae (Acarina: Laelaptidae) from southeastern England, with descriptions of new species. Ibidem 88 : 26-37.

-- 1957 a. Descriptions of some Phytoseiide mites (Acarina: Phytoseiidae). Part I. Nine new species from British Columbia with keys to the species of British Columbia. Part II.

Redescriptions/.....

Redescriptions of eight species described by Berlese. Ibidem 89 : 289-308.

CHANT, D.A. 1957 b. Descriptions of two new phytoseiid genera (Acarina: Phytoseiidae), with a note on Phytoseius Ribaga, 1902. Ibidem 89 : 357-363.

-- 1957 c. Notes on the status of some genera in the family Phytoseiidae (Acarina). Ibidem 89 : 528-532.

-- 1958 a. On the ecology of typhlodromid mites in south-eastern England. Proc. Tenth int. Congr. Ent. 4 : 649-658.

-- 1958 b. Immature and adult stages of some British Phytoseiidae Berl. 1916 (Acarina). J. Linn. Soc. Zool. 43 : 599-643.

-- 1959 a. Descriptions of a new species of Typhlodromus (Acarina: Phytoseiidae) from Eastern Asia. Can. Ent. 91 : 29-31.

-- 1959 b. Phytoseiid mites (Acarina: Phytoseiidae). Part I. Bionomics of seven species in southeastern England. Part II. A taxonomic review of the family Phytoseiidae, with descriptions of 38 new species. Can. Ent. 91 (suppl. 12): 166 pp.

-- 1959 c. Observations sur la famille des Phytoseiidae. Acarologia 1 : 11-22.

-- 1960 a./.....

CHANT, D.A. 1960 a. Descriptions of five new species of mites from India (Acarina: Phytoseiidae, Aceosejidae). Can. Ent. 92 : 58-65.

-- 1960 b. Two new species of Typhlodromus from California. Pan-Pacific Ent. 36 : 135-138.

-- 1961. An experiment in biological control of Tetranychus telarius (L.) (Acarina: Tetranychidae) in greenhouses using the predacious mite Phytoseius persimilis Athias-Henriot (Phytoseiidae). Can. Ent. 93 : 437-443.

-- 1965. Generic concepts in the family Phytoseiidae (Acarina: Mesostigmata). Ibidem 97 : 351-374.

CHANT, D.A., et al. 1959. A new subfamily, Macroseiinae Nov., of the family Phytoseiidae (Acarina: Gamasina). Ibidem 91 : 808-811.

CHANT, D.A. & ATHIAS-HENRIOT, C. 1960. The genus Phytoseius Ribaga, 1902 (Acarina: Phytoseiidae). Entomophaga 5 : 213-228.

CHANT, D.A. & FLESCHNER, C.A. 1960. Some observations on the ecology of phytoseiid mites (Acarina: Phytoseiidae) in California. Ibidem 5 : 132-139.

CUNLIFFE, F. & BAKER, E.W. 1953. A guide to the predatory phytoseiid mites of the United States. Pinellas Biol. Lab. Publ. 1 : 27 pp.

DE LEON, D. 1957. Three new Typhlodromus from Southern Florida (Acarina: Phytoseiidae). Fla Ent. 40 : 141-144.

-- 1958. Four new Typhlodromus from Southern Florida. (Acarina: Phytoseiidae). Ibidem 41 : 73-76.

-- 1959 a. A new genus and three new species of phytoseiid mites from Mexico with collection records of Phytoseius plumifer (C. and F.) and P. macropilis (Banks). Ent. News. 70 : 147-152.

-- 1959 b. Two new Typhlodromus from Florida. (Acarina: Phytoseiidae). Ibidem 70 : 105-108.

-- 1959 c. Seven new Typhlodromus from Mexico with collection notes on three other species (Acarina: Phytoseiidae). Fla Ent. 42 : 113-121.

-- 1959 d. The genus Typhlodromus in Mexico (Acarina: Phytoseiidae). Ibidem 42 : 123-129.

-- 1959 e. Two new genera of phytoseiid mites with a note of Proprioseius meridionalis Chant. (Acarina: Phytoseiidae). Ent. News. 70 : 257-262.

-- 1960. An undescribed Phytoseius from Florida and Mexico (Acarina: Phytoseiidae). Ibidem 71: 268-270.

DE LEON, D. 1961. Eight new Amblyseius from Mexico with collection notes on two other species (Acarina: Phytoseiidae). Fla Ent. 44 : 85-91.

— 1962 a. Twenty-three new phytoseiids, mostly from south-eastern United States (Acarina: Phytoseiidae). Ibidem 45 : 11-27.

-- 1962 b. The cervices of some phytoseiid type specimens (Acarina: Phytoseiidae). Acarologia 4 : 174-176.

-- 1965 a. Ten new species of Phytoseius (Pennaseius) from Mexico, Trinidad, and British Guiana with a Key to species (Acarina: Phytoseiidae). Ent. News. 74: 11-21.

-- 1965 b. Phytoseiid mites from Puerto Rico with descriptions of new species (Acarina: Mesostigmata). Fla Ent. 48 : 121-131.

DOSSE, G. 1955 a. Aus der Biologie der Raubmilbe Typhlodromus cucumeris Oud. (Acarina: Phytoseiidae). Z. Pfkrankh. 62 : 593-598.

— 1955 b. Über die Bedeutung der Raubmilben innerhalf der Spinnmilbenbiozönoze auf Apfel. 1. Grund sätzliches aus der Biologie räuberischer Milben. Mitt. biol. BdAnst. Berl.-Dahlem 85 : 40-44.

DOSSE, G. 1957 a. Über einige Faktoren, die den Aufbau einer Typhlodromus Population bestimmen (Acar., Phytoseiidae). Anz. Schädlingsk. 30 : 23-25.

-- 1957 b. Arbeitsmethoden zu morphologischen und biologischen Untersuchungen von räuberischen Milben. Z. angew. Ent. 40 : 155-160.

-- 1958 a. Uber die phytophagen und räuberischen Milben im südwestdeutschen Raum. Tagungsber. 17 : 9-29.

-- 1958 b. Die spermathecae, ein zusätzliches Bestimmungsmerkmal bei Raubmilben (Acar., Phytoseiidae). PflSch-Ber. 20 : 1-11.

-- 1959. On the process of copulation in mites of the genus Typhlodromus. Ibidem 22 : 125-133.

EHARA, S. 1958. Three predatory mites of the genus Typhlodromus from Japan (Phytoseiidae). Annot. zool. jap. 31 : 53-57.

-- 1959. Some predatory mites of the genera Typhlodromus and Amblyseius from Japan (Phytoseiidae). Acarologia 1 : 285-295.

-- 1961. On some Japanese mesostigmatid mites (Phytoseiidae and Aceosejidae). Annot. zool. jap. 34 : 95-98.

EHARA, S. 1962. Notes on some predatory mites (Phytoseiidae and Stigmaeidae). Jap. J. appl. Ent. Zool. 6 : 53-60.

EVANS, G.O. 1952. On a new predatory mite of eccnomic importance. Bull. ent. Res. 43 : 397-401.

-- 1953. On some mites of the genus Typhlodromus Scheuten 1857, from S.E. Asia. Ann. Mag. nat. Hist. (12) 6 : 449-467.

-- 1954. The genus Iphiseius Berl. (Acarina: Laelaptidae). Proc. zool. Soc. Lond. 124 : 517-526.

-- 1957. An introduction to the British Mesostigmata (Acarina) with keys to families and genera. J. Linn. Soc., Zool. 43 : 203-259.

-- 1958. A new mite of the genus Phytoseiulus Evans (Acarina: Phytoseiidae) from Southern Rhodesia. J. ent. Soc. sth. Afr. 21 : 306-308.

-- 1959. Some mesostigmatid mites from a nest of social spiders in Uganda. Ann. Mag. nat. Hist. (ser. 13) 1 : 580-590.

-- 1963. Observations on the chaetotaxy of the legs in the free-living Gamasina (Acarina: Mesostigmata). Bull. Brit. Mus. (nat. Hist.) 10 : 277-303.

EVANS, G.O. &/.....

EVANS, G.O. & BROWNING, E. 1955. Techniques for the preparation of mites for study. Ann. Mag. nat. Hist. (Ser. 12) 8 : 631-635.

FLESCHNER, C.A. & RICKER, D.W. 1954. Typhlodromid mites on citrus and avocado trees in southern California. J. econ. Ent. 47 : 356-357.

GARMAN, P. 1948. Mite species from apple trees in Connecticut. Bull. Conn. agric. Exp. Stn. 520 : 27 pp.

-- 1958. New species belonging to the genera Amblyseius and Amblyseiopsis with keys to Amblyseius, Amblyseiopsis and Phytoseiulus. Ann. ent. Soc. Am. 57 : 69-79.

-- 1961. Effect of sprays on mite and insect species of the apple orchard floor. Bull. Conn. agric. Exp. Stn. 634 : 16 pp.

GONZáLEZ, R.H. & SCHUSTER, R.O. 1962. Especies de la familia Phytoseiidae en Chile I. (Acarina: Mesostigmata). Bull. Univ. Chile agric. Exp. Stn. 16 : 35 pp.

HANTSBARGER, W.M. & O'NEILL, W.J. 1954. Predacious mites of the family Laelaptidae in north-Central Washington. J. econ. Ent. 47 : 176-177.

HERBERT, H.J. 1953. Progress report on predacious mite investigations in Nova Scotia (Acarina: Phytoseiidae). 83 rd. Ann. Rep. ent. Soc. Ont. 1952 : 27-29.

HERBERT, H.J. 1956./.....

HERBERT, H.J. 1956. Laboratory studies on some factors in the life history of the predacious mite Typhlodromus tiliae Oudms. (Acarina: Phytoseiidae) Can. Ent. 88 : 701-704.

HIRSCHMANN, W. 1957. Gangsystematik der Parasitiformes. Teil I. Rumpfbehaarung und Rückenflächen. Acarologie SchrReihe vergl. Milbenk., Fürth I: 20 pp.

-- 1962. Gangsystematik der Parasitiformes. Teil 5. Rumpfbehaarung und Rückenflächen. Ibidem 5: 56 pp.

HUFFAKER, C.B. & KENNETT, C.E. 1953 a. Cyclamen mite on strawberry. Calif. Agric. April 1953 : 8-12.

-- 1953 b. Developments toward biological control of cyclamen mite on strawberries in California. J. econ. Ent. 46 : 802-812.

-- 1956. Experimental studies on predation and cyclamen mite populations on strawberries in California. Hilgardia 26 : 191-222.

HUGHES, A.M. 1948. The mites associated with stored food products. Min. Agric. Fish., Lond. 168 pp.

-- 1961. The mites of stored food. Min. Agric. Fish. Food., Tech. Bull. 9 : 287 pp.

KARG, W. 1961. Zur Kenntnis der Typhlodromiden (Acarina: Parasitiformes) aus Acker- und Gründlandböden. Z. angew. Ent. 47 : 440-452.

LORD, F.T. 1949. The influence of spray programs on the fauna of apple orchards in Nova Scotia: III Mites and their predators. Can. Ent. 181 : 202-230.

MALCOLM, D.R. 1955. Biology and control of the timothy mite, Paratetranychus pratensis (Banks). Wash. agric. Exp. Stn., Tech. Bull. 17 : 35 pp.

MAYR, E. et al. 1953. Methods and principles of systematic zoology. McGraw-Hill Book Co., Inc. New York, 328 pp.

McMURTRY, J.A. & SCRIVEN, G.T. 1964. Studies on the feeding reproduction, and development of Amblyseius hibisci (Acarina: Phytoseiidae) on various food substances. Ann. ent. Soc. Am. 57 : 649-655.

-- 1965. Insectary production of phytoseiid mites. J. econ. Ent. 58 : 282-284.

MUMA, M.H. 1955. Phytoseiidae (Acarina) associated with citrus in Florida. Ann. ent. Soc. Am. 48 : 262-272.

-- 1961. Subfamilies, genera and species of Phytoseiidae (Acarina: Mesostigmata). Fla St. Mus. Bull. Biol. Sci. 5 : 267-302.

-- 1962. New Phytoseiidae (Acarina: Mesostigmata) from Florida. Fla Ent. 45 : 1-10.

MUMA, M.H. 1963 a./.....

MUMA, M.H. 1963 a. Generic synonymy in the Phytoseiidae (Acarina: Mesostigmata). Ibidem 46 : 11-16.

— 1963 b. The genus Galendromus Muma, 1961 (Acarina: Phytoseiidae). Ibidem (suppl. 1) : 15-41.

— 1964. Annotated list and keys to Phytoseiidae (Acarina: Mesostigmata) associated with Florida citrus. Fla agric. Exp. Stn., Tech. Bull. 685 : 42 pp.

— 1965. Eight new Phytoseiidae (Acarina: Mesostigmata) from Florida. Fla Ent. 48 : 245-254.

NESBITT, H.H.J. 1951. A taxonomic study of the Phytoseiinae (Family Laelaptidae) predacious upon Tetranychidae of economic importance. Zool. Verh., Leiden, 12 : 64 pp.

OUDEMANS, A.C. 1902. New list of Dutch Acari. Second part. Tijdschr. Ent. 45 : 52 pp.

— 1929. Acarologische Aanteekeningen XCIX. Ent. Ber., Amst. 8 : 11-20.

PETERSON, A. 1953. A manual of entomological techniques, Columbus, Ohio. 70-71.

PRITCHARD, A.E. & BAKER, E.W. 1962. Mites of the family Phytoseiidae from Central Africa, with remarks on the genera of the world. Hilgardia 33: 205-309.

RADFORD, C.D. 1950. Systematic check list of mite genera and type species. Int. Union Biol. Sci. (sér. C., ent.) 1 : 232 pp.

RIBAGA, C. 1902. Gamasidi planticoli. Riv. Patol. Veg. 10 : 175-178.

RYKE, P.A.J. & MEYER, M.K.P. 1958. Spider mites and false spider mites with notes on South African species and the basic concepts regarding their biological control. S. Afr. J. agric. Sci. 1 : 357-373.

SCHEUTEN, A. 1857. Einiges über Milben. Arch. Naturg. 23 : 104-112.

SCHUSTER, R.O. & SMITH, L.M. 1960. The spermathecae as taxonomic features in phytoseiid mites of western North America (Acarina: Phytoseiidae). Proc. ent. Soc. Wash. 62 : 181-188.

SCHUSTER, R.O. & PRITCHARD, A.E. 1963. Phytoseiid mites of California. Hilgardia 34 : 191-285.

SWIRSKI, E. 1960. Report on a visit to Hong-Kong and Japan. I. Bull. nat. Univ. agric., Rehovot No. 32 (in Hebrew).

SWIRSKI, E. & AMITAI, S. 1961. Some Phytoseiid mites (Acarina: Phytoseiidae) of Israel, with descriptions of two new species. Ktavim 11 : 139-202.

SWIRSKI, E. &/.....

SWIRSKI, E. & SHECHTER, R. 1961. Some phytoseiid mites (Acarina: Phytoseiidae) of Hong-Kong, with descriptions of a new genus and seven new species. Ktavim 11 : 97-117.

VAN DER MERWE, G.G. & RYKE, P.A.J. 1963. Key characteristics of the predacious family Phytoseiidae with special reference to the genus Amblyseius (Acarina). J. ent. Soc. sth. Afr. 26 : 82-93.

-- 1964. The subgenus Typhlodromalus Muma of the genus Amblyseius Berlese in South Africa (Acarina: Phytoseiidae). Ibidem 26 : 263-289.

VITZTHUM, GRAF H. VON. 1941. Acarina in Bronns Klassen und Ordnungen des Tierreichs 5 : (iv), 1011 pp.

WAINSTEIN, B.A. 1958. New species of Typhlodromus (Parasitiformes : Phytoseiidae) from Georgia (In Russian). Soobsch. Akad. Nauk. Gruz. 21 : 201-207.

-- 1959. A new subgenus and species of the genus Phytoseius Ribaga, 1902 (Phytoseiidae, Parasitiformes) (In Russian). Zool. Zh. 38 : 1361-1365.

-- 1962 a. Révision du genre Typhlodromus Scheuten, 1857 et systématique de la famille des Phytoseiidae (Berlese, 1916). (Acarina: Parasitiformes). Acarologia 4 : 5-30.

WAINSTEIN, B.A. 1962 b. Some new predatory mites of the family Phytoseiidae (Parasitiformes) of the USSR.fauna. Ent. Obezr. (Ent. Rev.) 41 : 139-146.

WESTERBOER, I. & BERNHARD, F. 1963. Die familie Phytoseiidae Berlese, 1916, pp. 451-777. In Beiträge zur Systematik und Ökologie Mitteleuropäischer Acarina Band II, Acad. Verlags., Leipzig.

WOMERSLEY, H. 1954. Species of the subfamily Phytoseiinae (Acarina: Laelaptidae) from Australia. Aust. J. Zool. 2 : 169-191.