

A REVISION OF THE SUBFAMILY RHODACARINAE (ACARINA: MESO-
STIGMATA) WITH DESCRIPTIONS OF NEW GENERA AND SPECIES

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ABSTRACT

A survey is given of the techniques employed in the taxonomic investigation of the Rhodacarinae. Keys to the families and subfamilies of the Mesostigmata are offered and the characteristics of the superfamily Parasitoidea and the family Rhodacaridae are discussed with the aid of diagrams. On the basis of the number of dorsal shields this family is divided into two subfamilies viz. the Rhodacarinae Oudemans and a new subfamily, the Ologamasinae. The essential data of the 180 known species of the Rhodacarinae are given. Fifty-two species are described and figured in full and of these one genus, one subgenus and 30 species are regarded as new to science.

The genera and subgenera included in the Rhodacarinae are: Cyrtolaelaps sens. lat., C. (Cyrtolaelaps), C. (Gamasellus), C. (Digamasellus), C. (Gamaselliphis) new subg., C. (Euryparasitus), Asca, Rhodacarus, Rhodacaropsis, Rhodacarellus, Rhodacaroides, Antennoseius, Halolaelaps sens. lat., H. (Halolaelaps), H. (Saprogamasellus), Saprolaelaps, Leitneria, Evanssellus new gen. and Saintdidieria. Lobocephalus is regarded as not belonging to the subfamily.

The new species described are: C. (Gamasellus) deepdalei, C. (G.) leggetti, C. (G.) shongwenii, C. (G.) hluhluwei, C. (G.) drakensbergi, C. (G.) natalensis, C. (G.) paranatalensis, C. (G.) macrosetosus, C. (G.) knysnaensis, C. (G.) neotasmanicus, C. (G.) grahami, C. (G.) warglei, C. (G.) nkanohlai, C. (Digamasellus) proteae, C. (D.) badenhorsti, C. (D.) seminudus, C. (D.) transvaalensis, C. (D.) macfarlanei, C. (Gamaselliphis) potchefstroomensis, C. (G.) montanellus, C. (G.) grahamstowni, C. (G.) lawrencei, Asca aethiopica, A. spinosa, Rhodacarus sublapideus,

R. ananasi.....

R. ananasi, R. rhodacaropsis, Antennoseius hoskopensis,
Evanssellus foliatus and Saintdidieria neoorbinella.

Type specimens in the Berlese collection in Florence,
which are also figured and described, are: Cyrtolaelaps
aster, C. (Gamasellus) nepotulus, C. (G.) pyriformis,
C. (G.) tetrastigma, C. (G.) quadrisigillatus, C. (G.)
succinctus, C. (Digamasellus) validulus, C. (D.) presepum,
C. (D.) bicolor, C. (D.) bisetus, Rhodacarus denticulatus,
R. calcarulatus and R. coronatus.

The new subfamily Ologamasinae includes genera trans-
ferred from the families Parasitidae, Pseudoparasitidae
and Neoparasitidae.

I. INTRODUCTION

Bearing in mind the fact that the Acarina occupy as many ecological niches as insects do and that their morphological adaptations are extremely diverse, the lack of information available on them can only be attributed to their small size. Investigations on the acarine fauna of the world prior to 1850 have been excellently summarized by Oudemans (1926-1937). Other comprehensive works on the mites were published by Berlese (1882-1897), Vitzthum (1940-1943) and Baker & Wharton (1952). The most important contributions to the study of the mites of South Africa have been made by Tucker, Lawrence, Zumpt, Till, Ryke and Meyer. For a key to separate the main suborders of the Acarina the reader is referred to Ryke & Meyer (1960).

Although, in modern taxonomy, the purely morphological species definition has been replaced by a biological definition which takes ecological, geographical, genetic and other factors into consideration the principle of similarity and divergence, in a comparative-morphological sense, still takes precedence over all others. Many groups of animals such as the mites are still so poorly known that the newer principles and techniques of taxonomy cannot be applied to any great extent. In such cases it is inevitable that the attention of the systematist is still almost entirely taken up with the describing of new species, the construction of keys and similar preliminary tasks. The major portion of the work of the modern taxonomist still remains to be done.

In the present paper the author invariably had to decide whether certain species are new species, new subspecies or varieties. As the majority of the descriptions are based on preserved museum material identifications could not be based.....

based on the biological criterion of reproductive isolation and decisions sometimes had to be made on the limited data available. Specimens which appear to be morphologically very similar and therefore possibly closely related may either be sibling species or subspecies of a polytypic species. The question as to whether the difference between two samples is sufficient to merit subspecific or specific or even generic separation can, in any case, not easily be answered and this is particularly true of a group so poorly known as the Acarina. In the past this question has often been too hastily answered in the affirmative with the result that, at present, the literature is almost flooded with synonyms.

It should however be born in mind that the most practical diagnostic characters of a taxonomic unit are those that relate to some easily visible structure with but slight variability. It is also necessary to emphasize the biological insignificance of many of the key characters or diagnostic characters which may actually constitute the most unimportant difference between the two categories. The majority of the characteristics employed in the keys of the present paper may possibly be of no particular importance to the organism but merely serve as indicators to the taxonomist. The modern trend, however, is to assume that no character can become established in a population unless it has superior selective qualities. The adaptive significance of many taxonomic characters is obvious but in the case of other characters some of the morphological expressions of the phenotype may not be directly adaptive but merely represent the by-products of the physiological actions of a superior gene complex.

The present revision of the Rhodacaridae should be regarded as a preliminary step towards a natural classification. The discrimination between intra-population variants, sub-species.....

species or species is mainly based on the presence or absence of morphological differences and, to a lesser extent, on geographical relationship. Whether the closely related rhodacarid species are reproductively isolated is not known. This is to be regretted for ⁱⁿ many taxonomic groups exceedingly similar populations may coexist side by side without interbreeding. Such sibling species which are morphologically nearly or completely identical satisfy every species criterion except that of morphological distinctness. On the other hand superficially similar organisms are often not as closely related as dissimilar ones. Internal characters, which are often less variable, and therefore of much greater value than most external ones when establishing relationship are practically inaccessible to the taxonomist who deals with mites.

The majority of the descriptions of species in the present paper are based on inadequate samples and cannot serve as descriptions of populations. Almost invariably it is merely a description of the specimen samples available to the author. It certainly does not represent an account of more than a small fraction of the many thousands of characteristics of the species. According to Meyers (1952) the ordinary species description is "nothing more or less than a prediction - a prediction that a population, agreeing more or less well with the descriptive information given, exists or existed at the place and time whence the specimens came, and that it is or was of the grade commonly designated by the word species" (p. 109).

The type material of the new species described is deposited either in the collections of the Institute for Zoological Research of the Potchefstroom University, in the Natal Museum or in the British Museum (Natural History), London.

The author.....

The author wishes to express his sincere appreciation to Prof. G.T.S. Eiselen under whose supervision the present investigation was carried out. Sincere thanks are due to my colleague, Dr. J.A. van Eeden, for encouragement, criticisms and his constant interest during every phase of the work. The author is also extremely grateful to Dr. G. Owen Evans of the British Museum (Nat. Hist.), London, who suggested the present study and with whom he had stimulating discussions during 1957; also for using the rhodacarid material in the Arachnida Section of the British Museum as well as the figures of specimens made during his visit to the Berlese collection at the Stazione di Entomologia Agraria, Florence, Italy. The material of Mesostigmata received from Dr. R.F. Lawrence of the Natal Museum, Pietermaritzburg, is also very much appreciated.

Finally and especially, the author wishes to acknowledge the essential part which his wife played in the preparation of this thesis; she was always patient and offered unfailing moral support.

II. TECHNIQUES

The present study is largely based on material collected from soil. Soil zoology researches during the past few years have demonstrated that the mites play an important role in the decomposition of organic material and in humification. For the collection of soil mites the most ideal apparatus is the Berlese funnel and its several modifications (Berlese 1905, Krausse 1915, Tullgren 1918, Haarlov 1947, Balogh 1953, 1958, Macfadyen 1953 etc.). It likewise was Berlese who first developed, for extracting arthropods from soil, a simple flotation apparatus and thus introduced another most widely used technical sorting method. All these devices are so universally known to soil zoologists that it is superfluous to expand on them. The functioning of the Berlese funnels is based on the principle of the gradual dessication of the soil samples and although they frequently function but imperfectly in subtropical and tropical areas where the humidity content of the atmosphere is very high, their effectivity may be increased by the use of large-sized funnels (of 100-200 cm. diameters) which allow the spreading out of the soil in them in very thin layers. The mites collected by means of the funnel should be stored in 70-80 % ethyl alcohol. For the separation of the animals from earth particles and vegetable debris which fall through the apparatus centrifuging with concentrated calcium chloride solution is used (Ryke 1959a).

Since the Berlese funnel can be applied in certain biotops only, the direct method of collecting in special sites should also be employed for the Rhodacaridae, e.g. under stones, the bark of trees, on the surface of the soil etc. For this purpose a strong magnifying glass is essential.

For the.....

For the capturing of the animals a fine brush, previously dipped in the alcohol of the collecting bottle, should be used.

Although it is a universal practice in acarology to make permanent mounts Grandjean (1949), Evans & Browning (1955) and Balogh (1959) are of the opinion that the use of permanent mounts greatly retards the advance of acarology. The present author wholly concurs with this opinion. Experiences gained prove that many of the alleged advantages that permanent preparations have over the temporary mounts do not exist. Many of the mites conserved in permanent mounts may deteriorate or the larger specimens may be crushed, due to the diminishing fluid layer in which case the animals are liable to perish. It is an undeniable fact that the permanent mounts can be easily handled and are always ready for an immediate study but since the mites are orientated in a fixed position the possibility of studying the animals from any desired direction is excluded. According to the unequivocal opinion of acarologists, lactic acid, which is used for temporary preparations, disposes of even better optical qualities than the fluids currently used in acarology for making permanent mounts. Balogh's (1959) experiences also lead to the conclusion that the open temporary mounts are, especially for routine identifications, less time consuming.

The preparation and examination of mites may be reduced to four phases namely clearing, depigmentation, mounting -- demounting and conservation. Clearing essentially consists in dissolving and removing the internal organs of the animal with the utmost care so that the cuticular appendages, especially the setae, should remain uninjured. For this purpose the specimens are transferred directly from the preservative to a drop of lactic acid on a slide and cleared by gently warming the slide on a hotplate until the lactic acid begins to steam.....

to steam. The animal can then be examined at once. By the use of this method the internal organs dissolve but partly, often causing them to be unsuitable for exact description, projection and drawing. This can be overcome by using the cold lactic acid process. The animals are placed in a small vial half filled with 96% alcohol and enough drops of lactic acid added to fill it up to about two-thirds of its capacity. Depending on the size of the animals and the thickness of the chitin, one to six months are needed for the dissolution and the removal of the internal tissues. The animals are usually more transparent than those treated solely by heating.

There is an absolute need for depigmentation in the cases of black or dark brown species for it affords the only means whereby adequate drawings can be made of these specimens. To this end the animals cleared in lactic acid are placed in the same fluid in a fire-resistant porcelain crucible, adding to it a 30% solution of H_2O_2 , up to a ratio of 1:1, depending on the degree of pigmentation. The crucible is then warmed up and after a few minutes the specimens will be visibly bleached. For research purposes, it is frequently more desirable to have only partially depigmented, yellowish brown individuals instead of the completely depigmented ones. The process should therefore be suspended at the appropriate time, the specimens thoroughly washed out first in distilled water then in 70% alcohol, subsequently placed in 96% alcohol and finally in pure lactic acid again. The animals are then ready for examination and drawing.

It is, however, often found advantageous to stain specimens before study. This is particularly necessary in the weakly sclerotized forms in which it is often difficult to define the boundaries of sclerotized structures. Lignin pink has been found to give satisfactory results and can be incorporated in a mounting medium consisting of 60 parts lactic acid.....

acid and 40 parts glycerine. The quantity of the lignin pink required is very small; it should however be sufficient to stain the medium bright cherry.

The method of examination most suitable for the study of especially the larger and more sclerotized species is the following. A few drops of lactic acid are placed in the centre of a cavity-slide and a cover glass slipped over it so as to cover only half of the depression. If the lactic acid drop is of a suitable size it will, after the cover glass has been slid into position, fill out the space beneath it by capillarity. If this does not take place a further amount of lactic acid must be added until the covered portion of the depression becomes full. The surplus acid is now removed from the uncovered portion of the cavity by means of a pipette. The specimen to be examined is now taken out by means of a fine camel's hair brush, placed in the centre of the depression of the slide, just about on the border of the covered portion and, still using the brush, cautiously pushed in underneath the cover glass, to approximately 0.5-1mm. from its edge. In a final step the specimen is pushed in deeper until it just gets stuck between the cover glass and the slide. Depending on the thickness of the specimen, it gets stuck either nearer or further away from the centre of the depression, and, in the case of very small species, rather near to its edge. The orientation of the animal can now be altered at will under a stereoscopic microscope by using the point of the brush or by cautiously moving the cover glass in a horizontal direction. A specimen prepared in this way may instantly be examined or drawn under the microscope and is also ready for projection. Having completed the studies and drawings, the open preparation can be demounted and the specimen replaced in the vial
with.....

with preservative.

Since the problem of conservation in lactic acid is not satisfactorily settled as yet, 70-80% alcohol conservation should be employed. It can be stated generally that the lactic acid conservation is suitable for the large and strongly chitinized animals and for the large-sized ones even if they are weakly sclerotized. In many cases, however, lactic acid causes severe corrosion or strong swellings and deformations in the weakly chitinized forms.

One of the problems resulting from the use of temporary mounting media is to find a method for the subsequent storage of the specimens. Each species of the rhodacarid material used during this investigation was placed in a small vial (1"x1/4") containing 70% ethyl alcohol and fitted with a cork. This was then put into a larger bottle (3"x1 1/8") together with a label giving the name of the species, habitat, locality, collector, date and serial number. The bottle was filled with 70% alcohol containing 5% glycerine and plugged with cotton wool. All the known details (including ecological data) of the species were also entered on specially printed cards and these are filed in a cabinet according to their serial numbers. A separate species index of preserved material facilitates finding the specimens when required.

III. SYSTEMATICS OF THE SUBORDER MESOSTIGMATA

During the last sixty years the comprehensive studies on the Mesostigmata of Berlese, Oudemans, Vitzthum, Trägårdh, Evans and Camin & Gorirossi contributed greatly to an understanding of the taxonomy of this group. Although the phylogeny of these mites are still inadequately understood the recent publication of Evans (1957) on the British Mesostigmata approaches a more natural classification.

The Mesostigmata include groups of mites which are free-living as well as those which are adapted to an advanced degree of parasitic life on both vertebrates and invertebrates. The free-living forms may either feed on bacteria, fungi or dead organic matter or they may be predacious. Some of the predacious species occurring on plants are of great economic importance and are often used in the biological control of plant parasitic mites (Ryke & Meyer, 1958a). The mesostigmatic mites are not, however, known to be phytophagous.

A large number of different species incline towards symphoristic habits on insects and other invertebrates, a mode of life which could be regarded as a first step towards parasitism (Ryke & Meyer, 1957, 1958b; Ryke, 1959b&c). These paraphages demonstrate some of the modifications which certain structures undergo in the switch over from a free-living to a parasitic mode of life. All the stages of transition between these two types of symbiosis are found and it is sometimes extremely difficult, if not impossible, to separate the real parasites from the free-living forms without recourse to their ecology. Many Mesostigmata, however, are known to be real endo- or ecto-parasites of which especially those associated with vertebrates are relatively well known. In this field Zumpt contributed much towards our knowledge of the ethiopian.....

the ethiopian forms. In spite of the fact that the structural modifications apparent in the parasitic species tend to conceal the true relationships between the different forms, the unspecialized free-living members of the group have hitherto largely been neglected by systematists.

Mites belonging to the suborder Mesostigmata are readily distinguished from other Acarina in respect of the following characteristics: The tarsus of the pedipalp is provided with a forked seta on its inner basal angle. The stigmata, one on each side of the body, are situated ventro- or dorso-laterally in the region of coxae II to IV; they are usually provided with an elongated peritreme. The chelicerae are usually chelate but may be modified in parasitic species; the movable digit of the chelicera of the male is usually modified into a spermatophoral process. Praetarsi and two claws, usually situated in pulvilli, are constantly found on tarsi II to IV but may be absent on tarsus I. The vast majority of the members possess a tritosternum, a structure which shows a marked reduction or absence in the endo-parasites. Eyes are absent.

Prior to the revisionary works of Camin & Gorirossi (1955) and Evans (1957) the classification of the divisions of the Mesostigmata higher than family rank was based on Trägårdh's fundamental works (1912-1950) on the comparative morphology of the sternal and genital shields in the females. Although this author's researches have added greatly to our knowledge of this suborder the classification of the higher groups was still unsatisfactory. Vitzthum (1940-43) and Baker & Wharton (1952), following the interpretations of Trägårdh, erroneously referred many genera to families with which they actually have no affinities. The fact that the accumulation of new data still necessitates a further revision of the.....

of the present taxonomic system only reflects the youth of the field of acarology.

Key to the superfamilies of the Mesostigmata

1. Female genital opening placed far back without any connection with either sternal or ventral shields.....
.....MICROGYNOIDEA
- . Female genital opening connected with either sternal or ventral shields.....2
2. Presternal setae flanking tritosternum.....3
- . Presternal setae not flanking tritosternum.....4
3. Genital shield primitively absent in females; median and lateral plates not closing genital opening; sternal plate divided into two parts, the posterior of which resembles a genital plate.....MEGISTHANOIDEA
- . Genital shield present.....10
4. Tritosternum with a narrow base and usually a pair of laciniae and widely removed from coxae I.....5
- . Tritosternum not as above, lying close to or covered by coxae I.....9
5. Genital orifice of the female covered by a single shield which may be fused with the ventral shield; digits of the chelicerae in the female without branched processes; movable digit of the male chelicera with or without spermatophoral process.....6
- . Genital orifice of the female covered by three shields, the genital and the paired laterals, which may be free or coalesced; one or both digits of the chelicera in both sexes provided with branched processes; male without.....

- out spermatophoral process.....FEDRIZZIOIDEA
6. Female with a large genital shield reaching to the middle of coxae II; sternal setae III and IV situated in the region of coxae II; genital orifice of the male near the anterior margin of the sterniti-genital shield.....
.....LIROASPOIDEA
- . Female with smaller genital shield not reaching to coxae II; sternal setae IV situated between coxae III or III and IV.....7
7. Genital orifice of the female surrounded by a sclerotized shield and covered by a large genital shield bearing one pair of setae; dorsal shield separated from the vertex shield.....PROTODINYCHOIDEA
- . Genital shield not enclosed in a sclerotized shield and bearing one or more pairs of setae.....8
8. Genital orifice of the male at or near the anterior margin of the sterniti-genital shield; movable digit of the male chelicera with a spermatophoral process except in some specialized parasitic species....PARASITOIDEA
- . Genital orifice of the male situated in the region of coxae III and covered by two shields; movable digit of the chelicera in the male without a spermatophoral process; dorsal shield in both sexes characteristically ornamented.....EPICRIOIDEA
9. Tritosternum with a short broad base lying close to but never covered by coxae I; without grooves or depressions for legs; dorsal shield reticulated, often with adherent nymphal skins.....TRACHYTOIDEA
- . Tritosternum with a narrow base and partly or completely covered.....

covered by coxae I; with or without depressions for the legs; dorsal shield smooth or ornamented but without adherent nymphal skins.....UROPODOIDEA

10. Genital shield tongue-shaped and fused posteriorly with ventral shield; stigmata and well-developed peritremes mainly dorsal in position.....THINOZERCONOIDEA

-. Genital shield enclosed in the fused sternal and ventral shields but not separated from ventral shield by a suture; stigmata and reduced peritremes ventro-lateral.....
.....DIARTHROPHALLOIDEA

IV. SUPERFAMILY PARASITOIDEA

The superfamily Parasitoidea (Gamasides auctorum) constitutes the largest proportion of the described mesostigmatic species. Its species range from generalized free-living predators to highly specific endo-parasites and were collected in every terrestrial niche from which mites have been recovered. Many are economically important as predators of agricultural pests or as parasites or vectors of diseases of man and his domesticated animals. The free-living species reach their maximum abundance in litter under trees, in humus and in the upper layers of the soil. The Parasitoidea are an extremely successful group as attested by their vast numbers of species and individuals.

In such a large and diverse group as the Parasitoidea it is to be expected that many taxonomic problems would remain to be solved. Obviously much data remain to be assembled on all aspects of this superfamily. In spite of their diversity, however, the parasitoid mites possess at least two apparently correlated characters common to all. These are the anterior position of the male genital aperture and the modified, spermatophore-bearing, male chelicerae. In some cases family limits cannot yet be clearly defined with the result that it is often difficult to place certain genera in their proper families with any degree of certainty. It is conceivable that some of the presently recognized families might have to be combined or genera transferred to families with whose members they have closer affinities.

Figures to illustrate the external morphology of the Parasitoidea are given in the diagrammatic sketches of a hypothetical mesostigmatic parasitoid mite (see diagrams I-VIII).

Key to.....

Key to the families of the Parasitoidea

1. Metasternal shields (diagr. II) in the female large, free or fused in the median line and flanking a triangular genital shield (diagr. II) provided with parasternal shields; spermatophoral process (diagr. VI) on the movable digit of the chelicera of the male fused with the digit distally; leg II in the male spurred and often crassate; palptarsal seta with three prongs (diagr. III); free-living or paraphages of insects....PARASITIDAE
- Without large metasternal shields flanking a triangular genital shield, metasternal setae being situated either on small shields free or fused with the exopodal shields (diagr. II) or on striated cuticle or on a compound sternal-metasternal shield; spermatophoral process, when present, free distally.....2
2. Females with a compound peritrematal-podal-metapodal shield strongly developed posterior to coxae IV and flanking a genity-ventral shield; sternal-metasternal shield reaching to the middle of coxae IV; leg II in some genera with one or more stout spurs; free-living in soil, humus and mosses, or paraphages of Coleoptera.....PACHYLAEIAPTIDAE
- Females without compound peritrematal-podal-metapodal shield flanking a geniti-ventral shield although a podal-peritrematal shield may be developed behind coxae IV...3
3. Synarthrodial membrane at the base of the movable digit of the chelicera developed into one or two stout brushes in both sexes; leg I shorter than the idiosoma and usually without ambulacrum; peritreme (diagr. II) in some species with a.....

with a U-shaped bend where it leaves the stigma (diagr. II); palptarsal seta three-pronged; free-living in soil, humus and mosses or paraphages of insects, especially Scarabaeidae.....MACROCHELIDAE

(a) Peritreme with a U-shaped bend where it leaves the stigma; genital shield usually with well-developed parasternal shields.....Subfam. Macrochelinae

-. Peritreme without the U-shaped bend; genital shield without parasternal shields.....Parholaspinae

-. Synarthrodial membrane at the base of the movable digit of the chelicera (diagr. V) developed into a cluster of "setae" or forming a row of setae like a coronet in the female (and usually also in the male).....4

4. Specialized seta on the inner basal angle of the palptarsus with a conspicuous hyaline leaf-like structure; dorsal shield in the female either with strong lateral incisions or divided into two shields (diagr. I); vaginal sclerites often present; free-living in soil, humus and mosses.....VEIGALIAIDAE

-. Specialized seta on the inner basal angle of the palptarsus lacking associated hyaline leaf-like structure..5

5. Dorsal shield in both sexes divided into two subequal shields or, where entire, partially or completely fused with the ventri-anal shield (diagr. II) and/or with the genital shield enclosed in a perigenital shield; free-living in humus and mosses.....6

-. Dorsal shield usually entire with anal or ventri-anal shield free, or, where divided, posterior shield considerably smaller than anterior, in which case the species are usually.....

are usually parasitic on vertebrates, showing, in many instances, modification of the chelicerae (in one or both sexes) for piercing the skin of the host, reduction or absence of a bipartite tritosternum (diagr. II) or the fusion of the palptibia and tarsus.....7

6. Idiosoma broadly triangular in outline with the lateral margins of the divided dorsal shield serrated; posterior dorsal shield (diagr. I) often with four large pore-like structures near its posterior margin; genital shield truncated posteriorly and lying close to a ventri-anal shield fused with the posterior dorsal or the posterior dorsal and peritrematal shields; genital orifice in the male between coxae III; without spermatophoral process and spurs on legs II; free-living in humus and mosses....
.....ZERCONIDAE

- . Idiosoma not as above; dorsal shield divided into two subequal shields; female with a posteriorly truncated genital shield (diagr. II) and a well-developed ventri-anal or anal shield, or with the dorsal shield entire and the ventri-anal shield either free, partially fused or completely fused with the dorsal shield ; in this case the genital shield is more or less enclosed in a perigenital shield formed by the fusion of the sternal, podal and ventri-anal; male with genital orifice prester-nal; spermatophoral process on chelicera and spurs on legs II present; free-living in soil, organic debris and mosses.....RHODACARIDAE

7. Dorsal shield with a network of tubercles; peritreme minute and enclosed with the stigma in a small lateral chamber; lacinae of the tritosternum short, stumpy; corniculi peg-like; leg I long and without ambulacrum; both sexes.....

both sexes with jugularia; geniti-ventral shield in the female large and flask-shaped; genital orifice of the male between coxae III; without spermatophoral process on chelicera and without spurs on leg II; free-living in organic debris and mosses.....EPICRIIDAE

- . Dorsal shield usually without such ornamentation but where tubercles are present the peritreme and peritrematal shield is well-developed; genital orifice of the male presternal or between coxae II and III.....8

- 8. Rostral and inner palptrochanter setae long and whip-like; tarsus II, III and often also IV with one or two long, flattened setae and the median lobe of the pulvillus often acutely pointed; peritreme frequently produced posterior to the stigma and the peritrematal shield produced posterior to coxae IV; para-anal setae situated in line with the posterior margin of the anus or considerably posterior to it; genital shield in the female truncated posteriorly and both sexes with a ventri-anal shield; genital orifice in the male pre-sternal; free-living in humus and mosses.....PLATYSEIIDAE

- . Rostral and inner palptrochanter setae of normal length; peritreme never extending backwards beyond the stigma; peritrematal shield rarely strongly produced posterior to coxae IV.....9

- 9. Corniculi either divided distally in both sexes or markedly reduced; tritosternum always bipartite; sternal shields in the female bearing only two pairs of setae, sternal setae III and IV situated either on small shields or on striated cuticle; dorsal shield entire with twenty-four or twenty-nine pairs of simple, pilose or plumose setae; fixed digit.....

fixed digit of the chelicera with two or three strong teeth in its proximal half; where teeth are absent the digit is provided with a hyaline membrane and male bears stridulating ridges laterally; free-living in vegetable debris and mosses.....AMEROSEIIDAE

- . Corniculi entire in both sexes or, when reduced in size, tritosternum absent or without lacinae; sternal shield in female usually with three or four pairs of setae; in those with two pairs chelicerae are sheer or stylet-like.....10

- 10. Female with a wedge-shaped genital shield having a truncated or slightly convex posterior margin; usually with a ventri-anal shield; tectum never elongate; leg I either of normal length with ambulacrum or long, antenniform without ambulacrum; male with ventri-anal shield separate from the sterniti-genital shield but may be fused with the peritrematal shield; associated with phytophagous mites on plants, in decaying vegetable matter and rarely in soil.....PHYTOSEIIDAE

(a) Leg I of normal length and provided with an ambulacrum; dorsal shields smooth or reticulated, without small tubercles; associated with phytophagous mites, insects or free-living in vegetable debris..
.....Subfam. Phytoseiinae

- . Leg I long antenniform without ambulacrum but terminating in one or two whip-like setae equal in length to or longer than the tarsus; dorsal shields with small tubercles often arranged in a hexagonal pattern; free-living in vegetable debris.....
.....Subfam. Podocininae

Female.....

- . Female with genital shield flask-shaped and widely removed from or abutting on anal shield, or tapering posteriorly; where wedge-shaped tectum is produced into a long, smooth or denticulate process; sclerotization often weak and tritosternum reduced or absent; chelicerae of one or both sexes may be modified; free-living, paraphages of insects or ecto- and endo-parasites of vertebrates.....11
- 11. Female usually with a small parallel-sided or wedge-shaped genital shield with or without a pair of setae and widely removed from an anal shield; tectum, in both sexes, produced into a lance-like structure; nymphae and adults, associated with Coleoptera, often have one or more of the sternal and coxal setae developed into blunt spines; male with sterniti-genital shield separate from anal shield; genital orifice presternal; chelicerae with spermatophoral process and legs II spurred; free-living or paraphages of insects, especially Coleoptera.....
.....EVIPHIDIDAE
- . Female usually with genital shield either flask-shaped and abutting on or widely removed from anal shield, or tapering posteriorly; tectum normal, reduced (without lacinae) or absent but never produced into a lance-like structure; male genital orifice presternal or between coxae II.....12
- 12. Leg I without ambulacrum in both sexes; genital orifice of the male between coxae II and closed by two shields, the anterior of which is provided with a pair of setae.....ARCTACARIDAE
- . Leg I usually with ambulacrum; genital orifice of the male.....

male pre-sternal and without small, setae-bearing shield; male with either hcloventral shield or sterni-ti-geniti-ventral shield separated from anal shield; clelicerae chelate-dentate, shear-like or stylet-like. This family contains a number of highly specialized ecto- and endoparasitic species showing reduction in sclerotization of the idiosoma, reduction or absence of a bipartite tritosternum and modification of the che-licerae.....LAELAPTIDAE

(a) Bipartite tritosternum present in both sexes....(b)

--. Without a bipartite tritosternum in both sexes..(c)

(b) Chelicerae in the female with teeth except in a few species of Haemogamasus in which the idiosoma is provided with numerous setae resembling a pelage; dorsal shield in deitonymphal and adult stages entire or with lateral incisions; peritrematal shield free or fused with the podal shield; free-living or ecto-parasitic on vertebrates.....Subfam. Laelaptinae

--. Chelicerae in the female without teeth and shear or stylet-like; idiosoma without numerous setae resembling a pelage; dorsal and ventral shields usually reduced or poorly sclerotized; dorsal shield in deutonymphal, and sometimes in adult stages, divided into two shields; peritrematal shield usually fused with podal shield and extending around the posterior margin of coxa IV; ectoparasites of vertebrates.....
.....Subfam. Dermanyssinae

(c) Ectoparasites of Chiroptera; legs stout and terminating in strong claws; dorsal shield entire or divided into two.....Subfam. Spinturnicidae

--. Parasites....

--. Parasites of the respiratory tract of vertebrates
(Amniota).....(d)

(d) Genital shield rudimentary or absent; palptibia and
tarsus fused; parasites of the respiratory tract of
mammals.....Subfam. Halarachninae

--. Genital shield present.....(e)

(e) Genital shield with a pair of setae; dorsal shield
entire; parasites of the respiratory tract of rep-
tiles.....Subfam. Entonyssinae

---. Genital shield with or without setae; dorsal shield
entire or variously divided or absent; parasites of
the respiratory tract of birds.....
.....Subfam. Rhinonyssinae

V. FAMILY RHODACARIDAE

GENERAL EXTERNAL MORPHOLOGY

The body is divided into an anterior tubular gnathosoma and a posterior sac-like idiosoma showing no evidence of primary segmentation (diagr. II).

The Gnath^hsoma

The chelicerae (diagr. V) are three-segmented, a strong retractor muscle being attached to the short basal segment. The larger distal segment terminates in a fixed digit and the third segment (the movable digit) is situated ventro-laterally to this. The chelicerae are chelate and the opposing edges of the digits are provided with distinct teeth. The exterior face of the fixed digit bears a dorsal seta and a number of ventral setae; the distal half of this digit is also provided with a pilus dentilis. In the males the movable digit carries a conspicuous spermatophoral process (diagr. VI) functioning as an accessory copulatory organ.

The dorsal wall of the tubular basis capituli is formed by the tectum (diagr. VII) which is produced anteriorly with a denticulate margin. The hypostome (diagr. VIII) bears four pairs of setae as well as a capitular groove which is provided with rows of denticles. The pair of capitular setae are situated on either side of the groove. The antero-medial part of the hypostome, the rostrum, bears the other three pairs of setae known as the rostrals, internal posterior rostrals and the external posterior rostrals. The corniculi and internal malae (hypostomal laciniae) associated with the rostrum, are relatively well developed.

The coxae of the six-segmented pedipalp (diagr. II) form the lateral and ventro-lateral walls of the basis capituli and the five free segments are provided with setae. The trochanter.....

trochanter, femur and genu bear two, five and six setae respectively. On its internal basal angle the palptarsus (diagram III) is provided with a conspicuous two- or three-pronged specialized seta. The palp of the male may be provided with spurs.

The Idiosoma

The dorsal surface is, in the adult stages, covered by either two approximately equal sized or one sclerotized shield (diagr.I). All the species are provided with two dorsal shields in the nymphal stages. The surface of the dorsal shield or shields may be smooth, reticulated or scabrous. The lateral margins of the body in which the dorsum is incompletely covered by one or two shields are formed by inter-scutal membrane which often carries a number of setae. The chaetotaxy of the shield and membrane is of taxonomic importance. The nomenclature adopted for the dorsal setae is based on the system introduced by Sellnick (1944) for the genus Zercon. These setae may be considered to form four longitudinal rows on each side of the middle line namely, a dorsal series (j & J), a medial series (z & Z), a lateral series (s & S) and, in addition to Sellnick's original system, a marginal series (r & R). This system was followed by Hirschman (1957) and Evans (1958). Evans designated the marginal series by using the letter M and divided the entire dorsal shield into an anterior and posterior part. He based the site of division on the chaetotactic pattern of the shield and indicated it by means of a dotted line. The series on the anterior shield is designated by ordinary letters and those on the posterior shield by using capitals. The setae on different parts of the body may be simple, lanceolate, spine-like, pilose, plumose, serrate, leaf-shaped, spatulate, paddle-like, rod-like or modified into conical spurs.

The ventral.....

The ventral surface of the idiosoma (diagr. II) is covered by usually well-defined shields. The tritosternum consists of a rectangular basal portion, longer than broad, bearing distally a pair of pilose lacinae. The sternal shield extends from the posterior margin of coxae I to between coxae III and IV. It is generally fused with the corresponding endopodal shields and the metasternal shields, and usually bears four pairs of setae. Sternal setae I may be detached from the sternal shield and each lies on a small jugular shield. One or more pairs of small shields frequently occur anterior to the sternal shield. When devoid of setae they are known as pre-endopodal shields and as jugular shields if they are provided with setae. The genital orifice in the female is situated posterior to the sternal shield and has the shape of a transverse slit. Posterior to it lies a distinct genital shield whose anterior portion may extend over the orifice. The shield may be uniformly sclerotized or may consist of a well-sclerotized basal portion and a weakly-sclerotized distal portion. It is always provided with one pair of setae. In those genera with an entire dorsal shield the genital shield is more or less enclosed in a perigenital shield formed by the fusion of the sternal, podal and ventri-anal shields.

The intercoxal region in the male is occupied by a compound sterniti-genital shield bearing five pairs of setae; this shield may be fused with the ventri-anal shield to form a holovertral shield. The ventri-anal shield may also be fused with the peritrematal and the dorsal shields. The genital orifice in the male is either presternal in position or located in the sterniti-genital shield in the region of coxae II.

The region posterior to coxae IV in the female is partially or completely covered by the ventri-anal shield. It is provided.....

provided with a varying number of setae. In those forms where the shield partially covers the venter the surrounding integument may also be provided with setae. The anal shield, surrounding the anus, is usually fused with the ventral shield and bears three setae namely the paired para-anals and the post-anal seta; the para-anals may be situated on each side of the anus or in line with its anterior or posterior margin. Several other small shields may occur posterior to coxae IV, the most important pair being the metapodal shields. The ventri-anal shield shows different degrees of fusion with the dorsal shield.

The pair of stigmata are situated ventro-laterally in the region of coxae III and IV. The peritreme extends anteriorly from the stigma, in most species to a position beyond coxae I. The stigma and peritreme are enclosed in a peritrematal shield which shows various degrees of fusion with the exopodal, dorsal and ventri-anal shields. The peritrematal shields are never strongly developed posterior to coxae IV.

The ambulacral apparatus (diagr. IV) of the ambulatory appendages comprises two claws and a lobate pulvillus. Although the legs are usually provided with these they may be reduced or absent on leg I. The claws may be sessile or situated on a praetarsus. In the majority of species legs I have a tactile function, the tarsi being provided with many sensory setae. Leg II of the male is armed with one or more spurs. In both sexes the setae on the legs are either simple or complex.

CLASSIFICATION

From the above account of the external morphology of the Rhodacaridae it should be obvious that the adult stages may be divided into two groups on the basis of the structure of the.....

of the dorsal shield. These two groups are regarded by the present author as separate subfamilies of the family Rhodacaridae.

- (1) Genera in which the divided dorsal shield of the deutonymph is retained in the adult.....
.....Subfam. Rhodacarinae Oudemans, 1902
- (2) Genera in which the dorsal shield in the adult is entire but divided in the deutonymph.....
.....Subfam. Ologamasinae nov.

SUBFAMILY RHODACARINAE

1902. Rhodacarinae Oudemans, A.C., Tijdschr. Ent. 45:48.

Oudemans (1902) proposed the subfamily Rhodacarinae to accommodate the genus Rhodacarus Oudms. Willman (1935a) added the genera Rhodacaropsis Willm. and Rhodacarellus Willm. and Evans (1955) transferred the genera Euryparasitus Oudms. and Halolaelaps Berl., previously included in the Gamasolaelaptidae, to this family. Evans (1957) also referred the genera Cyrtolaelaps Berl. 1887, Saprolaelaps Leitner and Leitneria Evans to the Rhodacaridae.

In the present paper the following genera or subgenera are regarded as belonging to the subfamily Rhodacarinae: Rhodacarus Oudms., Rhodacaropsis Willm., Rhodacarellus Willm., Cyrtolaelaps Berl. 1887, Gamasellus Berl. (transferred from the fam. Ascaidae Oudms.), Digamasellus Berl. (transferred from fam. Digamasellidae Evans), Euryparasitus Oudms., Gamaselliphis n. subgen., Halolaelaps Berl. & Trouess., Saprolaelaps Leitner, Leitneria Evans, Asca v. Heyden (from fam. Digamasellidae Evans), Antennoseius (from fam. Phytoseiidae Berl.) and Evanssellus n. gen. The following genera are also included in the Rhodacarinae but are regarded as synonyms of the above-.....

the above-mentioned genera: Iaelogamasus Berl. (from the fam. Ascaidae Oudms.), Dendrolaelaps Halbert, Protolaelaps Träg., Ceratozercon Berl. Incerta sedis: Saintdidieria Oudms., Lobocephalus Kramer.

Key to the genera and subgenera

1. Posterior dorsal shield with a pair of conspicuous setae-bearing postero-lateral protuberances...Asca v. Heyden
- Posterior dorsal shield without these protuberances....2
2. Leg I without claws.....3
- Leg I with claws.....5
3. Body small, elongate and weakly sclerotized with a constriction behind coxae IV; chelicerae heavily sclerotized, large and conspicuous.....Rhodacarus Oudms.
- Body without constriction and relatively strongly sclerotized.....4
4. Vertical setae situated on prominent protuberances; female with ventri-anal shield.....Evanssellus, n. gen.
- Vertical setae not situated on protuberances; female with anal shield.....Antennoseius Berl.
5. Sternal shield free or incompletely fused with endopodal shields.....6
- Sternal shield completely fused with endopodals.....8
6. Coxae II with an acute or obtuse spur on its anterior margin in both sexes.....7
- Coxae II unarmed in either sex.....Halolaelaps Berl. & Troues.
7. Anterior margin of the posterior dorsal shield entire; female.....

- female with ventri-anal shield considerably broader than long.....Leitneria Evans
- . Anterior margin of posterior dorsal shield incised; female with anal shield.....Saprolaelaps Leitner
8. Body constricted behind coxae IV; similar to Rhodacarus in gross morphology but claws present on tarsus I; specialized seta on palptarsus with three tines.....9
- Body not constricted..(Cyrtolaelaps Berl.1887 s.lat.)..10
9. Anterior and posterior regions of sternal shield weakly sclerotized and punctured.....Rhodacarellus Willm.
- . Region anterior to sternal shield provided with pre-endopodal shields.....Rhodacaropsis Willm.
- 10a Vertical setae short, spine-like; integument between posterior margin of ventri-anal shield and genital shield provided with setae; specialized seta on palptarsus three-pronged, one prong being minute; without jugular or pre-endopodal shields.....Subgen. Cyrtolaelaps Berl.
- . Vertical setae not short and spine-like.....10b
- 10b Specialized seta on palptarsus two-pronged; without jugular or pre-endopodal shields.....
-Subgen. Digamasellus Berl.
- . Specialized seta with three prongs; integument between ventri-anal shield and genital shield not provided with setae.....10c
- 10c Majority of the marginal setae on dorsum situated on integument; para-anal setae placed on a line posterior to anus; one pair of pre-endopodal shields present.....
-Subgen. Euryparasitus Oudms.
- . Majority.....

- ..- Majority of the marginal setae on dorsum situated on the shields; para-anal setae placed in line with the anus or anterior to it; with one or more pairs of pre-endopodal or jugular shields.....10d
- 10d Ventri-anal shield fused with dorsal shield in both sexes; with one pair of pre-endopodal shields but no jugular shields.....Subgen. Gamaselliphis nov.
- . Female with ventri-anal shield free; with one or more pairs of pre-endopodal shields or a pair of jugular shields.....Subgen. Gamasellus Berl.

Genus Cyrtolaelaps Berlese, 1887, nec Berlese, 1892

Cyrtolaelaps, Gamasellus, Digamasellus and Euryparasitus are generally regarded as separate genera. In the author's opinion the characteristics which distinguish these taxonomic units do not justify their separation. The fact is that many species cannot readily be placed in one of these groups. For practical reasons it is now proposed that they should be regarded as subgenera of the genus Cyrtolaelaps which must include the new subgenus Gamaselliphis as well.

The genus Cyrtolaelaps sens. lat. may therefore be defined as follows: Dorsal shield divided in both adult and nymph; tectum usually with denticulate anterior margin, in many cases with a median mucro; dorsal setae may be simple or complex; female with ventri-anal shield; sternal shield with three or four pairs of setae; jugular or pre-endopodal shields present or absent; specialized seta on palptarsus three or two-pronged; all the legs provided with claws; pretarsi may be reduced on tarsus I; male with free sterniti-genital shield or with the latter fused with the ventri-anal; ventr-anal shield free or fused with sterniti-genital, peritrematal.....

trematal and dorsal shields; spermatophoral process on movable digit of chelicera of male relatively short or very long.

Subgenus Cyrtolaelaps Berlese, 1887

1887. Cyrtolaelaps Berlese, A., Acar. Myr. Scorp. 44: 5.

1912b. Protolaelaps Trägårdh, I., Arch. Zool. exp. gen. (5)
8: 519.

In his "Acari, Myriopoda et Scorpiones hucusque in Italia reperta" Berlese (1887) proposed the generic name Cyrtolaelaps where he redescribed G. & R. Canestrini's Gamasus mucronatus. Although he erected this monotypic genus he subsequently used the same name for a new genus in 1892 with Gamasus nemorensis Koch as the typical species. Oudemans (1905) recognized the confusion and proposed the new name Veigaia for Cyrtolaelaps sensu Berlese, 1892, non 1887. Berlese, however, ignored the new name and described species of Cyrtolaelaps which are not related at all. Unfortunately the original descriptions of Berlese and other authors are so brief and, in most cases, without adequate figures that the proper taxonomic position of the species are questionable.

In 1935 Willmann restated the fact that Cyrtolaelaps mucronatus is the type of Cyrtolaelaps and that Veigaia should be used for Gamasus nemorensis. This was accepted by the authors of later publications on the veigaiaids e.g. Willmann (1936), Evans (1955) and Farrier (1957). Oudemans (1939) erected the family Veigaiaidae for Veigaia and both he and Vitzthum (1943) referred Cyrtolaelaps Berlese 1887 to the family Allolaelaptidae whereas Baker & Wharton (1952) placed it in the Ascaidae. Evans (1957) who pointed out that, according to the International Rules of Zoological Nomenclature, both these family names are invalid, suggested that the genus should be included in the Rhodacaridae.

Trägårdh.....

Trägårdh (1912b) enumerated the following characteristics for the genus (p. 565): "Two dorsal shields. Epistoma triangular, pointed. Male sterniti-metasternal shield separated from ventri-anal one. Female epigynial shield anteriorly rounded, separated from the large ventri-anal shield. Metasternal shields in both sexes fused with sternal shield. Male legs II with calcar femoralis. Ambulacres I without empodia (sic). Male chela mandibuli narrow, with lanceolate digitus fixus, and ensiform calcar".

The characters listed by Trägårdh equally well apply to species of the "genera" Gamasellus, Digamasellus and Euryparasitus. Cyrtolaelaps sens. str. can however readily be separated from these subgenera by the presence of short spinous vertical setae in the adult stage. It is further characterized by the absence of pre-endopodal or jugular shields and the possession of a three-pronged specialized seta on the palptarsus. Evans (1957, p. 215) was the first author to notice the presence of three prongs in Cyrtolaelaps. One of the prongs is reduced in size and is difficult to discern if the seta is not orientated correctly. Two pairs of setae are situated on the interscutal membrane between the anterior margin of the ventri-anal shield and the genital shield. All the species of this subgenus occupy a more or less well-defined ecological niche living in dark places such as caves and nests of small mammals.

Type:- Cyrtolaelaps mucronatus (G. & R. Can.)

Cyrtolaelaps mucronatus (G. & R. Can.), 1881

1881. Gamasus mucronatus, Canestrini, G. & R., Atti Ist. Venet. (5)7:1081.

1882. Gamasus mucronatus, Canestrini, G. & R., I Gamasi Italiani Monographia: 52.

1887.....

1887. Cyrtolaelaps mucronatus, Berlese, A., Acar. Myr. Scorp.
44: 5.
1902. Asca affinis, Oudemans, A.C., Tijdschr. Ent. 45: 45.
1903. Asca affinis, Oudemans, A.C., Tijdschr. Ned. Dierk.
Ver.(2)8(2): 92.
1905. Asca affinis, Oudemans, A.C., Abh. Nat. Ver. Bremen
18: 206, 237.
1910. Gamasellus? brevispinosus, Trägårdh, I., Naturw. Unter-
such. Sarekgeb. 4: 422.
- 1912b. Protolaelaps brevispinosus, Trägårdh, I., Arch. Zool.
exp. gen. (5)8: 566.
- 1914a. Asca affinis, Oudemans, A.C., Arch. Naturg. 79,9: 91.
- 1918a. Gamasellus rubicundus, Hull, J.E., Trans. nat. Hist.
Soc. North. 5: 78.
- 1918a. Gamasellus alienus, Hull, J.E., Trans. nat. Hist.
Soc. North. 5: 78.
1922. Gamasellus (Protolaelaps) mucronatus, Schweizer, J.,
Verh. Naturw. Ges. Basel 33: 35.
1923. Gamasellus (Protolaelaps) mucronatus, Halbert, J.N.,
J. Linn. Soc. Zool. Lond. 35: 365.
- 1926a. Gamasellus (Protolaelaps) mucronatus, Vitzthum, H.,
Treubia 8:7.
- 1926a. Cyrtolaelaps mucronatus, Oudemans, A.C., Ent. Ber.
7: 120.
1932. Asca affinis, Willmann, C., Mittlg. Höhlen Karstfischg.
4: 158, 160.
- 1935b. Cyrtolaelaps mucronatus, Willmann, C., Bull. Mus. Hist.
nat. Belg. 11, 29: 7.
1935. Asca affinis, Pax, F. & K. Maschke, Beitr. Biol. Glatzer
Schneeberges 1: 48.
1936. Cyrtolaelaps mucronatus, Maschke, K., Beitr. Biol.
Glatzer Schneeberges 2: 178.

1938.....

1938. Cyrtolaelaps mucronatus, Willmann, C., Mittlg. Höhlen Karstfschg. 1938: 18.
1940. Cyrtolaelaps mucronatus & Asca affinis, Sellnick, M., Göteb. K. Vet. Vitterh. Samh. Handl. ser. B, 6, 14: 26.
1941. Cyrtolaelaps mucronatus, Willman, C., Stud. Geb. Allg. Karstfschg. Biol. ser. 8: 20.

The specimen figured (figs. 1-8) was collected in England from a tree spanni's nest.

Female:-

Dimensions: Length, 1000 u; breadth, 600 u.

Dorsum (fig. 1). The dorsum is covered by two shields separated by a transverse strip of integument which is approximately of an even width throughout. The anterior shield is provided with 25 pairs of setae, two pairs of which are prominent and setose. The vertical setae are short, stout and spine-like (fig. 2). The posterior dorsal shield also bears two pairs of relatively long setose setae. All the other setae on the dorsum are short and simple.

Venter (fig. 3). The sternal shield projects backwards to the middle of coxae III. It is fused with endopodal shields I & II but endopodals III are free, the metasternal shields being fused with the sternal shield. The latter bears four pairs of setae, the posterior pair of which is situated submarginally in the posterior angles. The genital shield is rounded anteriorly and bears a pair of simple setae. It projects backwards beyond coxae IV. The large ventri-anal shield bears six pairs of setae in addition to the three circum-anal setae. The integument between the anterior margin of the ventri-anal shield and the genital shield is provided with two pairs of small setae situated in a transverse row. The interscutal membrane on the lateral sides of the shield bears
three pairs.....

three pairs of setae. In the specimens in hand the dorsal shield underlaps the venter; this is probably due to flattening by the cover glass.

The peritrematal shield is relatively broad and the peritreme reaches anteriorly to a position beyond coxa I. The stigmata are placed on a level between coxae III and IV. The tritosternum has a short base and two setiform lacinae. Pre-endopodal shields are absent.

Gnathosoma. The capitular groove of the hypostome bears nine rows of denticles (fig. 4). The capitular and external posterior rostral setae are shorter than the rostral and internal posterior rostral setae. The size and shape of the corniculi and the internal malae are shown in the figure. The tectum (fig. 5) has a serrated pointed mucro and a broad base. The movable digit of the chelicerae (fig. 6) is tridentate and the fixed digit bears five teeth and a pilus dentilis. According to Trägårdh (1910, 1912b) and also later authors the specialized seta on the palptarsus is two-pronged. This seta, however, also possesses a third very small prong. Evans (1957) has drawn attention to this fact and in the present species the author's observations corroborate his findings (fig.7).

Legs. All the legs are provided with claws and pulvilli. The pre-tarsus on leg I (fig. 8) is shorter than those of the other legs. The setae on the legs are simple or spine-like. Many setae are situated on small tubercles.

Male:-

Trägårdh (1912b, pp. 568-574) gives a description of the male, parts of which are repeated below.

"Colour dark-brown. Texture finely punctured and differing consequently from that of the nymphs, which on the dorsal side exhibits a net-like texture formed by very low ridges. The length.....

length of the anterior shield is 500 u. The mandibles are of Iaelaptine-type, with narrow chela, of even width throughout. The upper jaw is much shorter than the lower one; it has in the distal third 4 sharp, conical and perpendicular teeth, set closely together. Pilus dentarius not placed ventrally (at the lower edge), as is usually the case, but on the external, lateral side; it is also of an exceptional shape, being stout and conical, and pointing straight forward. The lower jaw is flattened laterally to a thin ensiform appendage which is of even width throughout until the distal third, where it tapers gradually towards the rounded top; calcar mandibuli is narrow, $2/3$ as long as the jaw, and tapering gradually throughout towards the top; as far as I have been able to discern, it is fused with the calcar only with its distal third.

The sternal shield is completely fused with metasternal shields into one, which, by a narrow strip of soft cuticle, is demarcated from the ventri-anal shield. There are five pairs of hairs. The ventri-anal shield is essentially of the same shape as in the female, but larger, extending forwards to the posterior edge of coxae IV. The hairs are present to the same number and in the same position as in the female.

The legs, are very characteristic through the great number of hairs inserted on low, semispherical tubercles. Ambulacres (on leg I) with two well developed claws which are, however, smaller than those of the other legs; the caruncle is greatly reduced and appears as a low hyalin collar round the base of the claws. Calcar femoralis (on leg II) straight, half as long as the telofemur, constricted at the base, and bluntly pointed at the top".

As pointed out by Willmann (1941, p.20) "Diese Art ist als ausgesprochen troglophil zu bezeichnen, sie macht aber keinen Unterschied zwischen echten Höhlen, Bergwerkstollen und Nestern von Kleinsäugetern (Maulwurf-nester); sie wird auch oberirdisch.....

oberirdisch an Leuchten, dunklen Orten angetroffen". The species is only known from the palaearctic region. The female described and figured in the present paper was found in the nest of a tree spanni, February 1932 and collected by A.W. Boyd in Cheshire, England.

Cyrtolaelaps aster (Berlese), new comb.

1918. Gamasellus (Protolaelaps) aster, Berlese, A., Redia 13: 137.
1922. Gamasellus (Protolaelaps) aster, Schweizer, J., Verh. Naturf. Ges. Basel 33: 35.

From the original description given by Berlese (1918, p.137) the following may be noted:

"Scuta dorsualia.....reticulo, punctis significato, areolata. Epistoma in mucronem brevissimum, utrinque basi spinulosum desinens." "Foem. scuto dorsuali posteriori lateraliter et parum in ventre inflexo". According to Berlese the dimensions of the female are: Length, 700 u; breadth, 480 u; length of ventri-anal shield, 310 u; breadth, 230 u. The setae on the legs are spine-like.

Male:- "Mas scuto ventrali cum omnibus caeteris ventris (excepto sterno) et cum dorsualibus confuso. Pedes secundi vix tertiis crassiores, femure calcari conico, robusto, cuius in axilla tuberculus spiniformis, parvus est; genu tibiaque tuberculo spiniformi et brevi spinula armatis. Mandibularum extroflexarum chelam bene videre nequeo in unico exemplo quod possideo, sed calcar perbreve conspicio, antrorsus directum, vix digitos superans.

Habitat in nidis Murium agrestium, in Sardinia ("Asuni")".

Remarks. Judging from the sketches of the type specimen (figs. 9-11) this species should be referred to the genus Cyrtolaelaps sens. str. The anterior dorsal shield bears three pairs of setose.....

setose setae and the posterior dorsal shield six pairs (fig. 9). These setae are setose in their distal halves only (fig. 10). The sternal shield bears three pairs of setae; the metasternal setae are situated on the integument (fig. 11). Other features of the venter are shown in the figure.

If the species described by Schweizer (1922) is not conspecific with C. aster they are probably closely related; his specimens were also found associated with bat detritus.

Cyrtolaelaps rectus (Berlese), new comb.

1920. Gamasellus (Protolaelaps) rectus, Berlese, A., Redia 14: 163.

Berlese originally described this species as follows:
"Foem. Color terreo-flavus. Nostrati G. (P.) mucronato sat primu visu, similis, quamvis valde exilior, sed linea scuta dorsualia sejungenti perfecte recta mox dignoscendus. Epistoma mucroniforme. seta utrinque penicillata, scapularis est et post scapulas. In margine corporis utrinque decem circiter consimiles pili conspiciuntur, statura extremum corpus versus gradatim majores; postremi, ad angulos postico-laterales corporis, ad 100 u long. Scutum ano-ventrale majus, dimidiam fere partem corporis ad ventrem occupans, elongate obtrigonum, postice rotundatum (ad 380 u long.; 300 u lat.). Ad 850 u long.; 500 u lat. Habitat in Columbia (N.A.), in humo.
Obs. Differt a G. (P.) aster Europae, cuius affinis, statura majori, corpore elongatiori, dermate scutulorum dorsualium laevi, pedibus longi-oribus et exilioribus (e.g. pes primus foemina G.P. asteri est 450 u long., sed G.P. recti est 680 u); scutum ano-ventrale est in G.P. astero foem 320 x 240; in G.P. recto est 400 x 310."

Remarks. The fact that Berlese compared this species with Cyrtolaelaps mucronatus and C. aster indicates that this species.....

species should be retained in Cyrtolaelaps sens. str. Investigations may, however, prove that it should be referred to Gamasellus.

Cyrtolaelaps minor Willmann

1952. Cyrtolaelaps minor, Willmann, G., Z. Parasit. 15: 422.

The female of this species described by Willmann (1952) is typical of the subgenus. The anterior dorsal shield is provided with 22 pairs of setae, three pairs of which are setose and the pair of verticals being spine-like. One pair of setae are situated on the integument anterior to the ventri-anal shield. Willmann figured the venter and dorsum of both the female and deutonymph.

Habitat. Found associated with different species of field mice in Germany.

Cyrtolaelaps setosus Kramer

1898. Cyrtolaelaps setosus, Kramer, J., Ergeb Hamb. Magal. Sam. 1892/93, Acariden: 22.

Kramer (1898) only figured the male and female cheliceræ. According to him this species possesses the following characteristics: Dimensions: Male: Length, 1650 u; breadth, 900 u; largest female: Length, 1700 u; breadth, 950 u. Colour, coffee-brown. Tectum triangular with a small tooth on each lateral side. Both sexes with divided dorsal shield, the posterior shield not bearing any "Dornen oder Zapfen". Female with sternal, genital and ventri-anal shields; male with holo-ventral shield. Setae on dorsal shields large, those on the posterior part of the posterior dorsal shield being longer and more dense. A pair of setae on the hind margin is more than two times longer than the others. Para-anal setae short, post-anal.....

post-anal seta long. Legs II & III of the male provided with spines and spurs; ventrally, the third segment of leg II bears a large spur (horn) and in front of it also a spine; the ventral surface of the fourth and fifth segment of the same leg also bears a short, stout spur, its apex being directed forwards; the spur on the sixth segment is larger, its long and pointed apex curving in an anterior direction. The fourth and fifth segments of legs III are each provided with a thick spine, the sixth bearing two similar spines. On leg IV only the tarsus bears a chitinous knob on its antero-ventral margin; behind this knob the segment is slightly swollen.

The genital plate of the female is rounded anteriorly, the front margin being very weakly sclerotized. The sternal shield has a truncated posterior margin. Both digits of the chelicerae of the male are provided with characteristic processes (figured by Kramer). The spermatophoral process of the movable digit tapers to its apex and it curves from the outer towards the inner side of the digit. The distal portion of the fixed digit is provided with a triangular extension, giving the apex of the digit a blunt appearance. The fixed digit is bidentate and the movable unidentate.

Habitat. "Meeresstrand; tiefster Ebbestrand; unter Steinen in der Mündung des Baches, oberhalb der Fluthlinie; Land". All specimens from "Süd-Feuerland, Uschuaia".

Remarks. The description is inadequate as regards taxonomic characters and Kramer only figured the chelicerae. Judging from the description of the dorsal chaetotaxy and bearing in mind its habitat this species may belong in Gamasellus.

Cyrtolaelaps subnudus (Berlese), new comb.

1918. Gamasellus (Protolaelaps) subnudus, Berlese, A.,

Redia 13: 138.

1923.....

1923. Protolaelaps (Prctolaelaps) subnudus?, Halbert, J.N.,
J. Linn. Soc. Zool. Lond. Zool. 35:365.

Berlese (1918) gives a relatively long description of this species without figures. Halbert (1923) thought that his specimens might be conspecific with those of Berlese. It differs from other species in the genus by having only an anal shield widely removed from the genital shield.

Habitat. Berlese's specimens were found in manure of poultry, Italy and Halbert's were collected in decaying turnips, Ireland. The species is relatively large, being more than 700 u long and 420 u broad.

Remarks. It is impossible to assign, with certainty, this species to a particular subgenus. Until further knowledge comes to hand it should be retained in Cyrtolaelaps sens. str.

Cyrtolaelaps species referred to Veigaia and other non-Rhod-
acarinae

Veigaia nemorensis (Koch)

1892. Cyrtolaelaps nemorensis, Berlese, A., Acar. Myr. Scorp.
63: 5.
1902. Cyrtolaelaps nemorensis, Oudemans, A.C., Tijdschr.
Ent. 45: 27.
1905. Cyrtolaelaps nemorensis, Voigts & Oudemans, Abh. Natur.
Ver. Bremen 18: 230.
1906. Cyrtolaelaps nemorensis, Berlese, A., Redia 3: 97.
1910. Cyrtolaelaps Kochi, Trägårdh, I., Naturw. Untersuch.
Sarekgeb. Schwed.-Lappl. 4(4): 416.
1915. Cyrtolaelaps Kochi, Halbert, J.N., Proc. roy. Irish
Acad. 31: 63.
1915. Cyrtolaelaps nemorensis, Halbert, J.N., Proc. roy.
Irish Acad. 31: 62.
- 1915.....

1915. Cyrtolaelaps nemorensis, Hull, J.E., Lancashire and
Cheshire Nat. 7: 370.
- 1918b. Cyrtolaelaps nemorensis, Hull, J.E., Lancashire and
Cheshire Nat. 11: 40, 42.
1922. Cyrtolaelaps nemorensis, Schweizer, J., Verh. naturf.
Ges. Basel 33: 35, 95.
1924. Cyrtolaelaps nemorensis, Schweizer, J., Arch. Hydro-
biol. 15: 126.
1941. Cyrtolaelaps nemorensis, Warren, ., Ann. Natal Mus.
10(1): 112, 115.

Veigaia agilis (Berlese)

1916. Cyrtolaelaps agilis, Berlese, A., Redia 12: 299.

Veigaia bouvieri (Berlese)

- 1916b. Cyrtolaelaps bouvieri, Berlese, A., Redia 12: 158.

Veigaia capreolus (Berlese)

- 1905b. Cyrtolaelaps capreolus, Berlese, A., Redia 2: 168.
- 1926a. Cyrtolaelaps capreolus, Vitzthum, H., Treubia 8: 4.
1943. Cyrtolaelaps capreolus, Vitzthum, H., Bronn's Klassen
und Ordn. Tierr. 5(4): 45.
1952. Cyrtolaelaps capreolus, Baker & Wharton, An Introduction
to Acarology: 20.

Veigaia cerva (Kramer)

1892. Cyrtolaelaps cervus, Berlese, A., Acar. Myr. Scorp.
68: 10.
1902. Cyrtolaelaps cervus, Oudemans, A.C., Tijdschr. Ent.
45: 26.
- 1914b. Cyrtolaelaps cervus, Oudemans, A.C., Arch. Natgesch.
79 (8): 160.

1915.....

1915. Cyrtolaelaps cervus, Halbert, J.N., Proc. roy. Irish Acad. 31: 62.
1915. Cyrtolaelaps cervus, Hull, J.E., Lancashire and Cheshire Nat. 7: 370.
1916. Cyrtolaelaps cervus, Hull, J.E., Lancashire and Cheshire Nat. 8: 384.
- 1918b. Cyrtolaelaps cervus, Hull, J.E., Lancashire and Cheshire Nat. 11: 35.

Veigaia exigua (Berlese)

- 1916a. Cyrtolaelaps exiguus, Berlese, A., Redia 12: 300.

Veigaia grandipes (Berlese)

- 1916a. Cyrtolaelaps grandipes, Berlese, A., Redia 12: 298.

Veigaia humilis (Hull)

- 1918a. Cyrtolaelaps humulis, Hull, J.E., Trans. nat. Hist. Soc. North. n.s. 5: 75.
- 1918b. Cyrtolaelaps humulis, Hull, J.E., Lancashire and Cheshire Nat. 11: 42.

Veigaia kochi (Trägårdh)

1901. Cyrtolaelaps kochi, Trägårdh, I., Zool. Anz. 25: 61.
1902. Cyrtolaelaps nemorensis, Oudemans, A.C., Tijdschr. Ent. 45: 27.
1904. Cyrtolaelaps herculeanus, Berlese, A., Redia 1: 240, 276.
1904. Cyrtolaelaps kochi, Trägårdh, I., Fauna Arctica 4(1): 34.
1910. Cyrtolaelaps kochi, Trägårdh, I., Naturw. Untersuch. Sarekgeb. Schwed.-Lappl. 4(4): 421.
1915. Cyrtolaelaps kochi, Hull, J.E., Lancashire and Cheshire Nat. 7: 370.

1918b.....

- 1918b. Cyrtolaelaps herculeanus, Hull, J.E., Lancashire and Cheshire Nat. 11: 35.
1922. Cyrtolaelaps kochi, Schweizer, J., Verh. naturf. Ges. Basel 33: 36, 95.
1928. Cyrtolaelaps herculeanus, Sellnick, M., Vetensk. Samh. Handl. Femte Följden, ser. B 1(4): 28.

According to Farrier (1957) other authors also described Veigaia species under the specific name kochi but their concepts cannot be determined from their publications.

Veigaia mitis (Berlese)

- 1916a. Cyrtolaelaps mitis, Berlese, A., Redia 12: 300

Veigaia planicola (Berlese)

1892. Cyrtolaelaps nemorensis var. planicola, Berlese, A., Acar. Myr. Scorp. 62: 6.

Veigaia pusilla (Berlese)

- 1916a. Cyrtolaelaps pusillus, Berlese, A., Redia 12: 301.

Veigaia transisalae (Oudemans)

1902. Cyrtolaelaps transisalae, Oudemans, A.C., Tijdschr. Ent. 39: 132.
- 1912b. Cyrtolaelaps transisalae, Trägårdh, I., Arch. Zool. Exp. Gen. (5) 8: 557.
1915. Cyrtolaelaps transisalae, Halbert, J.N., Proc. roy. Irish Acad. 31: 62.
- 1918b. Cyrtolaelaps transisalae, Hull, J.E., Lancashire and Cheshire Nat. 11: 40.
1922. Cyrtolaelaps transisalae, Schweizer, J., Verh. naturf. Ges. Basel 33: 36, 95.
1924. Cyrtolaelaps transisalae, Schweizer, J., Arch. Hydrobiol.....

biol. 15: 126.

1926b. Cyrtolaelaps transisalae, Vitzthum H., Jena Z. Naturw.
62: 140.

1926. Cyrtolaelaps transisalae, Jeannel, , Encycl. Ent. A.
Trav. gen. 8: 164.

Eugamasus immanis Berlese

1909. Cyrtolaelaps goliathus, Berlese, A., Redia 6: 372.

Gamasolaelaps aurantiacus Berlese

1904. Cyrtolaelaps aurantiacus, Berlese, A., Redia 1: 241.

1904. Cyrtolaelaps excisus, Trägårdh, I., Fauna Arctica 4(1):35.

Austrogamasus gracilipes (Banks)

1916. Cyrtolaelaps gracilipes, Banks, N., Trans. roy. Soc.
S. Aust. 40: 228.

Gamasiphis femoralis (Banks)

1916. Cyrtolaelaps femoralis, Banks, N., Trans. roy. Soc.
S. Aust. 40: 228.

Species dubiae

1905b. Cyrtolaelaps dama, Berlese, A., Redia 2: 168.

This is probably a Veigaia species. According to Farrier (1957) the type is missing from its proper place in the Berlese collection. The description is too brief and the figure too incomplete to place this species in its correct position

1905c. Cyrtolaelaps ibex, Berlese, A., Redia 2: 233.

This species, with an undivided dorsal shield, is neither a veigaiaid nor one of the Rhodacarinae. Farrier (1957) suggested that it may belong in the Laelaptidae.

1904.....

Nomen nudum

1954. Cyrtolaelaps leitnerae, Franz, H., Spiegel Landtierwelt Innsbr. 1: 338.

A nomen nudum was created when this name was used by Franz (1954) without giving a description or figure of the species.

Subgenus Gamasellus Berlese, 1892

1892. Gamasellus, Berlese, A., Acar. Myr. Scorp. 63: 4
1892a. Gamasellus, Berlese, A., Acar. Myr. Scorp. Mesostigmata: 61.
1905b. Gamasus (Laelogamasus), Berlese, A., Redia 2: 167 (new syn.).
1906. Gamasus (Laelogamasus), Berlese, A., Redia 3: 113.
1906. Gamasellus, Berlese, A., Redia 3: 101.
1942. Digamasellus, Womersley, H., Trans. roy. Soc. S. Aust. 66: 159.

The adults of the subgenus Gamasellus can be characterized by the following: The anterior dorsal shield is usually provided with 22 pairs of setae of which five pairs are in the dorsal series (j1-5), three pairs in the median series (z1-3), six or seven pairs in the lateral (s1-6 or 7) and seven or eight pairs in the marginal series (r1-7 or 8). In some species, however, some of the setae in the lateral and marginal series may be absent. With few exceptions all the setae on the dorsum are situated on the shields; rarely one or two of the marginal setae are placed on the lateral integument. The sternal shield is provided with four pairs of setae or sternal setae I may be situated on jugular shields. The majority of the members of the subgenus, however, possess pre-endopodal shields. In the female.....

male the ventri-anal shield is free but in the male it may be fused with either or both the sterniti-genital and posterior dorsal shields. The dorsal shield may underlap the venter without coalescing with the ventri-anal shield. As regards the ventral shields of the male four basic patterns can be distinguished: Those males with a holovertral shield, those with a free ventri-anal shield, those in which the ventri-anal is fused with the peritrematal and posterior dorsal shields and those which have this complex also fused with the sterniti-genital shield. The degree of fusion of the shields of the venter of the male probably is of no taxonomic importance.

The setae of the body and legs are simple or complex and every single species usually has at least two types of setae. The specialized seta on the palptarsus has three prongs, one of which usually is smaller than the others. Legs II-IV are always and leg I usually provided with claws. In a few species the praetarsi and pulvilli may be reduced. In the male leg II is provided with spurs. The spermatophoral process of the male chelicerae is relatively short. The tectum usually has a median mucro with one or more pairs of denticles at its base.

Type:- Gamasus falciger G. & R. Canestrini, 1881.

Key to the South African species of Gamasellus

1. Ventri-anal shield with 19 setae; three pairs of pre-endopodal shields present.....2
2. Ventri-anal shield with less than 19 setae; only one pair of pre-endopodal shields present... ..3
2. Posterior dorsal shield bearing seven pairs of setae with.....

- with setose distal ends and rounded tips.....
..... C. (G.) deepdalei, n.sp.
- . Posterior dorsal shield bearing four pairs of setose
setae with rounded tips... C. (G.) shongwenii, n.sp.
3. Ventri-anal shield with 15 setae.....4
- . Ventri-anal shield with 13 setae.....7
4. Anterior dorsal shield with more than 20 pairs of
setae.....5
- . Anterior dorsal shield with less than 20 pairs of
setae.....6
5. Dorsal shield underlapping venter
..... C. (G.) drakensbergi, n.sp.
- . Dorsal shield not underlapping venter.....
..... C. (G.) hluluwei, n.sp.
6. Anterior two pairs of setae on ventri-anal shield
arranged in a transverse row... C. (G.) nkanohlai, n.sp.
- . Anterior two pairs of setae on ventri-anal shield not
forming a transverse row..... C. (G.) warglei, n.sp.
7. Tarsus IV with prominent rod-like setae.....
..... C. (G.) macrosetosus, n.sp.
- . Tarsus IV without prominent rod-like setae.....8
8. Posterior pair of pre-anal setae on ventri-anal shield
serrate, remainder simple... C. (G.) neotasmaticus, n.sp.
- . Posterior pair of pre-anal setae on ventri-anal shield
usually simple; where serrate, at least one additional
pair on shield also serrate.....9
9. Dorsum.....

9. Dorsum with only one pair of simple setae.....
..... C. (G.) grahami, n.sp.
- Dorsum with more than one pair of simple setae.....10
10. Posterior dorsal shield with only one pair of prominent serrated setae... C. (G.) paranatalensis, n.sp.
- Posterior dorsal shield with more than one pair of serrated setae.....11
11. Posterior dorsal shield with two pairs of prominent serrate setae; sternal shield with incision in posterior margin..... C. (G.) natalensis, n.sp.
- Posterior dorsal shield with many serrate setae; sternal shield without incision in its posterior margin...
..... C. (G.) knysnaensis, n.sp.

C. (Gamasellus) falciger (G. & R. Can.), 1881

1881. Gamasus falciger, Canestrini, G. & R., Atti Ist. Venet. (5) 7: 1080.
1882. Gamasus falciger, Canestrini, G. & R., I Gamasi Italiani. Monografia: 51.
1885. Gamasus falciger, Canestrini, G., Prospetto dell' Acarofauna italiana: 77.
1892. Cyrtolaelaps falciger, Berlese, A., Acar. Myr. Scorp. 63: 4.
- 1892a. Cyrtolaelaps falciger, Berlese, A., Acar. Myr. Scorp. Mesostigmata: 60.
1921. Gamasellus falciger, Berlese, A., Redia 14: 81.
1922. Gamasellus falciger, Schweizer, J., Verhandl. Naturf. Ges. Basel 33: 34.
1941. Cyrtolaelaps sertatus, Willmann, C., Stud. Geb. Allg. Karstf. Berl. Biol. Ser. 8: 21 (New syn.).

1958.....

1958. Gamasellus falciger, Ryke, P.A.J., Entom. month.

Mag. 94: 121.

From specimens in the Michael collection, Arachnida Section, British Museum (Nat. Hist.) Ryke (1958) redescribed the female and male of this species on which Berlese based the characters of the subgenus Gamasellus.

Female:-

Dimensions: Length (excluding gnathosoma), 472 u; breadth, 330 u; length of leg I, 484 u; leg IV, 490 u.

Dorsum (fig. 12). The dorsum bears 42 pairs of setae, 22 pairs of which are on the anterior shield, 18 pairs on the posterior shield and two pairs on the interscutal membrane. Three types of setae can be distinguished on the reticulated dorsal shield. The vertical, j1, (fig. 13) the scapular, r5, and the posterior marginal setae are serrate in their distal halves and have rounded tips. The majority of the other setae are simple and more or less rod-like (fig. 14). A few pairs of setae are serrate distally without the rounded tips (fig. 15). The chaetotaxy of the dorsum and the distribution of the pores are illustrated in fig. 12.

Venter (fig. 16). The sternal shield (length, 125 u; breadth between coxae II, 90 u) bears four pairs of setae and three pairs of pores. The third pair of pores are represented by small incisions in the postero-lateral corners of the shield. The setae are simple and relatively short. The sternal shield is well sclerotized and ornamented by means of punctated lines forming a reticulate pattern. Three pairs of pre-endopodal shields are present in front of the shield. The pair in the middle is larger than the.....

than the others. The genital shield has a more or less triangular shape and is provided with a pair of setae. The ventri-anal shield covers almost the entire region behind coxae I. Like the sternal shield it is ornamented by interconnecting punctate lines. Six pairs of simple setae, excluding the circum-anal setae, can be distinguished. The two minute para-anal setae are situated in line with the middle of the anal aperture. The post-anal seta is serrate.

The endopodal shields of coxae IV are free. The exopodal shields are not fused with the peritrematal shields. The latter shields are produced slightly behind coxae IV. Anteriorly the peritreme extends beyond coxae I. The stigma is situated on a line immediately posterior to the anterior margin of coxae IV. The tritosternum has two pilose laciniae which are more than twice the length of the base.

Gnathosoma (fig. 17). The corniculi extend anteriorly to the front margin of the trochanter of the pedipalp. The inner malae have serrated anterior margins. The capitular groove has six rows of denticles. The gnathosomal setae are simple and of moderate length. The capitular setae are slightly shorter than the others. The movable digit of the chelicera is tridentate and the fixed digit bears five to six small teeth (fig. 18). The chaetotaxy of the palp is normal for the Parasitoidea. The specialized seta on the palptarsus (fig. 19) is three-pronged (two large and one small prong). The tectum (fig. 20) has a sharp pointed mucro flanked by two large and a few small denticles at its base.

Legs. The legs are well sclerotized with all the setae simple. Leg I and leg IV are of approximately the same length.....

length. Claws and pulvilli are present on all legs. Those on leg I (fig. 21) are smaller than the others (fig. 22).

Male:-

The dimensions are approximately the same as those of the female. The venter (fig. 23) is covered by a holoventral shield. It is ornamented as in the female and bears ten pairs of simple setae, excluding the anals. The post-anal seta is well developed and resembles the shape of the vertical setae. The endopodal and peritrematal shields are fused with the holoventral shield. The exopodal shields are free. The posterior pair of the three pairs of pre-endopodal shields is larger than that of the female. Leg II of the male is armed with spurs. These are arranged as shown in fig. 24. The other legs are unarmed and the chaetotaxy is similar to that of the female.

Habitat. The members of this species are usually found in humus and they are known from Europe.

C. (Gamaseilus) deepdalei, n.sp.

Female:-

Dimensions: Length, 665 u; breadth, 391 u.

Dorsum (fig. 25). The distribution of the setae on the two reticulated dorsal shields is shown in the figure. The anterior shield bears 22 pairs of setae, four pairs of which are serrate in their distal halves with rounded tips (j1, z1, z2, r5). The posterior dorsal shield is provided with seven pairs of this type and 16 pairs of simple setae. The setae with rounded tips are situated on the posterior and postero-lateral portions of the shield.

Venter.....

Venter (fig. 26). The sternal shield (length, 113 u; breadth between coxae II, 105 u) bears the usual four pairs of setae and is ornamented as depicted in the figure. The pair of pre-endopodal shields is distinct but an unpaired less-sclerotized area could be observed immediately posterior to the base of the tritosternum. The genital shield has a triangular shape, being slightly longer than broad. A single long slender plate and two small round platelets occur between the posterior margin of the genital shield and the front margin of the ventri-anal shield. In addition to the circum-anal setae the ventri-anal shield is provided with eight pairs of setae. The post-anal seta as well as the pair of setae on the postero-lateral margin of the shield are serrate with rounded tips. The pair of setae which is situated antero-medially to the latter is serrate but lacks the rounded tips. All the remaining setae are simple. The endopodal shields of coxae IV appear to be free. As in G. falciger the peritrematal shield is produced backward slightly beyond coxae IV. The tritosternum, peritreme and stigma are normal.

Gnathosoma. The movable digit of the chelicera is tridentate (fig. 27). The fixed digit of one of the chelicerae bears four large and one small tooth whereas the other chelicera has only three teeth, one of which is small. The hypostomal setae, corniculi and pedipalps are typical of the subgenus. The tectum (fig. 28) has a slender mucro flanked by two or three large denticles. The antero-lateral margin of the tectum is also provided with small teeth.

Legs. The chaetotaxy of the legs is essentially the same as that of G. falciger. The majority of the setae are simple but some are paddle-like and/or serrate distally. Legs

I and IV.....

I and IV are the longest and are subequal in length; leg III is the shortest. All the legs are provided with claws and pulvilli, those on leg I, which is more slender than the others, being smaller.

Male:-

Dimensions: Length, 617 u; breadth, 374 u.

It differs from the male of G. falciger in respect of the ventral shields which are not fused into a holoven-tral shield (fig. 29). The sterniti-genital shield bears five pairs of simple setae. Three pairs of pre-endopodal shields are present. The number, distribution and shape of the setae on the ventri-anal shield are similar to those in the female. The chelicerae each bears a short spermatophoral process (fig. 30). The spurs on leg II are similar to those figured for G. falciger. Other features as in the female.

Habitat and locality. Forestfloor. Holotype female from Deepdale, Aug. 1940, collected by W.G. Rumpert; allotype male from Hluhluwe Game Reserve, March 1944, collected by H. Potter.

C. (Gamasellus) leggetti, n.sp.

Female:-

Dimensions: Length, 600 u; breadth, 347 u.

Dorsum (fig. 31). The anterior dorsal shield carries 22 pairs of setae, five pairs of which are serrate with rounded tips. The posterior dorsal shield bears 18 pairs of setae, five pairs of which are serrate; four pairs of these (j1, z1, z2, r5) have prominent rounded tips and are almost paddle-like.....

paddle-like, the fifth pair (r1) being short. The other dorsal setae are flattened, being more or less spatulate. The distribution of the setae on the dorsum is illustrated in the figure.

Venter (fig. 32). The sternal shield, genital shield and the three pairs of pre-endopodal shields resemble those of G. falciger. The narrow platelet between the genital and ventri-anal shield is divided into two parts. In addition to the circum-anal setae the ventri-anal shield bears six pairs of setae. Three pairs are simple setae whereas the rest are shaped as shown in the figure. The ventral inter-scutal membrane is provided with two pairs of simple setae. The para-anal setae are situated in line with the anterior margin of the anal aperture.

Gnathosoma. The movable digit of the chelicera is tridentate and the fixed digit bears five teeth (fig. 33). The tectum (fig. 34) is typical of the genus and closely resembles that of G. falciger. The other features of the gnathosoma are normal.

Legs. The lengths, structure and chaetotaxy of the legs are normal.

Habitat and locality. The holotype female was sent to Dr. G.O. Evans (British Museum) by Dr. E.W. Baker (U.S.A.) and the former referred it to the present author for description. It was collected from duff, Leggett, Texas, U.S.A., 9th Febr. 1956.

C. (Gamasellus) shongwenii, n.sp.

Female:-

This species is near G. deepdalei but they can easily be.....

ly be separated on the basis of the chaetotaxy of the posterior dorsal shield.

Dimensions: Length, 566 u; breadth, 350 u.

Dorsum (fig. 35). The distribution of the setae on the dorsum is very similar to that of G. deepdalei and the shape of the setae on the anterior dorsal shield is practically identical in the two species. The posterior dorsal shield of the present species, however, lacks the prominent paddle-like serrated setae on its postero-lateral border characteristic of deepdalei. J3 and J4 in the posterior dorsal shield series are also relatively widely removed from the middle line.

Venter (fig. 36). The sternal and genital shields bear the usual number of setae. The three pairs of pre-entopodal shields are distinct. In addition to the anal setae the ventri-anal shield is provided with eight pairs of setae. The marginal setae on this shield are both simple, whereas the posterior one in G. deepdalei is serrate and paddle-like. All the other features of the venter are normal, approaching the conditions obtaining in deepdalei.

Gnathosoma. The movable digit of the chelicera bears three teeth and the fixed digit five (fig. 37). The tectum (fig. 38) can readily be distinguished from that of G. deepdalei by the presence of a relatively stout, sharp-pointed mucro similar to those present in G. falciger and G. leggetti.

Legs. The majority of the setae on legs II-IV and the proximal part of leg I are paddle-like. The setae on the distal portion of leg I and the tarsi of the other legs are mostly simple.

Habitat and locality. Holotype female and three paratype

females.....

females from forest floor Shongweni, July 1940, collected by W.G. Rumpert.

C. (Gamaseilus) hluluwei, n.sp.

This species can readily be recognised by the presence of the large number of serrate paddle-like setae on the dorsum.

Female:-

Dimensions: Length, 800 u; breadth, 457 u.

Dorsum (fig. 39). All the dorsal setae, with the exception of r2 and r3 are paddle-like and serrate in their distal halves. The anterior dorsal shield bears the usual 22 pairs of setae. The posterior dorsal shield is provided with the basic number of setae (20 pairs) distributed as shown in the figure. A striking feature of this species is the fact that setae r1 are relatively long, approximately equal in length to the vertical setae (j1). The posterior dorsal shield is much more distinctly reticulated than the anterior one.

Venter (fig. 40). The sternal shield is ornamented as shown in the figure; the ornamentations in the centre of the shield are faint. It is relatively long (190 u) and bears the usual number of simple setae. Only one pair of pre-endopodal shields is present. The genital shield is relatively small. Four small elongated platelets could be detected between the posterior margin of the genital shield and the anterior margin of the ventri-anal shield. The ventri-anal shield is provided with 15 setae. In addition to the post-anal seta three pairs of these setae are serrate distally. The para-anal setae are situated in

line.....

line with the anterior margin of the anus. The peritrematal shield is not produced behind the posterior margin of coxa IV. The peritreme reaches anteriorly to a position immediately in front of coxa II.

Gnathosoma. The hypostomal setae are normal. The palptarsus bears the usual three-pronged seta. The movable digit of the chelicera has four teeth and the fixed digit five (fig. 41). The tectum (fig. 42) is very similar to that of G. leggetti.

Legs. The legs of this species are characterized by the presence of spine-like spurs on the posterior surface of femur IV (fig. 40) and the trochanters of legs II & III. Many setae on the proximal parts of legs II-IV are serrate and/or paddle-like. All the setae on the antenniform leg I are simple. The claws and pulvilli on legs II-IV are relatively well developed but those on tarsus I are small and inconspicuous.

Male:

Dimensions: Length, 722 u; breadth, 426 u.

The chaetotaxy of the dorsum is essentially the same as in the female. As in G. deepdalei the venter is largely covered by the sterniti-genital shield and a free ventri-anal shield (fig. 43). The latter as well as the other shields are similar to those in the female. The hypostome is normal but the pedipalp is armed with a prominent projection on its ventral surface (fig. 44). The fixed digit of the chelicera is tridentate and the movable digit bears a single tooth in addition to the spermatophoral process (fig. 45). The legs are similar to those of the female but leg II is armed with additional spurs as shown in fig.

46. Other.....

46. Other features are essentially the same as in the female.

Habitat and locality. Holotype and paratype female from forest floor, Hluhluwe Game Reserve, collected by W.G. Rumpert, 1941; allotype male and two paratype females from Cathkin Peak, Sept. 1943, collected by R.F. Lawrence; three paratype females from Ingwazwane Forest, E. Griqualand, July 1945, collected by R.F. Lawrence.

C. (Gamasellus) drakensbergi, n.sp.

A striking feature of this species is the absence of serrate setae on both the venter and dorsum.

Female:-

Dimensions: Length, 591 u; breadth, 439 u.

Dorsum (fig. 47). The majority of the setae on the dorsum are relatively long and rod-like with small paddles distally. The vertical setae (j1) are relatively short and fringed at their distal tips. Setae r1, r2, r3 and r6 are minute and simple. The anterior dorsal shield has the normal number of setae but the posterior shield is provided with only 17 pairs of setae distributed as shown in the figure. That part of the dorsal shield, however, which underlaps the venter bears another three pairs of setae. All the setae on the posterior dorsal shield are shaped as depicted in fig. 48.

Venter (fig. 49). The underlapping dorsal shield forms the greater part of the lateral and posterior margin of the venter. The endopodal shields are fused with the sternal shield. Only one pair of pre-endopodal shields are present. The genital shield is broader than long and

is not.....

is not conspicuously ornamented. Two small and one long elongated platelet could be observed between the genital and ventri-anal shields. As in G. hluluwei the ventri-anal shield is provided with 15 setae. The para-anal setae are situated in line with the anterior margin of the anal aperture. The peritrematal shields are broad and the peritreme reaches to a position anterior to caxa II. The tristernum is provided with the usual pair of pilose laciniae.

Gnathosoma. The chelicerae are multidentate. The tectum (fig. 50) has a relatively slender mucro flanked by two short lateral projections. The other features of the gnathosoma are normal.

Legs. The majority of the setae on the legs are simple. The claws and pulvilli are similar to those of the species described above.

Male:-

Dimensions: Length, 504 u; breadth, 326 u.

This species represents a third type of covering of the male venter (fig. 51). The sterniti-genital shield and the single pair of pre-endopodal shields are free. The ventri-anal shield, exopodal shields and peritrematal shields are fused together and this complex is also fused with the dorsal shield. All the setae on the venter are simple except the post-anal seta which is paddle-like. The venter of the male of this species represents an intermediate stage between the holovertral type of shield as encountered in G. falciger and the free ventri-anal shield as in G. hluluwei. In falciger, however, the ventri-anal part of the shield is not fused with the dorsal shield.

In G......

In G. drakensbergi the dorsum of the male is also basically similar to that of the female except that the setae are relatively shorter.

The movable digit of the chelicera (fig. 52) bears a single tooth and the usual spermatophoral process. The fixed digit is tridentate and is provided with a small pilus dentilis. The tectum (fig. 53) of the male differs slightly from that of the female by having a slender mucro flanked by several small denticles. The palp is armed with a spur. The femur of leg II is armed with a conspicuous spur on its antero-ventral surface as illustrated in fig. 51.

Habitat and locality. Holotype female from forest floor Champagne Castle, Jan. 1944, collected by R.F. Lawrence; allotype male from Town Bush, Pietermaritzburg, Dec. 1939, collected by R.F. Lawrence.

C. (Gamasellus) natalensis, n.sp.

Female:-

Dimensions: Length, 800 u; breadth, 535 u.

Dorsum (fig. 54). The anterior dorsal shield is provided with three pairs of setae which are serrate distally (z1, z2, r5). The vertical setae have fringed distal tips. The other 18 pairs of setae are simple. Setae r2 are situated in the lateral series. The posterior dorsal shield carries 27 pairs of setae, three pairs of which are serrate (J5, Z3, Z5). The distribution of the setae closely resembles that of G. paranatalensis, n.sp.

Venter (fig. 55). The posterior margin of the sternal

shield.....

shield is concave with indications of an incision in the median line. The four pairs of setae on this shield are relatively small. The base of the tritosternum is flanked by one pair of pre-endopodal shields. The genital shield is punctated and has a slightly convex posterior margin. A pair of elongated platelets is present between its hind margin and the anterior margin of the ventri-anal shield. Four other pairs of small roundish platelets can be observed on the interscutal membrane of the venter. Their positions are indicated in fig. 55. The interscutal membrane is also provided with two pairs of simple setae. The reticulated ventri-anal shield bears 13 setae, the marginal setae on the lateral sides being prominent. The para-anal setae are situated in line with the middle of the anal aperture. The peritrematal shield is broad and the peritreme stretches to a position anterior to coxa I.

Gnathosoma. The structure of the hypostome is normal. The movable digit of the chelicera is tridentate and the fixed digit bears five teeth (fig. 56). The tectum (fig. 57) has a mucro flanked by two denticles.

Legs. The setae on the legs are simple, a few approaching a spine-like condition. The femur of leg II is armed with a spur. The claws on tarsus I are relatively well developed and of approximately the same size as those on the other legs.

Male:-

Dimensions: Length, 783 u; breadth, 522 u.

The ventri-anal and peritrematal shields are fused with the dorsal shield (fig. 58). The sterniti-genital shield bears five pairs of small setae. The rest of the

venter.....

venter is provided with eight pairs of setae in addition to the circum-anal setae. The dorsum is basically similar to that of the female. The hypostome resembles that of the female. The femur of the palp is armed with a long conical spur (fig. 59). The fixed digit of the chelicera bears four teeth and the movable digit, which is unidentate, is provided with the usual spermatophoral process (fig. 60). As shown in fig. 61 the tectum of the male differs from that of the female. The setae on the legs are simple. Femur II is armed with a prominent spur.

Habitat and locality. Holotype female and allotype male from forest floor High Flats, South Coast, Natal, Dec. 1943, collected by R.F. Lawrence.

C. (Gamasellus) paranatalensis, n.sp.

This species is closely related to G. natalensis but can readily be separated from the latter by its much smaller size and the distribution of the serrate setae on the posterior dorsal shield.

Female:-

Dimensions: Length, 465 u; breadth, 313 u.

Dorsum (fig. 62). The chaetotaxy of the dorsum is very similar to that of G. natalensis. Setae z2, z3 and r5 are setose and j1 has a fringed tip. The posterior dorsal shield bears only one pair of serrate setae (Z5), Z3 being an ordinary simple seta and not a long prominent serrate seta as in natalensis.

Venter (fig. 63). The sternal and genital shields are normal and provided with the usual number of setae. The

pair.....

pair of pre-endopodal shields are small. A pair of elongated platelets is sandwiched between the genital and ventri-anal shields. The metapodal shields are also elongated and other small platelets occur on the integument as depicted in the figure. The ventri-anal shield bears 13 simple setae. The lateral marginal setae are not as prominent as in natalensis. The interscutal membrane is provided with two pairs of setae. In some specimens the dorsal shield tends to underlap the venter; this may have been caused by pressure of the cover slip. The peritreme and peritrenatal shields resemble those of natalensis.

Gnathosoma. The anterior margin of the tectum (fig. 64) has a median sharp-pointed process with two lateral denticles on either side. The movable digit of the chelicera is tridentate and the fixed digit bears a number of teeth of variable size (fig. 65).

Legs. Leg I is not conspicuously thinner than legs II-IV. They are all provided with claws, pulvilli and simple setae.

Habitat and locality. Holotype female from forest floor Champagne Castle, Jan. 1944, collected by R.F. Lawrence; five paratype females from Cathkin Peak, Sept. 1943, collected by R.F. Lawrence.

C. (Gamaseilus) macrosetosus, n.sp.

This species can readily be recognized by the presence of strongly developed rod-like setae on tarsus IV of the female. The male is unknown.

Female:-

Dimensions: Length, 522 u; breadth, 395 u.

Dorsum.....

Dorsum (fig. 66). The majority of the setae on the dorsum are serrate. The vertical setae are tree-like. Setae r1-r4 are small and simple and r6-r7 are slightly serrate. A number of the marginal setae on the posterior dorsal shield are also without serrations. The distribution of the setae is shown in the figure.

Venter (fig. 67). The sternal shield bears four pairs of setae, the posterior pair of which is relatively long. The genital shield is almost parallel-sided. The ventrianal shield bears five pairs of setae in addition to the three anal setae. The pair of setae on the lateral margin of the shield is conspicuous and serrate. The other setae on the shield are simple. The interscutal membrane is provided with a pair of serrate setae. The postero-lateral part of the posterior dorsal shield tends to underlap the venter. The peritrematal shield is produced behind coxa IV. The peritreme reaches anteriorly to a position in front of coxa I. The base of the tritosternum is flanked by a single pair of pre-endopodal shields.

Gnathosoma. The anterior margin of the tectum (fig. 68) is irregularly denticulate. The movable digit of the chelicera is unidentate and the fixed digit multidentate (fig. 69). The hypostome and palp are normal.

Legs. The setae on the legs are strongly developed. They are either simple, spine-like, paddle-like or rod-like. The strongly developed rod-like setae on tarsus IV (fig. 70) is typical of this species.

Habitat and locality. Holotype female from forest floor in the Knysna forests, December 1943, collected by R.F. Lawrence.

C. (Gamaseilus).....

G. (Gamasellus) knysnaensis, n.sp.

This species is closely related to G. natalensis and G. paranatalensis but can be separated from these species on the basis of the type of dorsal setae.

Female:--

Dimensions: Length, 617 u; breadth, 400 u.

Dorsum (fig. 71). The chaetotactic pattern of the dorsum closely resembles that of natalensis and paranatalensis. In the present species, however, there is a large number of serrate setae. The posterior dorsal shield bears 13 pairs of serrate and 10 pairs of simple setae. Setae j2, z2, z3 and r5 on the anterior shield are serrate; by contrast setae j2 are simple in other closely related species. The vertical setae are stout with fringed tips. The setae on the posterior margin of the dorsum have rounded tips.

Venter (fig. 72). The sternal and genital shields bear the usual number of setae. The shape of the genital shield resembles that of G. macrosetosus. A pair of pre-endopodal shields is present and the interscutal membrane behind the genital shield is provided with two slender elongated platelets. The ventri-anal shield, bearing 13 setae, is slightly longer than broad. In this respect it differs from natalensis and paranatalensis in which the shield is broader than long. The setae on the lateral margin of the shield are pectinate. Both the para-anal and post-anal setae are minute. No setae could be observed on the ventral interscutal membrane. Postero-laterally the dorsal shield slightly underlaps the venter. The peritrematal shield is produced behind coxa IV; the peritreme extends anteriorly beyond coxa I.

Gnathosoma.....

Gnathosoma. The chelicerae (fig. 73) are very similar to those of G. natalensis, the movable digit being tridentate and the fixed digit multidentate. The tectum (fig. 74) has a median muco flanked by a pair of denticles. Other features of the gnathosoma are normal. The specialized seta on the palptarsus is prominent and the three prongs are almost equal in length.

Legs. All the legs are provided with relatively well-developed claws and pulvilli. The setae are simple or serrate.

Male:-

Dimensions: Length, 600 u; breadth, 383 u.

The venter of the male (fig. 75) resembles that of the males of G. paranatalensis and drakensbergi. The ventri-anal shield, which is fused with the dorsal and peritrematal shields, bears 15 setae distributed as illustrated in the figure. The dorsum is essentially similar to that of the female. Femur II is provided with a spur (fig. 75) similar to the one present in G. natalensis. The palp also bears a prominent spur as well as a number of spines (fig. 76). The cectum (fig. 76) differs from that of the female in that the median process is almost heart-shaped and the latter is flanked by two denticles. The chelicera (fig. 77) also bears a resemblance to that of G. natalensis and both the fixed and movable digit, which bears the spermatophoral process, differ from those of the female.

Legs. Femur II is provided with a spur. Other features as in the female.

Habitat and locality. Holotype female, allotype male and paratype.....

paratype females and males from floor of Knysna forest, Dec. 1943, collected by R.F. Lawrence.

G. (Gamasellus) neotasmanicus, n.sp.

This species is in the same group as G. natalensis, paranatalensis and knysnaensis.

Female:-

Dimensions: Length, 530 u; breadth, 373 u.

Dorsum (fig. 78). Setae z1, z2 and r5 are serrate on the reticulated anterior dorsal shield. The serrate setae on the posterior dorsal shield are situated on the posterior margin of the shield. The setae are distributed as shown in the figure.

Venter (fig. 79). The sternal and genital shields are normal. The single pair of pre-endopodal shields is not as slender as the platelets between the genital and ventri-anal shields. The ventri-anal shield is slightly broader than long and bears 13 setae. The posterior pair of lateral marginal setae are serrate, other setae being simple. The ventral interscutal membrane is provided with two pairs of simple setae. The postero-lateral part of the dorsal shield underlaps the venter. The peritrematal shield is produced behind coxa IV and the peritreme reaches anteriorly beyond coxa I.

Gnathosoma. The paltarsus is provided with the usual three-pronged seta (fig. 80) and the femur is armed with a spur (fig. 81). The fixed digit of the chelicera bears one large and two small teeth, the movable digit also being tridentate (fig. 82). The tectum (fig. 83) is similar to that of G. knysnaensis.

Legs.....

Legs. The claws and pulvilli on the legs are normal.
The majority of the setae are simple.

Male:-

Dimensions: Length, 435 u; breadth, 280 u.

The sterniti-genital shield bears five pairs of simple setae (fig. 84). Two pairs of small pre-endopodal shields can be distinguished. The ventri-anal shield which is fused with the dorsal and peritrematal shields bears 19 setae, including the circum-anal setae. The post-anal and two other pairs of these are serrate. The chelicerae resemble those of the closely related species but appear more elaborate (fig. 85). Leg II is well armed with spurs and spines; these are distributed as depicted in fig. 86. Other features of the male resemble those of the female.

Habitat and locality. From forest floor. Holotype and paratype female from Richards Bay, Zululand, Dec. 1943, collected by R.F. Lawrence; allotype male from Pietermaritzburg, Jan. 1940, collected by R.F. Lawrence; paratype females and males from Pietermaritzburg (Jan. 1940), Port Edward (Dec. 1943), Source of Mooli River, Potchefstroom (June 1958), Bush soil, Bathurst (Jan. 1956).

C. (Gamasellus) grahami, n.sp.

Female:-

Dimensions: Length, 522 u; breadth, 366 u.

Dorsum (fig. 87). This mite can readily be distinguished from the other species by the presence of stout serrated

setae.....

setae (fig. 88) on the reticulated dorsum. All the setae on the posterior dorsal shield are serrate whereas the anterior shield only bears one pair of simple setae (r1). The setae are situated on small tubercles.

Venter (fig. 89). The pair of pre-endopodal shields is slender and elongated. The shapes of the sternal and genital shields resemble those of G. paranatalensis. The interscutal membrane between the genital and ventri-anal shields is provided with four elongated platelets. The ventri-anal shield is slightly broader than long and bears five pairs of simple setae in addition to the anal setae. The ventral interscutal membrane is devoid of setae.

As in G. neotasmaticus the postero-lateral portion of the dorsal shield underlaps the venter and it is provided with three pairs of serrate setae. The peritrematal shield is relatively broad and it is not produced behind coxa IV; the peritreme reaches anteriorly beyond coxa I.

Gnathosoma. The tectum is similar to that of the male shown in fig. 93. The palp and hypostome are normal. Both the fixed and the movable digit of the chelicera are tridentate but the former may occasionally have an extra small tooth.

Legs. All the legs are provided with claws and praetarsi. The majority of the setae are simple.

Male:-

Dimensions: Length, 520 u; breadth, 360 u.

The dorsum of the male is essentially similar to that of the female. The venter (fig. 90) is provided with a sterniti-genital shield which has a conspicuous transverse

line.....

line immediately posterior to sternal setae II. Two small pairs of pre-endopodal shields could be identified. As in some of the other species described the ventri-anal shield is fused with the podal, peritrematal and dorsal shields. As illustrated in the figure, some of the setae on the ventri-anal shield are pectinated.

The chelicera of the male is shown in fig. 91. The palp (fig. 92) is armed with a large and a small spur. The tectum (fig. 93) is quinquispinous and resembles the tectum of G. trögårdhi Womersley. Leg II is armed with spurs. Other elgs as in the female.

Habitat and locality. Holotype female, allotype male and paratype male from bush soil cores, Bathurst Jan. 1956, collected by P. Graham; paratype female and paratype male from Grahamstown, October 1943, collected by W.G. Rumpert.

C. (Gamasellus) warglei, n.sp.

This species can readily be distinguished from the species of Gamasellus described above by the presence of only 19 pairs of setae on the anterior dorsal shield.

Female:-

Dimensions: Length, 1052 u; breadth, 720 u; length of leg I, 826 u.

This mite has a dark-brown colour.

Dorsum (fig. 94). The dorsum is very smooth and convex as in G. nkanohlai, n.sp. The anterior dorsal shield bears 19 pairs of setae and the reticulated posterior dorsal shield 20 pairs of setae. All the setae on the dorsum are simple.....

are simple. The two shields are separated by a narrow strip of integument. The distribution of the setae on the dorsum is shown in the figure.

Venter (fig. 95). The base of the tritosternum is flanked by a pair of pre-endopodal shields. The sternal and genital shields are provided with the usual number of setae. The reticulated ventri-anal shield is slightly broader than long and bears 15 setae; the para-anal setae are situated in line with the anterior margin of the anal aperture. The ventral interscutal membrane carries two pairs of relatively long simple setae. As in G. tasmanicus Wom. the peritrematal shield is produced backwards slightly beyond coxa IV and lies almost contiguous with the antero-lateral margin of the ventri-anal shield. The peritreme reaches anteriorly to a position in line with the front margin of coxa II.

Gnathosoma. The hypostomal setae (fig. 96) are relatively short. The internal malae are fringed anteriorly. Both the fixed and the movable digit of the chelicera (fig. 97) are tridentate. The tectum (fig. 98) has a median micro with small denticles at its base. The genu of the pedipalp bears two pairs of flattened setae (fig. 99). The specialized seta on the palptarsus is three-pronged (fig. 100).

Legs. All the legs are provided with claws and bi-lobed pulvilli (fig. 101). Leg I is relatively long and slender. Legs II & III are provided with small spurs. All the setae on the legs are simple.

Male:-

Dimensions: Length, 1000 u; breadth, 652 u.

The.....

The chaetotaxy of both the dorsum and the venter of the male is essentially similar to that of the female. The holovertral shield (fig. 102) is fused with the posterior half of the posterior dorsal shield. The gnathosoma, with the exception of the chelicerae, resembles that of the female. The fixed digit of the chelicera (fig. 103) is bidentate and the movable digit bears a single tooth; the spermatophoral process is approximately equal in length to the movable digit. The femur of leg II bears a conspicuous spur. The genu and tibia are also armed with smaller spurs (fig. 104).

Habitat and locality. Holotype female and allotype male from litter, Wargle, collected by W.G. Rumpert, Nov. 1942; paratypes from Hluhluwe, Zululand 1941, collected by W.G. R.; paratypes from Town Bush, Pietermaritzburg, Oct. 1945, collected by R.F. Lawrence.

G. (Gamasellus) nkanohlai, n.sp.

This species is closely related to G. warglei but can readily be separated from it by the chaetotaxy of the anterior portion of the ventri-anal shield.

Female:-

Dimensions: Length, 980 u; breadth, 700 u; length of leg I, 1022 u.

Dorsum (fig. 105). The chaetotactic pattern of the dorsum of this species is essentially the same as that of G. warglei. It differs from the latter in the following respects: Setae r6 are not placed on the anterior dorsal shield but are situated on the integument; setae J5 are usually.....

usually much smaller than in warglei.

Venter (fig. 106). The sternal, genital and ventri-anal shields are provided with the same number of simple setae as in warglei. It differs from the latter in that the anterior four setae on the ventri-anal shield are arranged in a single transverse row and not in two rows. The sternal shield is ornamented as illustrated in the figure. The para-anal setae are situated well in front of the anus. The anterior pair of setae on the ventral interscutal membrane laterally to the ventri-anal shield is much smaller than the posterior pair.

Gnathosoma. The hypostome, tectum, chelicerae and pedipalps are similar to those of G. warglei.

Legs. Legs I are longer than the body. Legs II & III are not armed with spurs. Tarsus IV is provided with a few relatively long simple setae (fig. 107). All the legs are provided with claws and bi-lobed pulvilli.

Male:-

Dimensions: Length, 980 u; breadth, 635 u.

The venter (fig. 103) of the male is similar to that of G. warglei except for the chaetotactic pattern on the posterior portion of the venter. The chelicerae and leg II also resemble those of this species.

Deutonymph:-

Dimensions: Length, 844 u - 933 u; breadth, 577 u - 622 u.

As is the case in the adult female the deutonymph is provided with two dorsal shields. The anterior dorsal shield bears 18 pairs of setae, r6 being on the integument (fig. 109).....

(fig. 109). The posterior dorsal shield carries 15 pairs of setae and four pairs of setae are placed on the integument. The venter (fig. 110) is provided with the normal sternal and anal shields. The chaetotaxy is similar to that of the adults. The metapodal shields are free. Four pairs of small platelets are placed in a transverse row behind the sternal shield.

Habitat and locality. Holotype female, allotype male, morphotype deutonymph and paratypes from litter, Nkanohla Forest, Nov. 1940, collected by R.F. Lawrence.

G. (Gamasellus) nepotulus Berlese

1908. Gamasellus nepotulus, Berlese, A., Redia 5: 13.

Judging from the sketches of the female type specimen in the Berlese collection this species is a typical gamasellid. The dorsal shields (fig. 111) are provided with two types of setae as shown in figs. 112 and 113. The venter is covered by the usual shields (fig. 114). The sternal and ventri-anal shields are reticulated. One pair of pre-endopodal shields is present. The shape of the conspicuous metapodal shields is depicted in the figure. The ventri-anal shield probably bears 7 pairs of setae in addition to the circum-anal setae. The tectum (fig. 115) is shaped like that of G. falciger but its base is devoid of denticles.

The male has a fused sterniti-geniti-ventri-anal shield and the pre-endopodal shields are conspicuous. All the shields are strongly reticulated. The dorsal chaetotaxy is similar to that of the female. The spur on the femur of leg II is shown in fig. 116.

Habitat.....

Habitat and locality. In humus, Sardinia.

C. (Gamasellus) pyriformis Berlese

1916b. Gamasellus pyriformis, Berlese, A., Redia 12: 161.

Female:-

Dimensions: Length, 520 u; breadth, 440 u.

The dorsum of the female type specimen in the Berlese collection (fig. 117) bears simple setae and a few prominent setose setae. As in G. tetrastigma Berl. and G. quadrisigillatus the posterior portion of the anterior dorsal shield is provided with four elongated pores. The reticulated ventri-anal shield (fig. 118) is almost twice as broad as long (380 u x 240 u) and bears nine pairs of setae in addition to the circum-anals; anterior to the anal aperture it also has two conspicuous round pores. The sternal and genital shields are normal and the peritrematal shield has a truncate posterior margin in line with the posterior margin of coxa IV. The hypostome (fig. 119) and hypostomal setae are normal. The specialized seta on the palptarsus is three-pronged. The chelicerae are multidentate.

Habitat and locality. East Africa in soil and litter.

C. (Gamasellus) tetrastigma Berlese

1916b. Gamasellus tetrastigma, Berlese, A., Redia 12:
161.

Female:-

Dimensions: Length, 500 u; breadth, 320 u.

As in.....

As in G. warglei and G. nkanohlae the dorsum is very smooth and convex. All the setae on the dorsum (fig. 120) are simple. The sketch of the dorsum of the type specimen indicates the position of the four chitinous "pores" on the anterior dorsal shield. Sternal setae I are situated on a pair of elongated jugular shields (fig. 121). In the type specimen the dorsal shields underlap the venter but this may have been caused by flattening due to pressure of the cover slip. The ventri-anal shield is slightly broader than long (240 u x 230 u) and is provided with six or seven pairs of setae in addition to the anal setae. The peritreme stretches anteriorly to a position approximately in line with the middle of coxa II. A striking feature of the lateral portion of the venter is the presence of a large triangular metapodal shield with a quasi stigma. The hypostome (fig. 122) is normal for the genus. The tectum (fig. 123) is similar to that of G. nepotulus. The specialized seta on the palptarsus is three-pronged. All the legs are provided with claws and legs II-IV also with pulvilli. The claws on leg I (fig. 124) are sessile and the pulvillus is probably reduced or absent.

Locality. East Africa.

G. (Gamasellus) mitigatus Berlese

1924. Gamasellus mitigatus, Berlese, A., Redia 15: 250.

Female:-

Dimensions: Length, 500 u; breadth, 280 u.

According to Berlese (1924) this species is closely related to G. quadrisigillatus Berl. The setae on the body are short and simple. The venter (fig. 125) exhibits
three.....

three striking features. The jugular shields may be fused with the anterior margin of the sternal shield. The peritreme is very short and does not reach beyond the middle of coxa III. The metapodal shields are large and flank the antero-lateral portions of the large ventri-anal shield. As in quadrisigillatus the para-anal setae are situated in line with the anterior margin of the anus. The anterior dorsal shield also bears the four chitinous "pores".

Locality. East Africa.

G. (Gamasellus) quadrisigillatus Berlese

1916b. Gamasellus quadrisigillatus, Berlese, A., Redia
12: 160.

Dimensions: Length, 630 u; breadth, 350 u.

Female:-

The majority of the setae of the dorsum (fig. 126) are simple. According to Dr. G.O. Evans (personal communication) the dorsal chaetotaxy of the type specimen was difficult to discern. As in the other species mentioned above four conspicuous chitinous pore-like structures occur near the posterior margin of the anterior dorsal shield. The posterior dorsal shield is transversely striated. The ventri-anal shield is slightly longer than broad (230 u x 220 u)(fig. 127). The metapodal shields are round and much smaller than in G. tertrastigma and mitigatus. As in these two species sternal setae I are situated on jugular shields. The peritrematal shield is relatively narrow. The seta on the palptarsus is three-bronged. The legs are normal.

Locality. East Africa.

G. (Gamasellus).....

C. (Gamasellus) succinctus Berlese

1916b. Gamasellus succinctus, Berlese, A., Redia 12: 160.

Female:-

Dimensions: Length, 600 u; breadth, 320 u.

According to Berlese (1916b) the setae are "...simpliciter mediocribus in dorso et ad margines corporis ornata" (p. 160). The ventri-anal shield (fig. 128) is longer than broad (250 u x 220 u) and the para-anal setae are probably situated in line with the anterior margin of the anus. The post-anal seta is relatively long. The sternal shield is heavily ornamented and bears three pairs of setae; sternal setae I are situated in front of the shield and, according to Berlese, the jugularia are "...intersese discreta" (p. 160). The peritrematal shield is very similar to that of G. tetrastigma; the peritreme reaches anteriorly just beyond the posterior margin of coxa II. The hypostome (fig. 129) is normal.

As in Rhodacarus the body of this mite is constricted behind coxae IV. According to Berlese the tectum is "...rotundatum, serrulatum" (p. 160). The nature of the chelicerae and the number of prongs on the palptarsal seta could not be determined by Dr. Evans. The chaetotaxy of the legs is normal. Leg I is almost as long as the body and its ambulacrum is situated on relatively well developed pre-tarsi.

Locality. East Africa.

Remarks. The taxonomic position of this species is uncertain but it should remain in the subgenus Gamasellus until further information is available.

C. (Gamasellus).....

C. (Gamasellus) spiricornis (G. & R. Can.)

1882. Gamasus spiricornis, Canestrini, G. & R., I Gamasi Italiani: 50.
1885. Gamasus spiricornis, Canestrini, G., Prospetto dell' Acarofauna Italiana: 77.
1892. Cyrtolaelaps spiricornis, Berlese, A., Acar. Myr. Scorp. 68: 9.
1910. Gamasellus spiricornis, Trägårdh, I., Naturw. Unters. Sarekgeb. Schw.-Lappl. 4, Zool. 4: 425.
1922. Gamasellus spiricornis, Schweizer, J., Verhandl. Naturf. Ges. Basel 33: 34.
1943. Gamasellus spiricornis, Cooreman, J., Bull. Mus. roy. Hist. nat. Belg. 19, 63: 18.

This is a typical Gamasellus species. According to Cooreman's (1943) description and figures the anterior dorsal shield bears 19 pairs of setae and the ventri-anal shield seven pairs, excluding the circum-anal setae.

Habitat and locality. It is known from various parts of Europe in soil, moss and litter.

C. (Gamasellus) racovitzai (Trouessart)

1903. Gamasus racovitzai, Trouessart, E., Res. Voy. S.Y. Belg. 1897-1899 Zool. Acariens: 6.
1908. Gamasellus racovitzai, Trägårdh, I., Wiss. Ergeb. Schwed. Südpol. Ex. 5 Zool. 11: 7.
1917. Gamasellus (Digamasellus) racovitzae, Berlese, A., Acariens 2e Exped. Antarct. franc.: 5.

This species can readily be recognized by the presence of two spurs on the trochanter and one spur on the femur
of leg.....

of leg IV of the female. The male is characterized by a processus tarsalis on leg II. The anterior dorsal shield bears 21 or 22 pairs of setae. The specialized seta on the palptarsus is three-pronged. All the setae on the body are simple. Pre-endopodal shields are present.

Habitat and locality. Antarctic species. Trägårdh's specimens were found in moss turf, South Shetland Islands.

G. (Gamasellus) racovitzai neo-orcadensis Trouessart

1912. Gamasellus racovitzai neo-orcadensis, Trouessart, E.,
Rep. Sci. Res. Scottish Nat. Antarct. Exp. 6: 86.

Trouessart (1912) regarded neo-orcadensis as a subspecies of racovitzai; he distinguished the species from one another on the basis of the differences concerning the spurs on leg II of the male.

Habitat and locality. In moss, South Orkneys.

G. (Gamasellus) punctum Berlese

1904. Cyrtolaelaps (Gamasellus) punctum, Berlese, A.,
Redia 1: 262.

Berlese (1904) described the species as follows:

"Pallide testaceus. Epistoma dentibus duobus lateralibus sat brevibus, acutissimis, basi interne ramusculatis, medio autem, nisi fallor, caeteris longiore.

Mas chela digitus, quantum video, subdentulis, calcare ut in G. captatore inflexo, sed minus longo et crassiore. Pedes secundi pariter femore calcare uno, spiniforme, sat valido; genu apophysis longiuscula, sat lata, subhyalina; tibia, quantum video, inermis. Corpus portice subundulato-crenulatum, setis duabus longis et robustis, aliisque aliquanto.....

quanto minoribus ornatum. Ad 230 u long.

Foemina corpore postice setis duabus longioribus, robustis (aliquando tamen robustioribus, subplumosis) aliisque minoribus. Ad 310 u long.

Habitat: sat frequens in fimetis ad Florentiam Impruneta".

Remarks. This species probably belongs in either Gamasellus or Digamasellus but it cannot be placed in its proper position from Berlese's brief description.

G. (Gamasellus) simplex (Berl.), new comb.

1905b. Gamasus (Laelogamasus) simplex, Berlese, A., Redia 2: 167.

1906. Gamasus (Laelogamasus) simplex, Berlese, A., Redia 3: 113.

This is the type species of the genus Laelogamasus and the only species Berlese described in the genus. The present author regards Laelogamasus as a synonym of Gamasellus. Unfortunately the type specimens which were in the Hamburg Museum seem to be lost. Judging from Berlese's description and figures (also those in his unpublished note book) the characters of this species do not merit a separate genus or subgenus and it is referred to the subgenus Gamasellus.

The dorsal shields are scabrate and areolate and divided in both sexes. The free ventri-anal shield is broad and almost covers the entire posterior portion of the venter. The sternal shield is probably provided with four pairs of setae; a pair of pre-endopodal shields is present. The tectum has a median macro with denticles at its base. Femur II of the male is armed but the legs of the female are unarmed. The male chelicera has a small spermatophoral process. The setae on the body are simple or complex.

Length.....

Length of male: 440 u.

Locality. Buitenzorg.

Remarks. Dr. G.O. Evans figured a specimen in the Berlese collection under the name Laelogamasus inguinalis. This is probably a manuscript name. The specimen is definitely a member of the new subgenus Gamaselliphis in which the ventri-anal shield in the female is fused with the posterior dorsal shield. This is not the case in simplex.

C. (Gamasellus) crozetensis Richters

1907. Gamasellus crozetensis, Richters, F., D. Südpol.
Exp. 1901-3, 9: 279.

This species is characterized by the shape of the tectum which is like those of the veigaiids. The peritreme is short and reaches anteriorly to the middle of coxa III. The ventri-anal shield lies contiguous with the genital shield. In the male the ventri-anal shield is fused with the posterior dorsal shield. The spermatophoral process of the male chelicera is long.

Habitat and locality. In moss, Possession Islands.

C. (Gamasellus) robustipes Berlese

1908. Gamasellus robustipes, Berlese, A., Redia 5: 13.

Berlese (1908, p. 13) described the species as follows: "Testaceus, elongate rectangularis; marginibus lateralibus trunci serrulatis; scuto ventrale (cum anale) mediocre, ovale; pedibus omnibus peracassis. Ad 420 u long.; 220 u lat. Mas ignotus. - Firenze".

Remarks. No figures or other description are available.

C. (Gamasellus).....

C. (Gamasellus) curvicrinus Berlese

1911. Gamasellus curvicrinus, Berlese, A., Redia 7: 433.

Berlese's very brief description is as follows:

"Pallide carneus, elongate rectangulus, postice recte truncatus (margine postico tenuiter denticulato-serrulato), ad angulos posticos laterales utrinque setis duabus (mediis deorsus, externis antrosus incurvis), longis.

Ad 430 u long.; 200 u lat.

Habitat super Chrysomelam quandam, nostris. Epilachnis sat similem; 'Giava'. Collegit Cl. Jacobson."

Remarks. It is impossible to ascertain the taxonomic position of this species from this description. It was probably a nymphal specimen with divided dorsal shield which are sometimes found on insects. The nature of the dorsum probably resembles that of Cyrtolaelaps minor Willm.

C. (Gamasellus) spalacis Oudemans

(Syn. : Parasitus spinipes Oudemans 1902, non Koch 1841)

1902. Parasitus spinipes, Oudemans, A.C., Tijdschr. Ent. 45: 50.

1903 Parasitus spinipes, Oudemans, A.C., Tijdschr. Ned. Dierk. Ver. ser. 2, 8: 78.

1912. Gamasellus spalacis, Oudemans, A.C., Ber. Ned. Ent. Ver. 3: 261.

Oudemans (1902) described a male specimen which he then regarded as the male of Parasitus spinipes Koch. In 1912, however, he found that it was not the male of Koch's species and gave it the name Gamasellus spalacis. The ventri-anal shield is fused with the peritrenatal as well as the posterior dorsal shield. The specimen was found in the nest of Talpa europaea. Although it probably is a gamasellid.....

gamasellid, its habitat suggests that it may belong to Cyrtolaelaps sens. str.

G. (Gamasellus) mycophagus Cooreman

1942. Gamasellus mycophagus, Cooreman, J., Bull. Mus. Hist. nat. Belg. 18, 58: 11.

This species may be either a gamasellid or a digamasellid. Cooreman gave no figures. The specimens were collected from Xanthochrous hispidus, Genbloux, Belgium.

G. (Gamasellus) vulgaris Vitzthum

1920. Gamasellus vulgaris, Vitzthum, H., Arch. Natg. 84 A, 6: 9.

Only the deutonymph is known. The sternal shield bears five pairs of setae. According to Vitzthum (1920) the specialized seta on the palptarsus is two-pronged. The claws and pulvilli on all the legs are well developed. Terminally tarsus I bears a relatively long seta, which is situated on a tubercle. The vertical setae are short and spine-like. The setae on the legs are also spinous.

Habitat and locality. Collected from Stomoxys calcitrans, Musca domestica and from rotting leaves in Weimar and Sofia.

Remarks. This species closely resembles the members of the genus Saintdidieria except that the club-like setae on the coxae are absent here. Vitzthum may also have overlooked the third tine of the palptarsal seta. The adult would determine if this species should be referred to Saintdidieria, Digamasellus or remain in Gamasellus.

G. (Gamasellus).....

G. (Gamasellus) aeronauta Vitzthum

1920. Gamasellus aeronauta, Vitzthum, H., Arch. Natg.
84 A, 6: 12.

This species is also based on a deutonymph and, according to Vitzthum (1920), the palp has a two-pronged seta. The sterniti-metasterniti-genital shield bears five pairs of setae. The vertical setae are short and spine-like. The legs are similar to those of G. vulgaris.

Habitat. On Anthomyiidae and also collected from rotting leaves.

Remarks. Possibly Gamasellus, Digamasellus or Saintdidieria.

G. (Gamasellus) quadripilus Berlese

1920. Gamasellus quadripilus, Berlese, A., Redia 14: 159.

This species possess simple and complex setae and it has a large ventri-anal shield. No figures available. Dimensions of female: Lengtn, 430 u; breadth, 190 u.

Habitat. In humus, Italy.

G. (Gamasellus) montanus (Willmann)

- 1936b. Cyrtolaelaps montanus, Willmann, C., Zool. Anz.
113: 273.

1954. Gamasellus montanus, Franz, H., Spiegel Land Tierw.
1: 340.

Willmann (1936b) referred this species to the genus Cyrtolaelaps (sens. str.) on account of the fact that tarsus I has a very short pretarsus and the ambulacra lack pulvilli.

It is

It is, however, a typical gamasellid; as regards the ambu-
lacro, similar conditions obtain in G. tetrastigma Berl.
Judging from Willmann's description and figures this species
has the general appearance of G. falciger except for the
presence of only one pair of pre-endopodal shields and the
occurrence of seven pairs of setae (excluding the circum-
anals) on the ventri-anal shield; it is also probably close-
ly related to G. spiricornis. The tectum of the female
is basically similar to those of G. deepdalei and drakens-
bergi. The spermatophoral process of the male chelicera
is relatively long, approaching the Digamasellus-type.
The male ventri-anal shield is free and similar to that
of the female, as is the case in G. deepdalei, hluhlwei
alpinus Schweizer and nivalis Schweizer.

Dimensions: Female: Length, 660 u; breadth, 390 u.

Habitat and locality. Pastures and wheat fields in alpine
regions.

C. (Gamasellus) concinnus (Womersley), new comb.

1942. ?Digamasellus concinna, Womersley, H., Trans. roy.
Soc. S. Aust. 66: 159.

1956a. Digamasellus concinnus, Womersley, H., J. Linn.
Soc. Lond. Zool. 42: 537.

Described and figured by Womersley (1942).

Habitat and locality. In moss, South Australia.

C. (Gamasellus) punctatus (Womersley), new comb.

1942. ?Digamasellus punctatus, Womersley, H., Trans. roy.
Soc. S. Aust. 66: 160.

Described and figured by Womersley.

Locality.....

Locality. South Australia.

G. (Gamasellus) trågardi (Womersley), new comb.

1942. ?Digamasellus trågardi, Womersley, H., Trans. roy. Soc. S. Aust. 66: 161.

1956a. Digamasellus trågardi, Womersley, H., J. Linn. Soc. Lond. Zool. 42: 537.

Described and figured by Womersley (1942).

Habitat and locality. In moss, South Australia.

G. (Gamasellus) semipunctatus (Womersley), new comb.

1942. ?Digamasellus semipunctatus, Womersley, H., Trans. roy. Soc. S. Aust. 66: 163.

1956a. Digamasellus semipunctatus, Womersley, H., J. Linn. Soc. Lond. Zool. 42: 538.

Described and figured by Womersley (1942). According to his figure the marginal setae on the posterior part of the dorsum are situated on the integument. Other features are typical of Gamasellus.

Habitat and locality. In moss, South Australia.

G. (Gamasellus) tasmanicus (Womersley), new comb.

1956a. Digamasellus tasmanicus, Womersley, H., J. Linn. Soc. Lond. Zool. 42: 538.

Described and figured by Womersley.

Habitat and locality. In moss, Tasmania.

G. (Gamasellus) jeanneli Andre

1947.....

1947. Gamasellus jeanneli, Andre, M., Mem. Mus. Paris.
n.s. 20: 70.

The female has one pair of pre-endopodal shields. The ventri-anal shield is longer than broad and is provided with six pairs of pre-anal setae. The para-anal setae are situated in line with the anterior margin of the anus. The ventri-anal shield in the male is not fused with the sterniti-genital shield. The specialized seta on the palptarsus is three-pronged.

Habitat and locality. An intertidal species found on the Kerguelen Islands.

G. (Gamasellus) nivalis Schweizer

1949. Gamasellus nivalis, Schweizer, J., Res. Rech. Scient. Parc. Nat. Suisse N.F. 2, 21: 34.

According to Schweizer (1949) this species is near G. spiricornis. The male and female chelicerae and leg II are very similar to those figured by Willmann for montanus. It has three pairs of pre-endopodal shields. The sterniti-genital shield is free. The chaetotaxy in both the female and male is near G. alpinus Schweizer and G. shongwenii. Dimensions of female: Length, 540 u; breadth, 270-320 u.

Habitat and locality. In moss and lichen plants, Switzerland.

G. (Gamasellus) alpinus Schweizer

1949. Gamasellus falciger var. alpinus, Schweizer, J., Res. Rech. Scient. Parc. Nat. Suisse N.F. 2, 21: 34.

Schweizer.....

Schweizer (1949) only found the male of this species and regards it as a subspecies of falciger. As the male of the latter is provided with a holioventral shield, Schweizer's subspecies should be elevated to species rank. It is closely related to G. montanus, nivalis and probably spinicornis as regards the dorsal chaetotaxy and the male spermatophoral process. Two pairs of pre-endopodal shields are present.

Dimensions: Length, 700 u; breadth, 350 u.

Habitat and locality. In moss, alpine region.

Subgenus Digamasellus Berlese, 1905.

1905c. Digamasellus, Berlese, A., Redia 2: 234.

1915. Dendrolaelaps, Halbert, J.N., Proc. roy. Irish Acad. 34: 68.

Berlese (1905c) proposed the subgenus Digamasellus as a subgenus of the genus Gamasellus and designated Digamasellus perpusillus as its type. Leitner (1949) revised the genus Digamasellus and she came to the conclusion that Dendrolaelaps Halbert is a synonym of the former. She enumerated the following characteristics for the genus: Specialized seta on the palptarsus two-pronged; anterior dorsal shield with 21 pairs of setae and the posterior shield with 15 pairs; sternal setae I always in front of the sternal shield; genital setae in the male situated on small platelets flanking the posterior end of the sterniti-metasternal shield; posterior portion of venter with eight pairs of setae in addition to the post anal setae; jugularia absent; ventri-anal shield of male fused with the dorsal shield.....

- . Ventri-anal shield with 11 setae.....5
- 4. Tectum with two spines; posterior dorsal shield without very long setae postero-laterally.....
..... D. transvaalensis, n.sp.
- . Tectum with three spines anteriorly and another pair of denticles laterally; posterior dorsal shield with two pairs of long setae postero-laterally...D. proteae, n.sp.
- 5. Ventri-anal shield ~~longer~~ longer than broad; anterior margin of posterior dorsal shield with incisions.....
..... D. capensis Berlese
- . Ventri-anal shield approximately as long as broad; anterior margin of posterior dorsal shield without incisions..... D. badenhorsti, n.sp.

C. (Digamasellus) perpusillus Berlese

- 1905c. Gamasellus (Digamasellus) perpusillus, Berlese, A., Redia 2: 234.
- 1910a. Gamasellus (Digamasellus) perpusillus, Berlese, A., Redia 6: 199.
- 1949. Digamasellus perpusillus, Leitner, E., Zbl. Ges. Geb. Ent. Lienz 3: 57.
- 1954. Digamasellus perpusillus, Franz, H., Spiegel Iand Tierw. 1: 341.

This species, on which Berlese based the subgenus Digamasellus, was figured by him (1910a) as well as by Leitner (1949). It is the only species of those described or redescribed by Leitner in which the integument between the ventri-anal and genital shields is not provided with setae. The ventri-anal shield has seven pairs of setae in addition to the.....

to the post-anal seta. The anal aperture is large, the epistome (tectum) has three spines and the spermatophoral process of the male is short.

Habitat and locality. Manure, rotting wood etc., Europe.

C. (Digamasellus) validulus Berlese

1921. Gamasellus (Digamasellus) validulus, Berlese, A.,
Redia 14: 163.
1941. ?Gamasellus (di) validulus, Lombardini, G., Miss.
Biol. Sag. Omo (R. Accad.) 12 Zool. 6: 183.

The body is twice as long as broad. The legs are short and legs IV are thicker than legs II. The posterior margin of the body bears two pairs of relatively long setae (fig. 130). The anterior dorsal shield has four elongated chitinous pore-like structures. The sternal shield reaches posteriorly to the hind margin of coxa III (fig. 131). Sternal setae III are placed near the middle line. The genital shield is narrow between coxae IV, expanding behind them. The ventri-anal shield is as broad as long. As in the type species the anterior setae of the posterior portion of the venter are situated on the ventri-anal shield, the latter bearing seven pairs of setae in addition to the post-anal seta. The peritreme is short and reaches to a position in line with the middle of coxa III.

Habitat and locality. In forest, Italian Somaliland.

C. (Digamasellus) presepum Berlese

1918. Gamasellus (Digamasellus) presepum, Berlese, A.,
Pedia 13: 136.
1949. Digamasellus presepum. Leitner, E., Zbl. Ges. Geb.

Ent.....

Ent. Meus 111: 57.

1954a. Digamasellus presepum, Hirschmann, W., Mikrokosmos
43: 107.

1954. Digamasellus presepum, Franz, H., Spiegel Land
Tierw. 1: 341.

The type specimen in the Berlese collection (figs. 132-134) agrees well with the figures of D. presepum given by Leitner (1949). The posterior dorsal shield carries three pairs of relatively long setae (only two pairs shown in fig. 132) and the anterior margin of the posterior dorsal shield has two incisions. Sternal setae I are situated anterior to the front margin of the sternal shield (fig. 133). The peritreme, situated in a peritrematal shield, is short and does not reach beyond coxa III. The integument between the ventri-anal and genital shields bears one pair of setae. The ventri-anal shield is provided with four pairs of setae in addition to the three circum-anal setae. The ventro-lateral interscutal membrane bears three pairs of setae. The metapodal shields are narrow and elongated. The genital orifice of the male is situated in front of the sternal shield and is flanked by sternal setae I (fig. 134). The spermatophoral process of the chelicera is relatively long.

Habitat and locality. In manure, stable hay and other decaying organic matter, Europe.

C. (Digamasellus) bicolor Berlese

Sternal setae I are situated on the sternal shield but the metasternal setae are placed on small metasternal shields (fig. 135). The ventri-anal shield is rounded

both.....

both anteriorly and posteriorly. The integument between its front margin and the genital shield bears three pairs of setae. The metapodal shields are oval-shaped. The peritreme is relatively long. The dorsal shields (fig. 136) are provided with short setae of which the posterior longer setae are still much shorter than those of D. bisetus Berl.

Habitat and locality. In humus, Florence, Italy.

G. (Digamasellus) bisetus (Berlese)

1891. Zenoon bisetus, Berlese, A., Acar. Myr. Scorp. 58: 7.
 1892. Cyrtolaelaps captator, Berlese, A., Acar. Myr. Scorp. 68: 8.
 1902. Cyrtolaelaps bisetus, Oudemans, A.C., Tijdschr. Ent. 45: 29.
 1922. Gamasellus captator, Schweiner, J., Verh. Naturf. Ges. Basel 33: 34.

The female specimen in the Berlese collection is damaged. The sternal shield is provided with four pairs of spine-like setae (fig. 137). The postero-lateral margin of the posterior dorsal shield bears two pairs of relatively long and conspicuous setae (fig. 138). The tectum has two sharp-pointed mucros (fig. 139). The male is provided with a large ventri-anal shield. Each chelicera is dentate and the movable digit bears a long, slender spermatophoral process (fig. 140). The femur of leg II has a strong spur (fig. 141) and the genu of leg IV bears a spine as illustrated in fig. 142. This species is also figured by Berlese (1891 and 1892).

Habitat and locality. In litter, Europe.

G. (Digamasellus).....

C. (Digamasellus) capensis Berlese

1920. Gamasellus (Digamasellus) capensis, Berlese, A.,

Redia 14: 159.

Berlese (1920) briefly described this species from humus in the Cape Province. Judging from his description the species in hand may well be conspecific with capensis.

Female:-

Dimensions: Length, 430 u; breadth 220 u (Berlese's specimens).

Length, 430-480 u; breadth, 220-275 u
(Present specimens).

Dorsum (fig. 143). The anterior dorsal shield bears 21 pairs of simple setae. As in some other Cyrtolaelaps (sens. lat.) species this shield is provided with four chitinous pore-like structures. The lateral interscutal membrane of the dorsum is provided with two pairs of setae. Setae I4 are slightly longer than the other setae of the dorsal series. The anterior margin of the posterior dorsal shield has two small incisions in front of setae I1.

Venter (fig. 144). The venter of the female shows similarity to that of D. bisetus. The sternal shield is provided with four pairs of setae and they are not as spinous as in bisetus. The posterior half of the venter closely resembles that of D. fallax Leitner. The reticulated rectangular ventri-anal shield is provided with four pairs of setae in addition to the circum-anal setae. The ventral interscutal membrane bears three pairs of setae, one pair of which is situated in front of the ventri-anal shield. The longish metapodal shields are shown in the figure. The peritreme, situated in a narrow peritrematal shield,

extends.....

extends rostrad to a position in line with the anterior margin of coxa II. The tritosternum has the normal two pilose laciniae.

Gnathopoda. All the setae on the hypostome are relatively short, the external posterior rostral setae being the smallest. The specialized seta on the palptarsus is two-pronged (fig. 145). The chelicerae are dentate and the tectum (fig. 146) has three spines.

Legs. All the legs are provided with well-developed claws and lobate pulvilli. The setae on the legs are simple.

Male:-

Dimensions: Length, 410 u; breadth, 230 u.

The ventri-anal shield, which is fused with the dorsal shield, is shaped as depicted in fig. 147. Its chaetotaxy is similar to that of the female. The sternal shield bears four pairs of setae and the genital setae are situated on three platelets. The dorsal shields of the male are basically the same as those of the female. The spermatophoral process of the movable digit of the chelicera is short and has approximately the same length as the digit (fig. 148). Leg II is armed with a spur (fig. 149). Other features resemble those of the female.

Habitat and locality. Berlese's specimens were collected from humus, Cape of Good Hope. Other specimens (those figured above) were found in a decaying straw heap, Aug. 1952, in a sheep's fold, July 1952 and in humus, Febr. 1953, Potchefstroom.

G. (Bigamasellus) proteae, n.sp.

Female.....

Femora:-

Dimensions: Length, 400 u; breadth, 200 u.

Dorsum (fig. 150). The anterior dorsal shield is provided with 22 pairs of setae. Marginal setae r6 and r7 are situated on a narrow strip of shield, separated from the main shield by a strip of integument (fig. 151). Seta r5 is placed near the peritreme which runs dorsally in its anterior half. The four semilunar pore-like structures are situated in line with setae z2. All the setae on the anterior dorsal shield are small. The posterior dorsal shield carries 17 pairs of setae while the lateral interscutal membrane bears one pair. As in many other species of the subgenus, the two pairs of setae on the posterolateral margin are much longer than the others. The anterior margin of the posterior shield has two characteristic incisions, the entrances of which are guarded by two small platelets (fig. 152).

Venter (fig. 153). Both the dorsum and the venter resemble those of D. foveolatus Leitner but the present species is larger and can also be separated from it by the characteristics shown in the figures. Sternal setae I are situated in front of the sternal shield, the latter bearing three pairs of setae. The ventri-anal shield bears three pairs of setae in addition to the anal setae. Two pairs of setae are situated on the integument anterior to this shield and the lateral membrane carries another two pairs. The metapodal shields are narrow and elongated. The peritreme is without a distinct peritrematal shield and anteriorly it reaches to a position in line with the hind margin of coxa I.

Gnathosoma. The hypostome, chelicerae and pedipalps are

normal.....

normal. The tectum has three slightly serrated spines anteriorly and a pair of denticles on its base (fig. 154).

Legs. The legs are normal and are provided with simple setae, claws and pulvilli.

Male:-

The male has approximately the same dimensions as the female. The genital orifice as well as sternal setae I are situated in front of this shield (fig. 155). The genital setae are placed on triangular shields. The anterior margin of the ventri-anal shield is basically similar to that of D. capensis. The chaetotactic pattern of this shield as well as that of the dorsum are the same as those of the female. The spermatophoral process (fig. 156) is longer and more slender than that of capensis and resembles the process of presepum.

Habitat and locality. Collected from a closed dry flower of Protea mellifera and associated with other mites and other small arthropods, Grabouw, January 1955.

C. (Digamasellus) badenhorsti, n.sp.

Female:-

Dimensions: Length, 364 u; breadth, 195 u.

Dorsum (fig. 157). The anterior dorsal shield bears 20 pairs of setae. Seta r5 is separated from the other marginal setae by a strip of integument. The majority of the setae on the dorsum are relatively long. The anterior margin of the posterior dorsal shield is without incisions. Only the posterior portion of this shield is reticulated.

Venter (fig. 158). The sternal shield bears four pairs

of setae.....

of setae, its front margin being similar to those of D. perpusillus, presepum, fallax, multidentatus Leitner and other species. The portion of the shield on which setae I are placed is weakly sclerotized. As in D. arvicolus Leitner, frenzelii Willm. and the species described by Sheals (1956) the ventri-anal shield bears five pairs of setae in addition to the circum-anals. The integument anterior to the shield is provided with one pair of setae; the lateral membrane also bears a pair. The shape of the metapodal shields is shown in the figure. The peritreme reaches anteriorly to the front margin of coxa II; it is situated in a narrow peritrematal shield.

The other features of the female are normal for the subgenus. The trispincous tectum is depicted in fig. 159.

Habitat and locality. Holotype female collected by Mr. J. Badenhorst from manure on his farm near Viljoenskroon, O.F.S., March 1958.

C. (Digamasellus) seminudus, n.sp.

Female:-

Dimensions: Length, 300 u; breadth, 150 u.

Dorsum (fig. 160). The dorsum is characterized by the fact that the dorsal shields do not cover the lateral parts of the body. The anterior dorsal shield is provided with 16 setae. The majority of its marginal setae (r2-r7) are situated on the integument. As shown in the figure the marginal setae of the posterior dorsal shield are also placed on the membrane. One pair of setae at the posterior end of the dorsum is considerably longer than the others. The anterior margin of the posterior dorsal shield has no incisions.

Venter.....

Venter (fig. 161). The posterior portion of the venter is provided with 10 pairs of setae in addition to the anal setae. Of these six pairs are placed on the interscutal membrane. The post-anal seta is much longer than the para-anals. The ventri-anal shield is oval-shaped and has an undulating, almost serrate, anterior margin similar to that of the posterior margin of the body. The sternal setae bears three pairs of setae; the metasternal setae are situated on the integument.

Gnathosoma and legs. The tectum has three relatively short spines (fig. 162). Other features are normal.

Habitat and locality. Holotype and paratype female from sheep's fold, Potchefstroom, August 1952.

C. (Digamasellus) transvaalensis, n.sp.

Female:-

Dimensions: Length, 310-330 u; breadth, 152-165 u.

Dorsum (fig. 163). The chaetotaxy of the dorsum closely resembles that of U. seminudus except that only four pairs of the marginal setae on the anterior portion of the body are on the integument. The majority of the setae are short, those at the posterior margin of the dorsum being slightly longer. The anterior margin of the posterior dorsal shield has two incisions.

Venter (fig. 164). The sternal shield bears four pairs of setae and the ventri-anal shield three pairs excluding the circum-anal setae. Four other pairs of setae are situated on the ventral interscutal membrane. The para-anal setae are placed in line with the anterior margin of the anus. The metapodal shields have a characteristic shape

in this.....

in this species (fig. 164). The peritreme is situated in a narrow peritrematal shield and it extends anteriorly to a position in line with the posterior margin of coxa I.

Gnathosoma and legs. The gnathosoma is normal; the tectum has two spines (fig. 165). All the legs bear well-developed claws and lobate pulvilli. The claw and bilobed pulvillus of leg I is shown in fig. 166.

Habitat and locality. Holotype and paratype females from damp soil, Boskop; paratype females from Potchefstroom; the specimens from Boskop were recovered during June 1958 and those from Potchefstroom were found on several occasions. Apparently a common species in the Transvaal.

C. (Digamasellus) macfarlanei, n.sp.

This species shows a superficial resemblance to the tenuipalpid plant parasitic mites of the genus Dolichotetranychus. It closely resembles Digamasellus cornutus (Kramer), D. septentrionalis Sellnick and D. acornutus Hirschman.

Female:..

Dimensions: Length, 427 u; breadth, 190 u.

Dorsum (fig. 167). The anterior dorsal shield bears 21 pairs of setae in addition to an unpaired seta antero-medially which probably represents the vertical setae. All the setae on this shield are short. The four chitinous pore-like structures are present. The posterior dorsal shield has two relatively long and two moderately long setae at its postero-lateral margin. Its anterior margin has two small incisures.

Venter (fig. 168). The ventri-anal shield is of unusual

shape.....

shape. The anal portion is roundish and the anterior portion is narrow. It only bears two pairs of setae in addition to the anal setae. The para-anal setae are relatively long and the post-anal seta is short. The ventral interscutal membrane is provided with five pairs of setae. The very narrow metapodal shields are conspicuous, due to their length. The sternal shield bears four pairs of setae. The peritreme is situated in an inconspicuous peritrematal shield and it terminates anteriorly in the region of coxa I (fig. 167).

Gnathosoma and legs. The gnathosoma is normal. The tectum has two relatively broad spines (fig. 169). The legs are all provided with claws and pulvilli. Leg I has a very short praetarsus and the claws are almost sessile.

Heteromorphous male:-

Dimensions: Length, 485 u; breadth, 205 u.

This male is larger than the female and is heavily armed with spurs and spines. The ventri-anal shield is shaped as shown in fig. 170; it bears eight pairs of setae in addition to the post-anal seta. The sterniti-genital shield has five pairs of setae; the genital setae are not situated on free platelets.

The chaetotaxy of the anterior dorsal shield is essentially the same as that of the female; it bears 22 pairs of setae, the vertical setae being normal. As in D. cornutus, septentrionalis and acornutus the posterior dorsal shield strikingly differs from that of the female by the presence of a pair of strong sharp-pointed chitinous processes, each bearing a small medially-directed seta near its tip (fig. 171). These conspicuous structures

replace.....

replace one of the ordinary pairs of setae being present in the female.

In two respects the gnathosoma of the male differs from that of the female. The corniculi are much broader and have irregular margins; they appear to be folded and membranous. The fixed digit of the chelicera has one strong tooth; the spermatophoral process of the movable digit is long, slender and coiled (fig. 172). Leg II is heavily armed (fig. 173). The femur is provided with a large spur and the genu and tibia each bears a small spur. Tarsus II has two sharp-pointed spurs, one of which is situated terminally.

Remarks. This species can be distinguished from D. septentrionalis by the length of the para-anal setae, the shape of the tectum, the chaetotaxy of the dorsum and by the nature of the posterior portion of the sterniti-genital shield and the anterior part of the ventri-anal shield in the male. D. acornutus is a much larger species than macfarlanei. The shape of the ventri-anal shield also differs from that of D. cornutus; in the latter species both pairs of postero-lateral dorsal setae are long.

Habitation and locality. Holotype female and allotype male collected from Roudsea oak, England, 1957. This species was referred to the present author by Mr. D. Macfarlane of the Commonwealth Institute of Entomology, London, in whose honour this species is named.

G. (Digamasellus) reticulatus Berlese, non
Sheals 1956.

1920. Gamasellus (Digamasellus) reticulatus, Berlese, A.,
Redia 14: 161.

This.....

This species is based on a deutonymph. The dorsal shields are reticulated and sculptured. The tectum has a single micro.

Dimensions: Length, 300 u; breadth, 200 u.

Habitat and locality. Associated with Geotrupis stereocarius and Gymnopleuris pillularius, Italy.

Remarks. No figures of this species are available. The nature of the dorsal shields and the tectum suggest that it may belong to Gamasellus or Saintdidieria.

G. (Digamasellus) cornutus (Kramer), new comb.

1896. Sejus cornutus, Kramer, P., Arch. Naturgesch. 52:257.

1892a. Cyrtolaelaps cornutus, Berlese, A., Acar. Myr. Scorp. Mesostigmata: 60.

1913. Dendrolaelaps bicornis, Hull, J.E., Trans. nat. Hist. Soc. North. 5: 57.

1923. Dendrolaelaps cornutus, Halbert, J.N., J. Linn. Soc. Lond. 35: 366.

1926c. Dendrolaelaps cornutus, Vitzthum, H., Zool. Jhrb. (Syst.) 52: 411.

1953. Dendrolaelaps cornutus, Turk, F.A., Ann. Mag. nat. Hist. 12, 6: 11.

This species was described in detail by Vitzthum (1926c). As in D. septentrionalis, macfarlanei and acornutus it has heteromorphous and homoiomorphous males.

Habitat and locality. In decaying wood, under bark of trees etc. in Europe.

G. (Digamasellus) inermis (Halbert), new comb.

1920. Gamasellus inermis, Halbert, J.N., Proc. roy. Irish Acad.

Acad. 35: 117.

This intertidal species is a digamasellid which Halbert (1920) collected "in fissures and between flakes on the seashore", Ireland. This author also figures the species.

C. (Digamasellus) oudemansi, (Halbert), new comb.

1915. Dendrolaelaps oudemansi, Halbert, J.N., Proc. roy. Irish Acad. 31: 68.
- 1918a. Dendrolaelaps oudemansi, Hull, J.E., Trans. nat. Hist. Soc. North. 5: 57.
- 1926c. Dendrolaelaps oudemansi, Vitzthum, H., Zool. Jhrb. (Syst.) 52: 424.

Halbert based his genus Dendrolaelaps, in which the ventri-anal shield of the male is fused with the dorsal shield, on this species. Leitner (1949), however, pointed out that this condition also obtains in certain Digamasellus species; she therefore suggested that the former should be regarded as a synonym of the latter.

Habitat and locality. Under bark of trees, Europe.

C. (Digamasellus) quadrisetus Berlese

1920. Gamasellus (Digamasellus) quadrisetus, Berlese, A., Redia 14: 159.
1923. Gamasellus (Digamasellus) quadrisetus, Vitzthum, H., Arch. Naturgesch. 89 A, 2: 115.
- 1926e. Dendrolaelaps quadrisetus, Vitzthum, H., Zool. Jhrb. (Syst.) 52: 425.
1949. Digamasellus quadrisetus, Schweizer, J., Res. Rech. Scient. Parc Nat. Suisse N.F. 2, 21: 33.

1954.....

1954. Digamasellus quadrisetus, Franz, H., Spiegel Land Tierw. 1: 341.
1955. Digamasellus quadrisetus, Hirschmann, W. & Rühm, W., Mikrokosmos 44, 10: 234.

Dimensions: Length, 430 u; breadth, 210 u.

Berlese (1920) based this species on a deutonymph found on decaying bark of pines on the soil. The tectum has three spines. The stigma is situated in line with coxa IV. Vitzthum (1923) gave a full description of the deutonymph and in 1926a also described and figured the female and male. Hirschmann & Rühm (1955) described the species as a "domestic animal" of printers.

Habitat and locality. Collected from the bark of trees; associated with Ips laricus, I. curvicaudus, Hylastes palliatus, H. cunicularius, Picea excelsa and Abies alba; in Europe.

C. (Digamasellus) cylindricus Berlese

1918. Gamasellus (Digamasellus) cylindricus, Berlese, A., Redia 13: 135.

The female has "ad angulos posticos utrinque seta una, latitudinem dimidiam fere corporis longitudine aequanti". The epistome is provided with three spines. The ventrianal shield is "plus duplo longius quam latius, subrectangulum".

Dimensions: Length, 515 u; breadth, 220; length of ventrianal shield, 170 u; breadth, 58 u.

No figures of this species are available.

Habitat and locality. In humus, Columbia, North America.

C. (Digamasellus).....

G. (Digamasellus) gracilis Berlese

1920. Gamasellus (Digamasellus) gracilis, Berlese, A.,
Redia 14: 159.

Dimensions: Length, 340 u; breadth, 150 u (female).
No figures are available.
Habitat and locality. In decaying leaves, Italy.

G. (Digamasellus) debilipes Berlese

1920. Gamasellus (Digamasellus) debilipes, Berlese, A.,
Redia 14: 160.

Dimensions of female: Length, 330 u; breadth, 190 u.
No figures available.
Habitat and locality. In humus, Columbia, North America.

G. (Digamasellus) innumerus Berlese

1920. Gamasellus (Digamasellus) innumerus, Berlese, A.,
Redia 14: 161.

This species is known only from the deutonymph which was found associated with beetles. The posterior margin of the body is finely crenulate. The setae on the dorsum are short but two are slightly longer than the others. The anal shield is small, almost trapezoidal, rounded anteriorly; posteriorly it is fused with the dorsal shield. All the dorsal and ventral shields are smooth and shiny. The tectum has three relatively long and sharp spines. The sternal shield is long and flask-shaped and extends beyond the anterior margin of coxae IV.

Dimensions: Length, 310 u; breadth, 140 u.
No figures available.

Habitat.....

Habitat and locality. On wings of Copris molossus, Java and on Copris hamadryas, Cape of Good Hope.

Remarks. This species may well belong to Gamasellus or Saintdidieria.

C. (Digamasellus) quadricrinus Berlese

1920. Gamasellus (Digamasellus) quadricrinus, Berlese, A.,
Redia 14: 162.

Dimensions of female: Length, 460 u; breadth, 250 u;
length of ventri-anal shield, 170 u; breadth, 140 u.

Habitat and locality. In humus, Lake City, Florida.
No figures available.

C. (Digamasellus) rhodacaroides Berlese

1920. Gamasellus (Digamasellus) rhodacaroides, Berlese, A.,
Redia 14: 162.

Berlese (1920) compared this species with Rhodacarus coronatus.

Dimensions of female: Length, 300 u; breadth, 140 u.

According to Dr. G.O. Evans (personal communication) this species is superficially like Rhodacarus in outline of the body. Tarsus I is provided with an ambulacrum as in Rhodacarellus but the specialized setae on the palptarsus is two-pronged. One or both digits of the chelicerae are multidentate. The anterior margin of the ventri-anal shield is rounded. The peritreme is only visible to the anterior margin of coxa III. Unfortunately the type specimen in the Berlese collection was not sufficiently clear
to figure.....

to figure it.

Habitat and locality. In decaying organic matter, Italy.

C. (Digamasellus) simplex Berlese

1920. Gamasellus (Digamasellus) simplex, Berlese, A.,
Redia 14: 163.

Berlese's (1920) description of this species is inadequate. Its genital shield is produced behind coxae IV and only an anal shield is present. If, however, it is compared with D. adelaideae (Womersley) this species may be a true digamasellid.

Habitat and locality. In humus, Italy.

C. (Digamasellus) viator (Vitzthum)

1921. Gamasellus viator, Vitzthum, H., Arch. Natg. 87 A,
4: 7.

1923. Gamasellus (Digamasellus) viator, Vitzthum, H.,
Arch. Natg. 89 A, 2: 117.

Only the deutonymph is known. The sternal shield bears four pairs of setae, the genital setae being placed on the integument. The palptarsal seta is two-pronged. Legs II are stout. The posterior dorsal shield has a pair of long incurving setae. Vitzthum (1921) could not discern the shape of the tectum.

Habitat and locality. On Bombus sp., Germany and associated with Hylesinus fraxini, Austria.

C. (Digamasellus) gradatus Willmann

1938b. Digamasellus gradatus, Willmann, C., Ann. Mus. nat,
Hung.....

Hung. 31: 159.

Only the male of this species is known. Willmann (1938b) gives a brief description and figures only the dorsum, leg II, tectum and chelicera. The species cannot, with certainty, be referred to the correct subgenus or genus. According to Willmann the setae on the posterior dorsal shield are much shorter than those on the anterior one. It may belong to Gamasellus.

Dimensions: Length, 750 u; breadth, 450 u.

Locality. Kümbschaya. Krenitzer Stoss.

G. (Digamasellus) americanus (Garman), new comb.

1948. Gamasellus americanus, Garman, P., Bull. Conn.

Agric. Exp. Sta. 520: 9.

This is a typical digamasellid with a two-pronged specialized seta on the palptarsus.

Dimensions: Length, 350-390 u; breadth, 150-180 u.

Habitat and locality. On apple bark, U.S.A.

G. (Digamasellus) arcuatus Willmann

1939. Digamasellus arcuatus, Willmann, C., Beitr. Biol.

Glatzer Schn. 5: 456.

This species is based on a male. Judging from Willmann's figures and brief description it may be a digamasellid or a species of Gamasellus. The epistome is rounded anteriorly and the spermatophoral process is relatively long.

Habitat and locality. In soil, Spiegltizer Seefelder.

G. (Digamasellus)....

C. (digamasellus) cultriger Lombardini

1940. Gamasellus (Di) cultriger, Lombardini, G., Boll.

Soc. ent. Ital. 72, 1: 13.

The correct taxonomic position of this species, based on a nymph, cannot be determined from Lombardini's brief description and probably schematic sketch of the dorsum. The sternal shield has five pairs of setae.

Habitat and locality. Under elytra of a passalid beetle, Brazil.

C. (Digamasellus) claviger Lombardini

1941. Gamasellus (di) claviger, Lombardini, G., Miss.

Biol. Sag. Omo (R. Accad.) 12, Zool. 6: 183.

This species is based on a nymph. The capitular setae on the hypostome are transformed into club-like processes. The dorsal shields are reticulated as in D. reticulatus Berl. The sternal shield carries five pairs of setae. The description and figures are inadequate for determination. It may belong to the genus Saintdidieria in which these club-like setae also occurs.

Habitat and locality. On Onitis alexis, Abyssinia.

C. (Digamasellus) armatus (Berlese)

1904. Cyrtolaelaps (Gamasellus) armatus, Berlese, A.,

Redia 1: 279.

1954. Digamasellus armatus, Hirschmann, W., Mikrokosmos

43: 246.

1954. Digamasellus armatus, Franz, H., Spiegel Land Tierw.

1: 341.

C. (Digamasellus).....

C. (Digamasellus) laticox Leitner

1949. Digamasellus laticox, Leitner, E., Zbl. Ges. Geb.
Ent. Wien 3: 59.
1954. Digamasellus laticox, Franz, H., Spiegel Land Tierw.
1: 341.

Dimensions of female: Length, 390 u; breadth, 182 u.

Habitat and locality. Manure in soil, Austria.

C. (Digamasellus) circuliiformis Leitner

1949. Digamasellus circuliiformis, Leitner, E., Zbl. Ges.
Geb. Ent. Wien 3: 59.
1954. Digamasellus circuliiformis, Franz, H., Spiegel Land
Tierw. 1: 340.

Dimensions of female: Length, 551 u; breadth, 169 u.

Habitat and locality. Manure in soil, Austria.

C. (Digamasellus) foveolatus Leitner

1949. Digamasellus foveolatus (sic), Leitner, E., Zbl.
Ges. Geb. Ent. Wien 3: 59.
1954. Digamasellus foveolatus, Franz, H., Spiegel Land
Tierw. 1: 340.
1956a. Digamasellus foveolatus, Hyatt K.H., Entom. month.
Mag. 92: 36.

Dimensions of female: Length, 325 u; breadth, 169 u.

Habitat and locality. In soil, Austria; in stable manure,
England.

C. (Digamasellus) fallax Leitner

1949.....

1949. Digamasellus fallax, Leitner, E., Zbl. Ges. Geb.
Ent. Lienz 3: 60.
- 1954a. Digamasellus fallax, Hirschmann, W., Mikrokosmos
43: 106.
1954. Digamasellus fallax, Franz, H., Spiegel Land Tierw.
1: 341.

Dimensions of female: Length, 468 u; breadth, 260 u.

Habitat and locality. Manure heap, Austria.

C. (Digamasellus) arvicolus Leitner

1949. Digamasellus arvicolus, Leitner, E., Zbl. Ges. Geb.
Ent. Lienz 3: 61.
1954. Digamasellus arvicolus, Franz, H., Spiegel Land
Tierw. 1: 341.

Dimensions of female: Length, 455-468 u; breadth,
221-247 u.

Habitat and locality. In soil, Austria.

C. (Digamasellus) longiusculus Leitner

1949. Digamasellus longiusculus, Leitner, E., Zbl. Ges.
Geb. Ent. Lienz 3: 61.
1954. Digamasellus longiusculus, Franz, H., Spiegel
Land Tierw. 1: 342.
- 1956a. Digamasellus longiusculus, Hyatt, K.H., Entom.
month. Mag. 92: 36.

Dimensions of the female: Length, 416-455 u; breadth,
221 u.

Habitat and locality. Manure heap, Austria; also collected
from manure in England.

C. (Digamasellus).....

C. (Digamasellus) frenzeli Willmann

- 1936b. Digamasellus frenzeli, Willmann, C., Zool. Anz.
113: 277.
1949. Digamasellus frenzeli, Leitner, E., Zbl. Ges. Geb.
Ent. Lienz 3: 55, 59.
- 1952b. Digamasellus frenzeli, Willmann, C., Veröff. Inst.
Meeresforsch. Bremerh. 1: 142.

Dimensions of female: Length, 400 u; breadth, 200 u.

Habitat and locality. Pasture fields, Germany and Austria.

C. (Digamasellus) angulosus Willmann

- 1936b. Digamasellus (?) angulosus, Willmann, C., Zool.
Anz. 113: 280.
1949. Digamasellus angulosus, Leitner, E., Zbl. Ges.
Geb. Ent. Lienz 3: 55, 59.
- 1952b. Digamasellus angulosus, Willmann, C., Veröff. Inst.
Meeresforsch. Bremerh. 1: 142.
1954. Digamasellus angulosus, Franz, H., Spiegel Land
Tierw. 1: 341.

Dimensions of female: Length, 360 u; breadth, 180 u.

Habitat and locality. Pasture fields, Germany and Austria.

C. (Digamasellus) muricatus (Fox), new comb.

1947. Asca muricata, Fox, I., Ann. ent. Soc. Amer. 40,
4: 600.

Fox (1947) referred this species to the genus Asca
and separated it from other members of the genus " by the
extreme reduction in size of the tubercles on the posterior
border.....

border of the notogaster" (p. 600). Judging from his description and the figure of the dorsum the present author is of the opinion that this species should be placed in the subgenus Digamasellus.

Habitat and locality. On Rattus norvegicus, Puerto Rico.

C. (Digamasellus) multidentatus Leitner

1949. Digamasellus multidentatus, Leitner, E., Zbl. Ges. Geb. Ent. Lienz 3: 62.

1954. Digamasellus multidentatus, Franz, H., Spiegel Land Tierw. 1: 341.

Dimensions of female: Length, 429 u; breadth, 234 u.

Habitat and locality. Manure heap, Austria.

C. (Digamasellus) brevipilis Leitner

1949. Digamasellus brevipilis, Leitner, E., Zbl. Ges. Geb. Ent. Lienz 3: 62.

1952b. Digamasellus brevipilis, Willmann, C., Veröff. Inst. Meeresforsch. Bremerh. 1: 143.

1954. Digamasellus brevipilis, Franz, F., Spiegel Land Tierw. 1: 340.

Dimensions of female: Length, 416 u; breadth, 182 u.

Habitat and locality. Nest of mole, Austria; pasture field Wangerooze.

C. (Digamasellus) crassitarsalis Willmann

1952b. Digamasellus crassitarsalis, Willmann, C., Veröff. Inst. Meeresforsch. Bremerh. 1: 142.

Dimensions.....

Dimensions of female: Length, 405 u - 435 u; breadth, 210-225 u.

Habitat and locality. On pastures, Wangerooge Island.

C. (Digamasellus) halophilus Willmann

1952b. Digamasellus halophilus, Willmann, C., Veröff.

Inst. Meeresforsch. Bremerh. 1: 143.

1954a. Digamasellus halophilus, Hirschmann, W., Mikrokosmos 43: 108.

1954. Digamasellus halophilus, Evans, G.O., Proc. zool. Soc. Lond. 123: 793.

Dimensions of female: Length, 510-570 u; breadth, 240-270 u.

Habitat and locality. Soil, Wangerooge and Holstein; soil, England.

C. (Digamasellus) adelaideae (Womersley), new comb.

1954. Dendrolaelaps adelaideae, Womersley, H., Rec. S.

Aust. Mus. 11, 2: 113.

Dimensions of female: 325 u (length); 182 u (breadth).

This species has a small ventri-anal shield bearing only the three circum-anal setae. It may be closely related to D. simplex Berl.

Habitat and locality. Found amongst the frass of bark-boring beetles of the genus Ips and its allies, Australia. Digamasellus quadrisetus Berl was also found associated with Ips spp.

C. (Digamasellus) concinnus (Womersley), new comb.

1954.....

1954. Dendrolaelaps concinna, Womersley, H., Rec. S. Aust.
Mus. 11, 2: 115.

Dimensions of female: Length of anterior dorsal shield,
195 u; posterior dorsal shield, 247 u.

Habitat and locality. Collected from frass under bark
infested with bark-boring beetles, Australia.

C. (Digamasellus) septentrionalis Sellnick

1958. Digamasellus septentrionalis, Sellnick, M., Swedish
State Plant Protection Inst. Contr. 11, 71: 19.

This species is closely related to D. macfarlanei,
cornutus and, according to Sellnick (1958), to D. acornutus
Hirschmann (a nom. nud.). It has heteromorphous and ho-
moiomorphous males. The heteromorphous males are provided
with a pair of chitinous processes on the posterior portion
of the dorsum.

Dimensions of female: Length, 465 u; breadth, 210 u.
Heteromorphous male: Length, 435 u; breadth, 255 u.
Homoiomorphous male: Length, 510 u; breadth, 255 u.

Habitat and locality. Stems, blades and ears of wheat and
grasses, North Sweden.

HOMONYM: C. (Digamasellus) reticulatus Sheals, non Ber-
lese 1920.

1956. Digamasellus reticulatus, Sheals, J.G., Entom.
month. Mag. 92: 101.

Dimensions of female: Length, 290-300 u; breadth,
160-165 u.

Habitat.....

Habitat and locality. In soil, Scotland.

Remarks. When it was noticed that the specific name reticulatus of Sheals is in reality a homonym and therefore unavailable under Articles 34 and 36 of the Rules of Nomenclature he was notified of this to give him opportunity to propose an alternative name. As far as could be determined Sheals has not, as yet, published a new name for his species.

NOMINA NUDA: The following species were described by Hirschmann(1951) in a dissertation which was not published. Several authors, however, referred to these species in their own publications. A few of the descriptions of these species given by the later authors may be adequate for purposes of the identification of Hirschmann's species. Hirschmann himself referred to his 1951 names in two papers published in 1954. The present author is of the opinion that the majority of his species names should be regarded as nomina nuda.

Digamasellus hexaspinosus

1954a. Digamasellus hexaspinosus, Hirschmann, W., Mikrokosmos 43: 107.

1954. Digamasellus hexaspinosus, Franz, H., Spiegel Land Tierw. 1: 341.

Digamasellus tetraspinosus

1954a. Digamasellus tetraspinosus, Hirschmann, W., Mikrokosmos 43: 107.

1954. Digamasellus tetraspinosus, Franz, H., Spiegel Land Tierw. 1: 341.

Digamasellus.....

Digamasellus disetus

- 1954a. Digamasellus disetus, Hirschmann, W., Mikrokosmos
43: 107.
- 1954b. Digamasellus disetus, Hirschmann, W., Mikrokosmos
43: 246.

Digamasellus cornutulus

1954. Digamasellus cornutulus, Franz, H., Spiegel Land
Tierw. 1: 340.

Digamasellus punctatus

1954. Digamasellus punctatus, Franz, H., Spiegel Land.
Tierw. 1: 341.

Digamasellus longus

- 1954b. Digamasellus longus, Hirschmann, W., Mikrokosmos
43: 246.

Digamasellus elaterophilus

- 1954b. Digamasellus elaterophilus, Hirschmann, W., Mikro-
kosmos 43: 246.

Digamasellus coleopterophilus

- 1954b. Digamasellus coleopterophilus, Hirschmann, W.,
Mikrokosmos 43: 246.

Digamasellus pini

1954b.....

- 1954b. Digamasellus pini, Hirschmann, W., Mikrokosmos
43: 246.

Digamasellus quadrisetosimilis

1955. Digamasellus quadrisetosimilis, Hirschmann, W. &
Rühm, W., Mikrokosmos 44: 236.

Digamasellus acornutus

1958. Digamasellus acornutus, Sellnick, M., Swedish State
Plant Protection Inst. Contr. 11, 71: 19.

Digamasellus foveolatosimilis

1958. Digamasellus foveolatosimilis, Sellnick, M., Swedish
State Plant Protection Inst. Contr. 11, 71: 22.

Sellnick (1958) figures only the dorsum of the nymph.

Digamasellus nidophilus

1958. Digamasellus nidophilus, Sellnick, M., Swedish
State Plant Protection Inst. Contr. 11, 71: 22.

Digamasellus punctatulus

1958. Digamasellus punctatulus, Sellnick, M., Swedish
State Plant Protection Inst. Contr. 11, 71: 22.

Digamasellus strenzkei

1958. Digamasellus strenzkei, Sellnick, M., Swedish
State Plant Protection Inst. Contr. 11, 71: 21.

Sellnick (1958) gives a short description and figures the
female.

Subgenus.....

Subgenus Gamaselliphis, n. subgen.

The subgenus Gamaselliphis is characterized by the following:

It is a strongly sclerotized species group. The anterior portion of the genital shield overlaps the posterior margin of the sternal shield. One pair of pre-endopodal shields is present. The ventri-anal shield is fused with the posterior dorsal shield. The peritrematal shield is broad, covering the lateral part of the venter, anterior to the ventri-anal shield. The venter of the male is similar to that of the female except for its sterniti-genital shield. The anterior dorsal shield in both sexes overlaps the anterior margin of the posterior dorsal shield.

Subgenotype:-- Cyrtolaelaps (Gamaselliphis) potchefstroomensis, n.sp.

Key to the South African species of Gamaselliphis

1. Leg I exceeding length of body.. G. grahamstowni, n.sp.
- . Leg I not exceeding length of body.....2
2. Majority of dorsal setae serrate or leaf-like.....3
- . Majority of dorsal setae not serrate or leaf-like....4
3. Setae on postero-lateral margin of dorsum conspicuously longer than others and with serrate distal parts and rounded tips; peritrematal shield and ventri-anal shield not separated by integument.. G. lawrencei, n.sp.
- . Setae on postero-lateral margin of dorsum more or less similar to other dorsal setae; peritrematal shield separated.....

separated from ventri-anal shield by a narrow strip
of integument..... G. potchefstroomensis, n.sp.

4. Marginal setae on dorsum broad and prominent; length
of body less than 400 u..... G. cathkini, n.sp.

5. Marginal setae simple; length of body exceeding
400 u..... G. montanellus, n.sp.

G. (Gamaselliphis) potchefstroomensis, n.sp.

Female:--

Dimensions: Length, 443 u; breadth, 318 u; length
of leg I (excluding pre-tarsus), 378 u.

Dorsum (fig. 174). The dorsal shields are imbricate and
reticulate. All the setae on both the dorsal shields are
serrate to leaf-like, the vertical setae being almost
tree-like. The anterior dorsal shield is provided with
22 pairs of setae and its hind margin overlaps the anterior
portion of the posterior dorsal shield. The latter is
fused with the ventri-anal shield and likewise bears 22
pairs of setae. Seta r7 is situated on a small platelet
which is also provided with a pore.

Venter (fig. 175). The sternal shield bears four pairs
of simple setae. Its concave hind margin is overlapped
by the genital shield. The pair of pre-endopodal shields
is slender and elongated. The tritosternum has the two
normal pilose laciniae. The lateral portion of the peri-
trematal shield is produced behind coxa I. The posterior
margin of this shield lies almost contiguous with the an-
tero-lateral margin of the ventri-anal shield which covers
the entire surface of the venter behind the genital shield.

The ventri-.....

The ventri-anal shield bears seven pairs of simple setae and one pair of serrate setae in addition to the anals; the para-anal setae are simple and the post-anal seta is serrate. The surface of the shield is ornamented by means of lines which form a reticulate pattern. The peritreme reaches anterior beyond coxa I.

Gnathosoma. The movable digit of the chelicera is tridentate and the fixed digit multidentate (fig. 176). The inner basal angle of the palptarsus is provided with a three-pronged specialized seta (fig. 177). The tectum (fig. 178) has a sharp-pointed macro flanked by two smaller processes.

Legs. Leg I is relatively long and is not used as a walking leg. Tarsus I is provided with four long sensory setae distally (fig. 179). It also bears a pretarsus, pulvillus and claws. The other legs are short and have well-developed claws and indistinct pulvilli. The setae on the legs are simple, those on leg IV being almost spatulate.

Male:-

Dimensions: Length, 426 u; breadth, 287 u

The dorsum of the male is similar in texture and chaetotaxy to that of the female. The venter (fig. 180) differs from that of the female only in respect of the sternal and genital shields which are replaced by a sterni-ti-genital shield. The degree of fusion between the ventral and dorsal shields are the same as in the female. Excepting the chelicerae, the gnathosoma possesses no noticeable specific characters in which it differs from that of the female. The unidentate movable digit of the chelicera is provided with a prominent spermatophoral process (fig. 181). The femur of leg II is armed with a

relatively.....

relatively prominent spur (fig. 180). The ambulacra are similar to those of the female.

Habitat and locality. Holotype female, allotype male and paratype females and males from humus, Potchefstroom, August 1952 and Jan. 1959.

C. (Gamaselliphis) montanellus, n.sp.

Female:--

Dimensions: Length, 504 u; breadth, 400 u; length of leg I, 390 u.

Dorsum (fig. 182). The majority of the setae on the dorsum are simple. The only exceptions are the serrate setae j1, z2 (slightly), r5 and Z5. The anterior dorsal shield bears 22 pairs of setae. The entire dorsum is reticulate to imbricate and highly sclerotized.

Venter (fig. 183). The pair of pre-endopodal shields tapers towards their lateral ends. The sternal shield is ornamented as illustrated in the figure. The front end of the genital shield overlaps the posterior margin of the sternal shield. The ventri-anal shield is fused with the posterior dorsal shield and bears eight pairs of pre-anal setae, all of which are simple. The peritrematal shield is broad and the peritreme reaches to a level anterior to coxa I.

Gnathosoma. The tectum (fig. 184) has a sharp-pointed micro flanked by two lateral projections. Both the fixed and movable digits of the chelicera (fig. 185) are tridentate. The palptarsus bears the usual three pronged specialized seta.

Legs.....

Legs. Leg I is basically similar to those of other species of the subgenus. All the legs are provided with claws and pulvilli (fig. 186).

Male:--

Dimensions: Length, 480 u; breadth, 356 u.

The dorsum of the male is essentially like that of the female. The venter is mainly covered by a sternitigenital shield, a peritrematal shield and a ventri-anal shield (fig. 187). The latter shield is fused with the dorsal shield and closely resembles that of the female. Both digits of the chelicera (fig. 187a) are practically unidentate, the movable digit bearing a relatively conspicuous spermatophoral process. Other features of the gnathosoma are similar to those of the female. Femur II is armed with a prominent spur.

Deutonymph

Dimensions: Length, 427 u; breadth, 280 u.

The anterior dorsal shield bears 20 pairs of setae, r1 and r6 being on the integument (fig. 188). The posterior dorsal shield carries 14 pairs of setae, two pairs of which are prominent and serrate distally. The anterior shield also bears two pairs of serrate setae (j1 and r5). The anal shield is relatively large and has a truncate anterior margin. The median mucro of the tectum of the deutonymph is flanked by two large sharp-pointed denticles.

Habitat and locality. Holotype female, allotype male, morphotype deutonymph and paratype female collected from forest floor, Cathkin Peak, Sept. 1953; collected by R.F. Lawrence.

G. (Gamaselliphis)....

C. (Gamaselliphis) grahamstowni, n.sp.

This species can readily be recognised by the antenniform leg I which exceeds the length of the body.

Female:-

Dimensions: Length, 560 u; breadth, 413 u; leg I, 608 u.

Dorsum (fig. 189). All the dorsal setae, except s1, are serrate. Four pairs of prominent setae on the posterior margin are serrate distally with rounded tips. Setae z1 are placed in line with the dorsal series. The distribution of the setae is shown in the figure.

Venter (fig. 190). The sternal, genital and pre-endopodal shields are normal for the subgenus. Excluding the anal setae the ventri-anal shield bears seven pairs of simple setae and one pair of serrate setae. The small simple para-anal setae are situated in line with the middle of the anus and the paddle-like post-anal seta is placed relatively far behind the aperture. The broad peritrematal shield is fused with the anterior dorsal shield and the ventri-anal shield is fused with the posterior dorsal shield (fig. 191). The peritreme stretches to a position in front of coxa I.

Gnathosoma. The hypostomal setae, corniculi and chelicerae are similar to those of other species of the subgenus.

The shape of the tectum is shown in fig. 192.

Legs. A striking character of this species is the length of legs I. Tarsus I (fig. 193) which is used as a tactile organ bears a small claw and four long sensory setae. The setae on the legs are simple, some approaching a spine-like condition and a few being serrate.

Male.....

Male:-

Dimensions: Length, 550 u; breadth, 378 u.

The dorsum is essentially like that of the female. The chaetotaxy of the ventri-anal shield is similar to that of the female (fig. 194). The sterniti-genital shield bears the usual number of setae. The movable digit of the chelicera bears a long spermatophoral process (fig. 195). Femur II is armed with a spur. Other features are as in the female.

Habitat and locality. Holotype female and allotype male from humus Grahamstown, Oct. 1943, collected by W.G. Rumpert; two paratype females and two males from soil, Bathurst Jan. 1956, collected by P. Graham.

G. (Gamaselliphis) cathkini, n.sp.

This is the smallest of the known species.

Female:-

Dimensions: Length, 318 u; breadth, 210 u.

Dorsum.(fig. 196). The dorsal setae are strongly developed (fig. 197) but no serrations could be detected except the tree-like vertical setae. The marginal setae are broad and hyaline-like. The only ordinary simple setae are z1 and z2. The chaetotactic pattern of the dorsum resembles that of G. montanellus.

Venter (fig. 198). The sternal shield bears the usual four pairs of setae and its hind margin is overlapped by the genital shield. The ventri-anal shield is provided with 19 setae including the three circum-anal setae. The two pairs of setae on the postero-lateral margin are relatively.....

tively strongly developed. The peritrematal shield and the peritreme are similar to those of other species.

Gnathosoma. The tectum has a median process with two denticles, which are strongly developed, at its base (fig. 199). The movable digit of the chelicera is tridentate and the fixed digit multidentate (fig. 200).

Legs. Leg I (fig. 201) bears a small claw, those on the other legs being larger. The setae on the legs are simple.

Habitat and locality. Holotype and paratype females from forest, Cathkin Peak, Sept. 1943; collected by R.F. Lawrence.

G. (Gamaselliphis) lawrencei, n.sp.

This species is quite distinct from other species in several respects and can easily be recognised. It is the largest of the known species.

Female:-

Dimensions: Length, 608 u; breadth, 470 u; leg I, 565 u.

Dorsum (fig. 202). The dorsum is strongly sclerotized and reticulate. All the dorsal setae, except Z4 on the posterior dorsal shield are serrate. The setae on the posterolateral margin are serrate distally with rounded tips. As in G. grahamstowni setae z1 are placed in line with the dorsal series. The posterior dorsal shield is fused with the ventri-anal and the anterior dorsal shield with the peritrematal shield (fig. 203).

Venter (fig. 204). The pre-endopodal shields are slender. The sternal shield is ornamented as shown in the figure.

The.....

The sternal shield tapers anteriorly and its apex is almost in line with sternal setae III. The posterior margin of the genital shield lies contiguous with the ventri-anal shield. The latter is provided with minute setae which are distributed as depicted in fig. 204. A striking feature of the anal region is the presence of a long serrate post-anal seta with a rounded tip. The peritrematal shield is fused with the ventri-anal shield, the line of fusion being visible. Other features of the venter are basically the same as those of other species.

Gnathosoma. The gnathosoma lacks any noticeable specific characters which distinguish this species from related forms. The only exception is the shape of the tectum (fig. 205), the median mucro of which has a broad base.

Legs. As in G. potchefstroomensis and G. grahamstowni the distal tip of tarsus I bears two pairs of long sensory setae. The pretarsus is short and it is provided with a small claw. The claws on legs II-IV are relatively well developed. The setae on the legs are simple or serrate.

Habitat and locality. Holotype female from High Flats, South Coast, Natal, Dec. 1943; collected by R.F. Lawrence.

Subgenus Euryparasitus Oudemans

1902. Euryparasitus, Oudemans, A.C., Tijdschr. Ent. 45:30.

The subgenus Euryparasitus, based on the only known species, E. emarginatus, is characterized by the following: The sternal shield bears four pairs of setae. In addition to the circum-anal setae, the ventri-anal shield is provided with nine pairs; the para-anal setae are placed be-

hind.....

hind the posterior margin of the anal aperture. The peritreme is relatively short and extends beyond the posterior margin of coxa II. One pair of pre-endopodal shields is present. The majority of the marginal setae on the dorsum are not situated on the shields. The tectum has a median macro. The specialized seta on the palptarsus has three prongs.

The species is usually associated with small mammals and specimens are frequently found in their nests. It is known from Europe.

Type: Gamasus emarginatus Koch

G. (Euryparasitus) emarginatus (C.L. Koch)

1839. Gamasus emarginatus, Koch, C.L., Deutschl. Crus.
Myr. Arach.
1886. Gamasus terribilis, Michael, A.D., J. Queck, Micr.
Club ser. 2, 15: 260.
1901. Cyrtolaelaps borealis, Trägårdh, I., Zool. Anz.
25: 61.
1902. Euryparasitus terribilis, Oudemans, A.C., Tijdschr.
Ent. 45: 30.
1903. Euryparasitus terribilis, Oudemans, A.C., Tijdschr.
Ned. Dierk. Ver. (2) 8 (2): 83.
1905. Euryparasitus terribilis, Voigts, H. & Oudemans, A.C.,
Abh. Natur. Ver. Bremen 18: 229.
1906. Gamasus (?) emarginatus, Berlese, A., Redia 3: 266.
- 1912b. Euryparasitus terribilis, Trägårdh, I., Arch. Zool.
exp. gen. (5) 8: 549.
1913. Euryparasitus terribilis, Oudemans, A.C., Ent. Ber.
4: 4.
- 1914b. Euryparasitus emarginatus, Oudemans, A.C., Arch.
Natg. 79, A, 8: 165.
- 1949.....

1949. Euryparasitus emarginatus, Bianchi, C. et al.,
Comment. pont. Acad. Scient. 13, 7: 504.
1952. Euryparasitus emarginatus, Bregetova, N., Aid Shelt.
14 Nauk. Akad. S.S.S.R.: 28.
- 1952a. Euryparasitus emarginatus, Willmann, C., Z. Parasit.
15: 401.
1954. Euryparasitus emarginatus, Franz, H., Spiegel Land
Tierw. 1: 340.

Oudemans (1902) states that Michael (1886) wrongly delineated the genital shield of the female which explains why Berlese referred it to the Parasitidae proper. He then proposed the new genus Euryparasitus to accommodate this species. Oudemans (1914b) noticed the resemblance between Koch's Gamasus emarginatus and Michael's G. terribilis and concluded that they are identical. He created the new combination Euryparasitus emarginatus. Owing to the fact that this species was always found associated with the nests of small mammals and Koch collected his specimens as free living forest soil inhabitants, Willmann (1952a) doubted the validity of this synonymy. Oudemans (1939) proposed the family Gamasolaelaptidae (= Metaparasitidae) to include the genera Gamasolaelaps Berl. (syn. Metaparasitus Oudms.), Euryparasitus Oudms., Digamasellus Berl., Gamasodes Oudms., Halolaelaps Berl. and Rhodacarellus Willm. Evans (1955) transferred the genus Euryparasitus to the family Rhodacaridae.

There are no characters of taxonomic value which merit a separate genus for this species and the present author therefore proposes transferring it to the genus Cyrtolaelaps sens. lat.

The characters of the species are the same as those mentioned under the subgenus.

Asca.....

Genus Asca von Heyden

1826. Asca, von Heyden, C.H.G., Vers. syst. Einth. in
Isis 19, 6: 610.
1913. Geratozercon, Berlese, A., Acarotheca Italica :204.

This genus may readily be recognised by the presence of a pair of conspicuous setae-bearing protuberances at the postero-lateral margin of the posterior dorsal shield. The majority of the marginal setae are not situated on the dorsal shields. The ventri-anal shield usually covers almost the entire surface of the posterior portion of the venter. One or two pairs of setae are placed on the integument between the anterior margin of this shield and the genital shield. The sternal shield bears three pairs of setae, the metasternal setae being placed on the integument or on lightly chitinized metasternal shields. Pre-endopodal or jugular shields are absent. The tectum usually has three anteriorly-directed spines. The specialized seta on the palptarsus is two-pronged. The legs are all provided with claws and pulvilli. Womersley (1956a) furnished a key to distinguish between five of the known species namely A. aphidioides (Linn.), A. nova Willm., A. major Wom., A. foliata Wom. and A. australica Wom.

Type: Acarus aphidioides Linnaeus

Asca aphidioides (Linn.)

1758. Acarus aphidioides, Linnaeus, C., Syst. Nat., Ed.
10, gen. 235: 616.
1805. Gamasus aphidioides, Fabricius, J.C., Syst. Antliat.:
361.
1826. Gamasus aphidioides, von Heyden, C.H.G., Vers.
syst.....

syt. Einth., in Isis 18, 6: 611.

For further details of this species up to 1850 the reader is referred to Oudemans' Kritisch Hist. Overz. Vol. I pp. 39-40, Vol. II pp. 118-120 and Vol IIIA pp. 366-367.

1887. Zercon bicornis, Berlese, A., Acar. Myr. Scorp. 41:8.

1913. Ceratozercon bicornis, Berlese, A., Acarotheca Italica: 204.

1923. Ceratozercon bicornis, Halbert, J.N., J. Linn. Soc. Lond. Zool. 35: 375.

1929. Asca aphidioides, Vitzthum. H., Tierw. Mitteleur. 3 (7): 30.

1948. Asca aphidioides, Schweizer, J., Res. Rech. scient. Parc Nat. Suisse N.F. 2, 20: 27.

1957. Asca aphidioides, Haarlov, N., Spol. zool. Mus. Haun. 17: 17.

According to Schweizer (1948) Asca aphidioides (Linn.) and A. bicornis (C. & F.) are two distinct species and can be separated by the presence of only one pilose seta on each of the dorsal "horns" in the former species. The majority of the dorsal setae in aphidioides are pilose. The sculpturing of the dorsal shields is a coarse mesh.

Dimensions of female: Length, 315 u; breadth, 207 u.

As regards the above-mentioned characteristics this species closely resembles the new species A. aethiopica.

Habitat and locality. In humus, moss, under bark of trees etc., Europe.

Asca aethiopica, n.sp.

As regards taxonomic characters this species resem-

bles.....

bles the type species, A. aphidioides, in that the tubercles on the posterior dorsal shield are each provided with one seta only. It is, however, a much smaller species than the type.

Females:-

Dimensions: Length, 276 u; breadth, 150 u.

Dorsum (fig. 206). The anterior dorsal shield is coarsely meshed and it bears 18 pairs of setae, all of which are serrate or pilose. As depicted in the figure this shield has a lateral incision on both sides. The four posterior marginal setae of the anterior half of the dorsum are situated on the integument. As is generally the case in the subgenus Gamasellus the anterior part of the dorsum bears 22 pairs of setae. The posterior dorsal shield is faintly reticulated and all the marginal setae are situated on the membrane; these setae are not serrate. All the setae on the shield are, to a greater or lesser degree, pilose. The only exception is the minute pair of postero-medial setae (J5). Each of the tubercles is provided with a prominent pilose seta.

Venter (fig. 207). The sternal shield bears three pairs of setae; its anterior border is not well defined but appears to reach as far as the base of the tritosternum. The metasternal setae are situated on the integument. The genital shield is provided with the usual pair of setae. The ventri-anal shield is almost twice as broad as long and entirely covers the posterior third of the venter. It bears 15 setae, the two postero-laterally situated pairs being much stronger developed than the others. The post-anal seta is well developed and it is relatively widely removed from the anal aperture. Two pairs of setae
are.....

are situated on the interscutal membrane between the ventri-anal and genital shields. A number of small platelets occur in close proximity to these setae. The metapodal shields are elongated with their longest axes directed transversely. The peritrematal shield is relatively broad. The peritreme extends rostrad to a position beyond coxa II. The tritosternum has two long pilose laciniae.

Gnathosoma. The gnathosoma is very similar to that of the subgenus Gamasellus and the other subgenera of the genus Cyrtolaelaps. The tectum (fig. 208) has three spines of equal size. The specialized seta on the palptarsus is two-pronged. The fixed digit of the chelicera (fig. 209) is multidentate and also bears a pilus dentilis. The movable digit is bidentate.

Legs. All the legs are provided with claws and pulvilli. The setae on the legs are simple to spine-like. Legs I and IV are approximately of the same length while legs II and III are shorter.

Although many specimens of this species were collected the male could not, as yet, be found.

Habitat and locality. Very common in humus under trees and other vegetation. Holotype female and many paratypes from humus in lucern field, Potchefstroom, March 1960.

Asca bicornis (Canestrini & Fanzago)

1876. Gamasus (Seius) bicornis, Canestrini, G. & Fanzago, F., Atti Soc. Ven.-Trent. 5: 103.
1877. Seius bicornis, Canestrini, G. & Fanzago, F., Atti Ist. veneto (5), 4: 121.
1882. Laelaps bicornis, Canestrini, G. & R., I Gamasi Italiani: 76. 1948.....

1948. Asca bicornis, Schweizer, J., Res. Rech. scient.
Parc Nat. Suisse N.F. 2, 20: 27.
1949. Asca bicornis, Schweizer, J., Res. Rech. scient.
Parc Nat. Suisse N.F. 2, 21: 33.
- 1952b. Asca bicornis, Willmann, C., Veröff. Inst. Meeres-
forsch. Bremerh. 1: 145.
1957. Asca bicornis, Haarlov, N., Spol. Zool. Mus. Haun.
17: 17.

The dorsal setae are not setose. The dorsal shields are faintly sculptured. The postero-dorsal protuberances are each provided with two setae which lack serrations; the medially-directed seta is shorter than the outer one. The dimensions of the female given by Schweizer (1948) are: Length, 324-360 u; breadth, 192-225 u.

Habitat and locality. In moss, humus etc., Europe.

Asca elongata (Berlese)

- 1910b. Ceratozercon bicornis var. elongatus, Berlese, A.,
Redia 6: 246.

Judging from the figure of the dorsum of A. bicornis given by Schweizer (1948) this species closely resembles A. elongata (fig. 210). Figures 210-212 of the type specimen in the Berlese collection show that one of the setae on the dorsal "horns" are serrate distally (fig. 211). According to Dr. G.O. Evans (personal communication) the specimen is not sufficiently cleared to figure the venter in detail. The sternal shield is convex posteriorly and extends a little posterior to the middle of coxa III.

Fig. 212 is a free hand drawing of the ventri-anal and

genital.....

genital shields.

Dimensions of female: Length, 340 u; breadth, 190 u.

Habitat and locality. In moss, Lake City, Florida, U.S.A.

Asca spinosa, n.sp.

This species is characterized by the long spine-like setae on the posterior half of the posterior dorsal shield.

Female:-

Dimensions: Length, 325 u; breadth, 182 u.

Dorsum (fig. 213). The anterior dorsal shield and the anterior half of the posterior dorsal shield are coarsely meshed. The chaetotaxy is basically the same as that of A. aethiopica. All the setae on the anterior two-thirds of the dorsum are pilose or serrate. The long spinous setae on the posterior portion are smooth or slightly serrate in their distal halves and are situated on small tubercles. The pair of postero-lateral protuberances is provided with two smooth setae. Setae J5 are small and simple.

Venter (fig. 214). The anterior portion of the sternal shield is weakly sclerotized. The metasternal setae are situated on the integument. The genital and ventri-anal shields are very similar to those of aethiopica. The post-anal seta is spine-like. The peritreme reaches anteriorly beyond coxa I.

Gnathosoma. The movable digit of the chelicera is bidentate and the fixed digit bears four small teeth (fig. 215). The anterior margin of the tectum is denticulate as depicted in fig. 216.

Legs. These are similar to those of A. aethiopica.

Male.....

Male:

Dimensions: Length, 290 u; breadth, 164 u.

The dorsum of the male resembles that of the female. As in the female the anterior portion of the sternal shield is weakly sclerotized. The sterniti-genital shield is free and bears five pairs of setae. The ventri-anal shield is provided with eight pairs of setae in addition to the circum-anal setae. The shape of its anterior margin is shown in fig. 217. The fixed digit of the chelicera has a few teeth in its distal half and the movable digit bears one tooth. The spermatophoral process is broad and tapers to a slender point (fig. 218). None of the legs are armed with spurs

Habitat and locality. Holotype female, allotype male and three other paratypes collected from termite's nest in soil under a stone, University campus, Potchefstroom March 1960.

Asca magnituberculata (Vitzthum), new comb.

1925. Gemasellus (Digamasellus) magnituberculatus,
Vitzthum, H., Suppl. Ent. Berlin 11: 5.

The dorsal setae are simple with the exception of the longer ones which are slightly serrate distally. The dorsal tubercles are bisetose and resemble those of A. nova, A. australica and A. elongata (probably also A. duo-
setosa Fox). Vitzthum (1925) could not discern the exact shape of the tectum and assumed its anterior margin to be in the form of a Gothic arch; this is probably not the case. Vitzthum did not figure all the setae present but the chaetotaxy appears basically similar to that of

the.....

the other species of the genus. This author also describes the male.

Dimensions of female: Length, 354-387 u; breadth, 181-187 u.

Habitat and locality. In abandoned bird's nest, Sumatra.

Asca nova Willmann

1939. Asca nova, Willmann, C., Zool. Anz. 125: 246.

1943. Asca nova, Cooreman, J., Bull. Mus. roy. Hist. nat. Belg. 19, 63: 17.

1956a. Asca nova, Womersley, H., J. Linn. Soc. Lond. Zool. 42, 288: 511.

This species is characterized by the presence of seven pairs of setae on the ventri-anal shield (as in A. elongata) and the occurrence of an oval chitinized thickening on each side of the anal aperture. The posterior dorsal tubercles are bisetose. The setae on the dorsum are simple and smooth.

Dimensions of female: Length, 345 u; breadth, 225 u.

Habitat and locality. In soil, Europe.

Asca quinquesetosa Wharton

1941. Asca quinquesetosa, Wharton, G.W., Smiths. Misc. Coll. 99, 12: 2.

According to Wharton (1941) the metasternal setae are situated on metasternal shields which are lightly chitinized but clearly defined. Other features of the venter are typical of the genus. The dorsal setae are probably simple. This species can easily be recognized by the presence.....

sence of five setae on each of the postero-dorsal tubercles.

Dimensions of female: Length from posterior margin to tip of hypostome, 440 u; width, 250 u.

Habitat and locality. In debris from boobies' (Sula leucogaster nesiotus) nests, Clipperton Island.

Asca duosetosa Fox

1946. Asca duosetosa, Fox, I., Proc. biol. Soc. Wash.
59: 174.

According to Fox (1946) this species is characterized by the presence of a prominent spur on the inner surface of the femur and genu of the palp. The metasternal setae are situated on the integument. The ventri-anal shield is provided with four pairs of setae in addition to the circum-anal setae. The dorsal shields (not figured by Fox) are sculptured and provided with stout scimitar-like setae. The postero-lateral protuberances are each provided with two probably smooth setae.

Dimensions of female: Length, 400 u; breadth, 240 u.

Habitat and locality. Collected from Rattus norvegicus, Puerto Rico.

Asca major Womersley

1956a. Asca major, Womersley, H., J. Linn. Soc. Lond.
Zool. 42, 288: 510.

1957. Asca major, Domrow, R., Proc. Linn. Soc. N.S.
Wales 81, 3: 200.

According to Womersley (1956a) this species is the

largest.....

largest known species of the genus Asca (dimensions: Length, 390 u; breadth, 234 u) but in the same paper this author describes Asca foliata with a length of 468 u. The two setae on each of the tubercles are narrowly foliate with serrate or ciliated margins. The ventri-anal shield has 15 setae. The dorsal setae are mostly simple with the exception of the longer setae which, according to Womersley, have slight indications of subapical ciliations or serrations. The tectum is trispinous but the median spine is much shorter than the lateral ones. The female was described by Womersley and Domrow (1957) described the male.

Habitat and locality. Among dead convolvulus stalks and leaf mould, Australia.

Asca foliata Womersley

1956a. Asca foliata, Womersley, H., J. Linn. Soc. Lond.
Zool. 42, 288: 507.

The dorsum of this species is furnished with narrow leaf-like setae with serrated edges. The ventri-anal shield is relatively widely separated from the genital shield and bears 15 setae. The tectum is provided with three equal spines. The protuberances on the dorsum each bears two of the leaf-like setae.

Dimensions of female: Length, 468 u; breadth, 286 u.

Habitat and locality. Scrub and foliage, Australia.

Asca australica Womersley

1956a. Asca australica, Womersley, H., J. Linn. Soc. Lond.
Zool. 42, 288: 508.

The dorsal setae, including the pair on each of the
dorsal.....

dorsal protuberances, are simple. The ventri-anal shield bears 15 setae. The tectum has three equal spines but they are longer than those of A. foliata. As in A. major the male has a sterniti-genital shield which is not fused with the ventri-anal shield.

Dimensions of female: Length, 325 u; breadth, 190 u.

Habitat and locality. In moss, Australia.

Asca species referred to other genera

Zercon crozetensis (Richters)

1907. Asca crozetensis, Richters, F., D. Südpol. Exp.
1901-1903, 9: 283.

Cyrtolaelaps mucronatus (G. & R. Can.)

1902. Asca affinis, Oudemans, A.C., Tijdschr. Ent. 45:45.
1903. Asca affinis, Oudemans, A.C., Tijdschr. Ned. Dierk.
Ver. (2) 8, 2: 92.
1905. Asca affinis, Oudemans, A.C., Abh. Nat. Ver. Bremen
18: 206, 237.
1914a. Asca affinis, Oudemans, A.C., Arch. Naturg. 79,9:91.
1932. Asca affinis, Willmann, C., Mittlg. Höhlen Karstf.
4: 158, 160.
1935. Asca affinis, Pax, F. & Maschke, K., Beitr. Biol.
Glatzer Schneeberges 1: 48.
1940. Asca affinis, Sellnick, M., Göteb. K. Vet. Vitterh.
Samh. Handl. ser. B, 6, 14: 26.

C. (Digamasellus) muricatus (Fox)

1947. Asca muricata, Fox, I., Ann. ent. Soc. Amer. 40,
4: 600.

Rhodacarus.....

Genus Rhodacarus Oudemans

1902. Rhodacarus, Oudemans, A.C., Tijdschr. Ent. 45: 50.

Rhodacarus, which is the type genus of the subfamily Rhoacarinae, is characterized by a small, elongated, weakly sclerotized body with a constriction behind coxae IV. The chelicerae are large, conspicuous and heavily sclerotized. The two dorsal shields do not cover the entire dorsum; the anterior dorsal shield usually carries 23 pairs of simple setae. Sternal setae I are usually situated on a punctated area of the sternal shield; the latter also bears the metasternal setae. The ventral shield is provided with five pairs of setae in addition to the circum-anal setae; the post-anal seta is long. The tectum has a long median mucro flanked by two or more smaller spines. The specialized seta on the palptarsus is three-pronged. Leg I lacks an ambulacrum.

Type: Rhodacarus roseus Oudemans

Rhodacarus roseus Oudemans

1902. Rhodacarus roseus, Oudemans, A.C., Tijdschr. Ent. 45: 50.

1918a. Rhodacarus roseus, Hull, J.E., Trans. nat. Hist. Soc. Northumb. n.s. 5: 56.

1920. Rhodacarus mandibularis, Berlese, A., Redia 14: 165 (new syn.).

1920. Rhodacarus roseus, Halbert, J.W., Proc. roy. Irish Acad. B, 35: 115.

1935a. Rhodacarus roseus, Willmann, C., Schr. naturw. Ver. Schl.-Holst. 20, 2: 423.

1956. Rhodacarus roseus, Sheals, J.G., Ent. month. Mag.

92.....

92: 102.

1957. Rhodacarus roseus, Haarlov, N., Spol. Zool. Mus.

Haun. 17: 19.

Female:-

Dimensions: Length, 490 u.

The anterior dorsal shield is provided with 23 pairs of setae, three chitinous "pores" and a transverse incision. The posterior dorsal shield bears 16 pairs of setae; its lateral interscutal membrane is provided with four pairs of setae.

The posterior border of the sternal shield tapers backwards. Its anterior portion is a lightly sclerotized punctated area. The ventri-anal shield is provided with five pairs of setae in addition to the circum-anal setae. The ventral interscutal membrane carries three pairs of setae. The peritreme reaches anteriorly to a position in line with the posterior margin of coxa II. The fixed digit of the chelicera has three or four teeth and the movable digit is tridentate. The median process of the tectum (fig. 228) tapers suddenly in its distal half and the lateral processes are smooth.

Male:-

The genital aperture is situated immediately behind a punctated area, the so-called balcony (Willmann, 1935b). The free sterniti-genital shield bears five pairs of setae. The ventri-anal shield has punctated areas along its anterior margin. The femur, genu and tibia of leg II are provided with spurs or spines. The movable digit of the chelicera has one large tooth and the fixed digit bears two or three small teeth. The tube-like spermatophoral process has a funnel-shaped opening (Haarlov, 1957).

Habitat.....

Habitat and distribution. This species was found in soil of grassland, moorland, woodland and the sea shore, Europe.

Rhodacarus sublapideus, n.sp.

Female:-

Dimensions: Length, 311 u; breadth, 147 u.

Dorsum (fig. 219). The anterior dorsal shield has a V-shaped incision; it bears 23 pairs of simple setae (fig. 220) as well as three chitinous "pores". The posterior dorsal shield is provided with 19 pairs of setae. The distribution of the setae and chitinous structures is shown in the figure. The body has a distinct constriction behind coxa IV. The two dorsal shields are relatively widely removed from one another, the band of soft integument allowing for free movement of the "abdomen".

Venter (fig. 221). The sternal shield is provided with four pairs of setae. The portion of the shield between sternal setae I and the tritosternum is weakly sclerotized and punctate. The genital shield bears one pair of setae and the ventri-anal six pairs in addition to the circum-anal setae. The para-anal seta are situated in line with the anterior margin of the anus; the post-anal seta is long. The ventral interscutal membrane bears two pairs of setae. The metapodal shields are narrow and elongated. The peritreme does not reach beyond the anterior margin of coxa III. The tritosternum has two long laciniae.

Gnathosoma. The gnathosoma is well sclerotized. The corniculi are relatively long and narrow. The palptarsal seta is three-pronged. The chelicerae are conspicuous (fig. 222). The movable digit bears three large and two small teeth. The fixed digit has a large tooth proximally and.....

and a row of eight to nine closely set smaller denticles. The tectum (fig. 223) is typical of some species of the genus; the median process has four denticles distally; the two lateral processes are either smooth or, in some specimens, provided with one or two spines.

Legs. Legs II-IV are provided with well-developed claws and pulvilli. Legs I are devoid of claws and pulvilli. Tarsus I (fig. 224) bears sensory setae terminally. All the setae on the legs are simple.

Habitat and locality. Holotype and many paratype females collected from soil in termite's nest under stone, University campus, Potchefstroom March 1960. Although many individuals were collected no males could be found.

Rhodacarus ananasi, n.sp.

This species is closely related to R. sublapideus.

Female:--

Dimensions: Length, 310 u; breadth, 140 u.

Dorsum (fig. 225). As in R. roseus, pallidus, denticulatus Berl., coronatus Berl. and sublapideus the anterior dorsal shield has a V-shaped incision; it bears 23 pairs of simple setae and three chitinous "pores" distributed as shown in the figure. The posterior dorsal shield is provided with 18 pairs of setae, the dorsal interscutal membrane being devoid of setae.

Venter (fig. 226). The sternal shield bears four pairs of setae. Its anterior portion, on which sternal setae I are situated, is weakly sclerotized and punctate. The genital shield is truncate posteriorly but its anterior margin could not be discerned. The ventri-anal shield

is.....

is provided with five pairs of pre-anal setae. The para-anal setae are situated in line with the anterior margin of the anal aperture; the post-anal seta is long. The ventral interscutal membrane bears three pairs of setae. The anterior pair is placed in line with the anterior margin of the ventri-anal shield but on the outside of the longish metapodal shields; these setae probably belong to the dorsal marginal series. Pre-endopodal shields are absent. The peritreme is short and does not reach beyond the anterior margin of coxa III.

Gnathosoma. The gnathosomal setae are normal for the genus. The palptarsal seta is three-pronged. The tectum (fig. 227) has a median process which tapers gradually but its distal end is bifurcate. The process is flanked by two lateral processes, each of which is provided with two or more small denticles. One or both of the digits of the heavily sclerotized chelicerae are multidentate.

Legs. Tarsus I lacks an ambulacrum but all the other legs are provided with claws and pulvilli. None of the legs are armed with spines.

Habitat and locality. Holotype female collected from pineapple fields (soil), Bathurst, June 1956 by P. Graham.

Rhodacarus pallidus Hull

1918a. Rhodacarus pallidus, Hull, J.E., Trans. nat. Hist. Soc. Northumb. 5: 57.

Hull (1918a) briefly described this species as follows:
"Translucent white with the appendages tinted with brown. Considerably larger than roseus. Epistome with a simple acute tapering process without terminal plume or basal
teeth.....

teeth; otherwise resembling roseus. West Allendale, under deeply embedded stones with Pergamasus hamatus". (p. 57).

Length of male, 440 u.

Rhodacarus roseus var pallidus of Halbert (1920) is probably not conspecific with Hull's species. Willmann (1957) is also of the opinion that the species he described in 1935a as pallidus may in fact be calcarulatus Berl.

Rhodacarus denticulatus Berlese

1920. Rhodacarus denticulatus, Berlese, A., Redia 14: 164.

1951. Rhodacarus denticulatus, Willmann, C., Sitz. Ber. öst. Akad. Wiss. 1, 160: 119.

Dimensions of female: Length, 300 u; breadth, 135 u.

This species is characterized by the digits of the female chelicerae which are both provided with many small teeth (fig. 230). The median process of the tectum as well as the lateral processes are serrate terminally (fig. 229).

Habitat and distribution. This species has a discontinuous distribution and was collected from soil in Java, Florida, Italy and Austria.

Rhodacarus calcarulatus Berlese

1920. Rhodacarus calcarulatus, Berlese, A., Redia 14: 164.

1935c. Rhodacarus pallidus, Willmann, C., Schr. naturw. Ver. Schl.-Holst. 20, 2: 423.

1957. Rhodacarus calcarulatus, Willmann, C., Abh. naturw. Ver. Bremen 35: 165.

Dimensions of female: Length, 480 u; breadth, 230 u.

Willmann.....

Willmann (1957) is of opinion that the species he described as pallidus (1935a) may actually have been calcularatus as leg II of the female is thickened and provided with spurs. According to Berlese (1920) the chelicerae are: "Mandibularum digitus fixus dentibus magnis, aequedissitis, tantum numero quatuor armatus; mobilis dentibus conformibus tribus, vix fixum apice summo superans" (p. 164). The shape of the tectum is shown in fig. 231. The spur on femur II is larger than that on the genu (fig. 232).

Habitat and locality. In moss, Italy.

Rhodacarus angustiformis Willmann

1951. Rhodacarus angustiformis, Willmann, C., Sitz. Ber. Öst. Akad. Wiss. 1, 160: 119.

Dimensions of female: Length, 405 u; breadth, 160 u.

This species is two and a half times as long as broad. The apex of the median process of the tectum (fig. 233) is finely denticulate. The fixed digit of the chelicera of the female has four teeth whereas the movable digit is tridentate (fig. 234). In the male the movable digit bears three teeth and the fixed digit is provided with five to six teeth (fig. 235). The femur of leg II of the male bears a prominent spur (fig. 236).

Habitat and locality. In deeper layers of soil, Austria.

Rhodacarus coronatus Berlese

1920. Rhodacarus coronatus, Berlese, A., Redia 14: 165.

Dimensions of female: Length, 450 u, breadth, 230 u.

The median.....

The median process of the tectum tapers gradually and the lateral processes are divided distally. The shape of the tectum of this species is shown in fig. 237. The movable digit of the chelicera is tridentate and the fixed digit bears five teeth (fig. 238).

Habitat and locality. In moss and humus, Italy.

Rhodacarus strenzkei Willmann

1957. Rhodacarus strenzkei, Willmann, C., Abh. naturw.

Ver. Bremen 35: 166.

Dimensions of female: Length, 555 u; breadth, 225 u.

Anterior dorsal shield with the usual 23 pairs of setae; three chitinous "pores" and a transverse incision are present on the shield. The movable digit of the female chelicera bears three teeth and the fixed digit six. The tectum resembles that of calcarulatus. Leg II of the male is provided with relatively strong spurs. The fixed digit of the male chelicera has two strong teeth and a long pilus dentilis. The movable digit bears a single large tooth. The spermatophoral process is U-shaped with a soup spoon-shaped distal portion; the latter is also provided with a leaf-like appendage.

Habitat and locality. In soil on bank of islands in Eider estuary, Germany.

Rhodacarus marksae Domrow

1957. Rhodacarus marksae, Domrow, R., Proc. Linn. Soc.

N.S. Wales 81, 3: 200.

Dimensions of female: Length, 302 u; breadth, 144 u.

Anterior.....

Anterior dorsal shield with 23 pairs of setae; posterior shield with 19 pairs. Both digits of the chelicerae are provided with both strong and small teeth. The median process of the tectum is shortly bifurcate apically and the two outward curving lateral processes are smooth.

Habitat and locality. In leaf mould, Great Barrie Reef, Australia.

Rhodacarus rhodacaropsis, n.sp.

Female:-

Dimensions: Length, 356 u; breadth, 160 u; length of leg I, 356 u.

This new species is characterized by the presence of two pre-endopodal shields. It is a typical rhodacarid with a prominent constriction behind coxae IV. The presence of pre-endopodal shields in the Rhodacarus group (Rhodacarus, Rhodacaropsis, Rhodacarellus and Rhodacaroides) was, up till now, regarded as a character of the genus Rhodacaropsis. This genus, however, has claws on leg I. Tarsus I of the present species is devoid of claws, a condition which is typical of the genus Rhodacarus. The present author therefore refers this species to the latter genus. Further collections of soil Acarina may show that we have to broaden the genus concept and perhaps include all the genera of the Rhodacarus group in one genus.

Dorsum (fig. 239). The anterior part of the dorsum is provided with 21 pairs of simple setae, three pairs of which are placed on the lateral interscutal membrane. The dorsum of the "abdomen" bears 19 pairs of setae of which 13 pairs are situated on the posterior dorsal shield.

Three.....

Three chitinous structures ("pores") are present on the anterior shield, each having extensions as depicted in the figure.

Venter (fig. 240). The base of the tritosternum is flanked by two elongated pre-endopodal shields; they are weakly sclerotized but distinct. The first pair of sternal setae are situated on the punctate area forming the "balcony". The sharp-pointed median process of the anterior margin of the genital shield overlaps the hind margin of the sternal shield. The ventri-anal shield bears six pairs of setae in addition to the long post-anal seta. The metapodal shields are elongated. Two lightly sclerotized platelets occur between the ventri-anal and genital shields. The peritreme is short, reaching to the posterior margin of coxa III.

Gnathosoma. The tectum is not typically rhodacarid; it has a median process without lateral spines (fig. 241). The movable digit of the chelicera is tridentate and the fixed digit bears six teeth (fig. 242). The palptarsal seta has three tines. The hypostome is typical of the genus Rhodacarus.

Legs. Leg I has the same length as the idiosoma; its tarsus is without claws (fig. 243). All the other legs are provided with well-developed claws and pulvilli (fig. 244). Unfortunately the male could not be found.

Habitat and locality. In humus under trees on river bank, Potchefstroom, March 1960.

Rhodacaropsis

Genus Rhodacaropsis Willmann

1935a. Rhodacaropsis, Willmann, G., Schr. naturw. Ver.
Schl.-Holst. 20: 426.

According to Willmann (1935a) this genus, which shows great similarity to Rhodacarus as regards body form, position of genital orifice, tectum and chelicerae, can be distinguished from it by the presence of two claws (without pretarsus and pulvillus) on tarsus I and the occurrence of pre-endopodal shields anterior to the sternal shield. The palptarsal seta is three-pronged.

Type: Rhodacaropsis inexpectatus Willmann

Rhodacaropsis inexpectatus Willmann

1935a. Rhodacaropsis inexpectatus, Willmann, G., Schr.
naturw. Ver. Schl.-Holst. 20: 427.

Dimensions of female: Length, 525 u; breadth, 195 u.

The anterior margin of the sternal shield consists of a lightly sclerotized, punctated band similar to that of Rhodacarus. Two pairs of pre-endopodal shields are present. The tectum has a median process flanked by two spines in the female. The male has a long hyaline process on femur II; the leg, however, is not thickened. The spermatophoral process is similar to those of the genus Rhodacarus.

Habitat and locality. Soil, Kieler Bucht, Germany.

Rhodacarellus.....

Genus Rhodacarellus Willmann

1935a. Rhodacarellus, Willmann, G., Schr. naturw. Ver. Schl.-Holst. 20: 429.

The body is constricted behind coxae IV. The pre-tarsus of leg I is strongly reduced but present. Claws are present on tarsus I but pulvilli are absent. Leg II of the male lacks spurs. In general appearance this genus resembles the subgenus Gemacarellus.

Type species: Rhodacarellus subterraneus Willmann

Rhodacarellus subterraneus Willmann

1935a. Rhodacarellus subterraneus, Willmann, G., Schr. naturw. Ver. Schl.-Holst. 20: 430.

Length of female: 300 u.

The posterior portion of the dorsum is provided with two kidney-shaped chitinous structures; they are situated in the body. The tectum has three denticulate processes. Tarsus I has a large number of setae distally and it bears a pair of small claws without pre-tarsus and pulvillus. The femur, genu and tibia of leg II are each provided with a large club-like seta. The ventri-anal shield is large and fused with the dorsal shield posteriorly. The long spermatophoral process tapers to a point.

Habitat and locality. In forest soil, Germany.

Rhodacarellus corniculatus Willmann

1935a. Rhodacarellus corniculatus, Willmann, G., Schr. naturw. Ver. Schl.-Holst. 20:432.

Length.....

length of female: 330 u.

The three denticulated processes of the tectum are flanked by a pair of spines. The posterior corners of the venter is provided with a pair of strong setae. The peritreme is long. The ventri-anal shield is large and rectangular.

Habitat and locality. In forest soil, Germany.

Rhodacarellus silesiacus, Willmann .

1936b. Rhodacarellus silesiacus, Willmann, C., Zool. Anz. 113: 282.

1951. Rhodacarellus silesiacus, Willmann, C., Sitz. Ber. Öst. Akad. Wiss. 1, 160: 121.

Dimensions: Length, 285 u; breadth, 120 u.

The ventri-anal shield is large, almost rectangular, and bears six pairs of setae in addition to the long post-anal seta. The movable digit of the chelicera has three and the fixed digit four large teeth. The tectum has three projections.

Habitat and locality. Pasturefields, Germany.

Rhodacarellus epigynialis, Sheals

1956. Rhodacarellus epigynialis, Sheals, J.G., Ent. month. Mag. 92: 102.

Dimensions of female: Length, 400-420 u; breadth, 180-190 u.

The female can readily be recognised by the presence of a genital shield with a rounded posterior margin and which extends forwards as an acute triangle. The ventri-

anal.....

anal shield bears four pairs of pre-anal setae. The integument between this shield and the genital shield is provided with two pairs of setae. Tarsus I has a pre-tarsus and claws. The male has a free sterniti-genital shield; the ventri-anal shield is not fused with other shields. Leg II is armed with spurs. The bidentate movable digit of the chelicera bears a slender spermatophoral process.

Habitat and locality. In soil, Scotland.

Genus Antennoseius Berlese

1916a. Antennoseius, Berlese, A., Redia 12: 203.

1930. Vitzthunia, Thor, S., Skr. Svalbard Ishavet 27:

114 (new syn.).

Leg I usually is longer than the idiosoma and tarsus I usually has no claws and pulvilli. The sternal shield bears two or three pairs of setae and the metasternal setae are situated either on the integument or on the metasternal-endopodal shields. A drop-shaped genital shield and an anal or small ventri-anal shield are present. The peritrematal shield is produced behind coxae IV. The dorsal shields are ornamented by means of punctate lines forming a reticulate pattern. The anterior margin of the tectum has many denticles. The specialized seta on the palptarsus is two-pronged. The male either has a holoven-tral shield or the sternal shield is free and only the ventri-anal shield fused with the peritrematal shield. The legs of the male are unarmed and similar to those of the female.

Type: Antennoseius delicatus Berlese

Antennoseius.....

Antennoseius delicatus Berlese

1916a. Antennoseius delicatus, Berlese, A., Redia 12: 304.

Dimensions of female: Length, 520 u; breadth, 270 u; leg I, 650 u.

The two dorsal shields (fig. 245) are reticulated and sculptured. The setae are short, subspiniiform or serrate (fig. 246). The sternal shield is provided with two pairs of setae (fig. 247). Sternal setae III and the metasternal setae are situated on a separate shield (fig. 248). The anal shield bears three setae, but the ventral interscutal membrane carries a large number. The peritrematal shield is produced behind coxae IV. The genital shield is flask-shaped and bears one pair of setae.

The gnathosomal setae are normal. Leg I is longer than the body and tarsus I, which is devoid of an ambulatorum, terminates in sensory setae. Tarsi II-IV are normal, bidactyle with pulvilli. The male has a fused sternitigeniti-ventri-anal shield. The chaetotaxy and ornamentation of the dorsum of the male is similar to that of the female.

Habitat and locality. In moss, St Germain, Maison Ieffritte.

Antennoseius boskopensis, n.sp.

Female:-

Dimensions: Length, 506 u; breadth, 311 u; length of leg I, 755 u; tarsus I, 132 u; tibia I, 165 u; length of anal shield, 88 u; breadth, 62 u; length of posterior dorsal shield, 222 u; breadth, 276 u.

Dorsum.....

Dorsum (fig. 249). The anterior dorsal shield, which is longer than the posterior one, is provided with 20 pairs of serrate setae. Marginal setae r5 and r7 are situated on the integument. The vertical setae (fig. 250) is leaf-like and the other dorsal setae (fig. 251) are also serrate but more slender. The ornamentation of both the anterior and posterior dorsal shields consists of punctate lines forming a reticulate pattern. The marginal setae of the posterior half of the dorsum are all placed on the integument, the shield itself bearing 18 pairs of serrate setae. It does not cover the entire surface of the dorsum. In many specimens examined the median setae on the posterior dorsal shield are irregularly distributed.

Venter (fig. 252). The sternal shield bears three pairs of setae. The metasternal setae are situated on the integument. The flask-shaped genital shield bears the usual pair of setae. All these setae are simple. The anal shield is provided with the post-anal and para-anal setae. The distribution of the setae on the venter is depicted in the figure. All the setae placed behind the level of the anal aperture (except the post-anal seta) are serrate and resemble those on the dorsum. The peritrematal shield is relatively broad and is produced slightly behind coxa IV; the stigma is situated behind the anterior margin of coxa IV. Anteriorly the peritreme reaches to a position in front of coxa I. The base of the tritosternum is flanked by a pair of pre-endopodal shields. As far as could be determined the laciniae of the tritosternum are not setose.

Gnathosoma. The hypostome and hypostomal setae are normal for the subfamily. The specialized seta on the palptarsus (fig. 253) is two-pronged. The tectum has an irregularly serrate anterior margin (fig. 254). The movable

digit.....

digit of the chelicera is bidentate and the fixed digit is multidentate, bearing a small pilus dentilis (fig. 255).

Legs. Leg I is antenniform and is one and a half times as long as the body. Tarsus I which is devoid of claws and pulvillus terminates in four long sensory setae (fig. 256). Trochanter I bears two broad, strongly developed setae in addition to the normal simple setae (fig. 257). The other legs are bidactyle and bear the normal pulvilli.

Male:--

Dimensions: Length, 444 u; breadth, 258 u.

The dorsum of the male is essentially the same as that of the female. The venter (fig. 258) is covered by a holovertral shield. All the setae on the venter, excluding those situated on the posterior margin, are simple. The posterior third of the holovertral shield is ornamented like the dorsal shields. The spermatophoral process of the male chelicera is produced slightly in front of the movable digit (fig. 259). The latter is provided with one tooth only but the fixed digit is multidentate as in the female. None of the legs are armed with spurs. Other features in the male resemble those of the female.

Habitat and locality. Holotype female, allotype male and paratypes collected from humus, Boskop and Potchefstroom, March 1960.

Antennoseius oudemansi (Thor), new comb.

1930. Vitzthumia oudemansi, Thor, S., Skr. Svalbard Ishavet 27: 116.

Dimensions of female: Length, 800-900 u; breadth,

360-440 u.....

360-440 u.

Thor (1930) proposed the new genus Vitzthumia to accommodate this species. It, however, possesses all the characteristics of the genus Antennoseius except that leg I is provided with claws and pulvillus. The ornamentation of the dorsal shields, the nature of the setae, the shape of the tectum, the two-pronged specialized seta on the palptarsus, the presence of an anal shield, the peritrematal shield which is produced behind coxa IV, the bidentate movable digit and multidentate fixed digit of the female chelicerae, the nature of the male spermatophoral process and the absence of spurs on leg II of the male are all features of the genus Antennoseius. The present author thus proposes the transference of this species to the genus Antennoseius; Vitzthumia thus becomes a synonym of this genus.

Habitat and locality. In moss, under stones, Svalbard.

Antennoseius masoviae Sellnick

1943. Antennoseius masoviae, Sellnick, M., Zool. Anz.

143: 201.

Dimensions of female: Length, 484 u; breadth, 242 u.

The dorsum of this species is characterized by the presence of five pairs of short stout setae on the anterior dorsal shield. The sternal shield carries three pairs of setae, the metasternal setae being situated on the integument. Pre-endopodal shields are absent. The anal shield is provided with three setae only. Coxae I and II are each provided with a spur-like seta. Tarsus I is devoid of claws and pulvillus but bears long sensory setae distally.

The dorsal.....

The dorsal surfaces of both the trochanter and femur of leg I bear a strong spine. The tectum has three anteriorly-directed spines.

Habitat and locality. In moss and soil litter, Germany.

Antennoseius borussicus Sellnick

1945. Antennoseius borussicus, Sellnick, M., Blätter für Milbenkunde 6: 42.
1949. Antennoseius delicatus, Schweizer, J., Res. Rech. Scient. Parc Nat. Suisse N.F. 2, 21: 75 (new syn.).
1951. Antennoseius borussicus, Willmann, C., Sitz. Ber. öst. Akad. Wiss. 1, 160: 111.

Dimensions of female: Length, 572 u; breadth, 287 u.

The vertical setae are fin-like. The dorsum is typical of the genus. The anal shield (which is in fact a ventri-anal shield) is provided with two pairs of setae in addition to the circum-anal setae. Sternal setae I are situated in front of the sternal shield. A pair of pre-endopodal shields is present. Leg I has no claws or pulvillus and the tarsus bears four long sensory setae terminally. Trochanter I has a strong spine-like seta. The tectum is normal.

The male has a holovertral shield and the chelicerae are similar to those of the other species of the genus.

Habitat and locality. In moss and beech litter, Germany.

Remarks. The species briefly described by Schweizer (1949) as A. delicatus is not conspecific with the type species since its ventri-anal shield is provided with 7 setae as is the case in borussicus and magniscutum. Willmann (1951) regards the latter species as a synonym of borussicus.

Antennoseius.....

Antennoseius magniscutum (Weis-Fogh), new comb.

1947. Vitzthumia magniscutum, Weis-Fogh, T., *Natura Jutlandica* 1: 253.

Dimensions of female: Length, 470-480 u; breadth, 250 u.

As in A. borussicus the anal shield is provided with more than the circum-anal setae; it bears two pairs of pre-anal setae. Leg I has approximately the same length as the body but its tarsus lacks a pre-tarsus and claws. These are replaced by "long hairs and short solenidions" (p. 255). The distribution of the serrate setae on the dorsum is very similar to that of A. boskopensis. Its denticulated tectum is typical of the genus. Pre-endopodal shields are absent.

Habitat and locality. Soil surface layer, Denmark.

Remarks. According to Willmann (1951) this species is a synonym of A. borussicus.

Antennoseius pannonicus Willmann

1951. Antennoseius pannonicus, Willmann, G., *Sitz. Ber. Öst. Akad. Wiss.* 1, 160: 109.

Dimensions of female: Length, 540 u; breadth, 285 u.

This species resembles A. masoviae in that some of the setae on the anterior dorsal shield are club-like. Coxae I and II, however, are provided with normal simple setae. The anal shield bears three setae. The anterior portion of the sternal shield is very characteristic. A pair of pre-endopodal shields is present. Sternal setae I and II are situated on the shield but setae III and the metasternal setae are off the shield and, according to Willmann (1951).....

(1951) placed on the integument. Trochanter and femur I have no spines. Leg I is without a pulvillus and claws.

Habitat and locality. In soil, Austria.

Antennoseius spinosus (Willmann), new comb.

1949. Vitzthumia spinosa, Willmann, C., Veröff. Mus.
Nat. Bremen 1A: 114.

Genus Halolaelaps Berlese & Trouessart, s. lat.

1889. Halolaelaps, Berlese, A. & Trouessart, E., Bull.
Bibl. Sci. Quest. 2, 2: 122.

The dorsal shields are provided with simple, pilose or spiculate setae. In the female the sternal shield is narrow and not fused with the endopodals. The anal shield is widely removed from the genital shield. The stigma is situated opposite the anterior margin of coxa IV. The metapodal shields are usually well developed. The specialized seta on the palptarsus is three-pronged. Coxa II is unarmed in both sexes. Legs II, III and occasionally I and IV are armed in the male. The male has a sterniti-genital shield separated from a ventri-anal shield. This genus was recently reviewed by Hyatt (1956b) and Willmann (1957).

Subgenus Halolaelaps Berlese & Trouessart

The peritreme is long. The epistome (tectum) has a finely denticulated rounded anterior margin, sometimes with a central macro. The ambulacrum is drawn out into long leaves.

Type species: Halolaelaps glabriusculus Berl. & Trouess.
= Gamasus marinus Brady

H. (Halolaelaps) marinus (Brady)

1875. Gamasus marinus, Brady, G.S., Proc. zool. Soc. Lond.: 307.
1889. Halolaelaps glabriusculus, Berlese, A., & Trouessart, E., Bull. Bibl. Sci. Quest 2, 2: 122.
- 1956b. Halolaelaps marinus, Hyatt, K.H., Entom. Gaz. 7: 8.
1957. Halolaelaps (H.) marinus, Willmann, C., Abh. naturw. Ver. Bremen 35: 168.

H. (Halolaelaps) celticus Halbert

1915. Halolaelaps celticus, Halbert, J.N., Proc. roy. Irish Acad. 31: 57.
- 1956b. Halolaelaps celticus, Hyatt, K.H., Entom. Gaz. 7:10.
1957. H. (H.) celticus, Willmann, C., Abh. naturw. Ver. Bremen 35: 168.

H. (Halolaelaps) holsaticus Vitzthum

1931. Halolaelaps holsaticus, Vitzthum, H., Zool. Anz. 96: 187.
1957. H. (H.) holsaticus, Willmann, C., Abh. naturw. Ver. Bremen 35: 169.

Subgenus Saprogamasellus Goetz

1957. Halolaelaps (Saprogamasellus), Goetz, H. in Sellnick, M., Kgl. fysiogr. Sällskpt. Lund Förhandl. 27, 2

This subgenus is characterized by the following:

Tectum with three processes, usually denticulate. Anterior margin of posterior dorsal shield with incision. Peritreme

very.....

very short, usually only reaching to coxa III. Area between peritreme and dorsal shield provided with small platelets. Tarsus and tibia IV of the male notched.

Type species: Halolaelaps (Saprogamasellus) strenzkei

H. (Saprogamasellus) remanei Willmann

1939. Halolaelaps remanei, Willmann, C., Abh. naturw. Ver.
Bremen 31: 538.
1957. H. (S.) remanei, Willmann, C., Abh. naturw. Ver.
Bremen 35: 170.

H. (Saprogamasellus) nodosus Willmann

- 1952b. Halolaelaps nodosus, Willmann, C., Veröff. Inst.
Meeresforsch. Bremerh. 1: 141.
1954. Halolaelaps nodosus, Evans, G.O., Proc. zool. Soc.
Lond. 123: 793.
- 1956b. Halolaelaps nodosus, Hyatt, K.H., Entom. Gaz. 7: 15.
1957. H. (S.) nodosus, Willmann, C., Abh. naturw. Ver.
Bremen 35: 171.

H. (Saprogamasellus) strenzkei Goetz

1957. H. (Saprogamasellus) strenzkei, Goetz, H. in Sell-
nick, M., Kgl. fysiogr. Sällskpt. Lund Förhandl. 27
(2): 22.
1957. H. (S.) strenzkei, Willmann, C., Abh. naturw. Ver.
Bremen 35: 173.

H. (Saprogamasellus) coxalis Willmann

1957. H. (S.) coxalis, Willmann, C., Abh. naturw. Ver.
Bremen.....

Bremen 35: 175.

1957. H. (S.) coxalis, Willmann, C. in Sellnick, M., Kgl.
fysiogr. Sällskpt. Lund Förhandl. 27: 21.

H. (Saprogamasellus) incisus Hyatt

- 1956b. Halolaelaps incisus, Hyatt, K.H., Entom. Gaz. 7: 16.
1957. H. (S.) incisus, Willmann, C., Abh. naturw. Ver.
Bremen 35: 175.

H. (Saprogamasellus) simplex Willmann

1957. H. (S.) simplex, Willmann, C., Abh. naturw. Ver.
Bremen 35: 177.
1957. H. (S.) simplex, Willmann, C. in Sellnick, M., Kgl.
fysiogr. Sällskpt. Lund Förhandl. 27 (2): 21.

H. (Saprogamasellus) balticus Willmann

1957. H. (S.) balticus, Willmann, C., Abh. naturw. Ver.
Bremen 35: 177.
1957. H. (S.) balticus, Willmann, C. in Sellnick, M., Kgl.
fysiogr. Sällskpt. Lund Förhandl. 27 (2): 22.

H. (Saprogamasellus) suecicus Sellnick

1957. H. (Saprogamasellus) suecicus, Sellnick, M., Kgl.
fysiogr. Sällskpt. Lund Förhandl. 27 (2): 16.

Genus Saprolaelaps Leitner

1946. Saprolaelaps, Leitner, E., Zbl. Ges. Geb. Ent. Lienz
1: 142.

This.....

This genus was reviewed by Leitner (1946) and Hyatt (1956b).

The setae on the divided dorsal shield are simple. In the female the sternal shield is longer than broad and not fused with the endopodals. The genital shield is wedge-shaped and the anal shield is widely removed from it. The venter of the male is covered by a holovertral shield and the sterniti-genital region of this shield is fused with the endopodals. The stigma is situated in line with coxa IV and the peritreme extends beyond coxa I. The peritrema-tal shield is well developed and free. The tectum usually has an elongated denticulate process. Coxae II are provided with an acute spur on its anterior margin. Femur II is spurred in the male only. The specialized seta on the palp-tarsus has three prongs.

Type species: Saprolaelaps subtilis Leitner

Saprolaelaps punctulatus Leitner

1946. Saprolaelaps punctulatus, Leitner, E., Zbl. Ges. Geb. Ent. Lienz 1: 81, 147.

1956b. Saprolaelaps punctulatus, Hyatt, K.H., Entom. Gaz. 7:22.

Saprolaelaps bacchusi Hyatt

1956b. Saprolaelaps bacchusi, Hyatt, K.H., Entom. Gaz. 7:22.

Saprolaelaps subtilis Leitner

1946. Saprolaelaps subtilis, Leitner, E., Zbl. Ges. Geb. Ent. Lienz 1: 141.

Saprolaelaps sculpturatus (Sellnick)

1943.....

1943. Halolaelaps (?) sculpturatus, Sellnick, M., Göteborgs
Vetensk. Samh. Handl. (5) 6 B: 26.

Saprolaelaps curvisetosus Leitner

1946. Saprolaelaps curvisetosus, Leitner, E., Zbl. Ges.
Geb. Ent. Lienz 1: 145.

Saprolaelaps areolatus Leitner

1946. Saprolaelaps areolatus, Leitner, E., Zbl. Ges. Geb.
Ent. Lienz 1: 146.

Genus Leitneria Evans

1957. Leitneria, Evans, G.O., J. Linn. Soc. Lond. Zool.
43: 221.

Evans (1957) based this monotypical genus on a species described by Halbert (1923). In a key to the Rhodacaridae Evans characterized the genus as follows: Anterior margin of the posterior dorsal shield entire; female with ventri-anal shield considerably broader than long; coxa II in both sexes provided with a spur on its anterior margin; leg II only armed in the male. Habitat in humus.

Type species: Gamasellus (Protolaelaps) granulatus Halbert

Leitneria granulata (Halbert)

1923. Gamasellus (Protolaelaps) granulatus, Halbert, J.N.,
J. Linn. Soc. Lond. Zool. 35: 364.

Dimensions of female: Length, 363 u; breadth, 275 u.

The.....

The peritrematal shield is broad and projects behind coxa IV; the peritremes are sinuous. The posterior dorsal shield is undulate in front. The dorsal shields are punctured, faintly reticulate and they bear short and stout setae. Pre-endopodal shields are absent. The metasternal shields each bears a seta. The ventri-anal shield is twice as broad as long. The tectum has a long median process fringed with minute denticles. The chelicerae are minute. All the legs are provided with ambulacra.

Habitat and locality. Under stones, Ireland.

Genus Evanssellus, new genus

This genus is based on a new species of mite collected from beech litter, New Zealand. The author has great pleasure in naming this genus in honour of Dr. G. Owen Evans of the British Museum (Nat. Hist.), London.

Diagnosis:- Dorsal shield divided; vertical setae situated on prominent protuberances; sternal shield in female with four pairs of setae; pre-endopodal shields present; ventri-anal shield with 17 setae; peritrematal shield produced behind coxa IV; specialized seta on the palptarsus three-pronged; tectum denticulate; leg I without claws and pulvillus; legs provided with many spine-like setae; male with holoven-tral shield; male chelicera without prominent spermatophoral process.

Type species: Evanssellus foliatus, n.sp.

Evanssellus foliatus, n.sp.

Female:-

Dimensions: Length, 542 u; breadth, 311 u; leg I, 622 u

Dorsum (fig. 260). The dorsal shields are imbricate. The anterior dorsal shield bears 21 pairs of setae, the majority of which are leaf-like. The pectillate vertical setae are situated on prominent protuberances. The first pair of marginal setae (r1) are relatively long, curving inwards, and are placed on small tubercles. The setal bases of all the setae on the dorsum are prominent. Setae z2 on the anterior shield are smaller than the others. The posterior dorsal shield is also provided with 21 pairs of leaf-like setae. The shields do not cover the entire dorsum but the integument is devoid of setae.

Venter (fig. 261). The sternal shield is broader than long and has a concave posterior margin which is overlapped by a median process of the genital area. The shield bears four pairs of setae, the metasternal setae being much shorter than sternal setae I-III. The tritosternum has two pilose laciniae and its base is flanked by a pair of triangular pre-endopodal shields. The ventri-anal shield bears seven pairs of setae in addition to the circum-anal setae. The two pairs of setae situated near its anterior margin as well as the para-anal setae are simple; the others are broad and flattened. The para-anal setae are placed in line with the posterior margin of the anus. The peritrematal shield is provided with a peritreme which reaches anteriorly to a position beyond coxa I; the shield is produced slightly behind coxa IV. The stigma is situated in line with the posterior margin of coxa IV.

Gnathosoma (fig. 263). The fixed digit of the chelicera bears four teeth and a pilus dentilis (fig. 262); the movable digit is provided with two or three teeth. The hypostomal setae are normal, the inner posterior rostral setae being the longest (fig. 263). The corniculi are relatively small.....

small. The palp is provided with a few spine-like setae in addition to the normal simple setae. The specialized seta on the palptarsus is prominent and it has three prongs; one of the prongs is considerably shorter than the others. The tectum has a median process, the base of which is fringed with denticles (fig. 264).

Legs. Leg I (fig. 265) is longer than the idiosoma and it bears strong spine-like setae. Tarsus I is devoid of claws and pulvillus; these are replaced by a cluster of sensory setae, two of which are relatively long. Legs II-IV also bear spinous setae in addition to the normal ones; they are all provided with well developed claws and pulvilli (fig. 266).

Male:-

Dimensions: Length, 525 u; breadth, 290 u.

The venter of the male (fig. 267) is covered by a holoventral shield. The chaetotaxy of both the venter and dorsum resembles that of the female. The lateral portion of the venter has an incision, approaching the condition obtaining in the Ologamasus - Gamasiphis group. The male chelicerae are exceptional in that the spermatophoral process probably forms part of the original movable digit. It appears as if the large tooth of this digit acts as its terminal point (fig. 268). As far as could be determined the digit is open at its tip. The fixed digit bears three or four teeth. Leg II of the male is not armed to a much greater degree than that of the female; femur II, however, bears a relatively small additional spur. The other legs are basically the same as those of the female.

Habitat and locality. Holotype female, allotype male and paratypes from beech litter, Queenstown, New Zealand, July 1954; collector unknown. These specimens were put at the present.....

present author's disposal for description by Dr. G. Owen Evans, British Museum (Nat. Hist.), London.

Remarks. This new genus, together with the genera Rhodacarus and Antennoseius are the only known genera of the Rhodacarinae which have no claws and pulvilli on leg I. The nature of the venter, the chaetotaxy of the two dorsal shields and the shape of the tectum and chelicerae indicate that it should be referred to this subfamily.

Genus Saintdidieria Oudemans

1939. Saintdidieria, Oudemans, A.C., Zool. Anz. 126: 200.

Oudemans (1939) proposed this genus for a species he described as Parasitus sexclavatus (1903) and which he later referred to the genus Gamasellus. The characteristics which Oudemans ascribed to the genus were that they are the same as those of the genus Gamasellus except that the specialized seta on the palptarsus is three-pronged in Saintdidieria. As the members of Gamasellus also possess a three-pronged seta there are, according to Oudemans' interpretation of Saintdidieria, no other characters which would merit a separate genus for sexclavatus. The present author, however, is of the opinion that the genus should be regarded as valid until the opposite can be proved by the study of the adults. The genus, which is based on a deutonymph, may be characterized by the presence of short spine-like vertical setae; five pairs of setae on the sterniti-genital shield; the modification of some of the setae on the coxae into club-like processes (a character which may be present in only certain species) and the presence of three prongs on the specialized palptarsal seta.

Type: Parasitus sexclavatus Oudemans

Saintdidieria sexclavata Oudemans

1903. Parasitus sexclavatus, Oudemans, A.C., Tijdschr. Ned. Dierk. Ver. (2) 8 (2): 74.
1904. Parasitus sexclavatus, Berlese, A., Redia 1: 279.

Oudemans (1939) based the genus Saintdidieria on this species of which only the deutonymph is known. The sternitigenital shield bears five pairs of setae. The coxae of the palps (capitular setae) and legs II-III each bears a club-like seta. Oudemans (1903) describes the tectum as rounded anteriorly but according to his unpublished drawings of this species the tectum has a median mucro with serrations on its lateral sides. The vertical setae as well as many other setae on the body and legs are spine-like. The specialized seta on the palptarsus has three tines. All the legs are provided with well-developed claws and pulvilli. Leg I bears a relatively long seta, situated on a tubercle, on the tip of the tarsus. The fixed digit of the chelicera is dentate (two teeth) and the movable digit bears three teeth.

Habitat and locality. On Geotrupes sylvaticus, Netherlands.

Saintdidieria octoclavata(Vitzthum), new comb.

1920. Gamasellus octoclavatus, Vitzthum, H., Arch. Natg. 84 A, 6: 14.

The sternal shield is provided with five pairs of spine-like setae. A seta on each of coxae I-III as well as the capitular setae on the hypostome are modified into club-like processes. All the legs are relatively stout and have well-developed claws and pulvilli. The setae on the legs are spinous. According to Vitzthum the tectum is
without.....

without a median mucro but shaped like a Gothic arch and the palptarsal seta is "probably" two-pronged.

Habitat and locality. Collected from Hister sinuatus, Germany.

Remarks. This species is closely related to S. sexclavatus, orbinella (Schweizer), neoorbinella, n.sp. and possibly also to Gamasellus vulgaris Vitz. Vitzthum (1920) probably overlooked the median denticulate process of the tectum which is usually not easily discernible. It is also probable that the specialized seta on the palp has three tines.

Saintdidieria orbinella (Schweizer), new comb.

1949. Copriphus orbinellus, Schweizer, J., Res. Rech. Scient. Parc Nat. Suisse N.F. 2, 21: 76.

This species appears to be closely related to S. octoclavata, the club-like setae being situated on the hypostome and on coxae I-III. They can be separated from each other by the chaetotaxy of the posterior portion of the sternitigenital shield and the broad peritreme in orbinella. Only the deutonymph is known.

Habitat and locality. In moss, Switzerland

Remarks. Schmölzer (1956) described a species, Copriphus janetscheki, which he regarded as closely related to orbinella. His description is likewise based on a nymph with a divided dorsal shield. The setae on the hypostome and coxae II-III are modified into spurs but are not club-like; the genital setae are not situated on the shield; the chaetotaxy of the posterior part of the venter is not like other species of Saintdidieria or Gamasellus. Judging from the figure of the venter of this species it resembles those.....

those of the fam. Eviphididae, the family in which Schmölzer placed it.

Saintdidieria neorbinella, n.sp.

Deutonymph:-

Dimensions: Length, 368 u; breadth, 240 u; length of anterior dorsal shield, 231 u; posterior dorsal shield, 142 u. Dorsum (fig. 269). The dorsal shields are provided with short spine-like setae (fig. 270). The anterior dorsal shield which is considerably longer than the posterior one, bears 23 pairs of setae. The posterior dorsal shield, the front margin of which is overlapped by the anterior shield, carries 14 pairs of setae.

Venter (fig. 271). The sterniti-genital shield is provided with five pairs of simple setae. The posterior end of the shield is narrow to fit into the narrow space between coxae IV. The anal shield bears the usual three setae and the para-anals are situated in line with the middle of the anal aperture. As depicted in fig. 271 the ventral interscutal membrane is covered with a number of spine-like setae. The peritreme is broad and conspicuous and extends anteriorly beyond coxa I. The tritosternum has two pilose laciniae.

Gnathosoma (fig. 272). The most striking feature of the hypostome is the modification of the capitular setae into club-like processes. The inner posterior rostral setae are relatively long but no indication of the external rostral setae could be found in the specimens examined. The rostral setae, however, are present. The capitular groove has eight rows of small to minute denticles. The corniculi are relatively small. The distribution of the setae on the pedipalp is shown in fig. 272. The trochanter has the usual

two.....

two pairs of setae of the deutonymph and adult but one pair is modified into spines and the other into stout flattened setae, similar to those occurring on trochanters II-III (fig. 271). Other setae on the palp are either simple or spine-like. The specialized seta on the tarsus is three-pronged (fig. 273). The chelicerae are relatively short and both digits of the chelicera are tridentate (fig. 274). The tectum (fig. 275) has a triangular, relatively well-sclerotized basal portion and a median denticulate, transparent process. The latter part of the tectum is not always easily discernible and on superficial examination only the better sclerotized triangular portion is seen.

Legs. All the legs are short and stout and they are mainly covered with spine-like setae. All the tarsi are provided with pre-tarsi, claws and pulvilli, similar to those depicted in fig. 276 for tarsus I. The tip of tarsus I bears a long seta which is situated on a small tubercle. Coxae I-III are each provided with a club-like seta. Trochanters II-IV each bears a short stout, flattened seta, in addition to other spinous setae.

Habitat and locality. Holotype and paratype deutonymphs from Hister latipes, Potchefstroom, Jan. 1952; one paratype also came from an unidentified beetle, Pietermaritzburg, collected by R.F. Lawrence.

Remarks. As regards the number and positions of the club-like setae this species resembles S. octoclavata and orbinella. Both these species, however, are not described and figured in detail so that it makes comparison rather difficult. S. octoclavata is a larger species and, judging from Vitzthum's figure (1920) coxae IV are relatively widely removed from one another. S. orbinella appears to be very similar to the South African species but Schweizer (1949) gives a
very.....

very brief description and the characters employed in the species discrimination are not mentioned or figured. The size of this species is practically the same as that of the present species. Schweizer's species, however, was collected from moss at a height of 1800 m. under an overhanging rock. Bearing in mind its distribution and habitat as well as the fact that orbinalia was not described in detail the present author regards the South African form as a new species.

Systematic position of the genus Saintdidieria

The question as to whether this genus should be included in the Rhodacarinae cannot be answered in the affirmative until the adult forms are known. The general appearance of these mites are like those of members of the fam. Eviphididae, usually found associated with insects. The known deutonymphs of the eviphidids, however, have an entire dorsal shield (Ryke & Meyer, 1957). The dorsal chaetotaxy, especially of the anterior dorsal shield, suggests a relationship with the Rhodacarinae. Not a single known characteristic of the genus Saintdidieria suggests its reference to another family or subfamily. The author thus proposes that it should, provisionally, be included in the subfamily Rhodacarinae.

Genus Lobocephalus Kramer

1898b. Lobocephalus, Kramer, P., Zool. Anz. 21: 418.

Kramer (1898b) based this genus on a nymphal specimen. Baker & Wharton (1952), following Vitzthum (1940-43), placed this genus in the family Ascaidae which, according to them, are characterized by the presence of a divided dorsal shield. The present author, however, could not find any evidence in the.....

the literature (Kramer, 1898b and Oudemans, 1928) that this is the case in Lobocephalus. On the contrary, Oudemans (1928) states: "Das Rückenschild ist einfach und deckt die ganze Körperfläche völlig zu" (p. 116). Although the description of the species is brief it can be assumed that Lobocephalus does not belong in the same group as the other Rhodacarinae. It is, moreover, highly improbable that it can be included in the Ologamasinae. Until evidence comes to hand the systematic position of the genus remains uncertain.

Type species: Lobocephalus acuminatus Kramer

1898b. Lobocephalus acuminatus, Kramer, P., Zool. Anz. 21:418.

1928. Lobocephalus acuminatus, Oudemans, A.C., Arch. Natg. 92 A, 4: 115.

Genus Rhodacaroides Willmann

1959. Rhodacaroides, Willmann, C., Kieler Meeresforsch. Inst. Meeresk. Univ. Kiel 15, 1: 97.

After the present study of the Rhodacarinae was completed a recent publication of Willmann (1959) came to the author's notice. Willmann proposes the new genus Rhodacaroides to accommodate a species which was collected in the soil of the Egyptian coast of the Red Sea. He characterized it as follows:

The elongated body with its constriction behind coxae IV, the nature of the chelicerae and the shape of the tectum resemble the Rhodacarus group. Tarsus I is provided with a pre-tarsus, claws and pulvillus; in addition to these it bears six long rod-like sensory setae. The peritreme is long and reaches anteriorly to a position in line with coxae I. The anterior dorsal shield bears

23 pairs and the posterior dorsal shield 20 pairs of setae; one pair of setae is placed on the integument. The spermatophoral process is slender, tapering to a point. The punctate area of the sternal shield is absent and it is replaced by two pairs of pre-endopodal shields.

Type species: Rhodacaroides aegypticus Willmann

Rhodacaroides aegypticus Willmann

1959. Rhodacaroides aegypticus, Willmann, G., Kieler Meeresforsch. Inst. Meeresk. Univ. Kiel 15, 1: 98.

Dimensions of female: Length, 510 u; breadth, 300 u.

Willmann (1959) described both the female and male of this species. The main characteristics of the species are the same as those given for the genus.

Habitat and locality. In soilwater, Egyptian coast of the Red Sea.

VII. SUBFAMILY OLOGAMASINAE, New Subfam.

Type genus: Ologamasus Berlese

The subfamily Ologamasinae can be recognised by the following characteristics:

The dorsal shield is entire in the adults but divided in the nymphal stages. The ventri-anal shield is either free or partially or completely fused with the dorsal shield. The genital shield is usually more or less enclosed in a perigenital shield formed by the fusion of the sternal, podal and ventri-anal shields. They are free-living mites in soil, organic debris and mosses.

A discussion of the different genera and species of this subfamily falls outside the scope of the present paper. Since it is a new subfamily the author wishes to submit a list of the genera and subgenera he intends to include in it. The different genera comprising the subfamily will be revised in another paper which is still in preparation. These genera were formerly included in the families Parasitidae, Pseudoparasitidae and Neoparasitidae.

The names are given in alphabetical order and those regarded as synonyms are indicated as such.

1956b. ANTENNOLAEIAPS, Womersley, H., Trans. roy. Soc. S. Aust. 79: 112.

Type species: Antennolaelaps affinis Womersley, 1956.

1916a. EPIPHIS. Berlese, A., Redia 12: 302.

Type species: Gamasiphis (Epiphis) rarior Berlese 1916.

1904. GAMASIPHIS, Berlese, A., Redia 1: 261.

Type species: Gamasus pulchellus Berlese, 1887.

1956a.....

- 1956a. GAMASIPHOIDES, Womersley, H., J. Linn. Soc. Lond.
Zool. 42: 528.
Type: Gamasiphis (Gamasiphoides) propinqua Womersley
1956.
- 1956a. GAMASITUS, Womersley, H., J. Linn. Soc. Lond. Zool.
42: 531.
Type: Gamasitus obscurus Womersley 1956
1952. HETEROIPHIS. Trägårdh, I., Ark. Zool. 4: 55.
Type: Heteroiphis arcuatus Trägårdh 1952
(Regarded as a synonym of Gamasiphis)
1907. HEYDENIELLA Richters
(A synonym of Gamasiphis)
1892. HOLOGAMASUS Berlese
(Lapsus for Ologamasus)
1892. HYDROGAMASUS, Berlese, A., Acar. Myr. Scorp. 68: 5.
Type: Gamasus salinus Laboulbene 1851 (= Gamasus
littoralis G. & R. Canestrini 1881)
- 1956a. LAELAPTIELLA, Womersley, H., J. Linn. Soc. Lond.
Zool. 42: 512.
Type: Laelaptiella anomala Womersley 1956.
- 1938b. MEGALIPHIS, Willmann, C., Ann. Hist. nat. Mus.
hung. 31: 161.
Type: Gamasiphis (Megaliphis) giganteus Willmann 1938.
1914. MICRIPHIS, Berlese, A., Redia 10: 140.
Type: Gamasiphis gamasellus Berlese 1913.
1952.....

1952. NEOGAMASIPHIS, Trägårdh, I., Ark. Zool. 4: 57.
Type: Neogamasiphis hamifer Trägårdh 1952.
1914. OLOGAMASELLUS Berlese
(Synonym of Ologamasus)
1888. OLOGAMASUS, Berlese, A., Bull. Soc. ent. Ital. 20:194.
Type: Gamasus aberrans Berlese 1888
- 1956b. ONCHOGAMASUS, Womersley, H., Trans. roy. Soc. S.
Aust. 79: 108.
Type: Onchogamasus communis Womersley 1956.
- 1910b. PACHYSEIUS, Berlese, A., Redia 6: 255.
Type: Pachyseius humeralis Berlese 1910.
- 1956a. PARASITIPHIS, Womersley, H., J. Linn. Soc. Lond.
Zool. 42: 535.
Type: Parasitiphis littoralis Womersley 1956.
1914. PERIPHIS, Berlese, A., Redia 10: 142.
Type: Eumaeus hemisphaericus Koch 1842.
1908. PHYSALLOLAEIAPS, Berlese, A., Redia 5: 13.
Type: Physallolaelaps ampulliger Berlese 1908.
- 1956b. QUEENSLANDOLAEIAPS, Womersley, H., Trans. roy. Soc.
S. Aust. 79: 109.
Type: Queenslandolaelaps vitzthumi Womersley 1956.
1898. SESSILUNCUS, Canestrini, G., Termes Füz. 21: 486.
Type: Gamasus heterotarsus G. Canestrini 1897.
1904. TRACHYGAMASUS, Berlese, A., Redia 1: 235.
Type: Gamasus pusillus Berlese 1892.

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