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Volume 4

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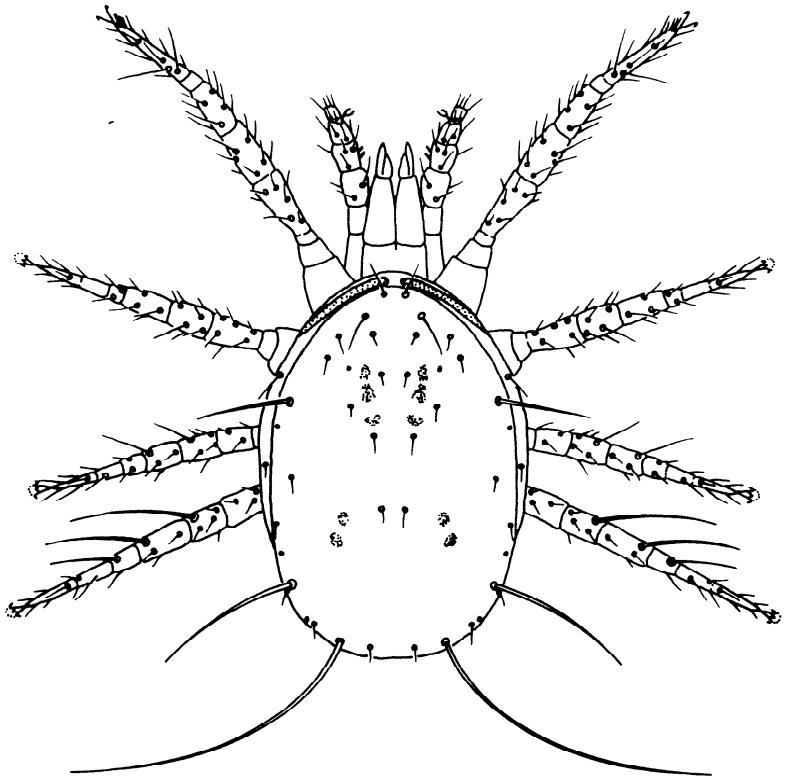
by

H. A. Denmark M. H. Muma



FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES
Doyle Conner, Commissioner

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A Revision of the Genus *Amblyseius* Berlese, 1914 (Acari: Phytoseiidae)

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ABSTRACT

Revision of the genus *Amblyseius* Berlese (Acari: Phytoseiidae), 149 pages, 770 figures, 1988 illustrations and descriptions are given for the 136 species included in this study. The synonymy is discussed and 10 new species described. Two new subgenera are described: *Multiseius* Denmark and Muma and *Pauciseius* Denmark and Muma. Plant hosts, food hosts, when known, and geographical distribution are given for each species.

FOREWORD

Mites of the family Phytoseiidae are predominately predatory. They probably are one of the most important mite predators of plant-feeding mites. They are moderate to relatively large in size, flattened-oval to nearly hemispherical in shape, and move rapidly in search of their prey. The life cycle from egg to adult is completed in 1-3 weeks. Phytoseiids have been collected on all continents and from the arctic to the tropics. They are found in a variety of terrestrial habitats. Although the food habits of phytoseiids have not been studied intensively, published accounts indicate a wide range of foods.

Amblyseius mites are abundant on shade trees, fruit trees, shrubs, vines, grass, moss, and osmunda. The genus *Amblyseius* is found also in decaying ferns, leaf litter, and soil. *Amblyseius* species have been found in association with or feeding on *Tetranychus* spp., *Brevipalpus* spp., scale crawlers, eriophyid mites, pollen, and honeydew.

The senior author, Harold Anderson Denmark, was born 3 July 1921. He attended public schools in Winter Garden, Florida. In 1941 he joined the United States Navy and served 6 years, much of that time with the Submarine Service in the Pacific Theater of Operation, discharged as a Signalman First Class. He received his B.S.A. degree with honors from the University of Florida in 1952. The following year he received his M.S. degree from the same institution. During this period he served as an interim instructor in the Department of Entomology.

In July 1953 he became an Entomologist with the State Plant Board of Florida (which, in 1961, became the Division of Plant Industry of the Florida Department of Agriculture). In July 1958 he became Chief Entomologist.

He is a member of Phi Kappa Phi and Gamma Sigma Delta honor societies, and in 1982 he was given the Achievement Award in Research by the Florida Entomological Society. He is a member of the Florida Entomological Society, having served as president in 1970, Entomological Society of America, Acarology Society of America, and American Registry of Professional Entomologists. He is author of 133 arthropod publications. His primary research interest is the biology, ecology, and taxonomy of Phytoseiidae. The Florida State Collection of Arthropods (FSCA), 5th largest arthropod collection (excluding Crustacea) in the United States, includes one of the best phytoseiid collections in the New World, built through Mr. Denmark's efforts. His research also include Homoptera: Aphididae and Thysanoptera.

On 30 November 1947, Harold married Thelma L. Odom. They have 2 children: Jamie Lynn Palmer of Clarksville, Tennessee and Harold Anderson Denmark, Jr. of Gainesville, Florida. Harold is a Deacon in the First Baptist Church, in Gainesville, Florida. His hobbies include tennis, swimming, and gardening.

The junior author, Martin Hammond Muma, was born in Topeka, Kansas, 24 July 1916. His professional training was obtained at Western Maryland College Extension Night School in 1933-34, Frostburg State Teachers College in 1935-36, and the University of Maryland in 1936-43. He received his B.S. degree in 1939, his M.S. in 1940, and his Ph.D. in 1943. From 1940-45, he served as an Instructor in Entomology and Assistant Entomologist at the University of Maryland; from 1945-51, he was Extension Entomologist and Associate Entomologist, Associate Entomologist, Associate Professor, and Associate Curator of The Museum at the University of Nebraska; 1951-71 he was Associate Entomologist, Associate Professor, and Entomologist and Professor at the University of Florida Citrus Experiment Station located near Lake Alfred, Florida where he was involved in research on the taxonomy, biology, ecology, and nonchemical control of injurious citrus insects and mites. Since 1971 Dr. Muma has continued his association with the University of Florida as an Emeritus Professor of Entomology. Since 1963 he has been a Research Associate of The Florida State Collection of Arthropods.

Although Dr. Muma's formal education and much of his official professional experience have been in the field of economic entomology, his favorite avocational fields are arachnology and speleology. In entomology he has investigated and contributed to the taxonomy, biology, ecology, and control of deciduous fruit insects, field crop insects, livestock parasites, and citrus insects and mites. In arachnology he has studied and contributed to the taxonomy, biology, and ecology of mites, spiders, tarantulas, scorpions, whip-scorpions, and solpugids. In speleology he has studied and contributed to cave biology, cave ecology, and cave terminology. He is author of a book, *Common Spiders of Maryland*, and author or coauthor of 190 scientific and nonscientific bulletins and papers.

Dr. Muma is a member of Alpha Zeta, Gamma Sigma Delta, Phi Kappa Phi, and Sigma Xi honor societies and a member of several professional organizations: Florida Entomological Society, Ecological Society of America, Society of Systematic Zoology, and Society of Animal Behavior.

On 14 September 1940, Martin married Katherine Elizabeth Short. They have 6 children: Bonnie, Leslie, Merrie, Sallie, Cherie, and Elsie. Martin is a Presbyterian. His hobbies include arachnology, speleology, and fishing.

Howard V. Weems, Jr.
Editor
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and Consumer Services
13 March 1989

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INTRODUCTION

The genus, *Amblyseius* Berlese, since it's erection in 1914 for 8 species, and it's expansion by Berlese in 1917, has had a varied systematic history. Oudemans (1936) did not recognize *Amblyseius* and placed Koch's and Berlese's species in *Typhlodromus* Scheuten. Vitzhum (1941) recognized *Amblyseius.* Garman (1948) recognized *Amblyseius* and described a subgenus *Amblyseiopsis* Garman. Nesbitt (1951) included *Amblyseius* in his taxonomic study of Phytoseiinae, Berlese (1916) and recognized Garman's subgenus. Womersley (1954) recognized *Amblyseius* and constructed a key to the then recognized species. All of these workers considered this genus to belong in the subfamily Phytoseiinae of the family Laelapidae.

Baker and Wharton (1952) apparently were the first acarologists to elevate the Phytoseiinae to a family status. Chant (1957) synonymized *Amblyseius* with *Typhlodromus* but retained the name as a subgenus. Athias-Henriot (1958) accepted Chant's synonymy of *Amblyseius* and also considered it a subgenus of *Typhlodromus.* Garman (1958) again recognized *Amblyseius* but maintained *Amblyseiopsis* as a separate genus. Chant, in his 1959 review of the family, maintained *Amblyseius* as a subgenus of *Typhlodromus* and included 60 species in what he considered to be the *obtusus* (Koch) species group. Muma, in his 1961 review of the subfamilies, genera, and species of Phytoseiidae, recognized the subfamily Amblyseiinae for Amblyseius and 19 other closely related genera. He also erected or recognized 4 subgenera that he considered to be closely related to the typical subgenus *Amblyseius.* Wainstein (1962) recognized *Amblyseius* and erected 7 subgenera and 8 sections for what he considered to be closely related forms. Chant (1965) recognized *Amblyseius* but synonymized all closely related genera and subgenera with it. Chant et al. (1978) analyzed the family Phytoseiidae using the methods of numerical taxonomy. They used 221 morphological characters in 93 species covering the major taxonomic groups that have been proposed within the family. Both weighted and unweighted character analyses were used. They concluded that neither the classical system, based mainly on dorsal chaetotaxy, nor the numerical system alone provides a completely acceptable classification of the family, but that numerical taxonomic analyses are useful as a tool in helping to determine the hierarchical organization of the group. Karg (1983) revised the genera and subgenera of Phytoseiidae, recognizing 10 genera and 26 subgenera in the tribe *Amblyseiini.*

In addition to the above cited studies, a number of local, state, or regional studies have also included information on the genus *Amblyseius* that is important to our knowledge of the size, variation, distribution, and complexity of this large, ubiquitous genus. Muma (1955) recognized *Amblyseius* and elevated the subgenus *Amblyseiopsis* to generic status in his review of phytoseiids associated with citrus in Florida. Athias-Henriot (1957) included *Amblyseius* in her review of the family Phytoseiidae of Algeria. Athias-Henriot (1966) cataloged 80 known species of what she considered to be Palearctic species of the genus *Amblyseius.* Pritchard and Baker (1962) described and listed 29 Central African species that they considered to be representatives of the genus. Schuster and Pritchard (1963) described 32 California species in the genus. Chant and Baker (1965) placed 29 Central American species in the genus. Van der Merwe (1968) described or listed 36 species in the genus from South Africa. Muma et al. (1970) described 6 species of the genus from Florida. Chant and Hansell (1971) described and listed 48 Canadian species in the genus. Arutunjan (1977) reviewed the family Phytoseiidae in the Armenian S.S.R., U.S.S.R. and included the subfamily Phytoseiinae and the genus *Amblyseius.*

Although most of these studies included species not recognized here as representing the genus, the number of true *Amblyseius* recorded indicate a large, widely distributed genus, involving a complex of sympatric and

allopatric species. Within the last 35 years, several workers have published reviews and revisions of the family Phytoseiidae using different nomenclatural systems for setal reference. Most important are those of Garman (1948), Nesbitt (1951), Womersley (1954), Athias-Henriot (1957, 1958, and 1960), Chant (1959), Muma (1961), Wainstein (1962), Hirschmann (1962), Pritchard and Baker (1962), Schuster and Pritchard (1963), Muma et al. (1970), Chant and Hansell (1971), and Chant et al. (1974). The nomenclatural system used in this paper is the same as used by Muma et al. (1970), with some additions.

It is evident from the above cited literature that there has been little agreement on the placement, status, and content of *Amblyseius* for most of the past 35 years. At the present time, however, all authors seemingly agree that *Amblyseius* is a valid genus of the tribe Amblyseiini in the family Phytoseiidae.

Berlese (1914) stated, "Furthermore, *Zercon obtusus* Koch, type of the genus *Amblyseius* cannot be exactly recognized, and I have (in A. [cari]., M. [yriopoda] et Scorp. [ione bucusque in] Ital. [ia reperta, 1882] mentioned a *Seius obtusus* (fasc. 54, N. 7), referring it to Koch's species and taking this form as type of the genus and defining it better here."

The type-species of *Amblyseius* is therefore *Zercon obtusus* Koch, as originally designated by Berlese in 1914 and based on material in the Berlese Collection identified as *obtusus* by him in 1882.

All authors have recognized Berlese's (1914) original designation of Koch's (1839) *Zercon obtusus* Koch as the type-species of *Amblyseius* Koch's type specimens have been lost or destroyed, and Koch's description and illustration are inadequate for placement of the species at the present time. There is no indication that Berlese ever saw the type specimens. He did not designate a neotype, a practice which was not done at that time. The following revisers Garman (1948), Nesbitt (1951), Womersley (1954), Chant (1959), Karg (1960), and Muma (1961), also presented inadequate descriptions and illustrations for placement of this species. There are 2 slides in Berlese's collection labeled *Amblyseius obtusus* (Koch). The collection data on the slides 22/14 and 19/10 read in translation "Florence, Boboli, rotten palm leaves". Prof. Dr. Fausta Pegazzano kindly furnished the following measurements of the slide 22/14 — length 440, width 305, M_3 170, L_8 300, Sge IV 112, Sti IV 102, St IV 68, spermatheca not visible. At a later date this slide was remounted and examined by Dr. Salvatore Ragusa. Dr. Ragusa reported (personal correspondence) that although the specimen is badly broken with some missing setae, the spermatheca is visible and is *Amblyseius obtusus* as recognized by authors and similar to the species described by Karg (1960). This slide is designated as the neotype of *Amblyseius obtusus*. Slide 19/10 — length 350, width 235, M_3 125, L_8 190, Sge IV 98, Sti IV 80, St IV 70, spermatheca saccular fits the description of *Amblyseius sellnicki* (1960). Wainstein and Shcherbak (1972) illustrated *A. obtusus* and agreed with Karg.

All workers, except Muma et al. (1970) have included in *Amblyseius* a wide variety of species, many of which have been designated to be members of other genera. These genera include *Phytoscutus* Muma, *Phytoscutella* Muma, *Amblyseiulella* Muma, *Proprioseiopsis* Muma, *Platyseiella* Muma, *Amblyscutus* Muma, *Cynodromella* Muma, *Amblyseiella* Muma, *Typhlodromopsis* De Leon, *Typhlodromips* De Leon, *Typhlodromalus* Muma, *Neoseiulus* Hughes, *Euseius* Wainstein, *Iphiseius* Berlese, *Iphiseiodes* De Leon, *Phyllodromus* De Leon, *Phytodromus* Muma, *Typhloseiella* Muma, *Typhloseius* Muma, *Mesoseiulus* Gonzales and Schuster, *Trochoseius* Pritchard and Baker, *Paraphytoseius* Swirski and Schechter, *Proprioseiulus* Muma and Denmark, *Nothoseius* Wainstein, *Paragigagnathus* Amitai and Grinberg, *Phytocerus* Amitai and Swirski, *Eharius* Tuttle and Muma, *Indoseiulus* Ehara, *Kampimodromus* Nesbitt, *Kashmerius* Chaudhri, *Chelaseius* Muma and Denmark, *Fundiseius* Muma and Denmark, Paraamblyseius Muma, *Ricoseius* De Leon, *Cydnoseius* Muma, *Denmarkia* Chaudhri, *Arrenoseius* Wainstein, *Amathia* Chaudhri, *Carinoseius* Wainstein, *Chileseius* Gonzales and Schuster, and *Avoiseius* Karg.

The present authors are here again restricting *Amblyseius* to the *Amblyseius (Amblyseius)* concept of Muma (1961) and are synonymizing the subgenus *Amblyseialus,* Muma (1961) with the typical subgenus, except as modified by Muma et al. (1970).

The genus *Amblyseius* is here revised and 2 new subgenera, *Multiseius* Denmark and Muma, new subgenus, and *Pauciseius* Denmark and Muma, new subgenus, are described. The new species are deposited in The Florida State Collection of Arthropods (FSCA) and The United States National Museum of Natural History (USNMNH). Other abbreviations for museums are Canadian National Collection (CNC); Museum of Comparative Zoology, at Harvard (MCZ); and Department de Zoologia, Escola Superior de Agricultura "Luis de Querioz" (ESCALQ), Universaidade de Sao Paulo, Brazil; Biological and Chemical Research Institute, Rydalmere, Australia (BCRI).

Where we were unable to borrow specimens from other phytoseiid workers, the original illustrations and their descriptions were used most frequently.

The type of *Amblyseius athiasae* (Hirschmann) is lost, and we are unable to place the species in one of the three subgenera. Species described by Bernhard in the genus *Amblyseius* that remain unknown are: *denticulosus, erlangensis,* and *reticulatus. Amblyseius lemani* Tencalla and Mathys was described from an immature specimen that is in very poor condition.

Other species that are either unknown, questionable, or not available for study and are not included in the revision are: *Amblyseius brevipalpus* Berlese, *Amblyseius caudalus* Berlese, *Amblyseius foenalis* Berlese, *Amblyseius fraterculus* Berlese, *Amblyseius hexagonus* Berlese, *Amblyseius longulus* Berlese, *Amblyseius perlongisetus* Berlese, *Amblyseius setatus* Berlese, *Amblyseius tuscus* Berlese, and *Amblyseius magnanalis* Thor.

Genus *Amblyseius* Berlese

Amblyseius Berlese, 1914: 143; Oudemans, 1936: 268; Vitzhum, 1941: 767; Garman, 1948: 11; Nesbitt, 1951: 15; Womersley, 1954: 188; Athias-Henriot, 1958: 336 (in part); Chant, 1957: 528; Chant, 1959: 66 (in part); Muma, 1961: 287; De Leon, 1966: 88; Muma et al., 1970: 62; Chant and Hansell, 1971: 704-758 (in part).

TYPE SPECIES — *Zercon obtusus* Koch, subsequent designation, Berlese 1914.

FEMALE — Moderate to large sized species. All measurements are given in microns. Dorsal scutum 306 to 450 long and 199 to 370 wide at L_4.

Dorsum — Chaetotaxy = verticals, clunals, 4 pairs of dorsal (D), 3 pairs of median (M), M_2 missing in some species), 8 pairs of lateral (L), and 2 pairs of sublateral (S) setae are usually found on the interscutal membrane (Some species may have 1 or both missing); verticals smooth and minute to moderate in length; clunals smooth and minute in length. Dorsal setae moderate to long and smooth or plumose. Median setae smooth or plumose and minute to very long in length. Lateral setae smooth or plumose and minute to very long in length. Dorsal scutum smooth with scattered marks indicating muscle attachment apodemes, and usually 2 to several pairs of pores (Fig.1).

Venter — Chaetotaxy = 3 sternals (St), 3 preanals (PAS), 2-3 ventrolateral (Vl), and a pair of caudal setae (Cs). Sternal scutum smooth to slightly creased, longer than wide, or no longer than wide, with 3 pairs of smooth, moderate in length, sternal setae, 2 pairs of pores, and concave posteriorly. Metasternal scuta with a smooth, moderate length seta. Genital scutum as wide as to narrower than ventrianal scutum, smooth to slightly creased, and a pair of setae smooth and moderate in length. Ventrianal scutum variable in shape, usually equals the width of the genital scutum, smooth, slightly creased, or imbricated, maybe divided but usually undivided with 3 pairs of smooth moderate length, preanal setae. Two to 4 pairs (usually 3) of smooth, moderate length, ventrolateral setae, and 1 pair of caudal setae. Primary and secondary metapodal scuta present, primary elongate, secondary elongate, or crescent-shaped (Fig. 2). Peritremes extending anteriorly usually to or beyond verticals; stigmatal scutum with a large primary pore and 1 - 2 secondary pores; peritremal scutum extending as an ectal strip around the exopodal scutum of leg IV (Fig. 3).

Spermatheca — Cervix fundibular, saccular, vesicular, tubular, or pocular in shape, 5 to 47 in length with modular, c-shaped, bifid, undifferentiated or differentiated atrium (Fig. 4).

Chelicerae — Normal in size in relation to body size, 0-4 denticules on movable finger, and 2-13 on fixed finger (Fig. 5).

Legs I through IV — Macrosetal chaetotaxy = 2, 1-2, 1-3, 3. Leg 1 always has an erect macroseta near the base of the tarsus that extends nearly perpendicular to the tarsal surface (St 1). Genu II with 7-8 setae arranged as follows: 2 - 2-2/0 - 1 or 2 - 2/1 -2/0 -1; Genu III with 6 - 7 setae arranged as follows: 1 - 2-2/0 - 1 or 1 - 2/1 - 2/0 - 1. Leg formula (longest leg in descending order): 4123 or 1423.

MALE — Smaller than female with shorter setae. Ventriannal scutum shield-shaped with 3 pairs of smooth moderate in length setae, a pair of pores, and creased or reticulated (Fig. 6). Spermatodactyl with foot subterminal, toe normal to enlarged, heel obscure, and lateral process obscure to distinct (Fig. 7). Macrosetae on leg IV shorter but proportional to those of females.

DISCUSSION — This genus is closely related to *Chelaseius* Muma and Denmark but differs in having chelicerae normal in size, in relation to body size, and the sternal scutum longer than wide, or length and width approximately equal. In *Chelaseius,* the sternal scutum is distinctly wider than long, and the chelicerae are large in relation to body size. There are no denticules on the movable finger and only 3 -5 on the fixed finger. Other characters are similar. Early workers erroneously placed most species of Phytoseiidae in *Amblyseius* or *Typhlodromus. Amblyseius* here is restricted to those species that have characters as described above. There are approximately 136 species that are placed in 3 subgenera. We recognize species groups within each subgenus based primarily on morphological characters of the spermathecae. These groups are delineated in each subgenus. Other species will be listed, but not in a subgenus, as the authors were unable to examine them. Some species are found in the tropics while other species are found as far north as the Northwest Territories in Canada.

Members of this genus have been found in association with or feeding on *Tetranychus* spp., *Brevipalpus* spp., scale crawlers, eriophyid mites, pollen, and honeydew. The host plants include shade trees, fruit trees, shrubs, vines, grasses, moss, and osmunda. The genus is found also in decaying ferns, leaf litter, and soil.

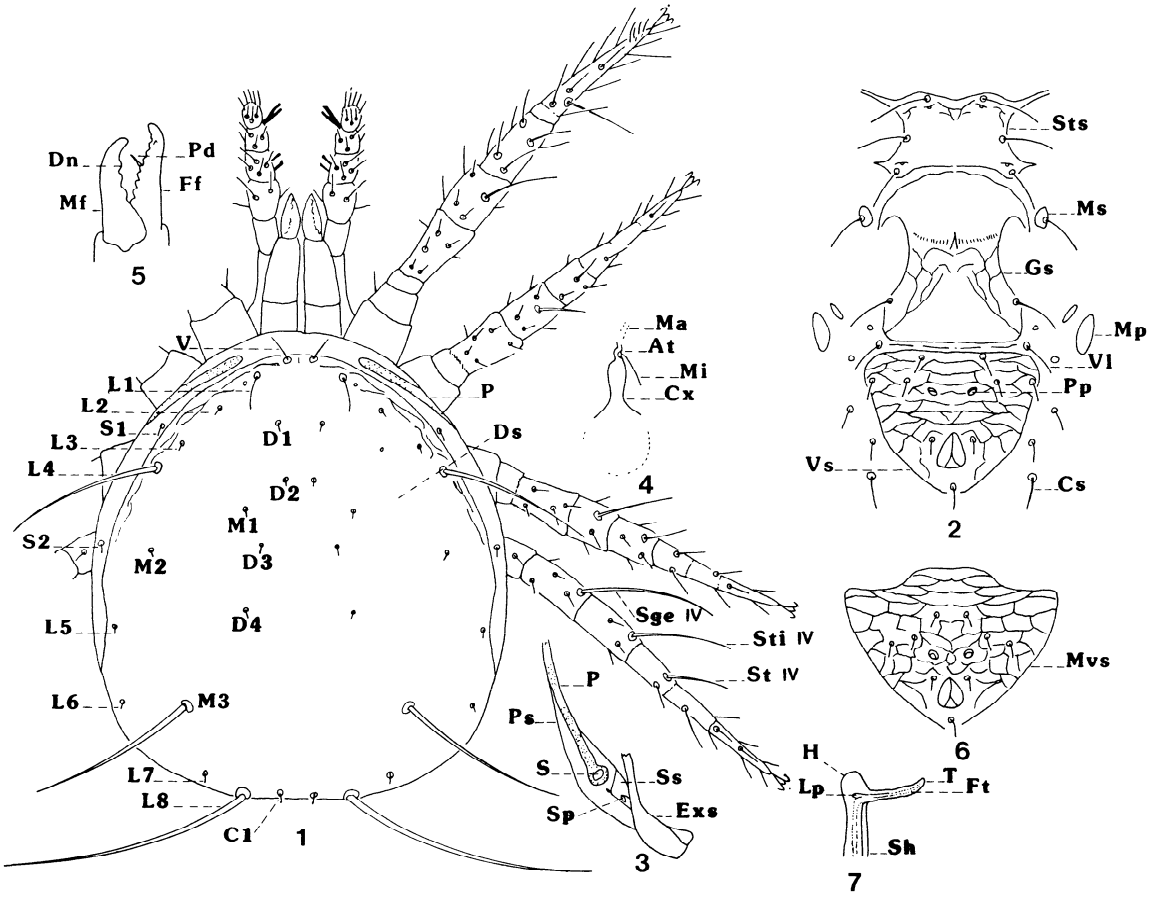
Key to Subgenera of *Amblyseius* Berlese

1. Fixed cheliceral finger with less than 8 (usually 3-5) denticules. Leg 4 macrosetae not graded in length, seta on genu, tibia or tarsus may be longest or shortest group ..... *Pauciseius* Denmark and Muma n. subgen., p. 132
— Fixed cheliceral finger with 8 or more denticules. Leg 4 macrosetae partly to completely graded in length 2
2. Leg 4 macrosetae graded in length, longest to shortest, from tibia to tarsus ..... *Amblyseius* Berlese, p. 6
— Leg 4 macrosetae partly graded in length, seta on genu always longer than seta on tibia, but longer or shorter than seta on tarsus ..... *Multiseius* Denmark and Muma n. subgen., p. 82

TERMINOLOGY

SIZE: Small 200-300, moderate 301-400, large 401-500. Setal length: minute — less than half of the width of genu IV; moderate — half to twice the width of genu IV; long — more than 2 to 4 times the width of genu IV; very long — more than 4 times the width of genu IV of the species in question.

ABBREVIATIONS: At-atrium, Cl-clunal setae, Cs-caudal setae, Cx-cervix, D_1-D_4-dorsal setae, Dn-denticule, Ds-dorsal scutum, Ect-exctal strip, Exs-leg IV exopodal



scutum, Ff-fixed finger, Ft-foot, Gs-genital scutum, H-heel, L_1-L_8-lateral setae, Lp-lateral process, M_1-M_3-median setae, Ma-major duct, Mf-movable finger, Mi-minor duct, Mp-metapodal scutum, Ms-metasternal scutum, P-peritreme, Pd-*pilus dentilis*, Pp-preanal pore, Ps-peritremal scutum, S_1-S_2-sublateral setae, S-stigmata, Sge I-IV-genual macroseta, Sh-shank, Sp-secondary pore, Ss-stigmatal scutum, St I-IV-tarsal macroseta, Sti III-IV-tibial macroseta, Sts-sternal scutum, T-toe.

SPERMATHECAL TERMINOLOGY: Terminology concerning the spermathecae is that of Schuster and Smith (1960), modified from Dosse (1958), and utilized by Muma, Denmark, and De Leon (1970).

The innermost structure of the spermatheca is the sack in which the male spermatophores are stored within the body of the female; it is seldom more than faintly, and even then evanescently, definable. The mesal end of the cervix opens into this spermatophore storage area; it is usually definable, but not in every female and frequently not on both sides of the same female. It lies between or just mesad of the coxae of legs III and IV of the adult female. At its ectal end, it is attached to the atrium, which opens into the major duct, through which the spermatophores are introduced into the female. In most, if not all species, the atrium also opens into the minor duct. The minor duct is not always definable within the same species and not definable at all on certain species. It is believed that the minor duct carries the sperm to fertilize the eggs as the female lays them, or after they are laid.

The structure and form of the spermathecal cervices and atria have been utilized by many workers in comparing and distinguishing species of phytoseiids. Muma, Denmark and De Leon (1970) utilized a series of descriptive terms in describing the structures. The following definitions update and refine this terminology from 1970 - 1987.

CERVICES

Coniform (same in 1970), having a horn-like shape.

Fundibular (fundibuliform in 1970), having a tapered or funnel-like shape.

Pocular (poculiform in 1970), shaped like a cup or bowl, either wider than long, as long as wide, or only slightly longer than wide.

Saccular (same in 1970), shaped like a sack, sack-like, longer than wide by a ratio of 1.5 - 4 times width.

Tubular (same in 1970), shaped like a tube or pipe, tube-like, 4.5 times or more longer than wide.

Vesicular (same in 1970), partly swollen like a bladder, bladder-like.

Combinations of these terms are used sometimes when the cervix seems to be compound or complex; i.e. tubular-pocular means that the ectal portion is tube-like but the mesal portion is cup-like.

ATRIA

Undifferentiated (same 1970), cannot be located at all.

Differentiated (not used in 1970), can be located by thickened walls, darkened walls, granulation, or location of minor duct.

Nodular (same in 1970), node of nut-like in shape.

Amblyseius (Amblyseius) Berlese

Amblyseius Berlese, 1914: 143; Athias-Henriot, 1958: 336 (in part); Chant, 1957: 528; Chant, 1959: 66 (in part); Muma, 1961: 287; De Leon, 1966: 88; Muma and Denmark, 1970: 62; Chant, 1971: 704-758 (in part).

TYPE SPECIES — *Zercon obtusus* Koch, 1839, by subsequent designation, Berlese, 1914.

Females of this, the typical subgenus, always have Sge IV longer than Sti IV which is longer than St IV. The Ff of the chelicerae with 8 more denticules and the Mf with 0 to 4. L_8 long to very long (150 to 400+). M_3 usually 100 to 150+. Species in this subgenus are found on grasses, vines, forest trees, fruit trees, palms, and in ground surface litter.

SPECIES GROUPS OF *AMBLYSEIUS (AMBLYSEIUS)* BERLESE

OBTUSUS GROUP
A. obtusus (Koch)
A. isuki Chant and Hansell
A. abbasovae Wainstein and Begljarov

LASSUS GROUP
A. lassus Schuster
A. koumacensis Schicha

TAMATAVENSIS GROUP
A. tamatavensis Blommers
A. channabasavanni Gupta and Daniels

AERIALIS GROUP
A. aerialis Muma
A. solus Denmark and Matthysse
A. anacardii De Leon

SUNDI GROUP
A. sundi Pritchard and Baker
A. parasundi Blommers
A. corderoi Chant and Baker

AMERICANUS GROUP
A. americanus Garman
A. nicola Chant
A. pritchardellus Athias-Henriot
A. kalandadzei Gomelauri
A. mazatlanus Denmark and Muma n.sp
A. duncansoni Specht and Rasmy
A. euvertex Karg
A. januaricus Wainstein and Vartapetov

PUNCTATUS GROUP
A. punctatus Muma
A. kulini Gupta
A. raoiellus Denmark and Muma n. sp.
A. hederae Denmark and Muma n. sp.
A. saopaulus Denmark and Muma

SCHUSTERI GROUP
A. schusteri (Chant)
A. ishizuchiensis Ehara
A. curiosus (Chant and Baker)
A. neobernhardi Athias-Henriot

PRAVUS GROUP
A. pravus Denmark
A. impressus Denmark and Muma
A. fieldsi Denmark and Muma n.sp.
A. kaguya Ehara
A. paucisetis Wainstein

ORIENTALIS GROUP
A. orientalis Ehara
A. firmus Ehara
A. multidentatus (Chant)
A. waltersi Schicha

OPERCULATUS GROUP
A. operculatus De Leon
A. shiganus Ehara
A. collaris Karg
A. passiflorae Blommers

GRACILIS GROUP
A. gracilis (Garman)
A. cessator De Leon
A. chilcotti Chant

LARGOENSIS GROUP
A. largoensis (Muma)
A. sakalava Blommers
A. herbicoloides McMurtry and Moraes
A. fijiensis McMurtry and Moraes
A. herbicolus (Chant)
A. nambourensis Schicha
A. phillipsi McMurtry and Schicha
A. fletcheri Schicha
A. vazimba Blommers
A. adhatodae Muma
A. ankaratrae Blommers

INVICTUS GROUP
A. invictus Schuster
A. chungas Denmark and Muma n. sp.
A. genualis De Leon
A. adjaricus Wainstein and Vartapetov
A. euanalis Karg

SAURUS GROUP
A. saurus De Leon
A. modestus (Chant and Baker)

SILVATICUS GROUP
A. silvaticus (Chant)
A. silvestris Denmark and Muma n.sp.

UNASSIGNED SPECIES GROUP
A. acalyphus Denmark and Muma
A. boina Blommers
A. cucurbitae Rather
A. hainanensis Wu
A. irinae Wainstein and Aruntunjan
A. lentiginosus Denmark and Schicha
A. megaporos De Leon

Key to the species groups in the subgenus *Amblyseuis (Amblyseius)*

1. Cervix tubular or tubular with various modifications 2
— Cervix not tubular or with various modifications 3
2. Cervix elongate tubular-pocular with stippled or fuzzy cervix wall and nodular atrium or cervix elongate slightly fundibular with crimped cervix wall and differentiated atria *Obtusus* group, p. 7
— Cervix short tubular with thin or thick cervix walls and atrium small c-shaped or large c-shaped... ..... *Lassus* group, p. 11
— Cervix elongate tubular-pocular and undiffentiated atria..... *Tamatavensis* group, p. 12
— Cervix short or long tubular and a nodular atria ..... *Aerialis* group, p. 15
— Cervix long narrow tubular flared internally and a nodular atria..... *Sundi* group, p. 18
— Cervix tubular-fundibular with c-shaped or differentiated atria..... *Gracilis* group, p. 50
— Cervix long slender tubular or fundibular with nodular, triangular, or waferoid atria..... ..... *Largoensis* group, p. 54
— Cervis tubular-fundibular with vesicular enlargement at ectal end and nodular to c-shaped atria ..... *Saurus* group, p. 70
3. Cervix saccular or saccular with various modifications 4
— Cervix not saccular or not saccular with various modifications 5
4. Cervix short to moderate size saccular-flared with nodular, differentiated, or c-shaped atria..... ..... *Americanus* group, p. 21
— Cervix long saccular swollen externally and/or distinctly flared internally and differentiated to slightly nodular atria..*Punctatus* group, p. 28
— Cervix saccular with thick wall ectally and thin wall internally and nodular or bifid atria..... ..... *Schusteri* group, p. 33
— Cervix saccular with nodular or undifferentiated atria..... *Orientalis* group, p. 42
— Cervix saccular or saccular-fundibular with differentiated or tiny bifid atria..... ..... *Operculatus* group, p. 46
5. Cervix long slender fundibular to broadly fundibular and nodular or differentiated atria..... ..... *Invictus* group, p. 65
— Cervix not fundibular..... 6
6. Cervix short pocular and c-shaped or undifferentiated atria..... *Silvaticus* group, p. 72
— Cervix pocular and undifferentiated, diffcrentiated, bifid, or nodular atria...*Pravus* group, p. 37

OBTUSUS GROUP

Three species are assigned to this group. They are *A. obtusus* (Koch), *A. isuki* Chant and Hansell, and *A. abbasovae* Wainstein and Begljarov. *A. obtusus,* as presently recognized, has an elongate tubular-pocular stippled, and/or fuzzy cervix wall, and a nodular atrium. *A. isuki* has an elongate ribbed tubular-pocular cervix, and a nodular atrium. *A. abbasovae* has an elongate slightly fundibular cervix and a differentiated but not distinctly nodular atrium all covered with "crimped membrane."

Key to females in *obtusus* group

1. Spermatheca with slightly fundibular cervix.... ....*abbasovae* Wainstein and Begljarov, p. 10
— Spermatheca ccrvix not fundibular but has cervix elongate tubular-pocular.....2
2. Verticals 30, L_1 40, L_4 105, and cervix 20-23... .....*obtusus* (Koch), p. 7
— Verticals 16, L_1 29, L_4 87, and cervix 13..... .....*isuki* Ehara, p. 9

Amblyseius obtusus (Koch)

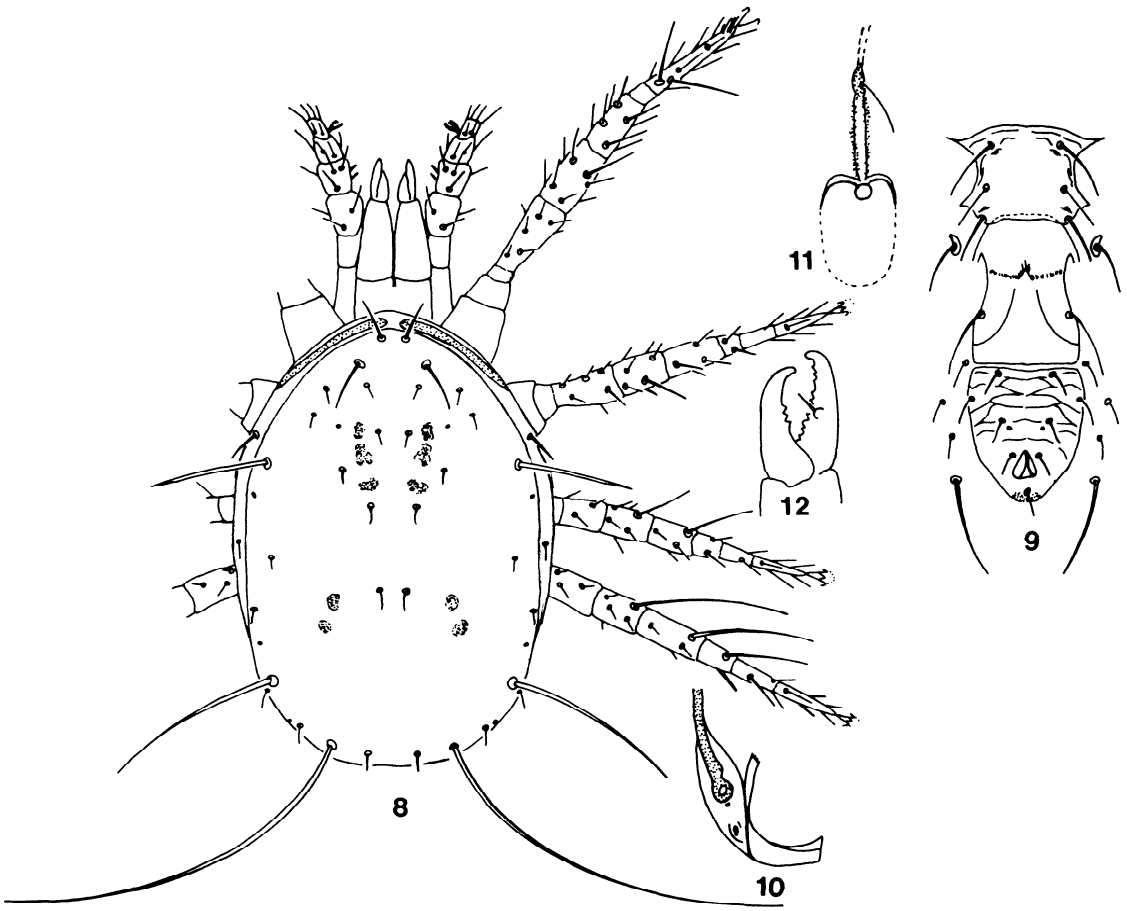
Fig. 8-12

Zercon obtusus Koch, 1839: 13; Canestrini and Fanzago, 1876: 130-141; Oudemans, 1930: 71.
Sejus obtusus (Koch), Berlese, 1889: 19.
Amblyseius obtusus (Koch), Berlese, 1914: 143; Womersley, 1954: 188-189; Athias-Henriot, 1957: 340-341; Athias-Henriot, 1958: 27-28.
Typhlodromus obtusus (Berlese) (ex. Koch) sic Chant, 1957: 306; Sellnick, 1958: 29; Karg, 1960: 441.
Typhlodromus perlongisetus affatisetus Wainstein, 1960: 683.
Amblyseius microsetae Muma, 1961: 289. NEW SYNONYM.
Amblyseius rhabdus, Denmark, 1965: 95. NEW SYNONYM.
Amblyseius kurashvilii Gomelauri, 1968: 515-517. NEW SYNONYM.
Amblyseius bajulus Chaudhri, 1979: 70. NEW SYNONYM.

TYPE — The type specimen of *obtusus* apparently has been lost. Location of the above cited synonyms is as follows: *T. perlongisetus affatisetus* Wainstein, Academy of Science (Borok, Yaroslavl District); *A. microsetae* Muma (USNMNH); *A. rhabdus* Denmark (FSCA); *A. kurashvilii* Gomelauri, in Gomelauri's collection; *A. bajulus* Chaudhri, University of Agriculture, Faisalabad, Pakistan.

DIAGNOSIS — *Amblyseius obtusus* is similar to *Amblyseius isuki* Chant and Hansell but differs in having the verticals approximately twice as long and the spermatheca approximately 0.40 longer than in *isuki.*

FEMALE — Length 349-378; width at L_4 259-276. Dorsal scutum smooth with scattered muscle marks, 4 or more small pores, and 17 pairs of setae. Measurements of setae: verticals 30; D_1 6, D_2 6, D_3 8, D_4 11; clunals 10; L_1 40, L_2 8, L_3 10, L_4 105, L_5 15, L_6 15, L_7 15, L_8 310; M_1 6, M_2 13, M_3 148. Anterior sublaterals 15; posterior sublaterals 12. Sternal scutum smooth to slightly creased, 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of small round pores posterior to the posterior pair of preanal setae, reticulated, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 11-13 denticules, and movable finger with 2-3 denticules. Leg formula 4123. Macrosetae Sge IV 126,



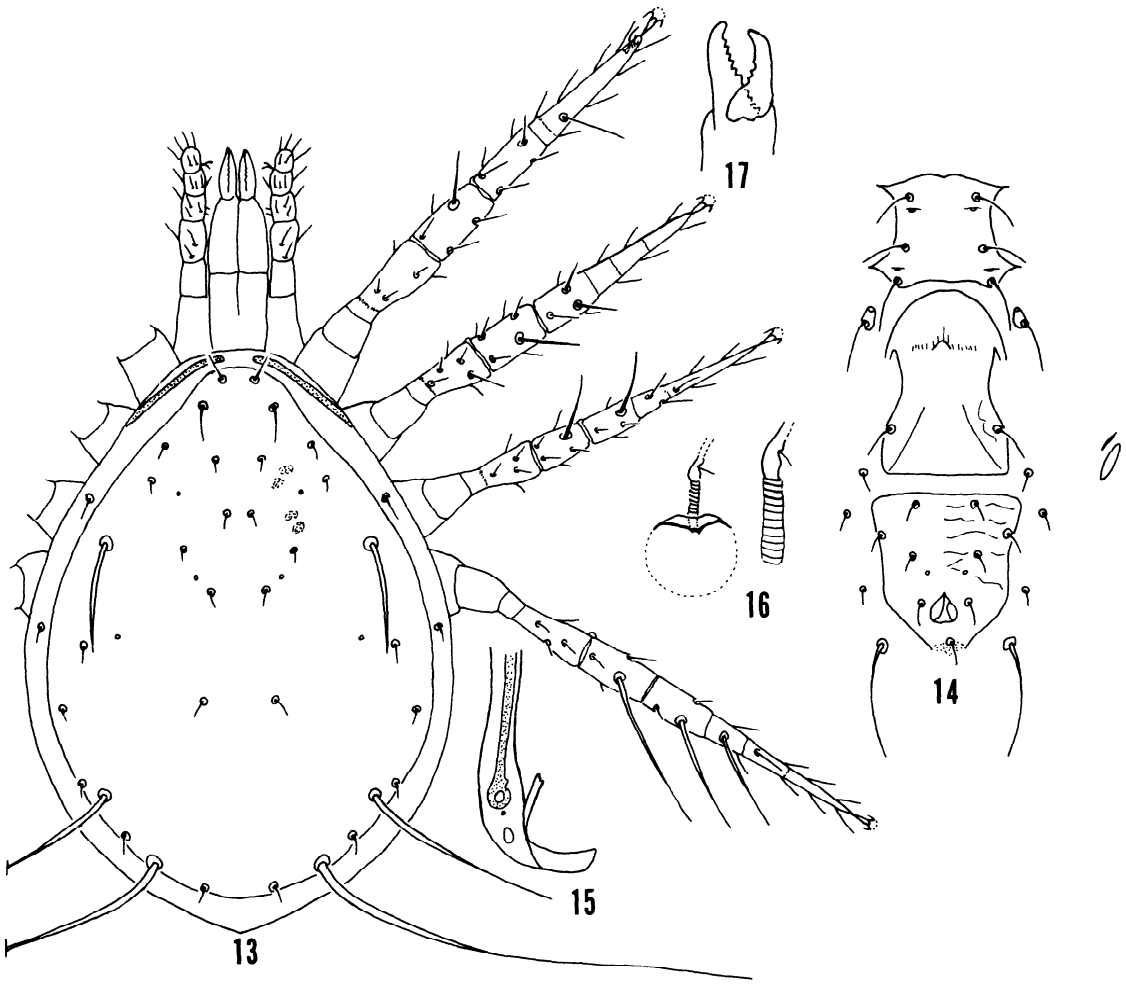
Figs. 8-12. *Amblyseius obtusus* (Koch): 8. Dorsal and leg structure of female, 9. Ventral scuta and setation of female, 10. Posterior peritremal and stigmatal development of female, 11. Spermathecal structure of female, 12. Cheliceral structure of female.

Sti IV 102, St IV 79. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/0 - 2/1 - 1. Spermatheca with an elongate tubular-pocular cervix 20 - 23 and a nodular atrium.

MALE — Similar to female but smaller. Spermatodactyl with foot terminal and lateral process obscure to distinct. Ventrianal scutum reticulated, a pair of pores, and 3 pairs of preanal setae.

DISCUSSION — This species is known from Russia, Germany, Italy, Pakistan, and United States. In Florida, this species is found in sod.

Karg (1960), Denmark (1965), and Arutunjan (1977) illustrated the spermatheca with the dorsal and ventral characters of *Amblyseius*. Karg (1960) described it and separated *Amblyseius sellnicki* Karg, (slide 19/10 in Berlese's collection) a closely related species of *Amblyseius obtusus* (Koch) that was identified by Berlese as *obtusus* (1914). Denmark described it as *Amblyseius rhabdus* Denmark (1965). Arutunjan (1977) illustrated this species as *Amblyseius obtusus* (Koch). Prasad reported this species in Hawaii in 1968, but did not illustrate it. Athias-Henriot (1958) illustrated the dorsal and ventral characters but did not illustrate the spermatheca. Karg (1960) stated that this species was common in Europe and appeared to be widespread. Wainstein (1975) recognized *affatisetus* as a junior synonym of *obtusus*. The senior author examined this species and agreed with Wainstein. All specimens are in Wainstein's collection. The holotype of *microsetae* (USNMNH) was examined and found to be a junior synonym of *obtusus*. It was collected from rotting fir bark at Corvallis, Oregon. *A. rhabdus* holotype (USNMNH) was reexamined and found to be a junior synonym of *obtusus*. The type drawing of *A. rhabdus* was sent to Dr. Karg who agreed it was *obtusus*. All specimens were taken from Bermuda grass and *Paspalum notatum* sod. *A. kurashvilii* was not available for examination, but it is considered here as a junior synonym based on the description and drawings of the type specimen in Gomelauri's collection. *A. bajulus* is considered here a junior synonym of *obtusus* based on the description and illustrations. The type is in the University of Agriculture, Faisalabad, Pakistan. Nothing is known of its food habits.



Figs. 13-17. *Amblyseius isuki* Chant and Hansell: 13. Dorsal and leg structure of female, 14. Ventral scuta and setation of female, 15. Posterior peritremal and stigmatal development of female, 16. Spermathecal structure of female, 17. Cheliceral structure of female.

Amblyseius isuki Chant and Hansell
Fig. 13-17

Typhlodromus (Amblyseius) perlongisetus (Berlese), Chant 1957: 299-300; 1959: 84 (misidentification). *Amblyseius isuki* Chant and Hansell 1971: 714.

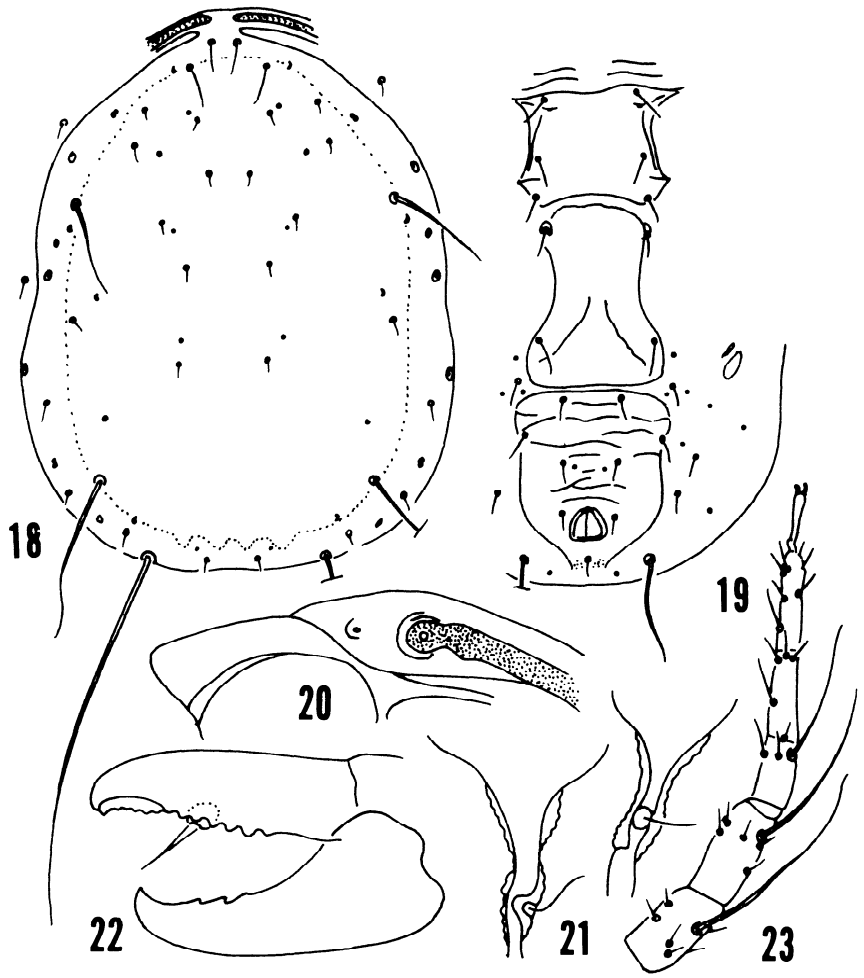
TYPE — Female holotype, Canada: near West Summerland, British Columbia, 6-VII-1956, D.A. Chant, on wild gooseberry (CNC).

DIAGNOSIS — *Amblyseius isuki* Chant and Hansell is similar to *Amblyseius obtusus* (Koch) but differs in having the verticals only half as long as in *obtusus*, and a different spermathecal cervix.

FEMALE — Length 361; width at L_4 230. Dorsal scutum smooth with scattered muscle marks, especially on the anterior area at least 3 small pores, and 17 pairs of setae. Measurements of setae: verticals 16; D_1 5, D_2 5, D_3 6, D_4 15; clunals 8; L_1 29, L_2 6, L_3 6, L_4 87, L_5 9, L_6 8, L_7 11, L_8 310; M_1 5, M_2 12, M_3 150; anterior sublaterals 20; posterior sublaterals 10. Sternal scutum smooth with 2 pores and 3 pairs of setae. Ventrianal scutum with a pair of small round pores posterior to the posterior pair of preanal setae, slightly creased, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending forward beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 115, Sti IV 98, St IV 63. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/0 - 1. Spermatheca with tubular-pocular cervix 13 and nodular atrium.

MALE — Unknown.

DISCUSSION — This species is known only from British Columbia, Canada. Nothing is known about the food habits of *A. isuki*. Only the holotype was studied.



Figs. 18-23. *Amblyseius abbasovae* Wainstein and Begljarov: 18. Dorsal and leg structure of female, 19. Ventral scuta and setation of female, 20. Posterior peritremal and stigmatal development of female, 21. Spermathecal structure of female, 22. Cheliceral structure of female, 23. Leg IV and setation (after Wainstein and Begljarov).

Amblyseius abbasovae Wainstein and Begljarov

Fig. 18-23

Amblyseius abbasovae Wainstain and Begljarov, 1971: 1807-1808.

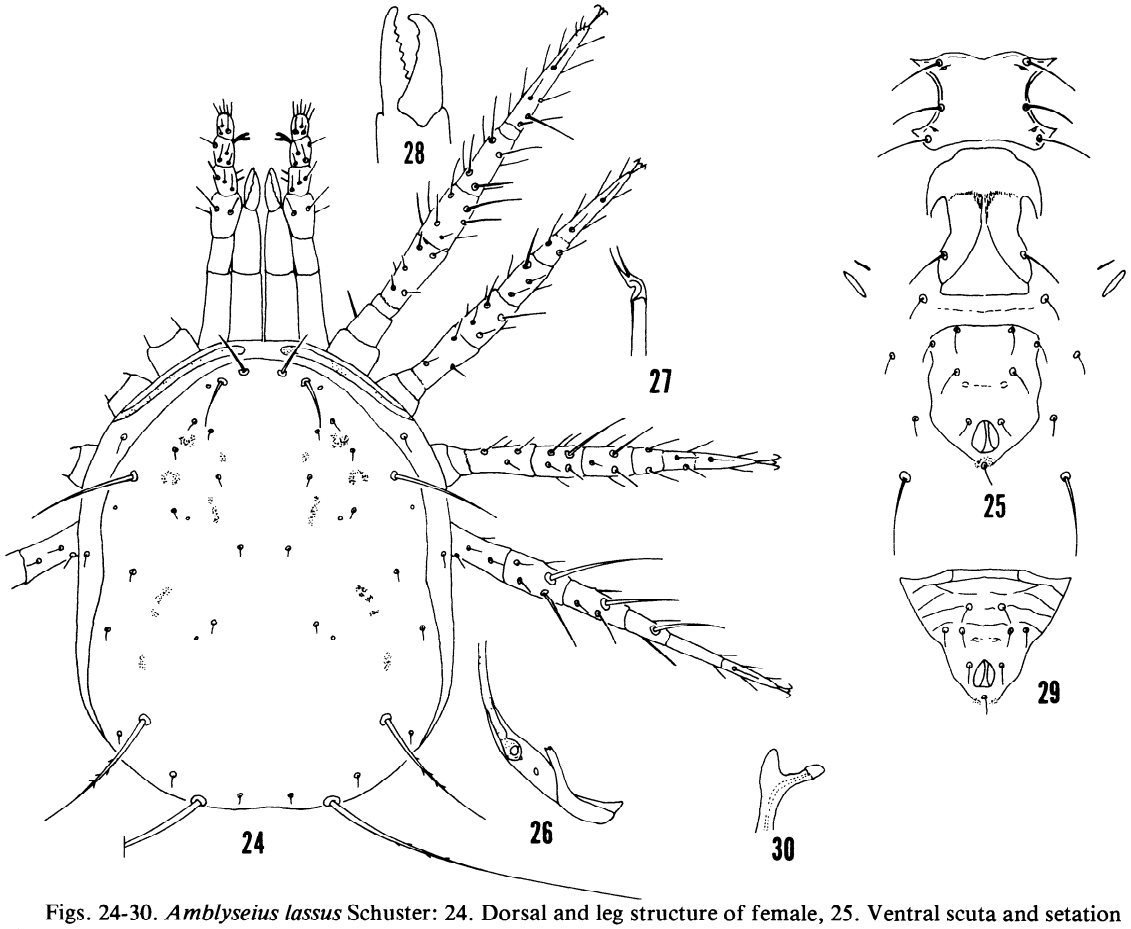
TYPE — Female holotype, U.S.S.R.: Kamen-Rybolov, Primorsky Territory, 26 VII 1962, water meadow of Daubicha river on grass, in Institute of Zoology, Academy of Science of the Ukranian S.S.R., Kiev.

DIAGNOSIS — *Amblyseius abbasovae* is unique in having a slightly fundibular-pocular cervix covered with a "crimped" membrane. The fixed finger of the chelicerae has 4-5 small denticules apically and 4-5 large denticules proximally. Otherwise it seems to group naturally with *obtusus* and *isuki*.

FEMALE — Length 370; width 270. Dorsal scutum smooth with 7 pairs of large pores, 4 pairs of small pores, 4 pairs of marginal pores, and 17 pairs of setae. The sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum slightly creased with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Chelicerae normal in relation to body size, fixed finger with 1 large denticule, and 4-5 small denticules distally, 6-7 large denticules proximally, and 3 denticules on the movable finger. Peritreme extending anteriorly to the verticals. Macrosetae on leg IV with longest on Sge IV, next longest on Sti IV, and shortest on St IV. Spermatheca with fundibular flared cervix covered with a "crimped" membrane and c-shaped atrium.

MALE — Unknown.

DISCUSSION — This species is known only from Russia. It has been taken at Kamen-Rybolov on grasses and at Kraskino on *Polygonum* sp. Nothing is known about the biology of this species. Measurements were given for setal length in the original description. The authors did not see this specimen. The drawings and description are from Wainstein and Begljarov (1971).



Figs. 24-30. *Amblyseius lassus* Schuster: 24. Dorsal and leg structure of female, 25. Ventral scuta and setation of female, 26. Posterior peritremal and stigmatal development of female, 27. Spermathecal structure of female, 28. Cheliceral structure of female, 29. Ventrianal scutum of male, 30. Spermatodactyl structure of male.

LASSUS GROUP

Two species are assigned to this group. They are *A. lassus* Schuster and *A. koumacensis* Schicha. Both species exhibit a large c-shaped atrium. The short tubular cervix is thin-walled in *A. lassus* and thick-walled in *A. koumacensis*. The latter species lacks M_2, but there is a tiny pore in the proper location for M_2 that may be the precursor for, or a replacement of the seta.

Key to females in *lassus* group

1. M_2 present ..... *lassus* Schuster, p. 11
— M_2 absent ..... *koumacensis* Schicha, p. 12

Amblyseius lassus Schuster
Fig. 24-30

Amblyseius lassus Schuster, 1966: 334.

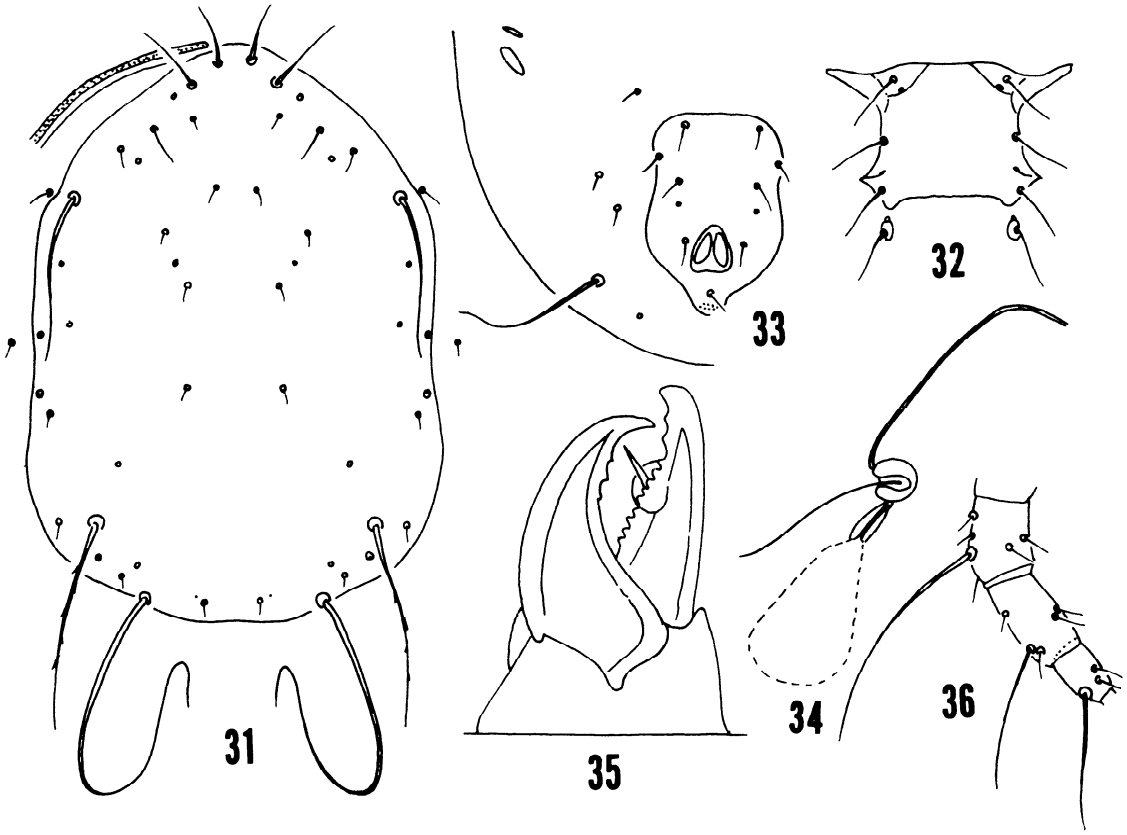
TYPE — Female holotype, Galapagos, Isla Santa Cruz, Darwin Research Station, 24 I 1964, I. Wiggins, on *Vallesia glabra* (Carv.) Link, in Department of Entomology, University of California, Davis.

DIAGNOSIS — See *A. koumacensis*.

FEMALE — Length 359; width at L_4 236. Dorsal scutum smooth with 4-5 small scattered pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 33; D_1 4, D_2 4, D_3 6, D_4 8; clunals 8; L_1 38, L_2 8, L_3 9, L_4 81, L_5 11, L_6 9, L_7 8, L_8 251; M_1 6, M_2 8, M_3 106; anterior sublaterals 13; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Chelicerae normal in relation to body size, fixed finger with 10-12 denticules, and movable finger with 3-4 denticules. Leg formula 4123. Macrosetae Sge IV 100, Sti IV 66, St IV 63. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/0 - 2/1 - 1. Spermatheca with tubular cervix 14 and c-shaped atrium.

MALE — The male is similar to the female but smaller. The ventrianal scutum lightly creased with a pair of elliptical pores and 3 pairs of preanal setae. The spermatodactyl with foot terminal, toe enlarged and lateral process indistinct.

DISCUSSION — Nothing is known about the biology and life history of this species. It has been taken only in the Galapagos Islands.



Figs. 31-36. *Amblyseius koumacensis* Schicha: 31. Dorsal structure of female, 32. Sternal scutum of female, 33. Ventrianal scutum of female, 34. Spermathecal structure of female, 35. Cheliceral structure of female, 36. Leg IV and setation of female (after Schicha).

Amblyseius koumacensis Schicha
Fig. 31-36

Amblyseius koumacensis Schicha, 1981: 42-45.

TYPE — Female holotype, New Caledonia: Koumac, 1 XII 1978, E. Schicha, on *Diospyros* sp. (BCRI).

DIAGNOSIS — *Amblyseius koumacensis* is similar to *Amblyseius lassus* but differs in having L_2 18, M_2 missing, and spermatheca with large c-shaped atrium of the spermatheca as opposed to L_2 8, M_2 present, and small c-shaped atrium of the spermatheca in *lassus*.

FEMALE — Length 278; width at L_4 159. Dorsal scutum smooth with 7 pairs of large pores, 4 pairs of small pores, and 16 pairs of setae. Measurements of setae: verticals 30; D_1 5, D_2 5, D_3 5, D_4 5; clunals 7; L_1 40, L_2 18, L_3 11, L_4 92, L_5 6, L_6 7, L_7 5, L_8 229; M_1 4, (M_2 missing), M_3 109; anterior sublaterals 13; posterior sublaterals 5. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Macrosetae Sge IV 110, Sti IV 75, St IV 66. Spermatheca with short tubular cervix 6 with large c-shaped atrium.

MALE — Unknown.

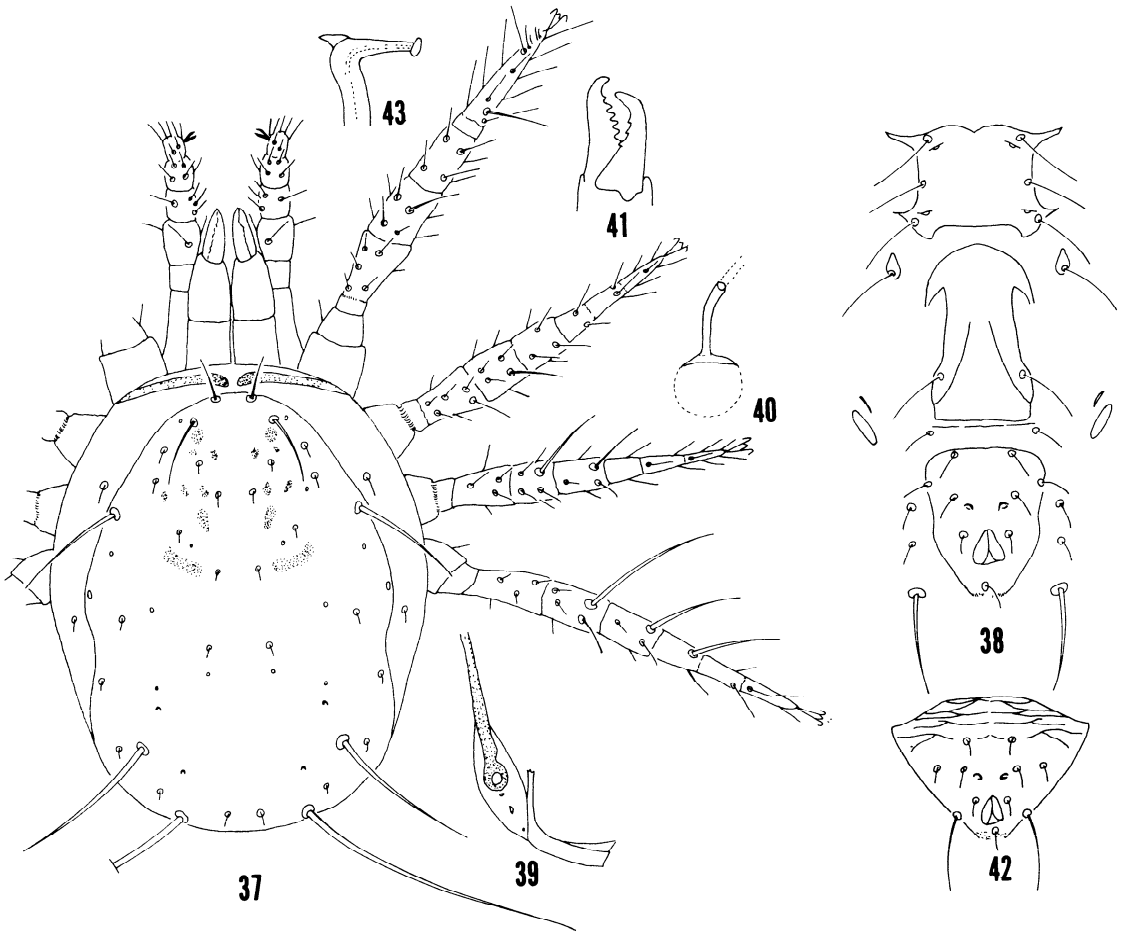
DISCUSSION — This species is known only from the type specimen. Nothing is known about the biology of this species. The drawing and description are taken from Schicha (1981) as the authors were unable to see the specimen.

TAMATAVENSIS GROUP

Two species are assigned to this species group. They are *A. tamatavensis* Blommers and *A. channabasavanni* Gupta and Daniel. Both species have an elongate tubular-pocular cervix and an undifferentiated atrium. The species are readily distinguishable on the basis of dorsal scutal setal spacing and lengths, and dentition of movable cheliceral finger.

Key to females in *tamatavensis* group

1. Cervix longer than 30, M_3 shorter than 100.... ....*channabasavanni* Gupta and Daniel, p. 14
— Cervix shorter than 30, M_3 longer than 100.... .....*tamatavensis* Blommers, p. 13



Figs. 37-43. *Amblyseius tamatavensis* Blommers: 37. Dorsal and leg structure of female, 38. Ventral scuta and setation of female, 39. Posterior peritremal and stigmatal development of female, 40. Spermathecal structure of female, 41. Cheliceral structure of female, 42. Ventrianal scutum of male, 43. Spermatodactyl structure of male.

Amblyseius tamatavensis Blommers

Fig. 37-43

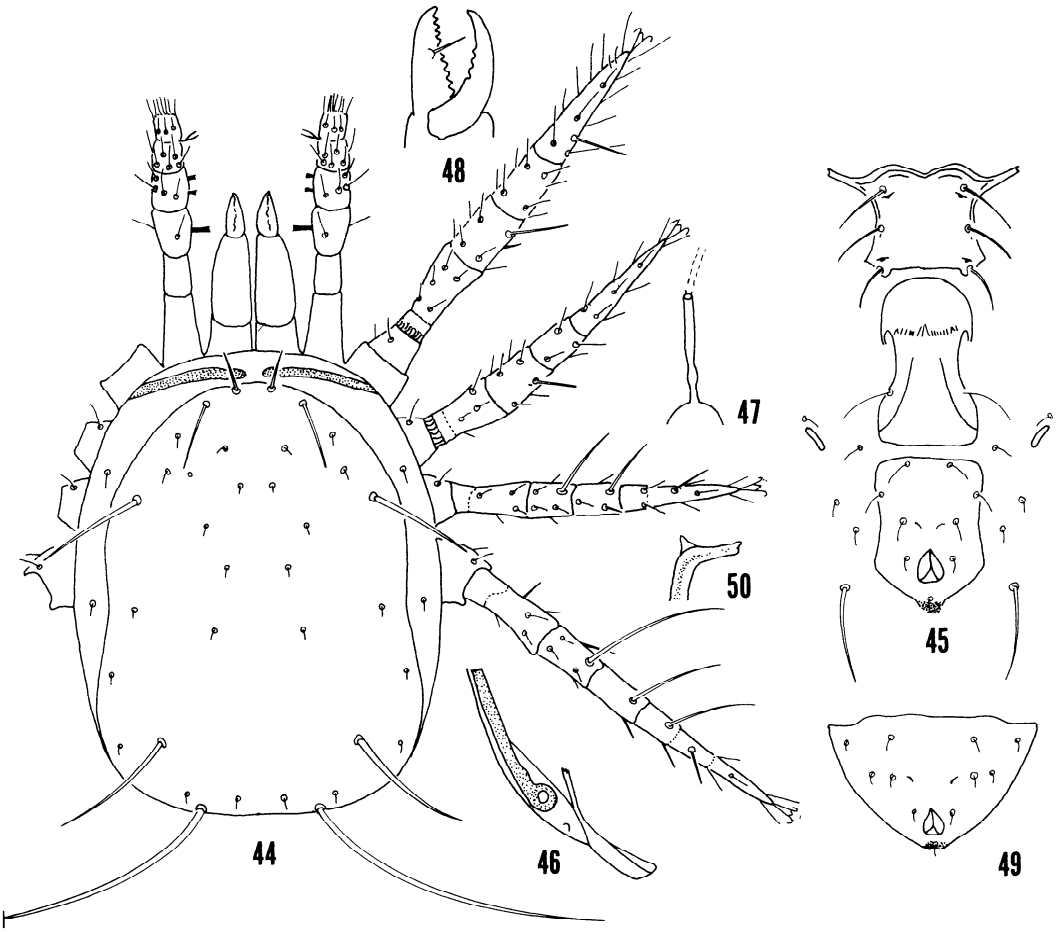
Amblyseius tamatavensis Blommers, 1974: 144.
Amblyseius maai Tseng, 1976: 123. NEW SYNONYM.
Amblyseius aegyptiacus Denmark and Matthysse, 1981: 343. NEW SYNONYM.

TYPE — Female holotype, Madagascar: Ivoloina, near Tamatave, 1 VIII 1972, L. Blommers, on *Citrus limon* (L.). Burm. f., in Institute of Taxonomic Zoology (Zoologisch Museum) University of Amsterdam.

DIAGNOSIS — *Amblyseius tamatavensis* is similar to *Amblyseius channabasavanni* Gupta and Daniel but differs in having St IV 70-72, spermathecal cervix 16-19, fixed finger of the chelicerae with 11-12 denticules, and 3 pairs of preanal setae on the ventrianal scutum in the male as apposed to St IV 61, spermathecal cervix 32, fixed finger of the chelicerae with 9 denticlues, and 4 pairs of preanal setae on the ventrianal scutum in the male in *channabasavanni.*

FEMALE — Length 330; width at L_4 204. Dorsal scutum smooth with 8-10 small to medium sized pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 29; D_1 5, D_2 5, D_3 5, D_4 5; clunals 6: L_1 53, L_2 6, L_3 6, L_4 84, L_5 5, L_6 5, L_7 5, L_8 251; M_1 5, M_2 5, M_3 115; anterior sublaterals 12; posterior sublaterals 6. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Chelicerae normal in relation to body size, fixed finger with 11-12 denticules, and movable finger with 3-4 denticules. Leg formula 4123. Macroseate Sge IV 108-113, Sti IV 75-89, St IV 70-72. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with tubular-pocular cervix 16-19 and undifferentiated atrium.

MALE — Similar to female but smaller size. The ventrianal scutum reticulated anteriorly with a pair of elliptical pores and 3 pairs of preanal setae. The spermatodactyl with foot terminal, lateral process present, and toe enlarged.



Figs. 44-50. *Amblyseius channabasavanni* Gupta and Daniels: 44. Dorsal and leg structure of female, 45. Ventral scuta and setation of female, 46. Posterior peritremal and stigmatal development of female, 47. Spermathecal structure of female, 48. Cheliceral structure of female, 49. Ventrianal scutum of male, 50. Spermatodactyl structure of male.

DISCUSSION — This species has been laboratory-reared on *Oligonychus coffee* (Nietner) and on *Tetranychus neocaledonicus* Andre plus pollen and bee honey (Blommers 1976). This species was described by Denmark and Matthysse (1981) from Nigeria as *Amblyseius aegyptiacus*. Tseng (1976) described this species as *Amblyseius maai* Taiwan on *Achyranthes aspera* L. *A. tamatavensis* has been taken on lemon leaves, *Citrus limon, Phaseolus* sp., *Leontis* sp., and *Ipomoea* sp. all from Madagascar. Matthysse (1981) collected it in Nigeria on *Solanum incanum* L. and *Luffa aegypticaca* Mill. in association with the vegetable spider mite, *Tetranychus neocaledonicus* Andre, *Oligonychus gossypii* (Zacher), and *Brevipalpus californicus* (Banks). *A. maai* was examined and found to be a junior synonym.

Amblyseius channabasavanni Gupta & Daniel

Fig. 44-50

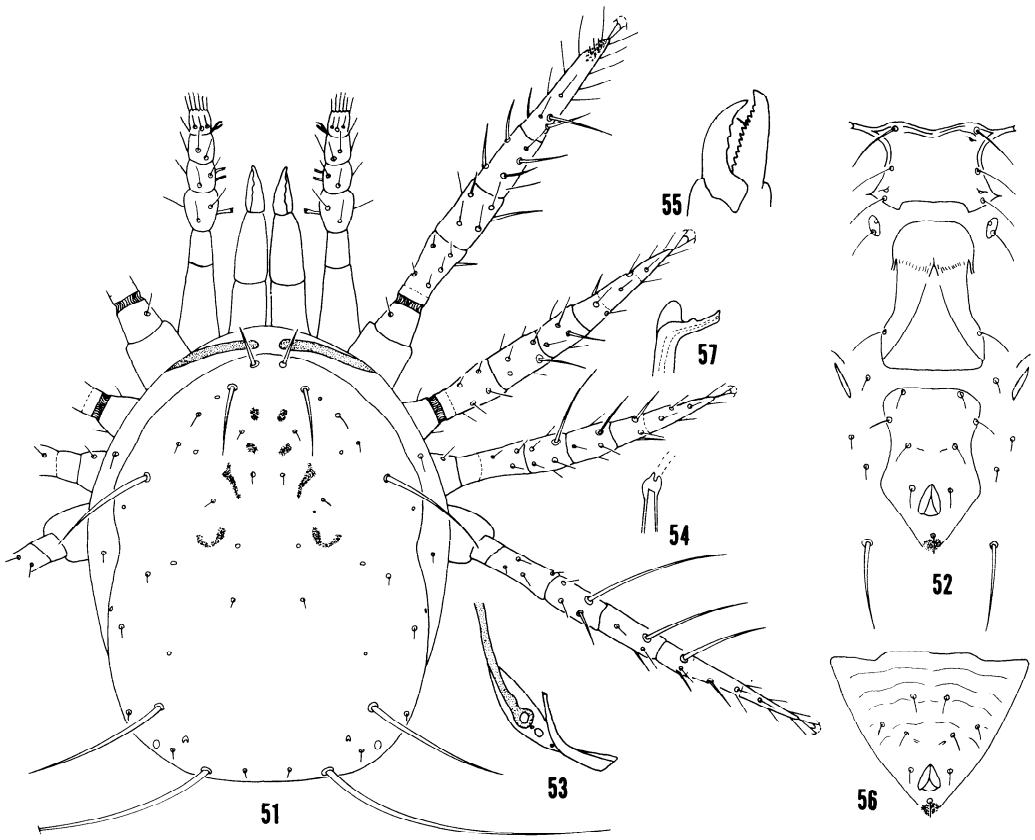
Amblyseius channabasavanni Gupta and Daniel, 1978: 328-329.

TYPE — Female holotype, India: Kirala, Trevandrum, 14 XII 1975, S.K. Gupta on *Chrysanthemum* sp., in National Collection of the Zoological Survey of India, Calcutta.

DIAGNOSIS — See *A. tamatavensis* Blommers.

FEMALE — Length 365; width at L_4 235. Dorsal scutum smooth with 17 pairs of setae. Measurements of setae: verticals 31; D_1 6, D_2 4, D_3 4, D_4 6; clunals 7; L_1 52, L_2 9, L_3 9, L_4 80, L_5 8, L_6 8, L_7 8, L_8 235; M_1 4, M_2 6, M_3 94; anterior sublaterals 13; posterior sublaterals 8. Sternal scutum lightly creased anteriorly and laterally, 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth, a pair of elliptical pores, and 3 pair of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, movable finger with 4 denticules. Leg formula 1423. Macrosetae Sge IV 109, Sti IV 80, St IV 61. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with tubular-pocular cervix 32 and undifferentiated atrium.

MALE — Similar to female, but smaller. The



Figs. 51-57. *Amblyseius aerialis* (Muma): 51. Dorsal and leg strucutre of female, 52. Ventral scuta and setation of female, 53. Posterior peritremal and stigmatal development, 54. Spermathecal structure of female, 55. Cheliceral structure of female, 56. Ventrianal scutum of male, 57. Spermatodactyl structure of male.

ventrianal scutum smooth, a pair of elliptical pores, and 3 pairs of preanal setae. The spermatodactyl has foot subterminal and toe slightly forked. Lateral process distinct.

DISCUSSION — Nothing is known about the biology of this species. It has been collected only in India on *Chrysanthemum* sp. and *Dahlia* sp.

AERIALIS GROUP

Three species are assigned to this specific group. They are *A. aerialis* (Muma), *A. solus* Denmark and Matthysse, and *A. anacardii* De Leon. *A. aerialis* has a short, distinctly nodular, spermathecal atrium and a very short tubular cervix. *A. solus* has a very distinct short nodular atrium and the longest tubular cervix. *A. anacardii* has an indistinctly nodular, short atrium, and a short, but thick-walled, tubular cervix.

The 3 species may also be distinguished by dorsal scutal setae spacing and size and by macrosetal size. It should also be noted that these 3 species appear to have more than 1 erect seta on tarsus I.

Key to females in *aerialis* group

1. L_8 longer than 300, Sge IV 150, Sti IV 100 .... *solus* Denmark and Matthysse, p. 16
— L_8 shorter than 300, Sge IV shorter than 150, Sti IV shorter than 100 2
2. M_3 130 or longer, Sge IV 130 or longer .... *aerialis* (Muma), p. 15
— M_3 85, Sge IV 100 ..... *anacardii* De Leon, p. 17

Amblyseius aerialis (Muma)

Fig. 51-57

Amblyseiopsis aerialis Muma, 1955: 264; Garman, 1958: 75.

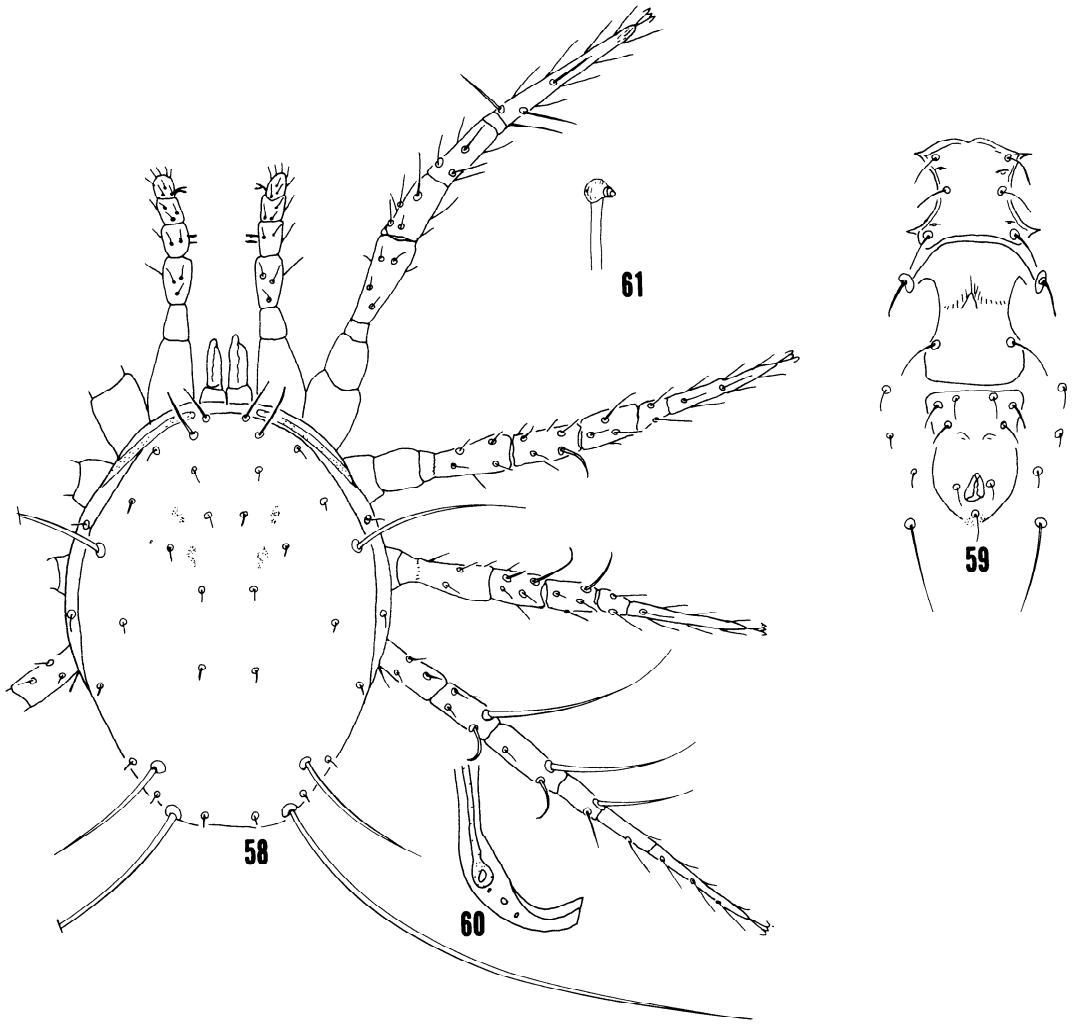
Amblyseius aerialis (Muma), Athias-Henriot, 1957: 338; Muma, 1961: 287; De Leon, 1966: 91; Schuster, 1966: 332; Muma et al., 1970: 66; Muma, 1971: 24; Denmark & Muma, 1973: 249; Muma, 1975: 55; Denmark & Muma, 1978: 4.

Typhlodromus (Amblyseius) aerialis (Muma), Chant, 1959: 88.

TYPE — Female holotype, Florida: Lucerne Park, 22 V 1952, on citrus (USNMNH).

DIAGNOSIS — See *Amblyseius solus* Denmark and Matthysse.

FEMALE — Length 390-420; width at L_4 280-330. Dorsal scutum smooth with scattered muscle marks, 8-10 small to medium sized pores and 17 pairs of setae. Measurements of setae: verticals 35; D_1 4, D_2 4, D_3 4, D_4 4; clunals 6; L_1 57, L_2 8, L_3 4, L_4 106, L_5 12, L_6 12, L_7 11, L_8 267; M_1 4, M_2 11, M_3 138; anterior sublaterals



Figs. 58-61. *Amblyseius solus* Denmark and Matthysse: 58. Dorsal and leg structure of female, 59. Ventral scuta and setation of female, 60. Posterior peritremal and stigmatal development of female, 61. Spermathecal structure of female.

15; posterior sublaterals 12. Sternal scutum lightly creased anteriorly with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 11-12 denticules, and movable finger with 3-4 denticules. Leg formula 1423. Macrosetae Sge IV 137, Sti IV 82, St IV 75. Genu II 2 p 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with tubular cervix 11-12 and nodular atrium.

MALE — Similar to female but smaller. Spermatodactyl with foot terminal and toe slightly enlarged. Ventrianal scutum lightly creased, a pair of elliptical pores and 3 pairs of preanal setae.

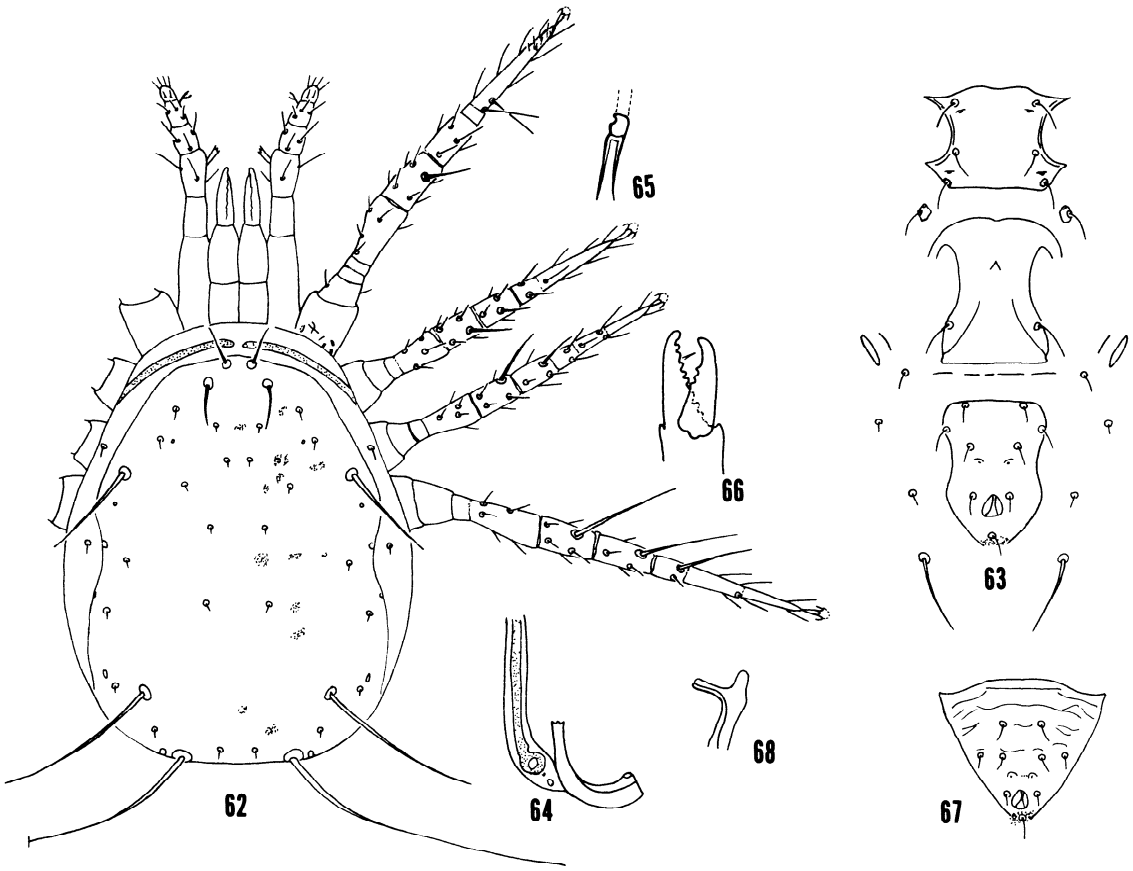
DISCUSSION — This species has been found on citrus trees in Florida feeding on *Brevipalpus* spp. Muma (1964). Garman (1958) reported this species from Bermuda, Mexico, Honduras, and Louisiana. Muma and Apeji (1970) reported it feeding on *Oligonychus milleri* (McGregor) in Jamaica. Schuster (1966) collected it on mangrove leaves, rotting *Opuntia*, and algae on dead shrubs near Darwin Research Station, Santa Cruz, Galapagos Islands. Denmark and Muma (1973) reported it from Porto Feliz, Sao Paulo, Brazil on *Musa cavendishi*. Athias-Henriot (1957) reported it from Alger, Algeria on *Fraxinus* sp., *Rubus ulmifolius*, and *Ulmus campestris*. Rao and Rao (1964) reported this species from Assam, India on *Citrus* sp. The biology of this species is not known.

Amblyseius solus Denmark & Matthysse

Fig. 58-61

Amblyseius solus Denmark and Matthysse, 1981: 345.

TYPE — Female holotype, Nigera: Ibadan, 12 V 1976, J.G. Matthysse, on *Psophocarpus tetragonolobus*



Figs. 62-68. *Amblyseius anacardii* De Leon: 62. Dorsal and leg structure of female, 63. Ventral scuta and setation of female, 64. Posterior peritremal and stigmatal development of female, 65. Spermathecal structure of female, 66. Cheliceral structure of female, 67. Ventrianal scutum of male, 68. Spermatodactyl structure of male.

(L.) DC. (FSCA).

DIAGNOSIS — *Amblyseius solus* is similar to *Amblyseius aerialis* (Muma) and *Amblyseius anacardii* De Leon but differs in having L_4 118, L_8 361, M_3 125, Sge IV 157, Sti IV 109, St IV 82, and spermathecal cervix 20 as apposed to L_4 106 and 92, L_8 267 and 230, M_3 138 and 86, Sge IV 137 and 105, Sti IV 82 and 68, St IV 75 and 64, and cervix 11-12 and 14 respectively for *aerialis* and *anacardii*.

FEMALE — Length 329; width at L_4 208. Dorsal scutum with small muscle marks near M_1 and 17 pairs of setae. Measurements of setae: verticals 33; D_1 4- D_4 4; clunals 4; L_1 41, L_2 7, L_3 5, L_4 118, L_5 6, L_6 6, L_7 5, L_8 361; M_1 4, M_2 4, M_3 125; anterior sublaterals 10; posterior sublaterals 8. Sternal scutum about as wide as long, smooth with 2 pairs of pores, 3 pairs of setae, and truncate posteriorly; ventrianal scutum with a pair of pores posterior to 3 pairs of ventrianal setae, and 3 ventrolateral setae arranged in 2 rows on each side of the ventrianal scutum; peritremes extending forward between L_1 and verticals. Chelicerae normal in relation to body size. Leg formula: 4123. Macroseta Sge IV 157, Sti IV 109, St IV 82. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with long tubular cervix 20 and a nodular atrium.

MALE — Unknown.

DISCUSSION — This species has been collected only in Nigeria. It was collected in association with *Tetranychus neocaledonicus* Andre, *Oligonychus gossypii* (Zacher), *Brevipalpus californicus* (Banks), and Eriophyidae.

Amblyseius anacardii De Leon

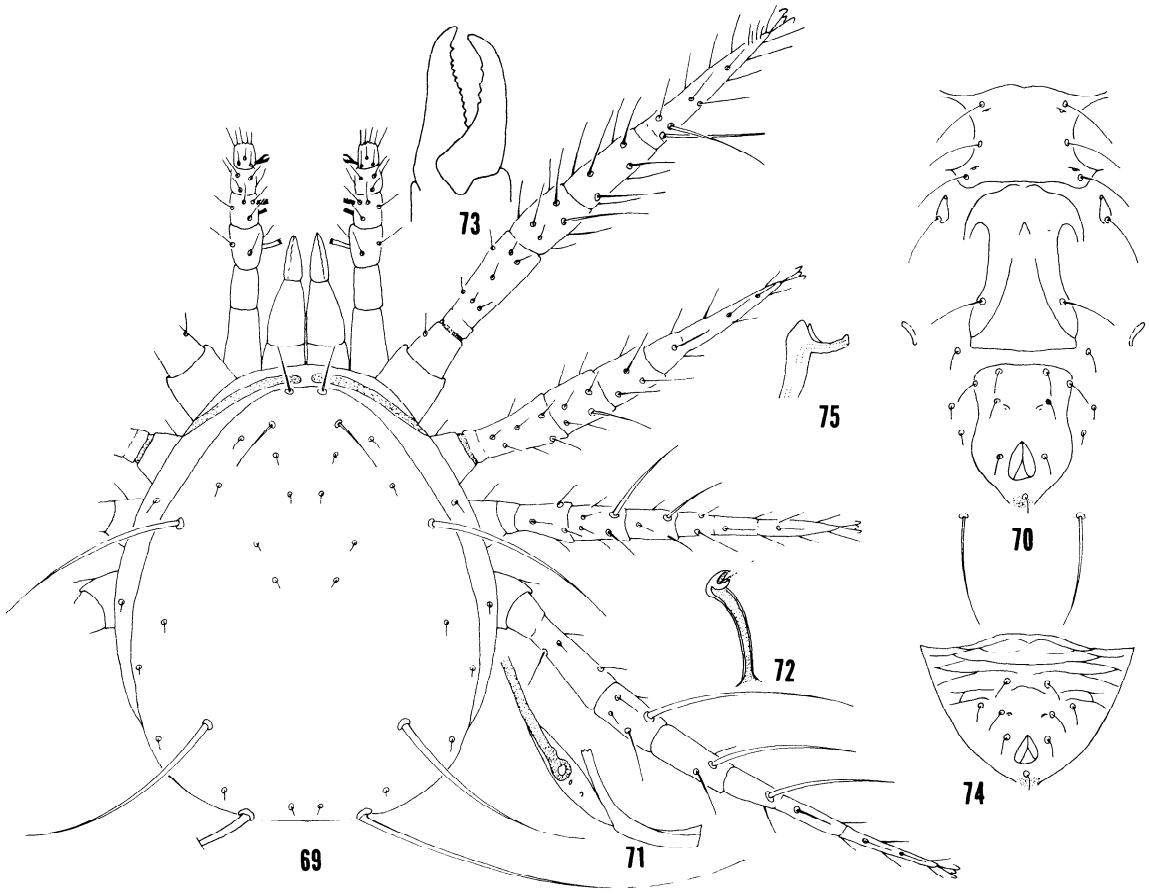
Fig. 62-68

Amblyseius anacardii De Leon, 1967: 23, 25.

TYPE — Female holotype, Trinidad: St. Augustine, 1 X 1963, D. De Leon, on *Vengueria madagascarensis* (MCZ).

DIAGNOSIS — See *Amblyseius solus* Denmark and Matthysse.

FEMALE — Length 335; width at L_4 220. Dorsal scutum smooth with 17 pairs of setae. Measurements of setae: verticals 30-34; D_1 5, D_2 5, D_3 5, D_4 8; clunals 7; L_1 38-42, L_2 9, L_3 7, L_4 92, L_5 6, L_6 8, L_7 5, L_8 230; M_1 5, M_2 10, M_3 86; anterior sublaterals 12; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three



Figs. 69-75. *Amblyseius sundi* Pritchard and Baker: 69. Dorsal and leg structure of female, 70. Ventral scuta and setation of female, 71. Posterior peritremal and stigmatal development of female, 72. Spermathecal structure of female, 73. Cheliceral structure of female, 74. Ventrianal scutum of male, 75. Spermatodactyl structure of male.

pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 10-13 denticules, and movable finger with 3-4 denticules. Leg formula 1423. Macrosetae Sge IV 105, Sti IV 68, St IV 64. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/0 - 1. Spermatheca tubular cervix 14 and nodular atrium.

MALE — The males are similar to females but smaller. The ventrianal scutum is creased with 3 pairs of ventrianal setae and a pair of elliptical pores. The spermatodactyl with foot subterminal, lateral process present, and toe not enlarged.

DISCUSSION — This species is known only from Trinidad. It has been taken on *Musa textilis, Mangifera indica, Anacardium occidentale, Mamea americana, Canangia odorata, Piper tuberculata, Cecropia peltata, Hamelia erecta, Dieffenbachia picta, Miconia fragans,* and *Gossypium barbadense.* Nothing is known about its biology.

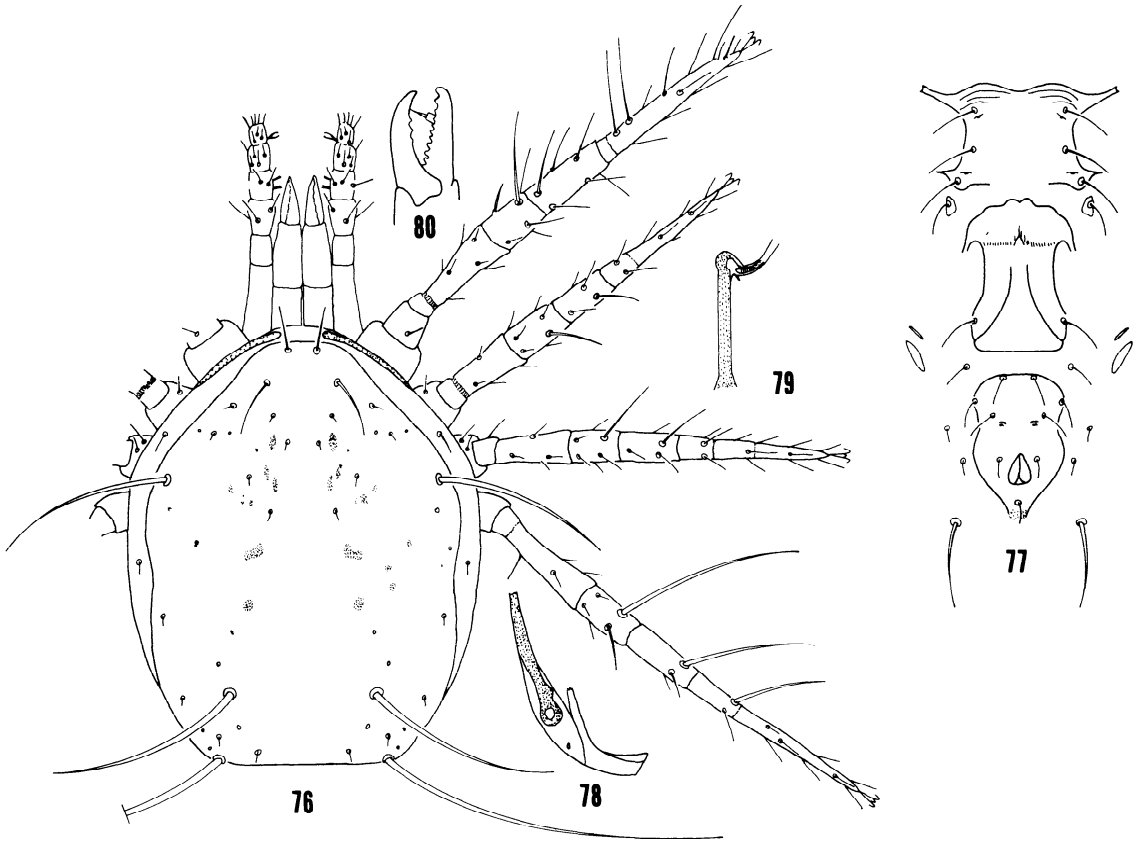
SUNDI GROUP

Three species are assigned to this species group. They are *A. sundi* Pritchard and Baker, *A. parasundi* Blommers, and *A. corderoi* Chant and Baker. *A. sundi* has a nodular atrium with major duct entering laterally and a tubular cervix that is slightly bowed and flared internally. *A. parasundi* has a nodular atrium with the major duct entering laterally and a straight tubular cervix that is flared internally. *A. corderoi* has a nodular atrium with the major duct entering terminally, the minor duct laterally, and a very slender tubular cervix that is flared internally.

These 3 species also seem to have 2 erect tarsus I setae.

Key to females in *sundi* group

1. L_2 longer than 10, L_3 longer than 10, L_4 approximately 130, M_3 approximately 130 ..... *corderoi* Chant, p. 20
— L_2 shorter than 10, L_3 shorter than 10, L_4 longer than 130, M_3 longer than 130 2
2. M_3 longer than 200, Sge IV longer than 200, St IV longer than 100 ..... *sundi* Pritchard and Baker, p. 19
— M_3 shorter than 200, Sge IV shorter than 200, St IV shorter than 100 ..... *parasundi* Blommers, p. 19



Figs. 76-80. *Amblyseius parasundi* Blommers: 76. Dorsal and leg structure of female, 77. Ventral scuta and setation of female, 78. Posterior peritremal and stigmatal development of female, 79. Spermathecal structure of female, 80. Cheliceral structure of female.

Amblyseius sundi Pritchard and Baker

Fig 69-75

Amblyseius sundi Pritchard and Baker, 1962: 244; Matthysse and Denmark, 1981: 344.

TYPE — Female holotype, Belgian Congo: Leopoldville, 10 IV 1955, E.W. Baker, on *Fiscus polita* Vahl (USNMNH).

DIAGNOSIS — *Amblyseius sundi* is similar to *Amblyseius parasundi* and *Amblyseius corderoi* but differs in having M_3 251, L_8 423, Sge IV 210, Sti IV 151, St IV 110, and M_2 present as apposed to M_3 171 and 133, L_8 426 and 423, Sge IV 190 and 137, Sti IV 140 and 96, and St IV 90 and 81 in *parasundi* and *corderoi,* respectively.

FEMALE — Length 371; width at L_4 251. Dorsal scutum smooth with 17 pairs of setae. Measurements of setae: verticals 41; D_1 5, D_2 5, D_3 5, D_4 6; clunals 5; L_1 49, L_2 6, L_3 7, L_4 174, L_5 6, L_6 6, L_7 6, L_8 423; M_1 5, M_2 7, M_3 251; anterior sublaterals 12; posterior sublaterals 7. Sternal scutum smooth, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth, a pair of elliptical pores near posterior pair of preanal setae, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 15 small denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 210, Sti IV 151, St IV 110. Genu II 2 - 2-2/1 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermathecal cervix tubular flared internally 36-41 with nodular atrium.

MALE — Similar to female but smaller in size. The ventrianal scutum reticulated anteriorly, a pair of elliptical pores, and 3 pairs of preanal setae. The spermatodactyl with foot subterminal and toe upturned.

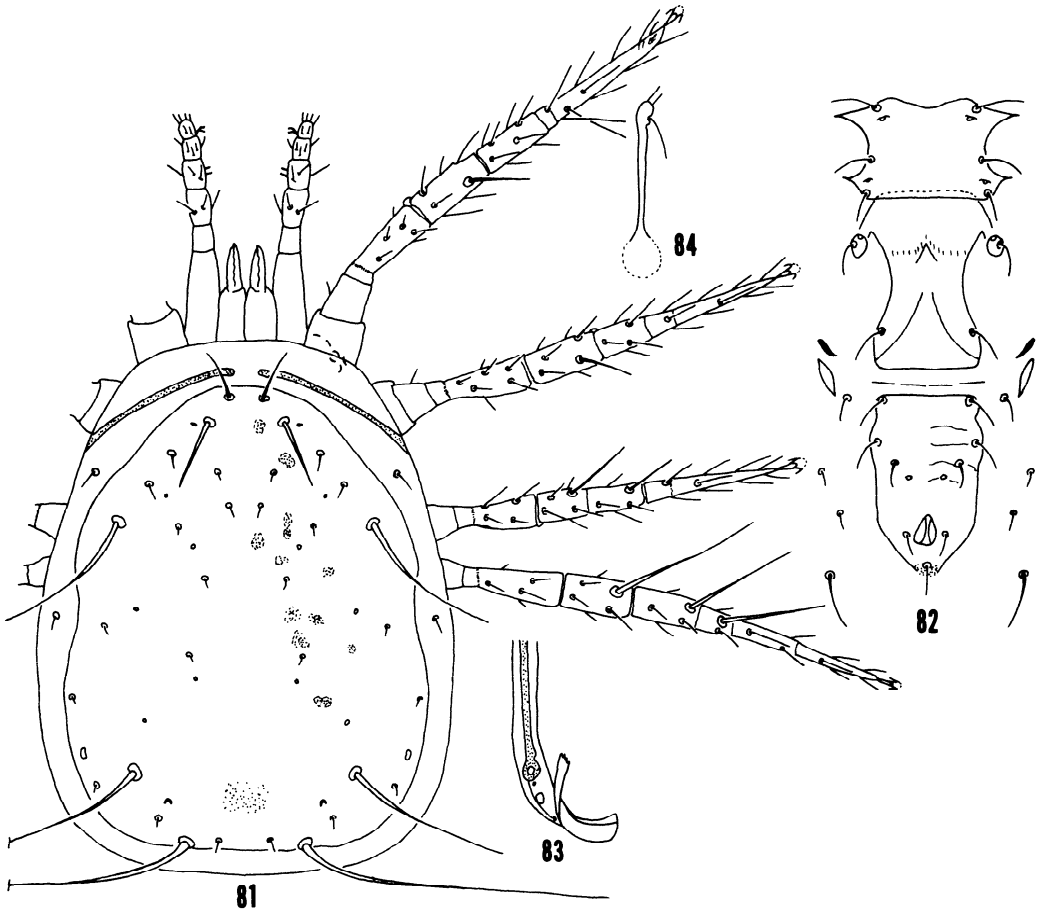
DISCUSSION — This species has been collected in the Belgian Congo on *Ficus polita* Vahl, *Citrus* sp., *Hibiscus* sp., *Datura* sp., *Baphia* sp., and *Prunus* sp. It has been taken in Ibadan, Nigeria on *Plumeria* sp., *Ipomoea batatas* (L.) Lam., *Codiaeum variegatum* (L.) Blume; *Musa* sp., *Acalypha wilkesiana* Mull. Arg., and *Capsicum annuum* L. It was associated with *Tetranychus neocaledonicus* Andre and *Oligonychus gossypii* (Zacher), as well as several unidentified species of *Tetranychus.* Also present were *Brevipalpus phoenicis* (Geijskes). It appeared to be a common predator on spider mites in Ibadan (Matthysse and Denmark 1981).

Amblyseius parasundi Blommers

Fig. 76-80

Amblyseius parasundi Blommers, 1974: 144.

TYPE — Female holotype, Madagascar: Republic



Figs. 81-84. *Amblyseius corderoi* Chant and Baker: 81. Dorsal and leg structure of female, 82. Ventral scuta and setation of female, 83. Posterior peritremal and stigmatal development of female, 84. Spermathecal structure of female.

of Malagasy, Tamatave, 25 VIII 1972, L. Blommers, on *Artocarpus incisa,* in Zoologisch Museum, University of Amsterdam.

DIAGNOSIS — See *Amblyseius sundi* Pritchard and Baker.

FEMALE — Length 361-370; width at L_4 235. Dorsal scutum smooth with scattered muscle marks and 7-8 small pores and 1 medium pore in the position of M_2, and 17 pairs of setae. Measurements of setae: verticals 42; D_1 5, D_2 5, D_3 6, D_4 7; clunals 6; L_1 51, L_2 6, L_3 6, L_4 153, L_5 6, L_6 7, L_7 6, L_8 426; M_1 5, M_2 missing, M_3 171; anterior sublaterals 20; posterior sublaterals 12. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of preanal setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 190, Sti IV 140; St IV 90. Genu II 2 -2-2/0 - 1; genu III 1 - 2-2/0 - 1. Spermathecal cervix tubular flared internally 36 with nodular atrium.

MALE — Unknown.

DISCUSSION — Blommers (1974) reported this to be a thelytokous species in mass-rearings and field collected specimens. Blommers (1975) reared this species on *Oligonychus coffeae, Eotetranychus limoni,* and *Eutetranychus sambiranensis.* In addition to *Artocarpus incisa,* it was also found on *Citrus hystrix, Citrus limonia, Mangifera indica, Passiflora foetida, Persea americana,* and *Psidium guajava* in Tamatave.

Amblyseius corderoi Chant & Baker

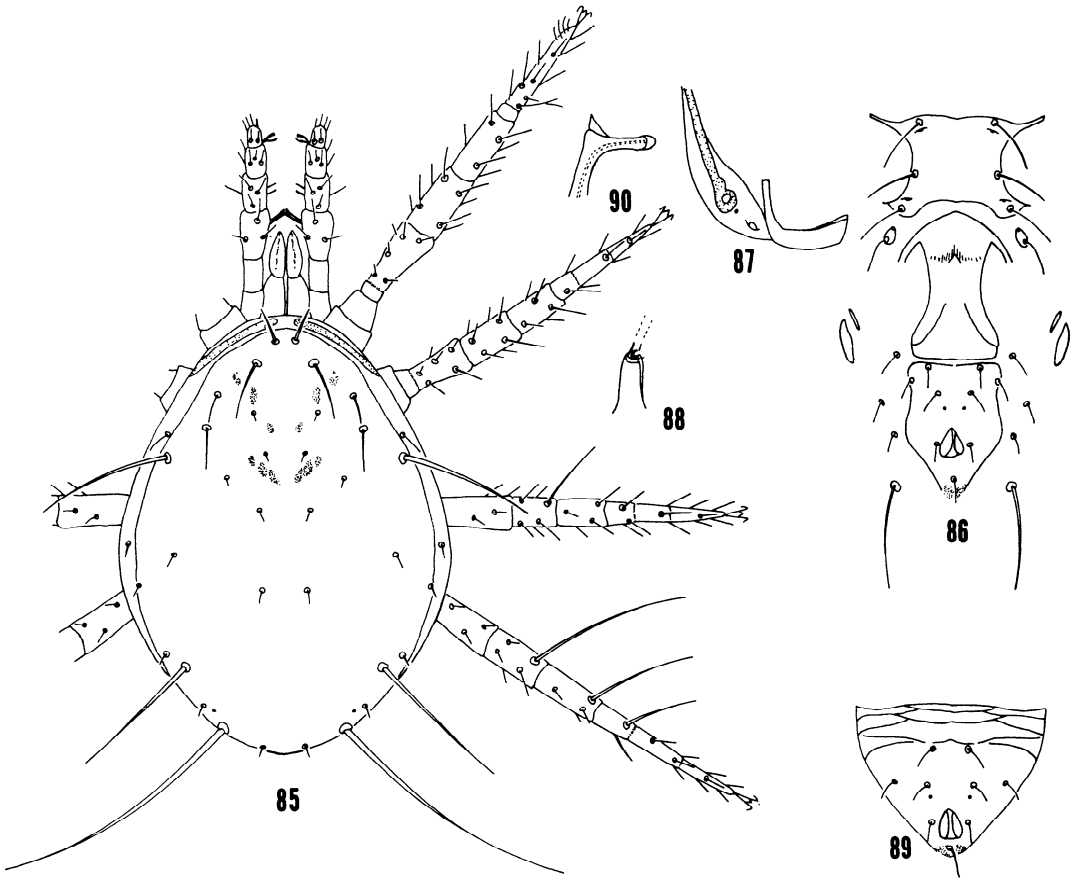
Fig. 81-84

Amblyseius corderoi Chant & Baker, 1965: 19.

TYPE — Female holotype, Honduras: Copan, 28 II 1959, J.G. Matthysse, on "leaf" (USNMNH).

DIAGNOSIS — See *Amblyseius sundi* Pritchard and Baker.

FEMALE — Length 396; width at L_4 267. Dorsal scutum smooth with scattered muscle marks, 5 to 6 small to medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 44; D_1 5, D_2 5, D_3 6, D_4 8; clunals 6; L_1 55, L_2 13, L_3 13, L_4 129, L_5 12, L_6



Figs. 85-90. *Amblyseius americanus* (Garman): 85. Dorsal and leg structure of female, 86. Ventral scuta and setation of female, 87. Posterior peritremal and stigmatal development of female, 88. Spermathecal structure of female, 89. Ventrianal scutum of male, 90. Spermatodactyl structure of male.

12, L_7 9, L_8 260; M_1 4, M_2 6, M_3 133; anterior sublaterals 19; posterior sublaterals 11. Sternal scutum smooth, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth to lightly creased, a pair of small round pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 14 denticules, and movable finger with 2 denticules. Leg formula 4123. Macrosetae Sge IV 137, Sti IV 96, St IV 81. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with tubular internally flared cervix 41 and nodular atrium.

MALE — Unknown.

DISCUSSION — Nothing is known about the life history or food habits of this species. It has been taken on wild fig leaves, *Ficus* sp., in Honduras and Costa Rica.

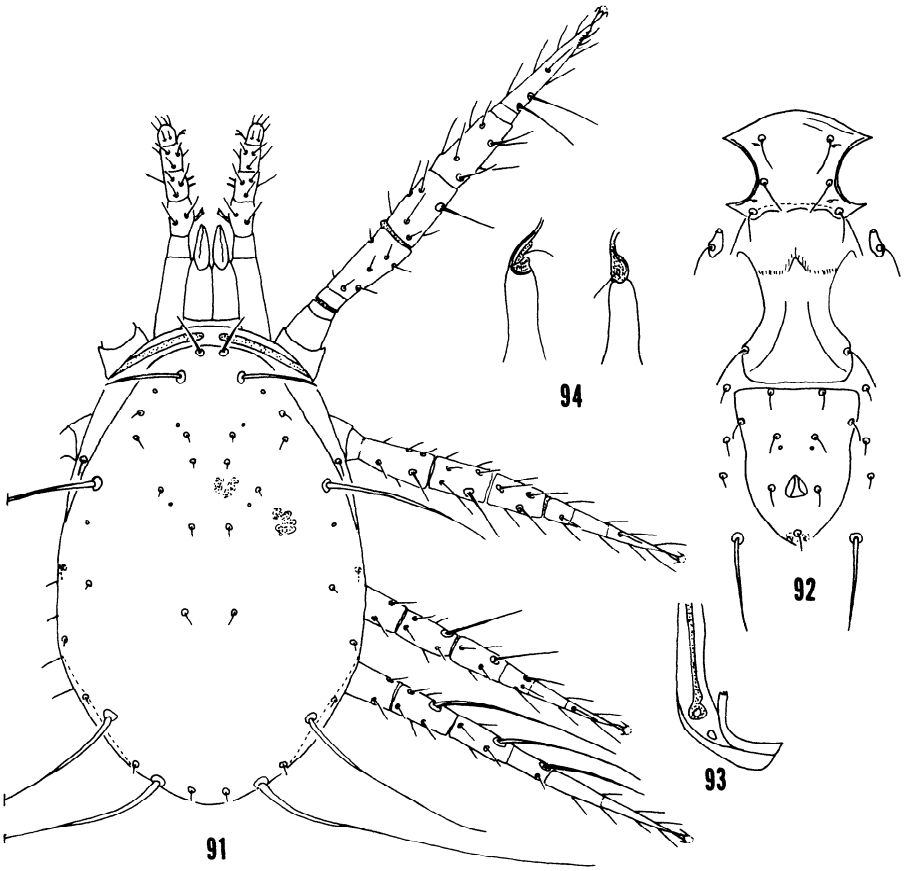
AMERICANUS GROUP

Eight species are assigned to this group. They are *A. americanus* (Garman), *A. nicola* Chant, *A. pritchardellus* Athias-Henriot, *A. kalandadzei* Gomelauri, *A. mazatlanus* Denmark and Muma, *A. duncansoni* Specht and Rasmy, *A. euvertex* Karg, and *A. januaricus* Wainstein and Vartapetov. *A. americanus* has a differentiated atrium with a short (2x) saccular flared cervix. *A. nicola* has a differentiated to nodular atrium and a moderate-sized (3x) saccular slightly flared cervix. *A. pritchardellus* has a slightly nodular atrium and a moderate-sized (3x) saccular-flared cervix. *A. kalandadzei* has a c-shaped atrium with a moderate-sized (3x) saccular-flared cervix. *A. mazatlanus* has a c-shaped atrium with a short (2.5x) saccular slightly flared cervix. *A. duncansoni* has a c-shaped atrium with a short (2x) saccular slightly flared cervix. *A. euvertex* has a small c-shaped atrium with a short (2x) thick-walled saccular-flared cervix. *A. januaricus* has small nodular atrium and a short (2x) saccular-flared cervix that is distinctly flared internally.

Some of these species have 1 erect tarsus I seta; others have 2 or 3.

Key to females in *americanus* group

1. L_1 shorter than 10 ..... *pritchardellus*, p. 23
— L_1 longer than 10 2
2. L_1 shorter than 50 5
— L_1 50 or longer than 50 3
3. Sge IV longer than 200 ..... *euvertex*, p. 27
— Sge IV shorter than 200 4



Figs. 91-94. *Amblyseius nicola* Chant: 91. Dorsal and leg structure of female, 92. Ventral scuta and setation of female, 93. Posterior peritremal and stigmatal development of female, 94. Spermathecal structure of female.

4. L_2 12, L_3 9, cervix 20 or longer ..... *kalandadzei,* p. 24
— L_2 4, L_3 4, cervix shorter than 20 ..... *januaricus,* p. 27
5. Sge IV shorter than 100 ..... *mazatlanus,* p. 25
— Sge IV longer than 100 6
6. St IV longer than 75 and M_3 longer than 150 ..... *nicola,* p. 23
— St IV 75 or shorter than 75 and M_3 shorter than 150 7
7. St IV 55, Sge III 50 ..... *americanus,* p. 22
— St IV, SGE III 25 ..... *duncansoni,* p. 26

Amblyseius americanus (Garman)

Fig. 85-90

Amblyseiopsis americanus Garman, 1948: 17.
Typhlodromus (Amblyseius) americanus (Garman), Chant 1959: 94.
Amblyseius americanus (Garman), Cunliffe and Baker, 1953: 25.

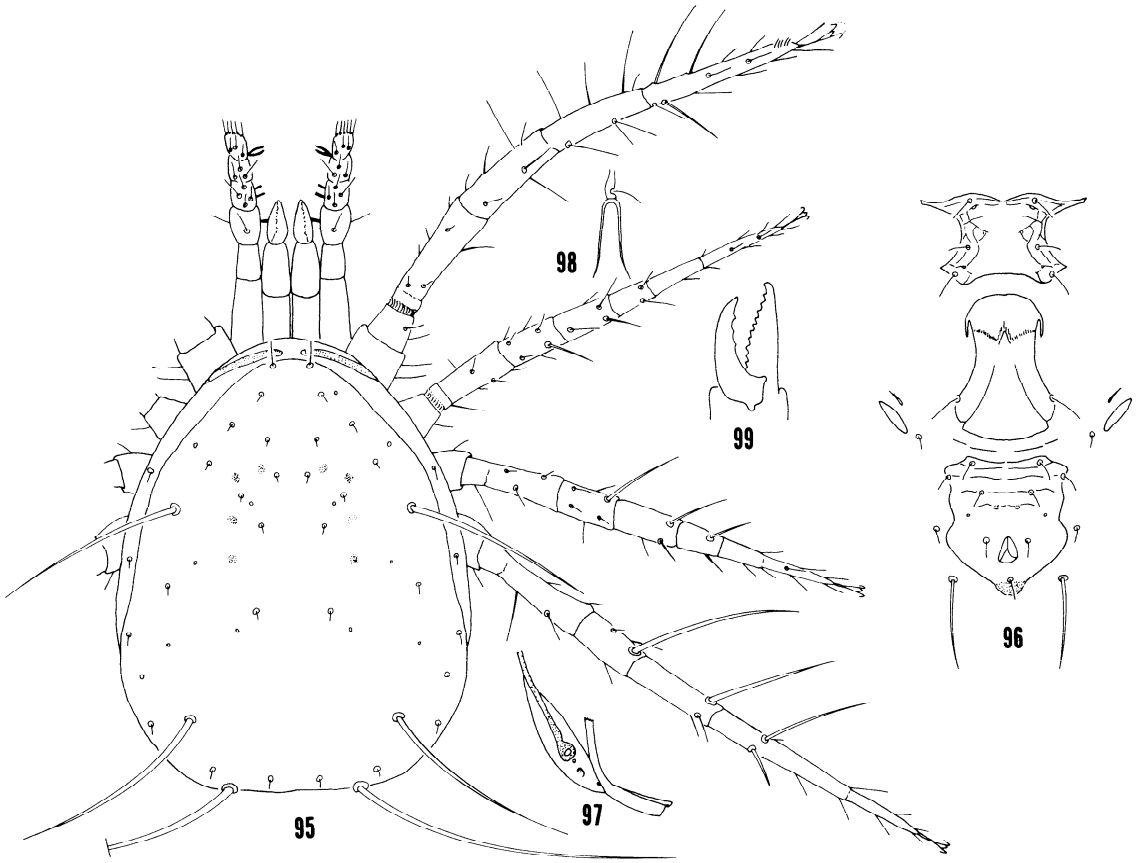
TYPE — Female holotype, U.S.A.: Connecticut, Mallingford, 17 II 1938, J.F.T. (?), on apple bark, in Connecticut Agricultural Experiment Station Collection.

DIAGNOSIS — *Amblyseius americanus* is similar to *Amblyseius duncansoni* Specht and Rasmy but differs in having S_1 twice as long as S_2, St IV 55 and Sge III 60 as apposed to S_1 only slightly longer than S_2, St IV 75 and Sge III less than 30 in *duncansoni.*

FEMALE — Length 348; width at L_4 234. Dorsal scutum smooth with scattered muscle marks anteriorly, 1 or more small pores, and 17 pairs of setae. Measurements of setae: verticals 28; D_1 5, D_2 5, D_3 6, D_4 8; clunals 9; L_1 52, L_2 22, L_3 38, L_4 112, L_5 8, L_6 10, L_7 11, L_8 220; M_1 5, M_2 6, M_3 117; anterior sublaterals 20; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth, a pair of small round pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to the body size, fixed finger with 11 denticules, but movable finger cannot be observed. Leg formula 4123. Macrosetae Sge IV 141, Sti IV 94, St IV 55. Genu II 2 - 2-2/0 - 1. Genu III 1 - 2/0 - 2/1 - 1. Spermatheca with saccular slightly flared cervix 15 and differentiated atrium.

MALE — Similar to the female but smaller. Spermatodactyl with foot terminal and lateral process distinct. Ventrianal scutum lightly creased with 2 small round pores and 3 pairs of preanal setae.

DISCUSSION — This species is known only from the type series on bark and leaves of apple.



Figs. 95-99. *Amblyseius prichardellus* Athias-Henriot: 95. Dorsal and leg structure of female, 96. Ventral scuta and setation of female, 97. Posterior peritremal and stigmatal development of female, 98. Spermathecal structure of female, 99. Cheliceral structure of female.

Amblyseius nicola Chant

Fig. 91-94

Amblyseius nicola Chant, 1971: 714.

TYPE — Female holotype, Canada: Westview, British Columbia, 9 IX 1957, C.V.G. Morgan, on fern (CNC).

DIAGNOSIS — *Amblyseius nicola* is similar to *Amblyseius kalandadzei* Gomelauri but differs in having L_4 143, L_8 300, M_3 165 as apposed to L_4 60, L_8 157, M_3 85 in *kalandadzei.*

FEMALE — Length 390; width at L_4 220. Dorsal scutum smooth with scattered muscle marks anteriorly, at least 4 pairs of small pores, and 17 pairs of setae. Measurements of setae: verticals 36; D_1 6, D_2 6, D_3 6, D_4 8; clunals 10; L_1 58, L_2 8, L_3 11, L_4 143, L_5 8, L_6 8, L_7 10, L_8 300; M_1 6, M_2 6, M_3 165; anterior sublaterals 13; posterior sublaterals 9. Sternal scutum smooth, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores posterior to the base of the posterior pair of preanal setae and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerare normal in relation to body size, fixed finger with 9 denticules. Unable to observe the movable finger. Leg formula 4123. Macrosetae Sge IV 172, Sti IV 126, St IV 95. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermathecae with saccular slightly flared cervix 20 and slightly elongate nodular atrium.

MALE — Unknown.

DISCUSSION — Nothing is known about the biology of this species. It is known only from the holotype.

Amblyseius pritchardellus Athias-Henriot

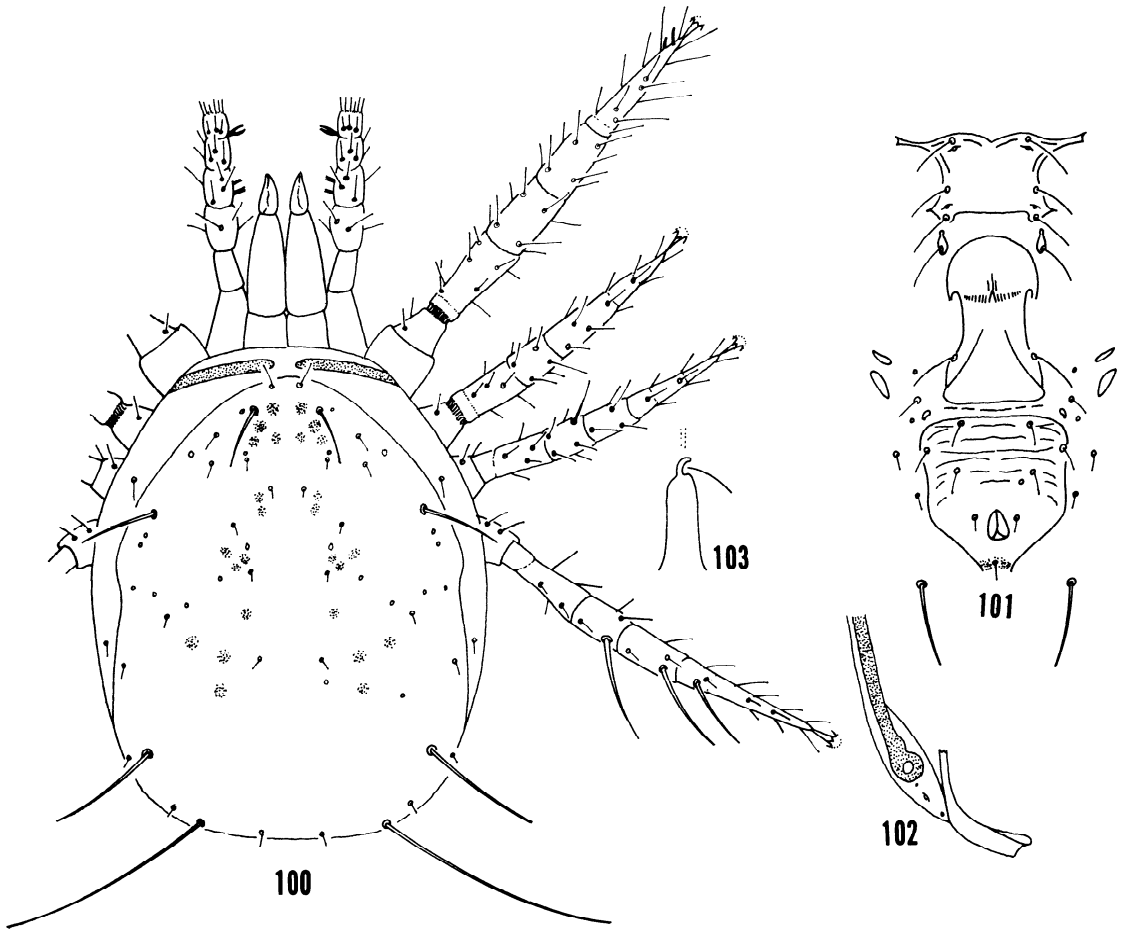
Fig. 95-99

Amblyseius pritchardellus Athias-Henriot, 1967: 532.

TYPE — Female holotype, Argentina: Sierra de la Ventana, at Bahia Blanca, Buenos Aires, 3 IX 1963, H. Franz, in litter of *Stipa* sp., in Natural History Museum, Zoologische Abteilung, Vienna, Austria.

DIAGNOSIS — *Amblyseius pritchardellus* is similar to *Amblyseius euvertex* Karg but differs in having L_1 4, L_4 180, L_8 266, Sge IV 150 as apposed to L_1 25, L_4 250, L_8 560, Sge IV 300 in *euvertex.* Both species have several macrosetae on leg 1.

FEMALE — Length 405; width at L_4 254. Dorsal scutum smooth with 8-9 small to medium sized pores, muscle marks dorsocentrally, and 17 pairs of setae. Measurements of setae: verticals 28; D_1 4, D_2 4, D_3 4,



Figs. 100-103. *Amblyseius kalandadzei* Gomelauri: 100. Dorsal and leg structure of female, 101. Ventral scuta and setation of female, 102. Posterior peritremal and stigmatal devlopment of female, 103. Spermathecal structure of female.

D_4 5; clunals 6; L_1 4, L_2 4, L_3 4, L_4 180, L_5 6, L_6 6, L_7 6, L_8 266; M_1 4, M_2 4, M_3 157; anterior sublaterals 7; posterior sublaterals 5. Sternal scutum reticulated with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum creased with a pair of small round pores and 3 pairs of preanal setae. Two pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 150, Sti IV 126, St IV 110. Genu II 2 - 2-2/1 - 1; genu III 1 - 2 - 2/1 - 1. Spermatheca with saccular-flared cervix 17 and nodular atrium.

MALE — Unknown.

DISCUSSION — This species is only known from Argentina in litter of *Groffrea decorticans* and *Stipa* sp. Nothing is known about the biology of this species.

Amblyseius kalandadzei Gomelauri

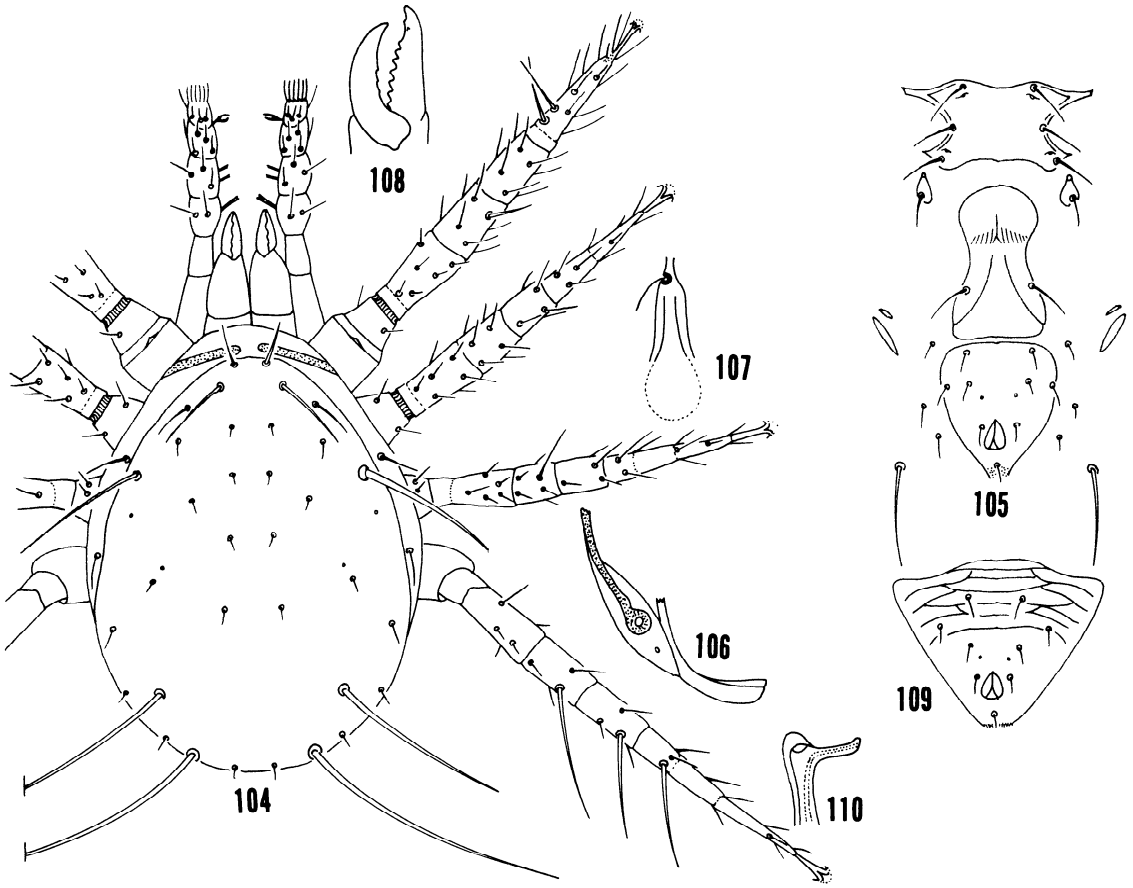
Fig. 100-103

Amblyseius kalandadzei Gomelauri, 1968: 701-702; Kolodochka, 1980: 45; 1981: 18.

TYPE — Female holotype, Russia: Tbilisi, Georgia, VI 1956, on moss, Department of Invertebrates of the Institute of Zoology of the Academy of Sciences of the Georgian S.S.R.

DIAGNOSIS — See *Amblyseius nicola* Chant.

FEMALE — Length 331; width at L_4 220. Dorsal scutum smooth with 10 small to medium sized pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 22; D_1 6, D_2 5, D_3 6, D_4 6; clunals 9; L_1 47, L_2 12, L_3 9, L_4 60, L_5 11, L_6 10, L_7 6, L_8 157; M_1 5, M_2 5, M_3 85; anterior sublaterals 12; posterior sublaterals 7. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of round pores, slightly creased, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger appears to have 9 denticules, but unable to see



Figs. 104-110. *Amblyseius mazatlanus* Denmark and Muma n. sp.: 104. Dorsal and leg structure of female, 105. Ventral scuta and setation of female, 106. Posterior peritremal and stigmatal development of female, 107. Spermathecal structure of female, 108. Cheliceral structure of female, 109. Ventrianal scutum of male, 110. Spermatodactyl structure of male.

movable finger. Leg formula 4123. Macrosetae Sge IV 81, Sti IV 67, St IV 58. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular slightly flared cervix 23 and c-shaped atrium.

MALE — Unknown.

DISCUSSION — This species has been collected only in Russia: Tbilisi and Moldavia on *Plantago* sp., *Viola* sp., and moss. Nothing is known about the biology of this species.

Amblyseius mazatlanus Denmark and Muma n. sp.

Fig. 104-110

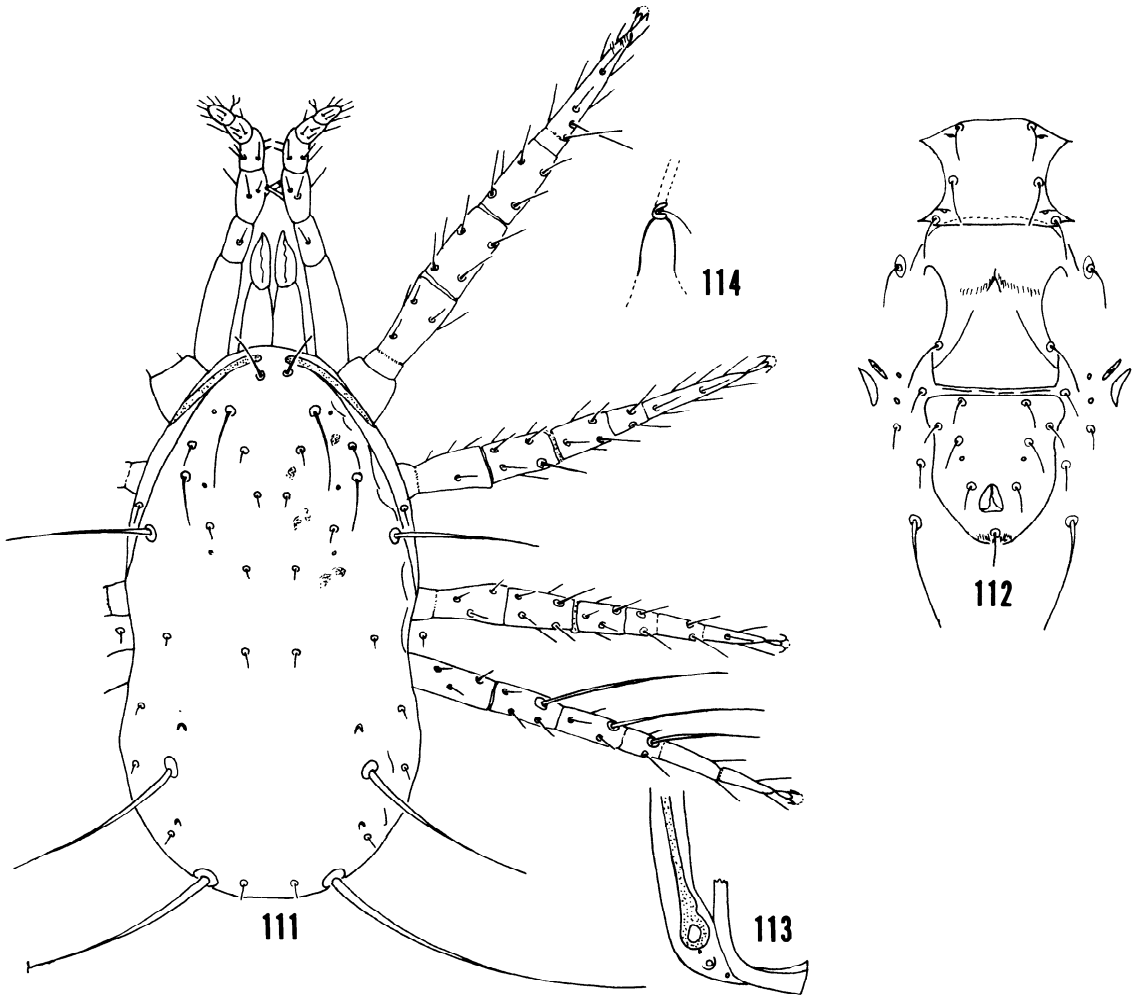
TYPE — Female holotype, Mexico: Mazatlan, 26 VII 1970, D.M. Tuttle, M.J. Abbatello, and E.W. Baker, on *Sida* sp. (USNMNH).

DIAGNOSIS — *Amblyseius mazatlanus* is similar to *Amblyseius januaricus* Wainstein and Vartapetov but differs in having V36, L_2 28, L_4 105, St IV 81 apposed to V19, L_2 4, L_4 71, St IV 56 in *januaricus*.

FEMALE — Length 337; width at L_4 200. Dorsal scutum smooth with 2-3 small pores and 17 pairs of setae. Measurements of setae: verticals 36; D_1 6, D_2 6, D_3 7, D_4 7; clunals 5; L_1 63, L_2 28, L_3 12, L_4 105, L_5 15, L_6 10, L_7 14, L_8 200; M_1 6, M_2 7, M_3 91; anterior sublaterals 32; posterior sublaterals 20. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to the body size, fixed finger with 8-10 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 99, Sti IV 88, St IV 81. Genu II 2 - 2/1 - 2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular slightly flared cervix 17 and c-shaped atrium.

MALE — Similar to female but smaller. Spermatodactyl has foot subterminal, lateral process present, and toe normal in size. Ventrianal scutum lightly reticulated with a pair of small round pores and 3 pairs of preanal setae.

DISCUSSION — In addition to the holotype female, the allotype and 9 female paratypes were collected with the holotype; 4 female paratypes were collected at Mazatlan, 26 VII 1970, on *Albutilon* sp., *Willardia*



Figs. 111-114. *Amblyseius duncansoni* Specht and Rasmy: 111. Dorsal and leg structure of female, 112. Ventral scuta and setation of female, 113. Posterior peritremal and stigmatal development of female, 114. Spermathecal structure of female.

mexicana, and 2 female *Waltheria indica* var. *americana*; 1 male at Escurnapa, 29 VII 1970, on *Erigeron canadensis*, 3 male, 6 female on *Nepeta cataria*; 1 female at Zempoala, Veracruz, Mexico, 8 VII 1974, on *Pinus* sp. Nothing is known of the biology of this species.

Amblyseius duncansoni Specht & Rasmy

Fig. 111-114

Amblyseius duncansoni Specht and Rasmy, 1970: 1022; Chant and Hansell, 1971: 725.

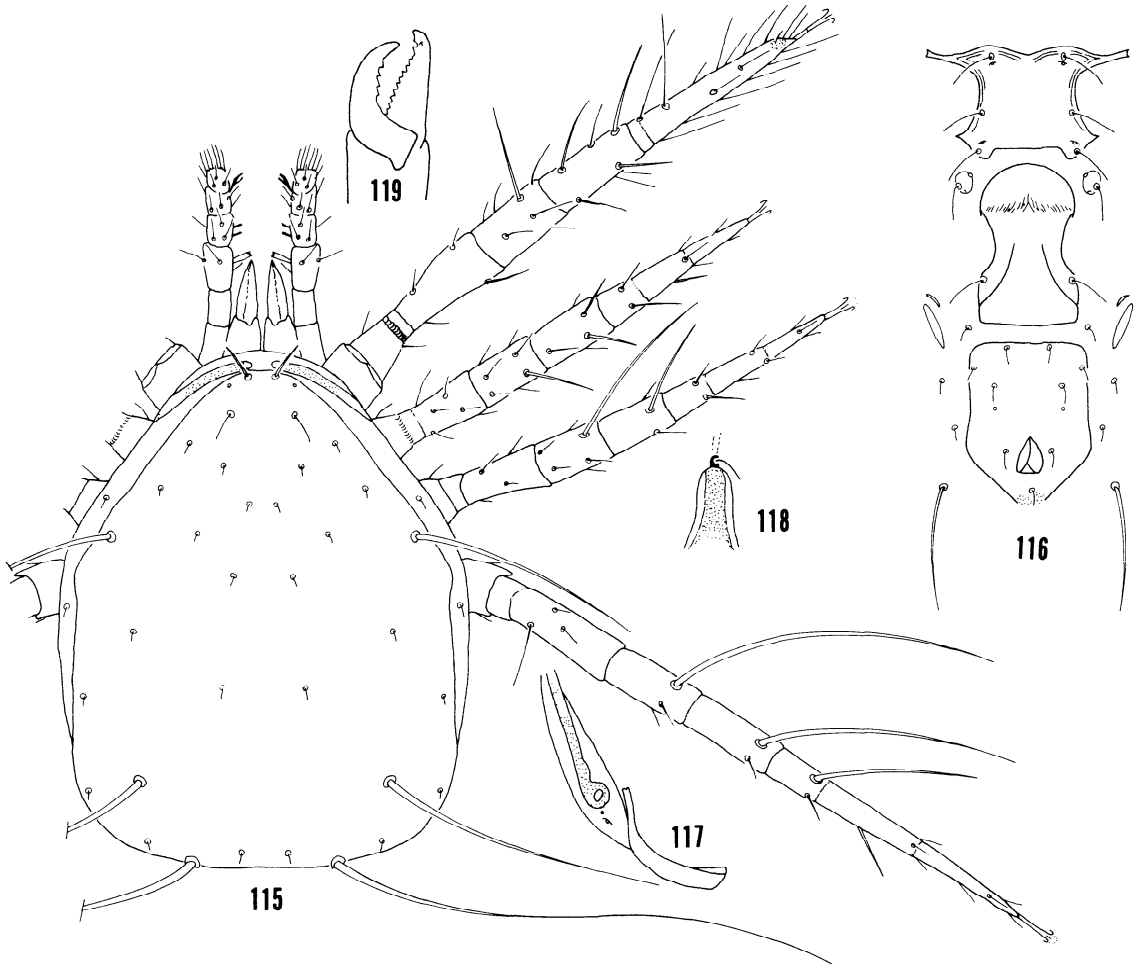
TYPE — Female holotype, Canada: Falmouth, Nova Scotia, 16 XII 1968, A. Rasmy bark of *Malus* sp. (CNC).

DIAGNOSIS — See *Amblyseius americanus* (Garman).

FEMALE — Length 380; width at L_4 245. Dorsal scutum smooth with 4-6 small to medium sized pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 24; D_1 5, D_2 5, D_3 6, D_4 6; clunals 8; L_1 56, L_2 18, L_3 30, L_4 118, L_5 9, L_6 7, L_7 8, L_8 230; M_1 5, M_2 6, M_3 130; anterior sublaterals 13; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Chelicerae normal in relation to body size, fixed finger with 10 denticules, but unable to see movable finger. Leg formula 4123. Macrosetae Sge IV 130, Sti IV 100, St IV 75. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/0 - 1. Spermatheca with saccular slightly flared cervix 19 and c-shaped atrium.

MALE — Unknown.

DISCUSSION — Nothing is known of the life history of this species. It was collected on apple bark in association with tetranychid mite eggs, collembola, coccids, thrips, and other arthropods. It is known only from the type collection and from Missouri on apple.



Figs. 115-119. *Amblyseius euvertex* Karg: 115. Dorsal and leg structure of female, 116. Ventral scuta and setation of female, 117. Posterior peritremal and stigmatal development of female, 118. Spermathecal structure of female, 119. Cheliceral structure of female.

Amblyseius euvertex Karg

Fig. 115-119

Amblyseius euvertex Karg, 1983: 314.

TYPE — Female holotype, Brazil: 5 IX 1971, K. Lenko, in humus, in Academy of Agricultural Sciences of the German Democratic Republic Institute for Plant Protection Research at Kleinmachnow, East Germany.

DIAGNOSIS — See *Amblyseius pritchardellus* Athias-Henriot.

FEMALE — Length 456; width at L_4 282. Dorsal scutum smooth with a pore near verticals and 17 pairs of setae. Measurements of setae: verticals 33; D_1 5, D_2 5, D_3 6, D_4 6; clunals 8; L_1 25, L_2 6, L_3 7, L_4 250, L_5 6, L_6 6, L_7 6, L_8 560; M_1 5, M_2 6, M_3 295; anterior sublaterals 11; posterior sublaterals 6. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 12 denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 300, Sti IV 240, St IV 150. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with saccular-flared cervix and small c-shaped atrium.

MALE — Unknown.

DISCUSSION — *Amblyseius euvertex* is known only from the type specimens. Nothing is known about the biology of this species.

Amblyseius januaricus Wainstein & Vartapetov

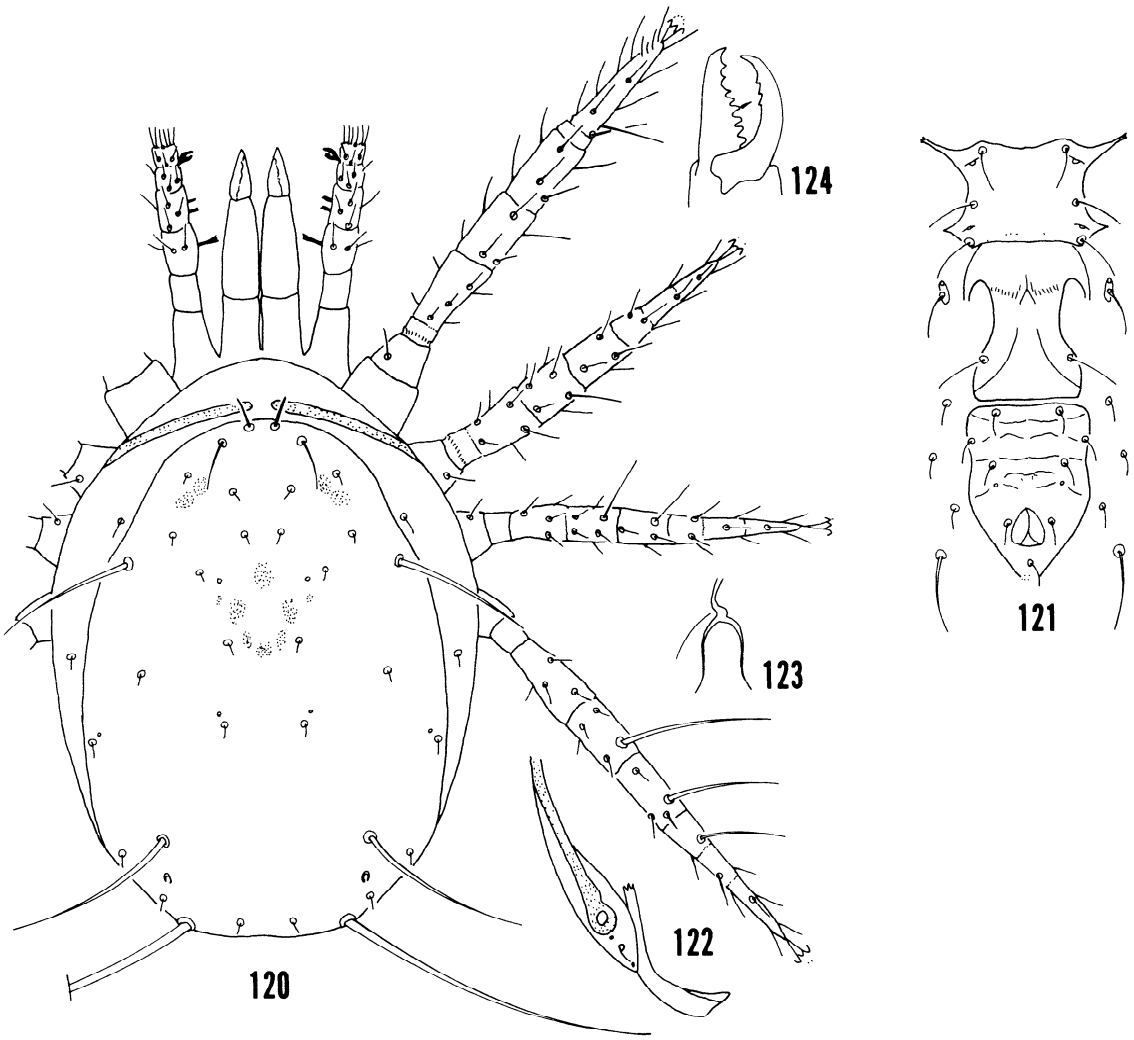
Fig. 120-124

Amblyseius januaricus Wainstein and Vartapetov, 1973: 1085.

TYPE — Female holotype, U.S.S.R.: Kobuleti, 25 I 1971, on *Rubus idaeus* L., in Institute of Biology of Inland Waters, S.S.R. Academy of Science.

DIAGNOSIS — See *Amblyseius mazatlanus* Denmark and Muma.

FEMALE — Length 330; width at L_4 219. Dorsal



Figs. 120-124: *Amblyseius januaricus* Wainstein and Vartapetov: 120. Dorsal and leg structure of female, 121. Ventral scuta and setation of female, 122. Posterior peritremal and stigmatal development of female, 123. Spermathecal structure of female, 124. Cheliceral structure of female.

scutum smooth with 2-3 small to medium sized pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 19; D_1 4, D_2 4, D_3 4, D_4 6; clunals 8; L_1 41, L_2 4, L_3 4, L_4 71, L_5 8, L_6 8, L_7 7, L_8 220; M_1 4, M_2 5, M_3 105; anterior sublaterals 10; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum slightly creased, a pair of small round pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 94, Sti IV 75, St IV 56. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/0 - 2/1 - 1. Spermatheca with saccular-flared cervix 13 and nodular atrium.

MALE — Unknown.

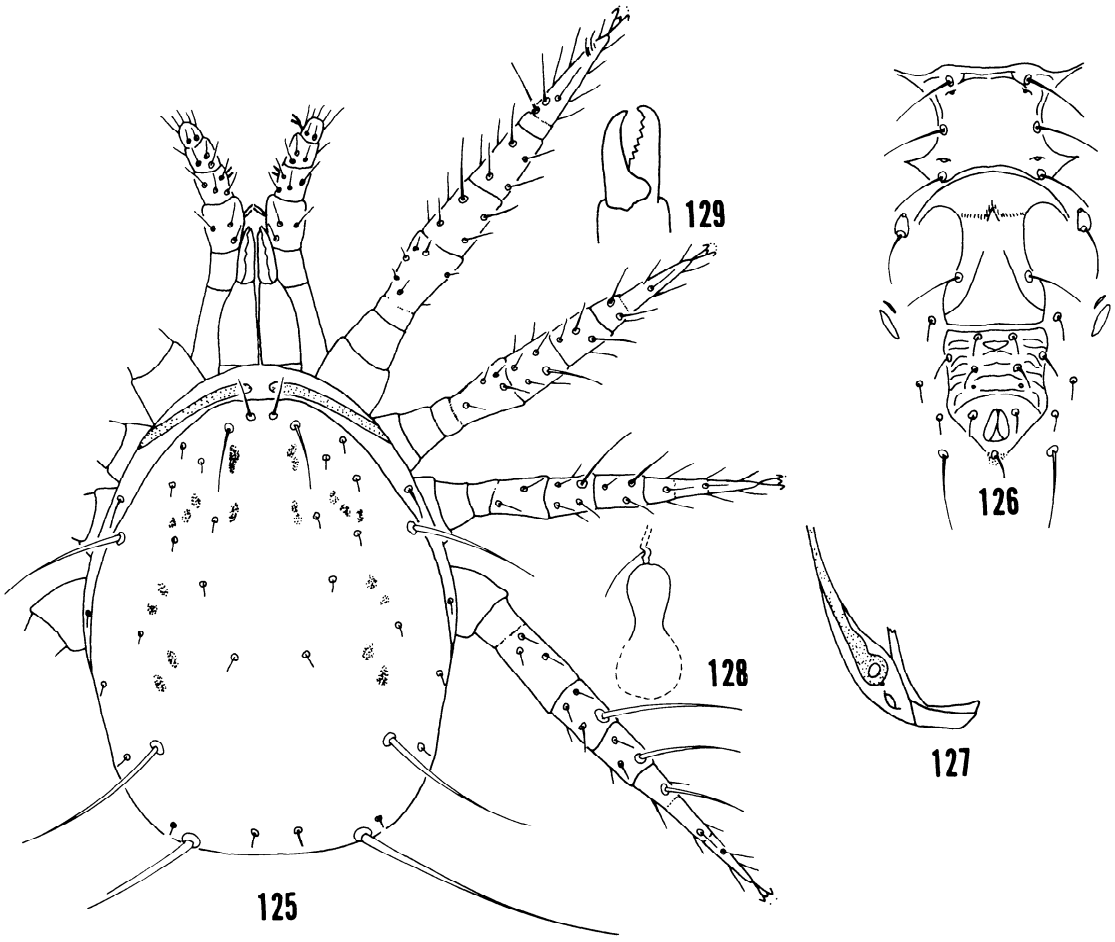
DISCUSSION — Nothing is known about the food habits. All specimens have been collected in Russia.

PUNCTATUS GROUP

Five species are assigned to this group, but one is somewhat divergent. They are *A. kulini* Gupta, *A. raoiellus* Denmark and Muma, *A. hederae* Denmark and Muma, *A. saopaulus* Denmark and Muma, and *A. punctatus* Muma. Four species have the atrium differentiated to slightly nodular and the saccular cervix swollen externally and distinctly flared internally. *A. hederae* is divergent in having the cervix (7x) slender, almost vesicular, and only slightly flared internally, with a differentiated atrium.

Key to females in *punctatus* group

1. Pores on the ventrianal scutum small and round 2
— Pores on the ventrianal scutum large and oval.. 3



Figs. 125-129. *Amblyseius punctatus* Muma: 125. Dorsal and leg structure of female, 126. Ventral scuta and setation of female, 127. Posterior peritremal and stigmatal development of female, 128. Spermathecal structure of female, 129. Cheliceral structure of female.

2. Spermathecal cervix 15 and approximately twice as long as wide, L_2 5 ....*punctatus* Muma, p. 29
— Spermathecal cervix 27 and approximately 7 times longer than wide, and L_2 17 ..... *hederae* Denmark and Muma n. sp., p. 32
3. Ventrianal scutum wider that genital scutum and reticulated, L_4 longer than 100 and nodular atrium ....*saopaulus* Denmark and Muma, p. 32
— Ventrianal scutum as wide or slightly wider than genital scutum and not reticulated, L_4 shorter than 100, and atrium not nodular 4
4. Cervix 11 with large differentiated atrium, and M_3 100 .....*kulini* Gupta, p. 30
— Cervix 15-18 with small differentiated atrium, and M_3 122 ..... *raoiellus* Denmark and Muma n. sp., p. 31

Amblyseius punctatus Muma

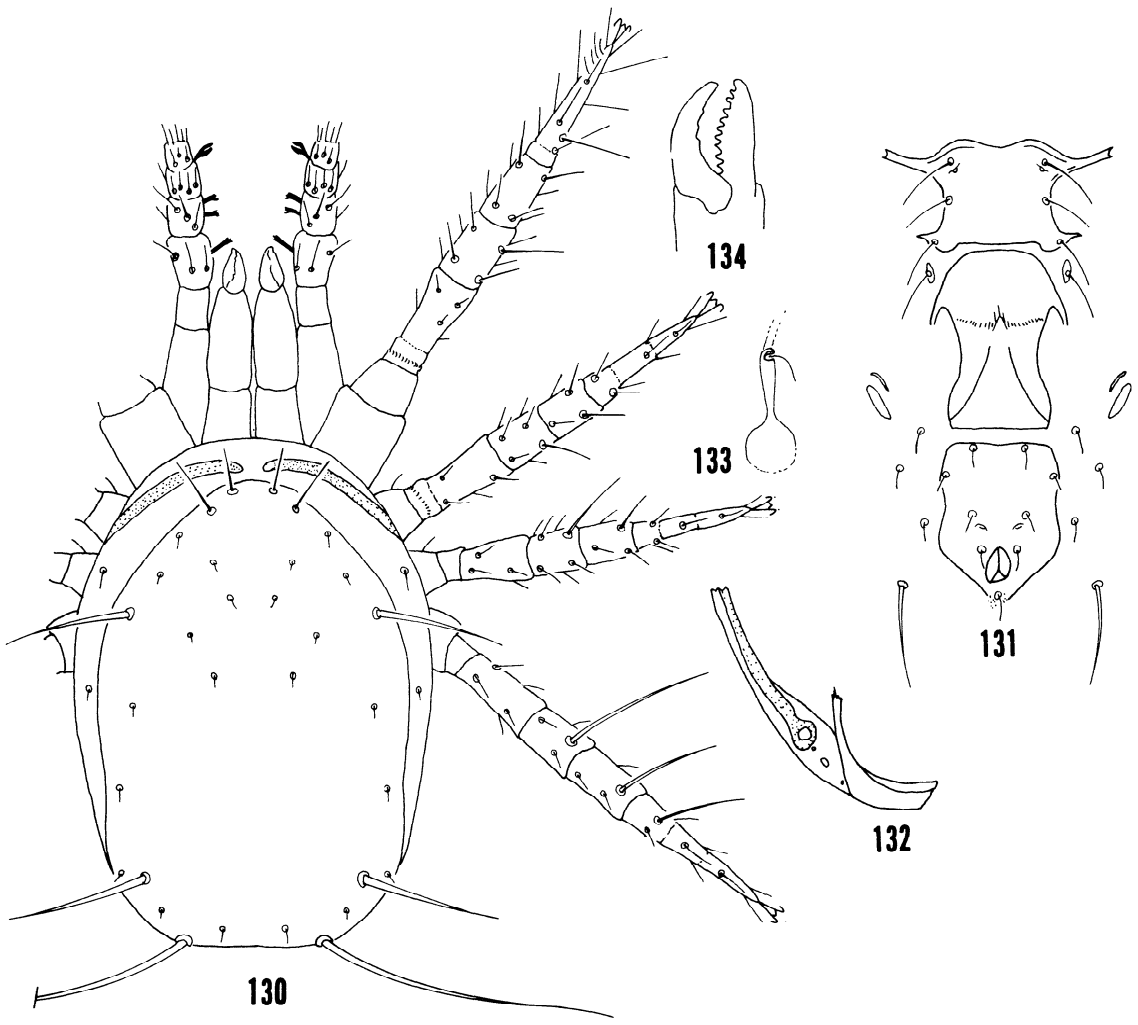
Fig. 125-129

Amblyseius punctatus Muma, 1967: 203.

TYPE — Female holotype, U.S.A.: North Carolina, Wake County, Umstead State Park, 3 I 1963, M.H. Farrier and L.J. Metz, mixed hardwood litter (USNMNH).

DIAGNOSIS — *Amblyseius punctatus* is similar to *Amblyseius hederae* Denmark and Muma but differs in having spermatheca 15 and approximately twice as long as wide, L_2 5, L_4 79-90 and L_8 181-192 as apposed to to spermatheca 27 and approximately 7 times longer than wide, L_2 17, L_4 59, and L_8 150 in *hederae*.

FEMALE — Length 330-335; width at L_4 190-204. Dorsal scutum smooth with scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 28; D_1 5, D_2 5, D_3 6, D_4 6; clunals 9; L_1 47, L_2 5, L_3 5, L_4 79-90,



Figs. 130-134. *Amblyseius kulini* Gupta: 130. Dorsal and leg structure of female, 131. Ventral scuta and setation of female, 132. Posterior peritremal and stigmatal development of female, 133. Spermathecal structure of female, 134. Cheliceral structure of female.

L_5 7, L_6 7, L_7 5, L_8 181-192; M_1 5, M_2 7, M_3 102-113; anterior sublaterals 13; posterior sublaterals 12. Sternal scutum smooth to slightly creased anteriorly, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum creased, a pair of small round pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending past the verticals. Chelicerae normal in relation to body size, fixed finger with 10-11 denticules, and movable finger with apparently no denticules. Leg formula 1423. Macrosetae Sge IV 70-97, Sti IV 60-66, St IV 49-52. Genu II 2 - 2-2/0 - 1. Genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular flared cervix 15 and nodular atrium.

MALE — Similar to female but smaller. Ventrianal scutum creased with 3 pairs of preanal setae and a pair of small round pores. Spermatodactyl with foot terminal, lateral process evident, and slightly enlarged toe.

DISCUSSION — *Amblyseius punctatus* is known only from North Carolina from mixed hardwood litter. Food habits are unknown.

Amblyseius kulini Gupta

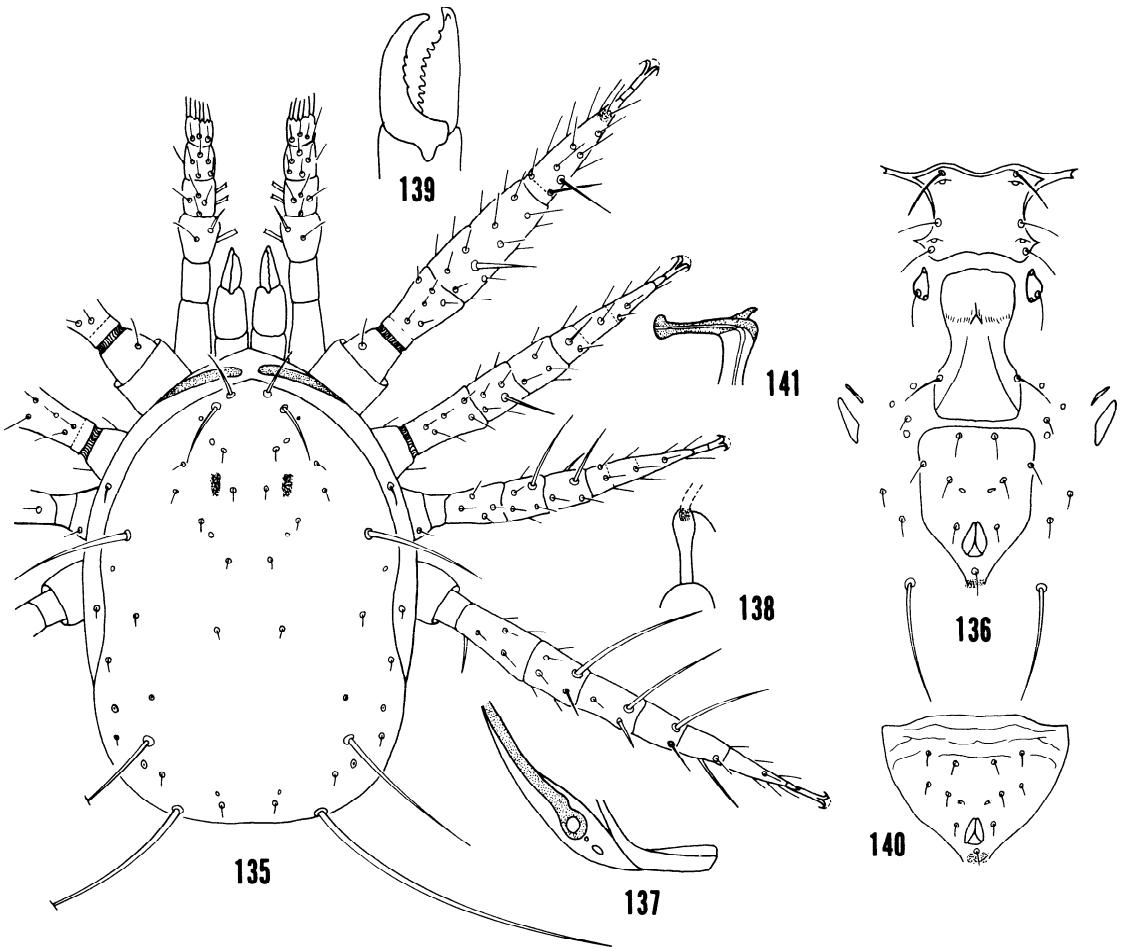
Fig. 130-134

Amblyseius kulini Gupta, 1978: 63.

TYPE — Female holotype, India: Assam, 8 XI 1974, S.K. Gupta, on *Bambusa* sp., in National Collection of the Zoological Survey of India, Calcutta.

DIAGNOSIS — *Amblyseius kulini* Gupta is similar to *raioellus* Denmark and Muma but differs in having M_3 100, cervix 11 and c-shaped atrium as apposed to M_3 122, cervix 15-18 and undifferentiated atrium in *raoiellus*.

FEMALE — Length 328; width at L_4 208. Dorsal scutum smooth with 17 pairs of setae. Measurements of setae: verticals 29; D_1 6, D_2 6, D_3 6, D_4 7; clunals 8; L_1 47, L_2 11, L_3 10, L_4 89, L_5 8, L_6 8, L_7 8, L_8 212; M_1 6, M_2 7, M_3 100; anterior sublaterals 14; posterior sublaterals 7. Sternal scutum smooth with a pair of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and three pairs of preanal setae. Three



Figs. 135-141. *Amblyseius raoiellus* Denmark and Muma n. sp.: 135. Dorsal and leg structure of female, 136. Ventral scuta and setation of female, 137. Posterior peritremal and stigmatal development of female, 138. Spermathecal structure of female, 139. Cheliceral structure of female, 140. Ventrianal scutum of male, 141. Spermatodactyl structure of male.

pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to the body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 103, Sti IV 72, St IV 69. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with saccular flared cervix 11 and small c-shaped atrium.

MALE — Unknown.

DISCUSSION — This species has been collected only in India and nothing is known about its biology.

Amblyseius raoiellus Denmark and Muma n. sp.

Fig. 135-141

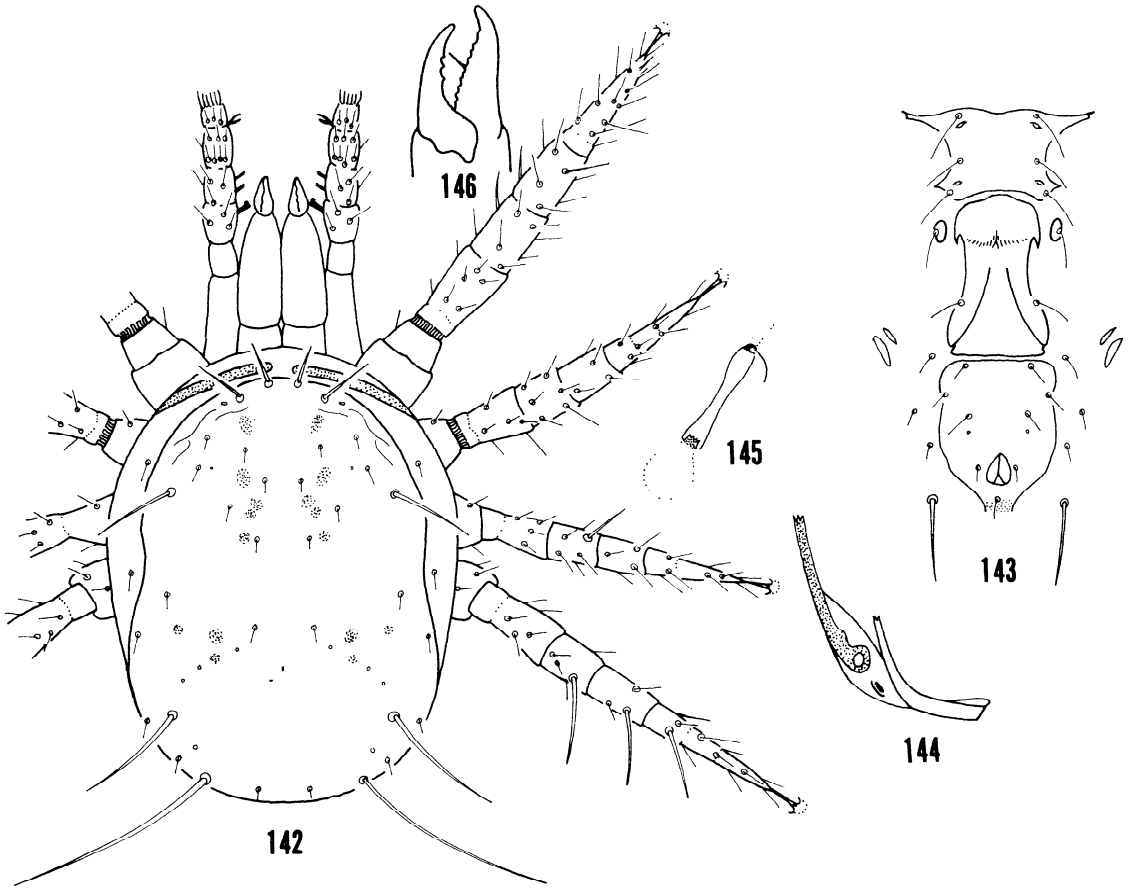
TYPE — Female holotype, India: Karnatake State, South Kanara District, 16 VII 1975, N.M. Nayar, on *Raoiella indica* (FSCA).

DIAGNOSIS — See *Amblyseius kulini* Gupta.

FEMALE — Length 346; width at L_4 217. Dorsal scutum smooth with 7-8 small to medium sized pores and 17 pairs of setae: veticals 36; D_1 3, D_2 3, D_3 4, D_4 4; clunals 6; L_1 53, L_2 6, L_3 8, L_4 95, L_5 7, L_6 8, L_7 11, L_8 220-235; M_1 3, M_2 8, M_3 122; anterior sublaterals 12; posterior sublaterals 5. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 106-113, Sti IV 72-81, St IV 62-74. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular-pocular cervix 15-18 and differentiated atrium.

MALE — Similar to female but smaller. Spermatodactyl with foot terminal, lateral process present, and toe enlarged. Ventrianal scutum lightly reticulated, a pair of elliptical pores, and 4 pairs of preanal setae.

DISCUSSION — This species is known only from the type series of 10 females and 3 males all taken on *Raoiella indica*. Nothing is known about the biology of this species.



Figs. 142-146. *Amblyseius hederae* Denmark and Muma n. sp.: 142. Dorsal and leg structure of female, 143. Ventral scuta and setation of female, 144. Posterior peritremal and stigmatal development of female, 145. Spermathecal structure of female, 146. Cheliceral structure of female.

Amblyseius hederae Denmark & Muma n. sp.

Fig. 142-146

TYPE — Female holotype, Japan: via Anchorage, Alaska, 4 IV 1985, D. Atkins, on *Hedera helix* (USNMNH).

DIAGNOSIS — See *Amblyseius punctatus* Muma.

FEMALE — Length 345; width at L_4 204. Dorsal scutum smooth with scattered muscle marks, 5-6 small pores, and 17 pairs of setae. Measurements of setae: verticals 27; D_1 5, D_2 5, D_3 5, D_4 6; clunals 9; L_1 42, L_2 17, L_3 11, L_4 59, L_5 10, L_6 10, L_7 8, L_8 150; M_1 5, M_2 8, M_3 94; anterior sublaterals 17; posterior sublaterals 9. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 13 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 68, Sti IV 58, St IV 55. Genu II 2 - 2/1 - 2/0 - 1; genu III 1 - 2/0 - 2/1 - 1. Spermatheca with externally swollen saccular cervix 27 and small c-shaped atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type specimen. Nothing is known about the biology of this species.

Amblyseius saopaulus Denmark & Muma

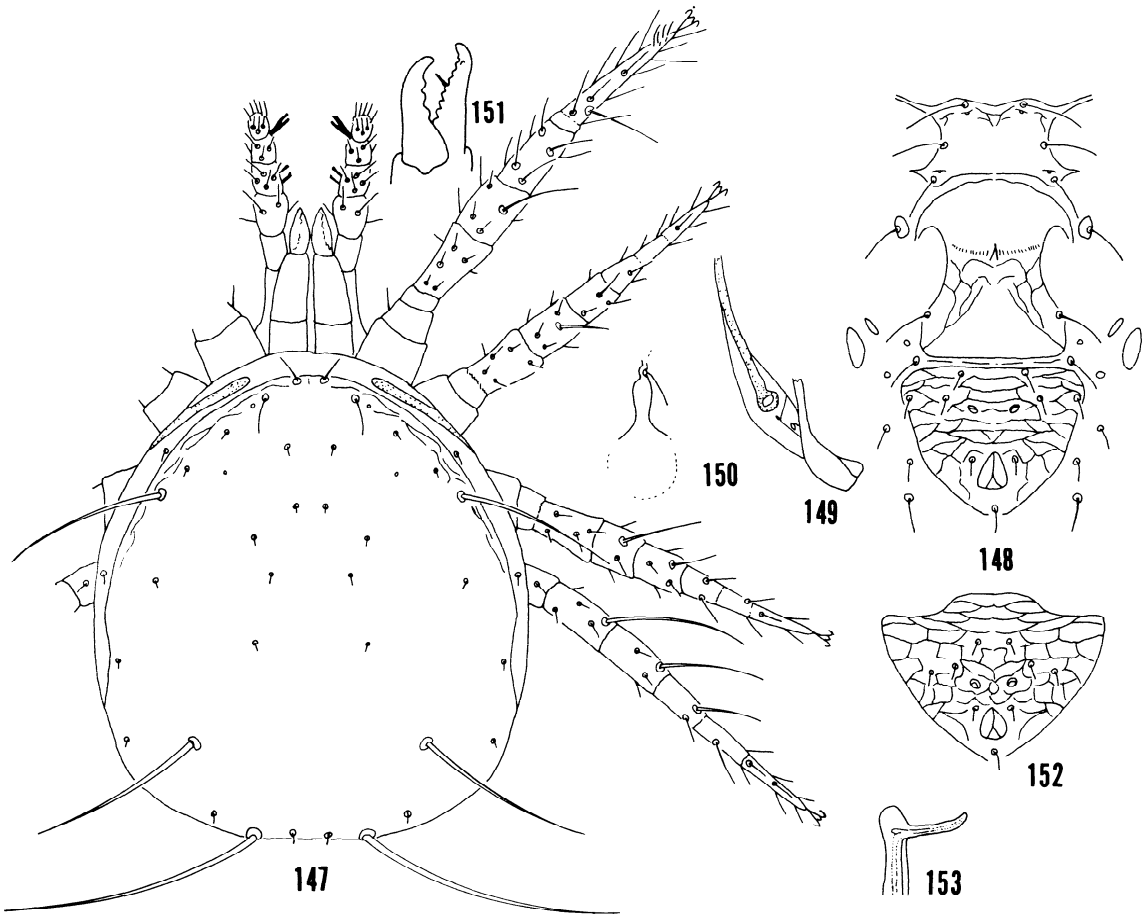
Fig. 147-153

Amblyseius saopaulus Denmark and Muma, 1973: 243.

TYPE — Female holotype, Brazil: Pariguera-acu, Sao Paulo, 6 VI 1967, C.H.W. Flechtmann, on *Theobroma* sp. (ESALQ).

DIAGNOSIS — *Amblyseius saopaulus* is unique in this group in having L_4 longer than 100 and the ventrianal scutum in the male and female heavily reticulated.

FEMALE — Length 340-390; width at L_4 267-280. Dorsal scutum with 2-3 small pores, lightly reticulated along the anterior edge of the dorsal scutum, and with 17 pairs of setae. Measurements of setae: verticals 27; D_1 5, D_2 5, D_3 5, D_4 5; clunals 6; L_1 28, L_2 3, L_3 4, L_4 126,



Figs. 147-153. *Amblyseius saopaulus* Denmark and Muma: 147. Dorsal and leg structure of female, 148. Ventral scuta and setation of female, 149. Posterior peritremal and stigmatal development of female, 150. Spermathecal structure of female, 151. Cheliceral structure of female, 152. Ventrianal scutum of male, 153. Spermatodactyl structure of male.

L_5 5, L_6 5, L_7 5, L_8 204; M_1 5, M_2 5, M_3 145; anterior sublaterals 6; posterior sublaterals 5. Sternal scutum creased anteriorly, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum reticulated, a pair of large elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to L_1. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 117, Sti IV 84, St IV 47. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/0 - 2/1 - 1. Spermatheca with saccular flared cervix 12 and nodular atrium.

MALE — Similar to female, but slightly smaller. The ventrianal scutum reticulated with a pair of large elliptical pores and 3 pairs of preanal setae. The spermatodactyl with foot subterminal, toe not enlarged, and lateral process indistinct.

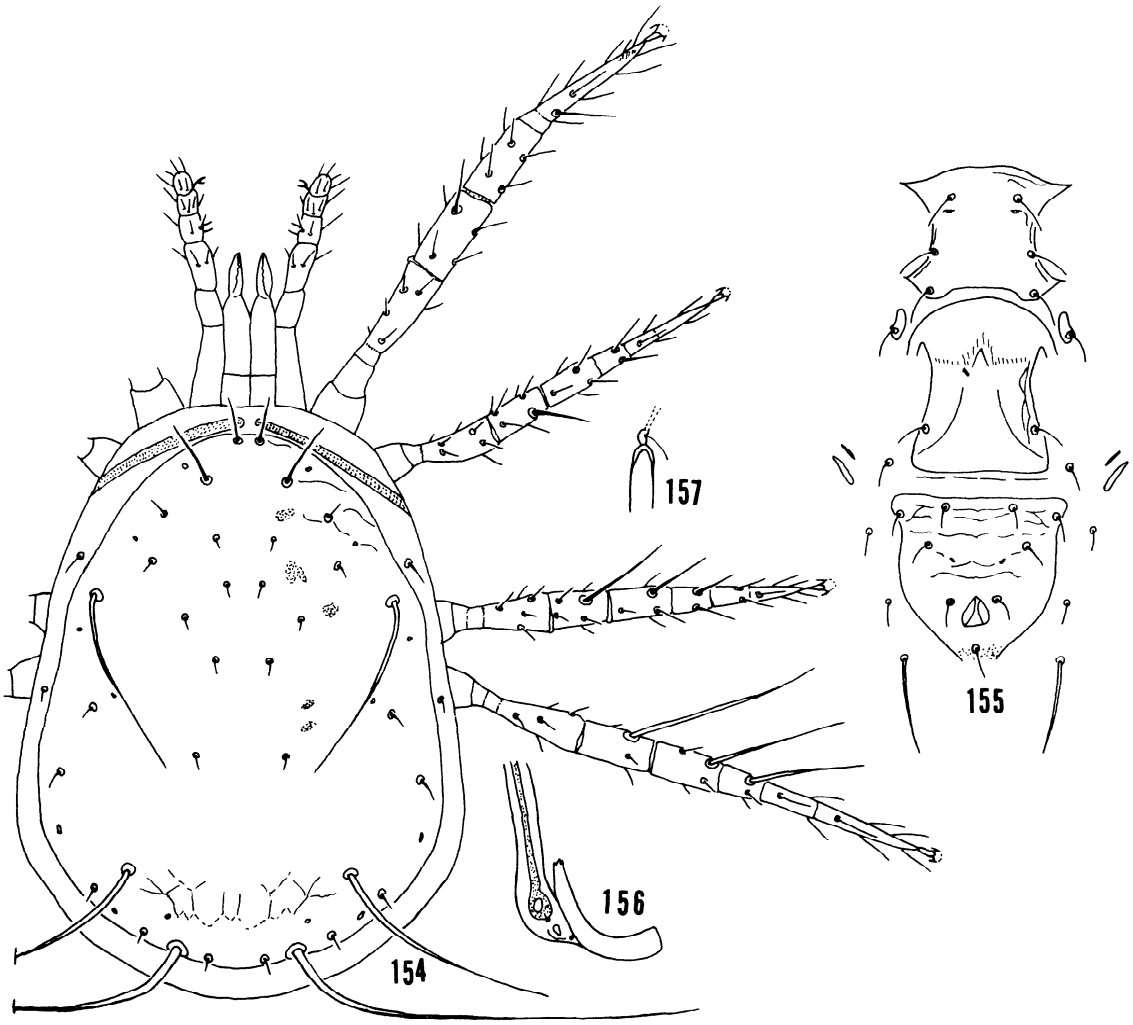
DISCUSSION — Nothing is known about the biology and life history of this species. It has been taken only in Brazil on *Dahlia* sp., *Malus sylvestris* Mill., *Camellia sinensis* (L.) O. Kuntz, and *Theobroma* sp.

SCHUSTERI GROUP

Four species are assigned to this group. They are *A. schusteri* (Chant), *A. ishizuchiensis* Ehara, *A. curiosus* (Chant and Baker), and *A. neobernhardi* Athias-Henriot. Three species have a short more or less nodular atrium and a saccular cervix that is thick-walled ectally and thin-walled internally; *curiosus* varies only by having a bifid atrium.

Key to adult females of the *schusteri* group

1. Spermatheca with bifid atrium..... .....*curiosus* (Chant & Baker, p. 35
— Spermatheca with nodular atrium 2
2. Preanal pore on ventrianal scutum small but elliptical .....*schusteri* (Chant), p. 34
— Preanal pore on ventrianal scutum small and round 3
3. L_4 less than 100, L_2 not longer than L_3, and cervix of spermatheca approximately 18 ....*neobernhardi* Athias-Henriot, p. 36



Figs. 154-157. *Amblyseius schusteri* (Chant): 154. Dorsal and leg structure of female, 155. Ventral scuta and setation of female, 156. Posterior peritremal and stigmatal development of female, 157. Spermathecal structure of female.

— L_4 longer than 100, L_2 longer than L_3, and cervix of spermatheca approximately 8 .... *ishizuchiensis* Ehara, p. 35

Amblyseius schusteri (Chant)

Fig. 154-157

Typhlodromus (Amblyseius) schusteri Chant, 1959: 88.
Amblyseius schusteri (Chant), Muma, 1961: 287; Schuster and Pritchard, 1963: 235.

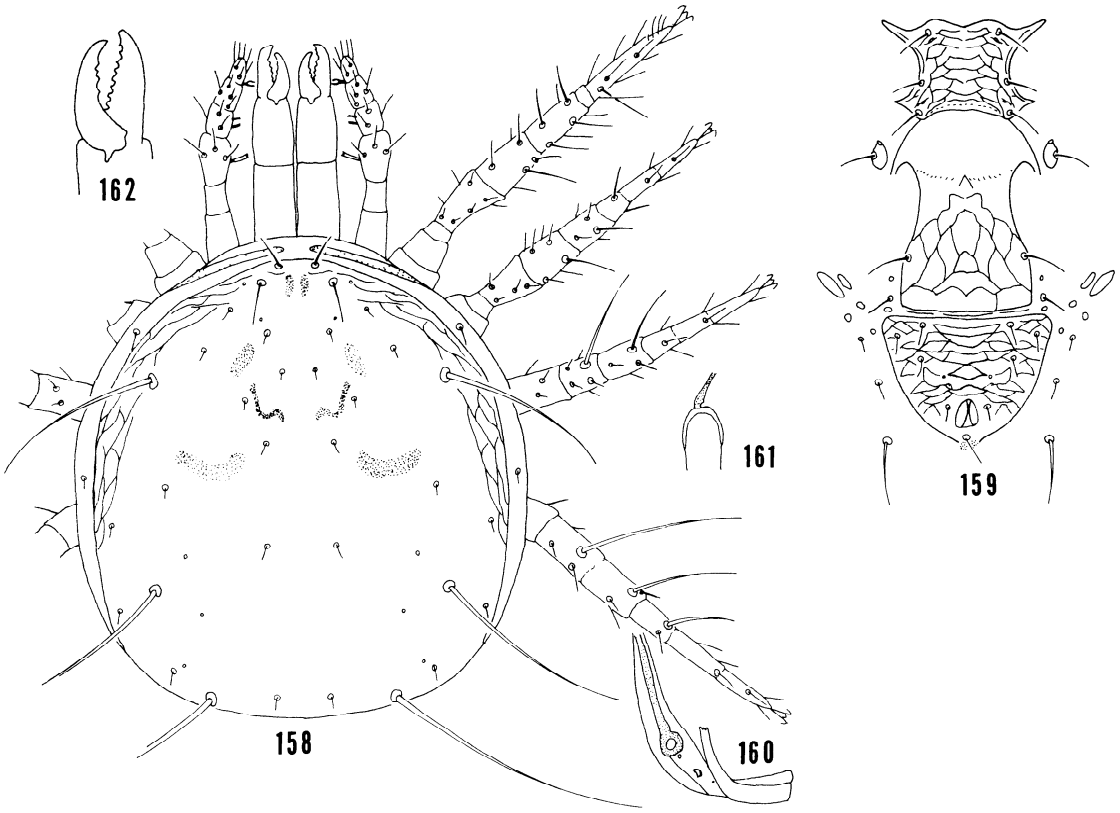
TYPE — Female holotype, California: Fresno County, Kaiser Pass, 6 VIII 1956, R. Schuster, host unknown (CNC).

DIAGNOSIS — *Amblyseius schusteri* is similar to *Amblyseius curiosus* (Chant and Baker) but differs in having verticals 35, L_1 53, M_3 196, Sge IV 165, Sti IV 149, and small c-shaped atrium as apposed to verticals 25, L_1 19, M_3 144, Sge IV 136, Sti IV 82, and a v-shaped atrium in *curiosus*.

FEMALE — Length 408; width at L_4 283. Dorsal scutum smooth with scattered muscle marks, 5-6 small pores, and 17 pairs of setae. Measurements of setae: verticals 35; D_1 7, D_2 6, D_3 8, D_4 9; clunals 14; L_1 53, L_2 12, L_3 8, L_4 125, L_5 18, L_6 16, L_7 12, L_8 314; M_1 8, M_2 8, M_3 196; anterior sublaterals 22; posterior sublaterals 10. Sternal scutum smooth, with 2 pores and 3 pairs of setae. Ventrianal scutum lightly creased, a pair of round to elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 2 denticules. Leg formula 4132. Macrosetae Sge IV 165, Sti IV 149, St IV 76. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/0 - 2/1 - 1. Spermatheca with ectally thickened saccular cervix 21 and nodular atrium.

MALE — Similar to female but smaller. Spermatodactyl with foot terminal, ventrianal scutum creased, 2 pores, and 3 pairs of preanal setae.

DISCUSSION — This species known only from California.



Figs. 158-162. *Amblyseius ishizuchiensis* Ehara: 158. Dorsal and leg structure of female, 159. Ventral scuta and setation of female, 160. Posterior peritremal and stigmatal development of female, 161. Spermathecal structure of female, 162. Cheliceral structure of female.

Amblyseius ishizuchiensis Ehara

Fig. 158-162

Amblyseius (Amblyseius) ishizuchiensis Ehara, 1972: 162.

TYPE — Female holotype, Japan: Mt. Kamegamori, Shikoku, 30 VII 1967, K. Ishikawa, from litter, in Biological Institute, Faculty of Education, Tottori University, Tottori, Japan.

DIAGNOSIS — See *Ambylseius neobernhardi* Athias-Henriot.

FEMALE — Length 400; width at L_4 300. Dorsal scutum smooth with scattered muscle marks especially anteriorly, 3 to 5 small pores, and 17 pairs of setae. Measurements of setae: verticals 24; D_1 6, D_2 6, D_3 6, D_4 11; clunals 9; L_1 35, L_2 9, L_3 6, L_4 149, L_5 9, L_6 11, L_7 11, L_8 235; M_1 6, M_2 11, M_3 178; anterior sublaterals 10; posterior sublaterals 8. Sternal scutum reticulated with 2 pores and 3 pairs of setae. Ventrianal scutum with a pair of small round pores, reticulated, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to the body size, fixed finger with 14 denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 139, Sti IV 87, St IV 57. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with ectally thickened saccular cervix 8 with an elongate atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type and was taken from litter.

Amblyseius curiosus (Chant and Baker) New Combination

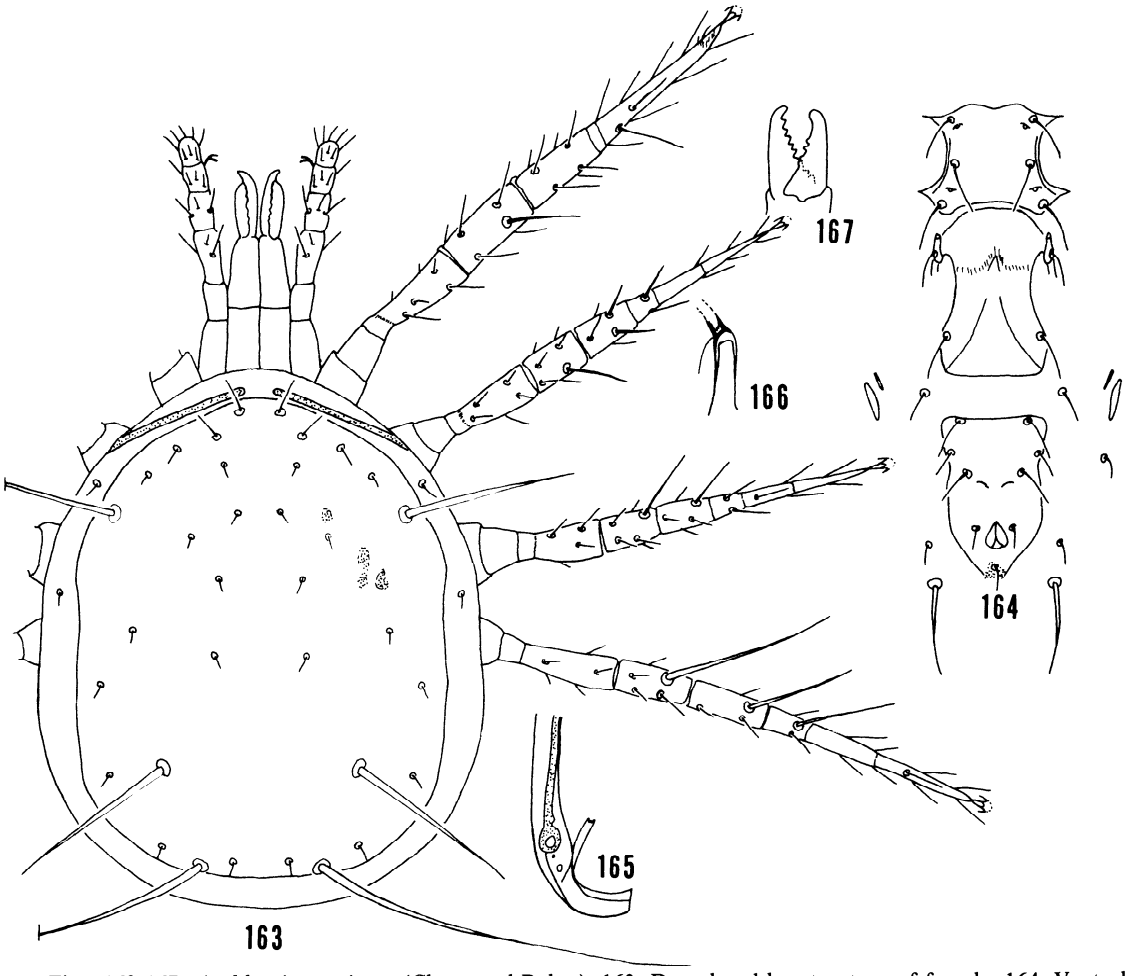
Fig. 163-167

Iphiseius curiosus Chant and Baker, 1965: 11.
Amblyseius arenus Muma, 1965: 250.

TYPE — Female holotype, Costa Rica: Turrialba, 3 IV 1959, E.W. Baker, on shrub leaves (USNMNH).

DIAGNOSIS — See *Amblyseius schusteri* Chant.

FEMALE — Length 416; width at L_4 230. Dorsal scutum smooth with a few muscle marks anteriorly and 17 pairs of setae. Measurements of setae: verticals 25; D_1 6, D_2 6, D_3 6, D_4 6; clunals 8; L_1 19, L_2 13, L_3 5, L_4 130, L_5 15, L_6 13, L_7 11, L_8 295; M_1 6, M_2 7, M_3 144; anterior sublaterals 16; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth, 2 elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 12 denticules, and movable finger with 4 denticules. Leg formula 1423. Macrosetae Sge IV 136, Sti IV 82, St



Figs. 163-167. *Amblyseius curiosus* (Chant and Baker): 163. Dorsal and leg structure of female, 164. Ventral scuta and setation of female, 165. Posterior peritremal and stigmatal development of female, 166. Spermathecal structure of female, 167. Cheliceral structure of female.

IV 78. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/0 - 1. Spermatheca with ectally thickened saccular cervix 20 and bifid differentiated atrium.

MALE — The male is similar to but smaller than the female. The ventrianal scutum is lightly creased with a pair of elliptical pores and 3 pairs of preanal setae. Spermatodactyl with foot terminal, lateral process distinct, and toe slightly upturned.

DISCUSSION — Nothing is known about the biology of this species. It has been collected on leaves of a shrub in Costa Rica, on croton leaves in Nicaragua, in Trinidad on *Ryania speciosa*, and in Florida in oak-pine-bay litter.

Amblyseius neobernhardi Athias-Henriot

Fig. 168-174

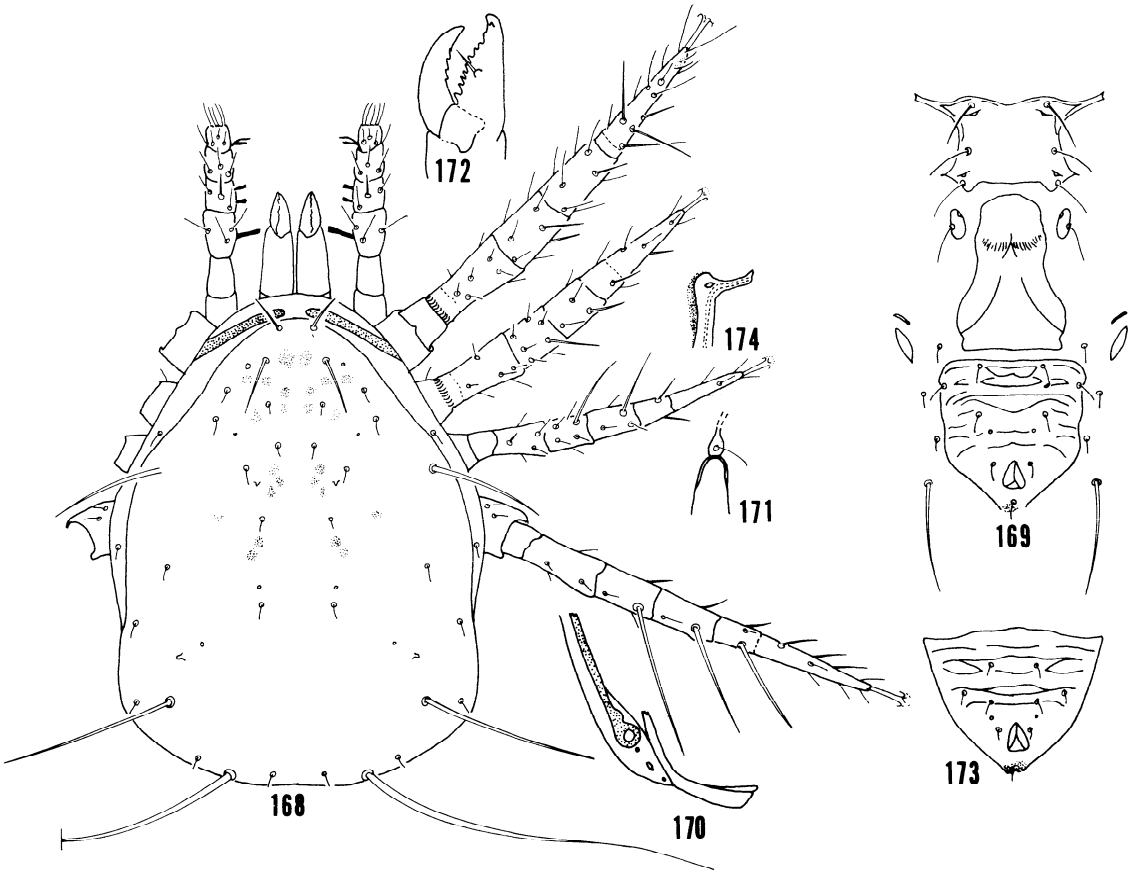
Amblyseius intermedius Bernhard, 1963: 694, Preocc. (*Amblyseius intermedius* Gonzales & Schuster, 1962: 14-15).

Amblyseius neobernhardi Athias-Henriot, 1966: 199.

TYPE — Female holotype, West Germany: Erlangen, Barjern, 1963, in humus, was destroyed during the remodeling of the building along with all of Bernhard types.

DIAGNOSIS — *Amblyseius neobernhardi* is similar to *Amblyseius ishizuchiensis* Ehara but differs in having L_1 42, L_3 12, L_4 90, L_8 302, M_3 141, and cervix 8 as apposed to L_1 35, L_3 6, L_4 149, L_8 235, M_3 178, and cervix 18 in *ishizuchiensis*.

FEMALE — Length 376; width at L_4 251. Dorsal scutum smooth with scattered muscle marks dorsocentrally, 6-7 small to medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 27; D_1 5, D_2 6, D_3 7, D_4 12; clunals 11; L_1 42, L_2 10, L_3 12, L_4 90, L_5 12, L_6 10, L_7 10, L_8 302; M_1 6, M_2 16, M_3 141; anterior sublaterals 12; posterior sublaterals 7. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum reticulated with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to



Figs. 168-174. *Amblyseius neobernhardi* Athias-Henriot: 168. Dorsal and leg strucuture of female, 169. Ventral scuta and setation of female, 170. Posterior peritremal and stigmatal development of female, 171. Spermathecal structure of female, 172. Cheliceral structure of female, 173. Ventrianal scutum of male, 174. Spermatodactyl structure of male.

the verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 122, Sti IV 95, St IV 73. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with ectally thickened saccular cervix 18 and nodular atrium.

MALE — Similar to female but slightly smaller. The ventrianal scutum reticulated with a pair of small round pores and 3 pairs of preanal setae. The spermatodactyl with foot terminal, toe upturned, and lateral process indistinct.

DISCUSSION — This species has been collected in West Germany in deposits of dead grass along the banks of a river. Also, humus, sphagnum, and on *Calluna* sp. Nothing is known of its biology.

PRAVUS GROUP

Five species are assigned to this group. They are *A. pravus* Denmark, *A. impressus* Denmark and Muma, *A. pauciseius* Wainstein, *A. fieldsi* Denmark and Muma n. sp., and *A. kaguya* Ehara.

The atria of spermathecae of these species vary from undifferentiated, differentiated, bifid to nodular, but all species have pocular cervices.

Key to females in *pravus* group

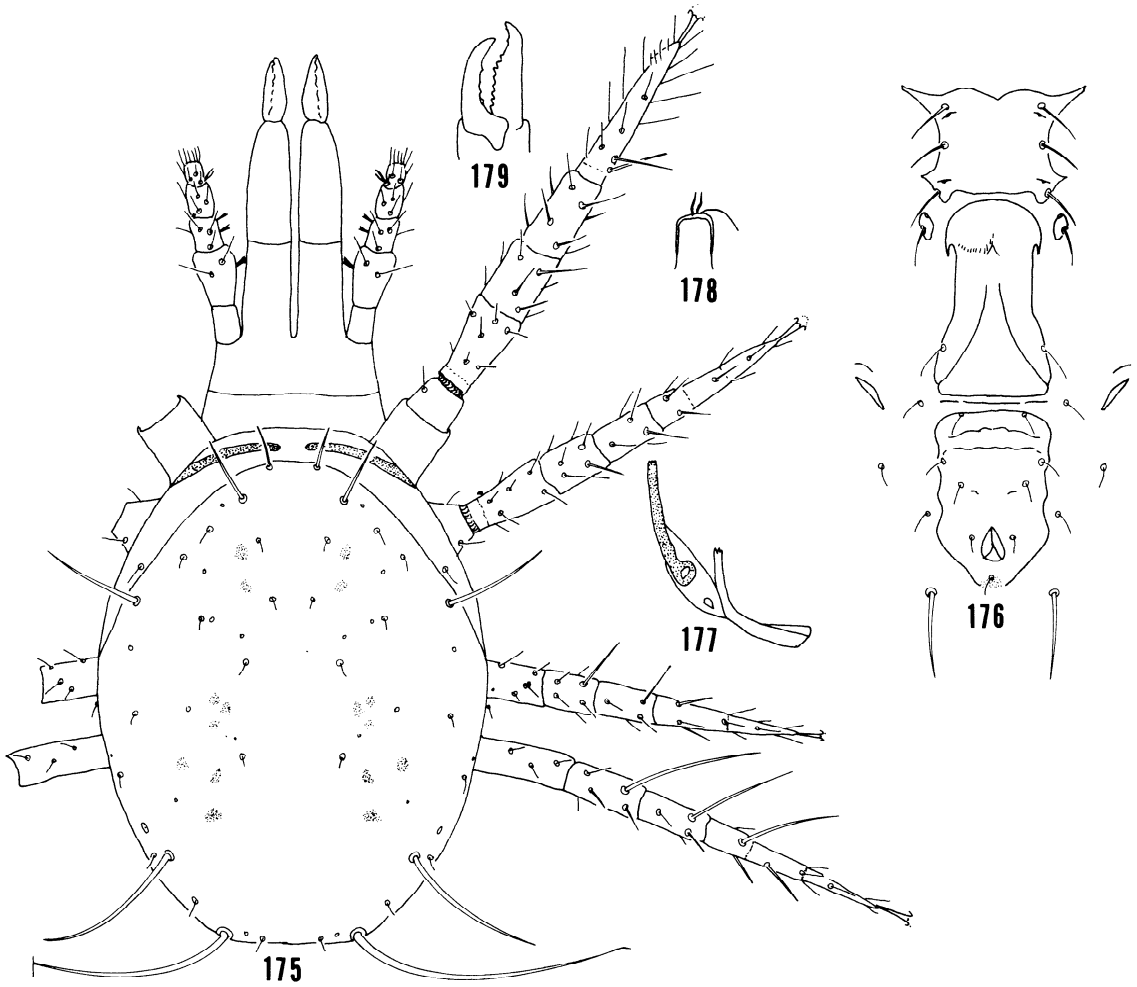
1. Verticals 20 or shorter, Sge IV approximately 100, Sti IV approximately 60 ..... *fieldsi* Denmark and Muma, p. 39
— Verticals 30 or longer, Sge IV 90 or longer, Sti IV much longer or shorter than 60 2
2. L_4 longer than 100 3
— L_4 shorter than 100 4
3. L_8 300 or longer, 2 pairs of ventrolaterals ..... *paucisetis* Wainstein, p. 41
— L_8 shorter than 300, 3 pairs of ventrolaterals ..... *impressus* Denmark and Muma, p. 39
4. L_2 6, L_8 280, Sge 120 ..... *kaguya* Ehara, p. 40
— L_2 12, L_8 210, Sge 60 .... *parvus* Denmark, p. 37

Amblyseius pravus Denmark

Fig. 175-179

Amblyseius usitatus Denmark and Muma 1973: 245. (homonym of *Amblyseius usitatus* v. d. Merwe, 1965: 71).

Amblyseius pravus Denmark, 1977: 171; Denmark and Andrews, 1981: 149.



Figs. 175-179. *Amblyseius pravus* Denmark: 175. Dorsal and leg structure of female, 176. Ventral scuta and setation of female, 177. Posterior peritremal and stigmatal development of female, 178. Spermathecal structure of female, 179. Cheliceral structure of female.

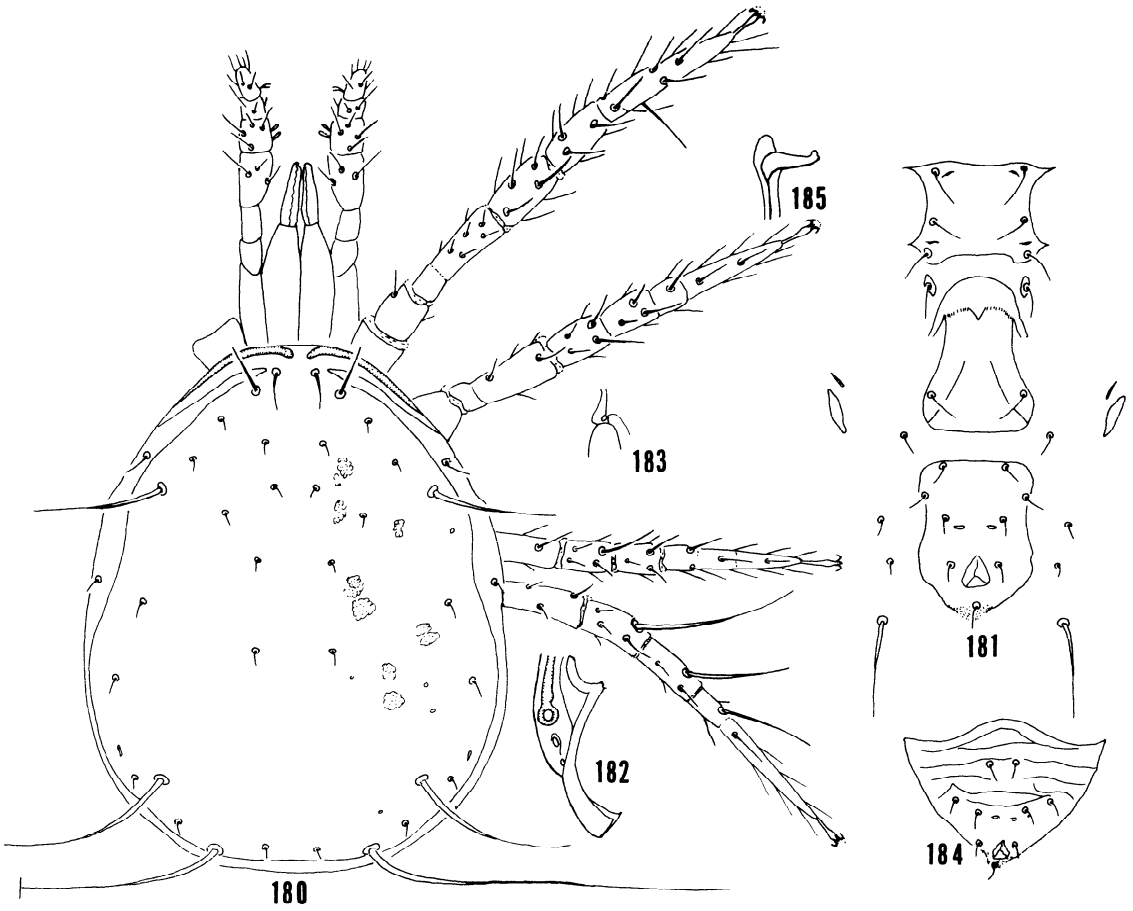
TYPE — Female holotype, Brazil: Rio Claro, Sao Paulo, 1 VI 1970, V.L. Letizio, on *Pinus elliotti* (ESALQ).

DIAGNOSIS — *Amblyseius pravus* is similar to *Amblyseius impressus* Denmark and Muma and *Amblyseius paucisetis* Wainstein but differs in having L_8 212, M_3 102, Sge IV 64, Sti IV 45, St IV 41, and cervix of spermatheca 8 with undifferentiated atrium as opposed to L_8 281, M_3 141, Sge IV 126, Sti IV 94, and St IV 99 in *impressus* and cervix 8 with nodular atrium in *impressus*, and L_8 314-335, M_3 145, Sge IV 125, Sti IV 91-100, St IV 91-100. Cervix 7 with undifferentiated atrium in *paucisetis*. *A. paucisetis* has only 2 pairs of setae surrounding the ventrianal scutum as apposed to 3 pairs in *pravus* and *impressus*.

FEMALE — Length 385; width at L_4 259. Dorsal scutum smooth with 5 to 6 small pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 31; D_1 6, D_2 4, D_3 9, D_4 7; clunals 6; L_1 50, L_2 12, L_3 12, L_4 91, L_5 14, L_6 11, L_7 13, L_8 212; M_1 4, M_2 8, M_3 102; anterior sublaterals 14; posterior sublaterals 11. Sternal scutum smooth, with a pair of pores and 3 pairs of setae. Ventrianal scutum with a pair of elliptical pores approximately in line with the posterior pair of preanal setae, smooth, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 64, Sti IV 45, St IV 41. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with a poculiform cervix 8 and differentiated atrium.

MALE — Unknown.

DISCUSSION — This species is known only from Brazil and El Salvador on *Citrus sinensis*. Nothing is known about the biology of this species.



Figs. 180-185. *Amblyseius impressus* Denmark and Muma: 180. Dorsal and leg structure of female, 181. Ventral scuta and setation of female, 182. Posterior peritremal and stigmatal development of female, 183. Spermathecal structure of female, 184. Ventrianal scutum of male, 185. Spermatodactyl structure of male.

Amblyseius impressus Denmark & Muma
Fig. 180-185

Amblyseius impressus Denmark and Muma, 1973: 246.

TYPE — Female holotype, Brazil: Sao Paulo, ? IX 1968, W.M. Vila, on *Pinus caribaea* Morelet (ESALQ).

DIAGNOSIS — See *Amblyseius pravus* Denmark.

FEMALE — Length 402; width at L_4 283. Dorsal scutum smooth with 5-6 small pores, scattered muscle marks in the mid-lateral area, and 17 pairs of setae. Measurements of setae: verticals 38; D_1 7, D_2 6, D_3 6, D_4 11; clunals 10; L_1 45, L_2 10, L_3 10, L_4 110, L_5 12, L_6 12, L_7 12, L_8 281; M_1 6, M_2 11, M_3 141; anterior sublaterals 13; posterior sublaterals 11. Sternal scutum smooth, 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of crescent-shaped pores. Three pairs of setae surround the ventrianal scutum. Chelicerae normal in relation to body size, fixed finger with 15 denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 126, Sti IV 94, St IV 90. Genu II 2 - 2 -2/1 - 1; genu III 1 - 2 - 2/1 - 1. Spermatheca with a poculiform cervix 8 and nodular atrium.

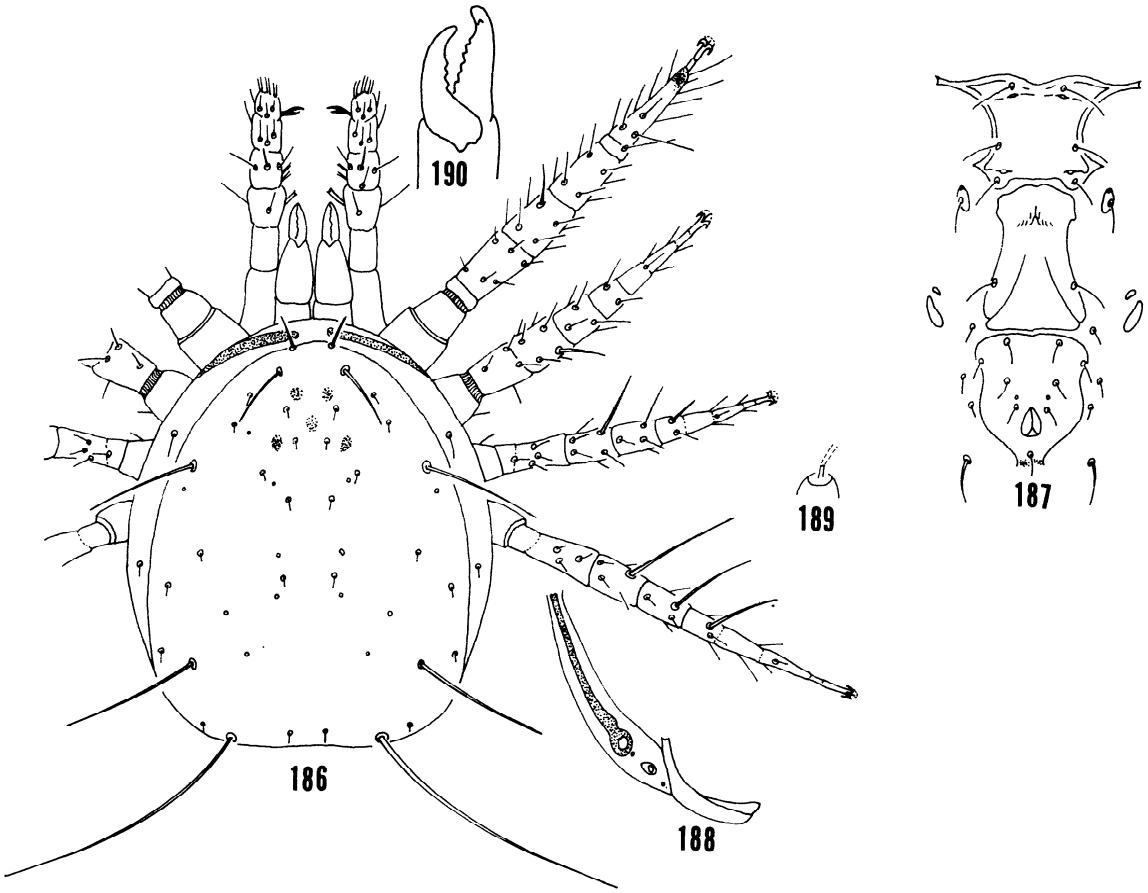
MALE — The male is similar to the female but is smaller. The ventrianal scutum is reticulated with a pair of crescent-shaped pores and 3 pairs of preanal setae. The spermatodactyl with foot terminal, toe enlarged, and lateral process indistinct.

DISCUSSION — Nothing is known about the biology and life history of this species. It has been taken only in Brazil on *Malus sylvestris* Mill., *Ficus benjamina, Hibiscus* sp., *Thuja* sp., and *Pinus* spp.

Amblyseius fieldsi Denmark & Muma n. sp.
Fig. 186-190

TYPE — Female holotype, Mexico; near Valpensis, 8 XI 1962, D. Tuttle and E. Baker (FSCA).

DIAGNOSIS — *Amblyseius fieldsi* Denmark and Muma is similar to *Amblyseius kaguya* Ehara but differs in having V 19, L_8 188, Sge IV 99, Sti IV 65, St IV 50, and cervix of spermatheca 8 with undifferentiated atrium as apposed to V 30, L_8 282, Sge IV 120, Sti IV 94, St IV 65, and cervix of spermatheca 13 with v-shaped



Figs. 186-190. *Amblyseius fieldsi* Denmark and Muma n. sp.: 186. Dorsal and leg structure of female, 187. Ventral scuta and setation of female, 188. Posterior peritremal and stigmatal development of female, 189. Spermathecal structure of female, 190. Cheliceral structure of female.

atrium in *kaguya*.

FEMALE — Length 330; width at L_4 204. Dorsal scutum smooth with a few muscle marks anteriorly, 7 small pores, and 17 pairs of setae. Measurements of setae: verticals 19; D_1 5, D_2 5, D_3 5, D_4 5; clunals 10; L_1 44, L_2 5, L_3 5, L_4 78, L_5 5, L_6 5, L_7 5, L_8 188; M_1 5, M_2 5, M_3 104; anterior sublaterals 16; posterior sublaterals 5. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 99, Sti IV 63, St IV 50. Genu II 2 - 2-2/0 - 1; genu III 2 - 2/1 - 2/0 - 1. Spermatheca with poculiform cervix 8 and differentiated atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type specimen. Nothing is known about its biology. This species is named in honor of Mrs. Ladonia Fields, a faithful technican for many years.

Amblyseius kaguya Ehara

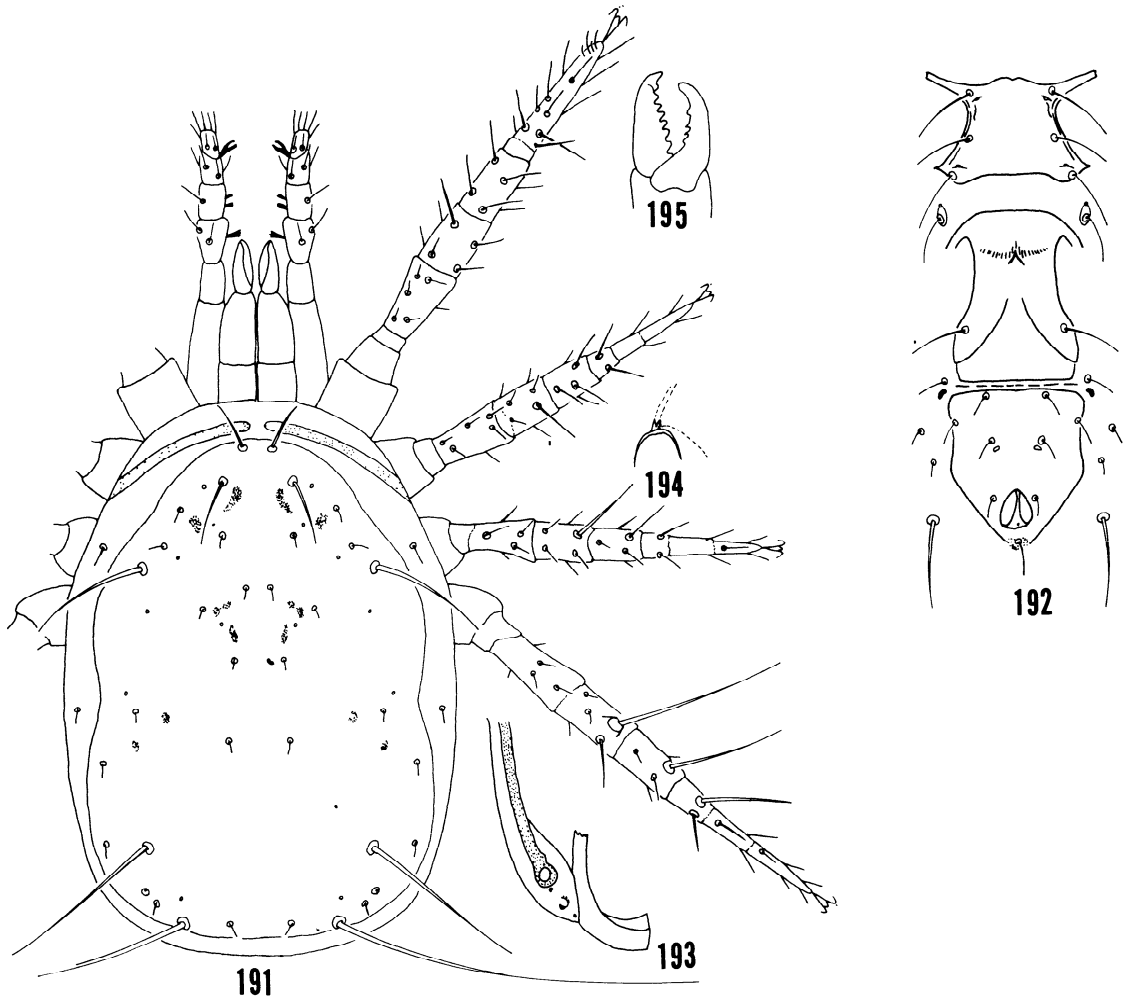
Fig. 191-195

Amblyseius kaguya Ehara, 1966: 12-14.

TYPE — Female holotype, Japan: Kochi, Kochi, 4 VIII 1965, S. Ehara, on a bamboo, *Sasa kurilensis* (Rupr.) Makino & Shibata, in Biological Institute, Faculty of Education, Tottori University, Tottori, Japan.

DIAGNOSIS — See *Amblyseius fieldsi* Denmark & Muma.

FEMALE — Length 365; width at L_4 224. Dorsal scutum smooth with scattered muscle marks, 8 to 9 small pores, and 17 pairs of setae. Measurements of setae: verticals 30; D_1 6, D_2 5, D_3 5, D_4 8; clunals 9; L_1 42, L_2 6, L_3 8, L_4 80, L_5 8, L_6 8, L_7 8, L_8 282; M_1 5, M_2 6, M_3 116; anterior sublaterals 11; posterior sublaterals 10. Sternal scutum smooth, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth, a pair of elliptical pores near and posterior to the posterior preanal setae, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to the body size, fixed finger with 12 denticules, and movable finger



191-195. *Amblyseius kaguya* Ehara: 191. Dorsal and leg structure of female, 192. Ventral scuta and setation of female, 193. Posterior peritremal and stigmatal development of female, 194. Spermathecal structure of female, 195. Cheliceral structure of female.

with 4 denticules. Leg formula 4123. Macrosetae Sge IV 120, Sti IV 94, St IV 65. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with pocular cervix 13 and bifid atrium.

MALE — Unknown.

DISCUSSION — This species has been collected at Kochi on bamboo and at Matsuyama on *Dryopteris obtusissima* Nakino in Japan.

Amblyseius paucisetis Wainstein

Fig. 196-200

Amblyseius paucisetis Wainstein, 1983: 181-186.

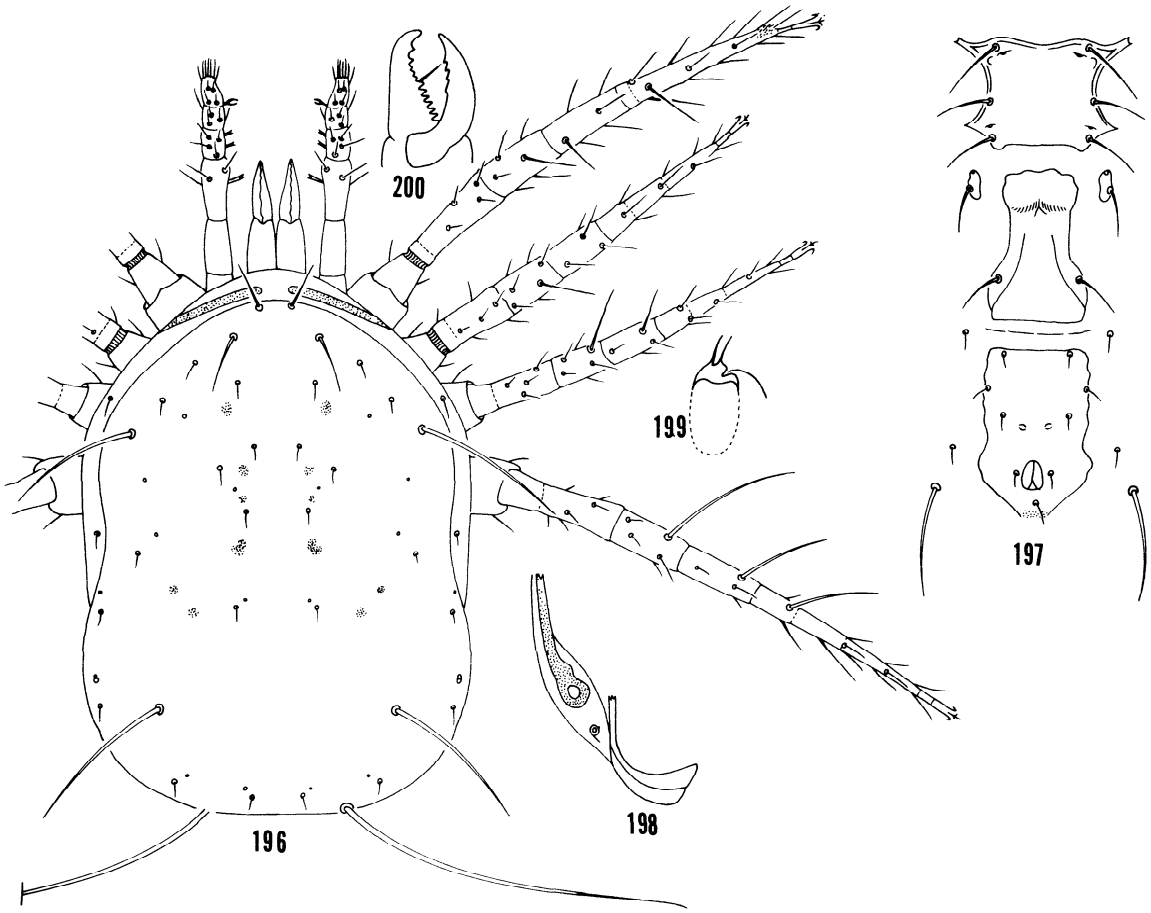
TYPE — Female holotype, Hawaii Island: Hawaii Volcano National Park, 16-18 VII 1973, T. Parman, in litter, Bernice P. Bishop Museum, Honolulu.

DIAGNOSIS — See *Amblyseius pravus* Denmark.

FEMALE — Length 410-423; width at L_4 298. Dorsal scutum smooth with 5 pairs of pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 42; D_1 9, D_2 8, D_3 9, D_4 10; clunals 9; L_1 49, L_2 14, L_3 8, L_4 117, L_5 14, L_6 14, L_7 16, L_8 314-335; M_1 9, M_2 9, M_3 145; anterior sublaterals 16; posterior sublaterals 12. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal ventrianal setae. Two pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 15 denticules, and movable finger with 4 denticules. Macrosetae Sge IV 125, Sti IV 91-100, St IV 91-100. Genu II 2 -2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with pocular cervix 7 and undifferentiated atrium.

MALE — Unknown.

DISCUSSION — This species is known from the holotype and paratype females collected from the same site. Nothing is known about the biology of this species.



Figs. 196-200. *Amblyseius paucisetis* Wainstein: 196. Dorsal and leg structure of female, 197. Ventral scuta and setation of female, 198. Posterior peritremal and stigmatal development of female, 199. Spermathecal structure of female, 200. Cheliceral structure of female.

ORIENTALIS GROUP

Four species are assigned to this group. They are *A. orientalis* Ehara, *A. firmus* Ehara, *A. multidentatus* (Chant), and *A. waltersi* Schicha. All of the species have nodular atria and saccular flared or unflared cervices except *multidentatus* (Chant) which has an undifferentiated atrium. *A. orientalis* has the longest cervix, *A. waltersi* the shortest.

Key to females in *orientalis* group

1. Elliptical pores on ventrianal scutum, L_2 16, L_3 24 ..... *orientalis* Ehara, p. 42
— Small round pores on ventrianal scutum, L_2 and L_3 8 or less 2
2. Verticals approximately 30, L_4 approximately 100, L_8 approximately 250 ..... *firmus* Ehara, p. 43
— Verticals 40 or longer, L_4 130 or longer, L_8 300 or longer 3
3. St IV shorter than 100, cervix shorter than 15, and pores on ventrianal scutum at the level with the posterior pair of preanal setae ..... *multidentatus* (Chant), p. 44
— St IV longer than 100, cervix 15 or longer, and pores on ventrianal scutum posterior to the posterior pair of preanal setae ..... *waltersi* Schicha, p. 45

Amblyseius orientalis Ehara

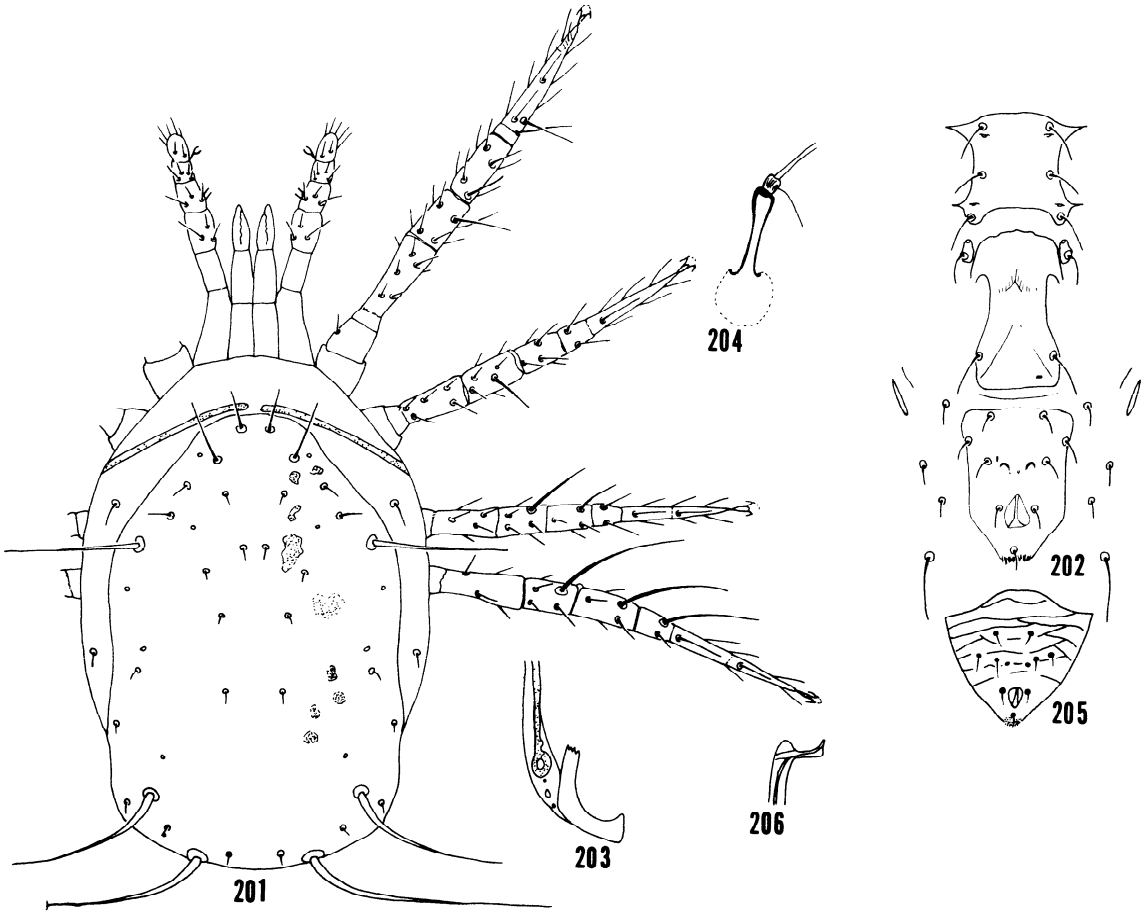
Fig. 201-206

Amblyseius orientalis Ehara, 1959: 291-293.

TYPE — Female holotype, Japan: Sapporo, Hokkaido, 10 IX 1958, S. Ehara, on *Quercus crispula* Blum, in Zoological Institute, Faculty of Science, Hokkaido University.

DIAGNOSIS — *Amblyseius orientalis* is similar to *amblyseius firmus* Ehara but differs in having L_1 52 L_2 16, L_3 24, M_3 135, Sge IV 137, and pores on ventrianal scutum elliptical as apposed to L_1 32, L_2 6, L_3 6, M_3 165, Sge IV 102, and pores on the ventrianal scutum small and round in *firmus*.

FEMALE — Length 377; width at L_4 220. Dorsal



Figs. 201-206. *Amblyseius orientalis* Ehara: 201. Dorsal and leg structure of female, 202. Ventral scuta and setation of female, 203. Posterior peritremal and stigmatal development of female, 204. Spermathecal structure of female, 205. Ventrianal scutum of male, 206. Spermatodactyl structure of male.

scutum smooth with 6-8 small scattered pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 33; D_1 6, D_2 4, D_3 6, D_4 6; clunals 8; L_1 52, L_2 16, L_3 24, L_4 111, L_5 13, L_6 10, L_7 13, L_8 264; M_1 4, M_2 6, M_3 135; anterior sublaterals 20; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with 2 crescent-shaped pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Chelicerae normal in relation to body size, fixed finger with 10 or more denticules, and movable finger with 3-4 denticules. Leg formula 1423. Macrosetae Sge IV 137, Sti IV 91, St IV 83. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with saccular-flared cervix 16 and nodular atrium.

MALE — Similar to female but smaller. The ventrianal scutum reticulated with a pair of elliptical pores and 3 pairs of preanal setae. The spermatodactyl with foot subterminal, toe, and lateral process indistinct.

DISCUSSION — Nothing is known about the biology and life history of this species. It has been taken only in Hokkaido, Japan on *Quercus cripula*.

Amblyseius firmus Ehara

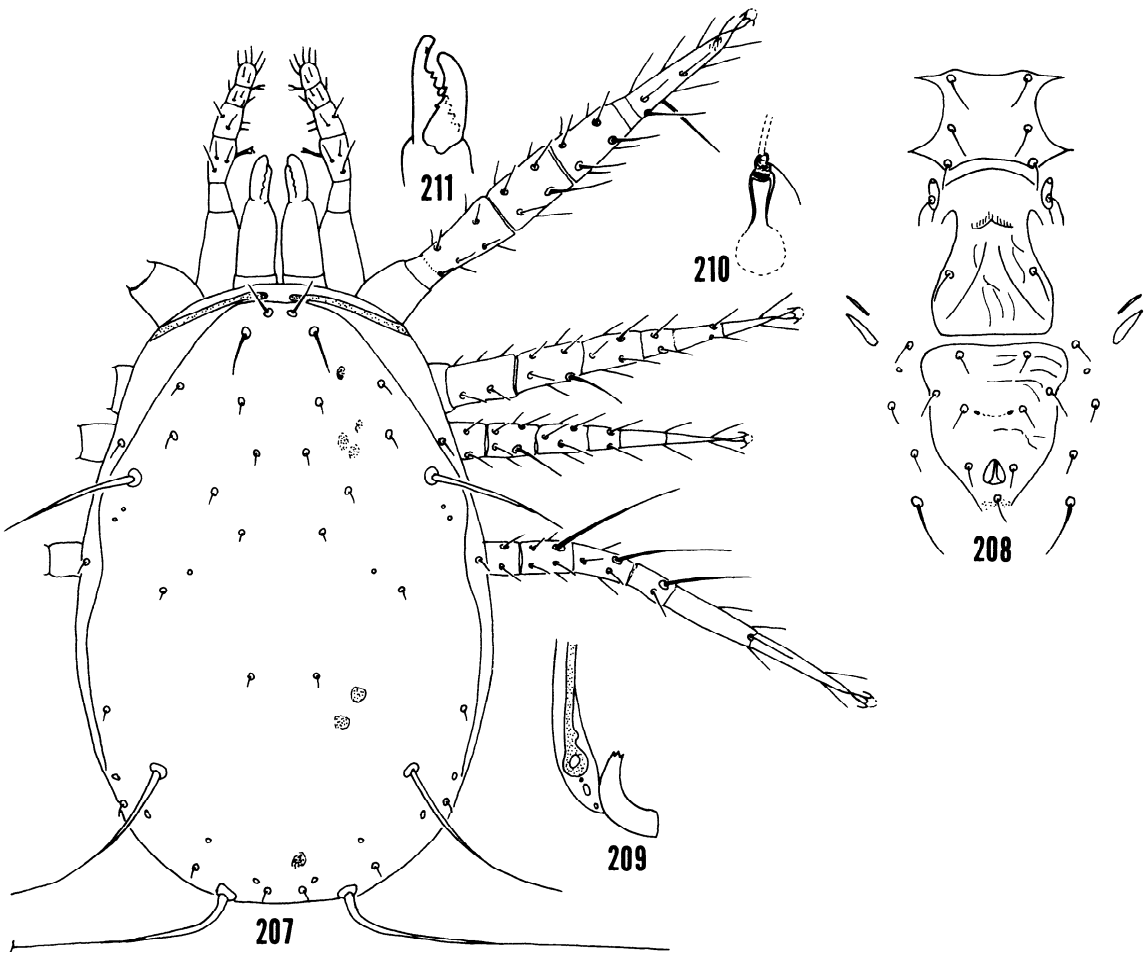
Fig. 207-211

Amblyseius firmus Ehara, 1967: 222-223.

TYPE — Female holotype, Japan: Mombetsu, Prov. Hidaka, 23-24 VII 1966, N. Kiski, on *Magnolia kobus* DC. var. *borealis* Sarg., in Zoological Institute, Faculty of Science, Hokkaido University.

DIAGNOSIS — See *Amblyseius orientalis* Ehara.

FEMALE — Length 361; width at L_4 285. Dorsal scutum smooth with 7-8 small to medium sized pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 30; D_1 6, D_2 6, D_3 6, D_4 8; clunals 8; L_1 32, L_2 6, L_3 6, L_4 105, L_5 11, L_6 11, L_7 11, L_8 251; M_1 6, M_2 10, M_3 165; anterior sublaterals 13; posterior sublaterals 10. Sternal scutum smooth with 3 pairs of setae. Ventrianal scutum lightly creased with a pair of small elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Chelicerae normal in relation to body size, fixed finger with 12 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 102, Sti IV 84, St IV 71. Genu II 2 - 2/1 - 2/0 - 1; genu III 1 - 2-2/0 - 1.



Figs. 207-211. *Amblyseius firmus* Ehara: 207. Dorsal and leg structure of female, 208. Ventral scuta and setation of female, 209. Posterior peritremal and stigmatal development of female, 210. Spermathecal structure of female, 211. Cheliceral structure of female.

Spermatheca with saccular slightly flared cervix 12 and nodular atrium.

MALE — Unknown.

DISCUSSION — Nothing is known about the life history of this species. It has been taken only at the type locality on *Magnolia kabus* DC. var. *borealis* Sarg. and *Osmunda cinnamomea* L.

Amblyseius multidentatus (Chant)

Fig. 212-218

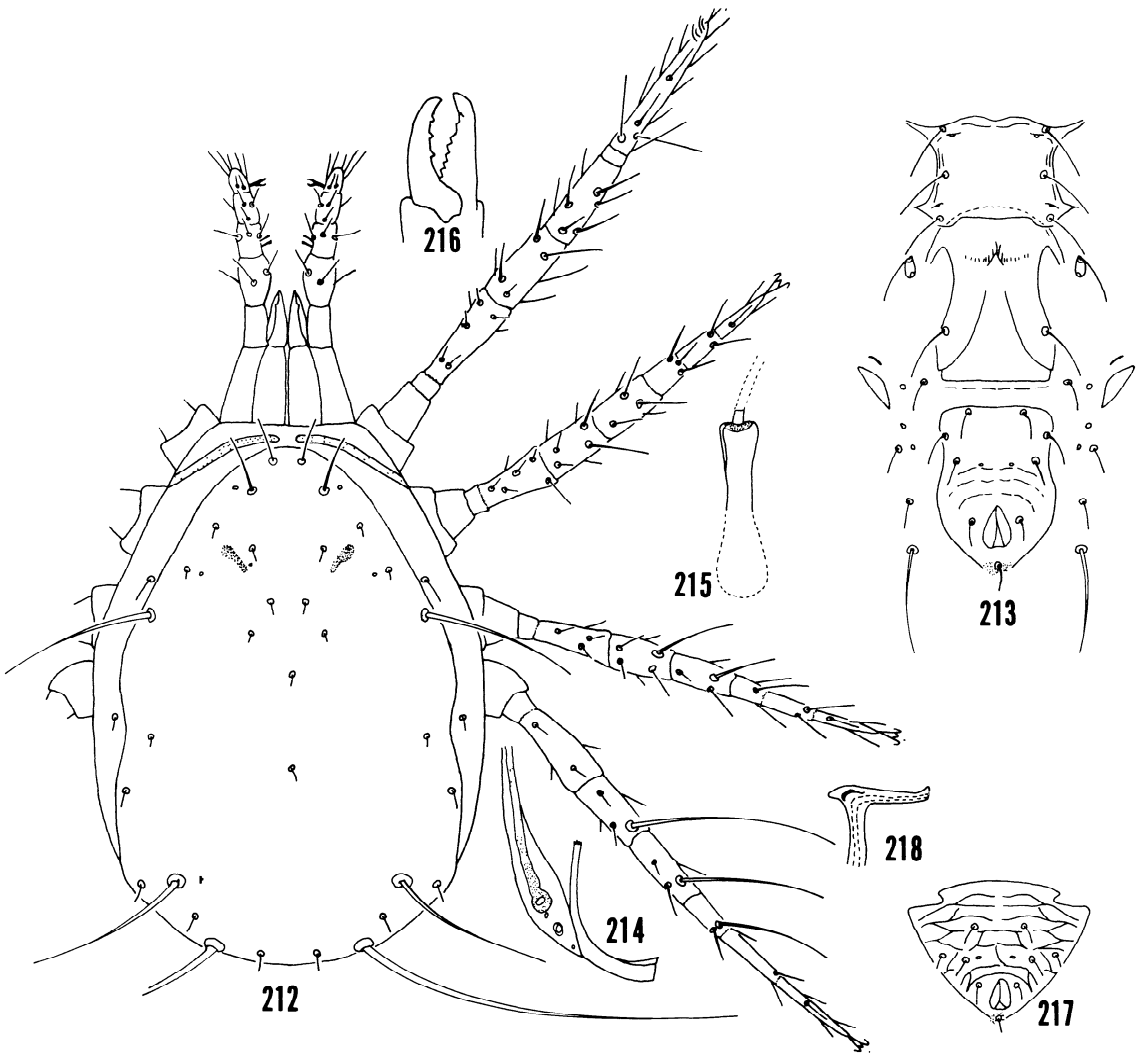
Typhlodromus (Amblyseius) multidentatus Chant, 1959: 84.

Amblyseius multidentatus (Chant), Muma, Denmark, and De Leon, 1970: 66.

TYPE — Female holotype, U.S.A.: Florida, St. Petersburg, 11 VII 1952, E.W. Baker, on *Sabal palmetto* (USNMNH).

DIAGNOSIS — *Amblyseius multidentatus* is similar to *Amblyseius waltersi* Schicha but differs in having Sti IV 68-196, St IV 50-78, 2-3 small pores on dorsal scutum, pores on ventrianal scutum at the level of the posterior pair of preanal setae as apposed to Sti IV 120-126, St IV 113-120, 6 pairs of large pores and 13 pairs of small pores on dorsal scutum, pores on ventrianal scutum posterior to posterior pair of preanal setae.

FEMALE — Length 361-392; width at L_4 235-241. Dorsal scutum smooth, 2-3 small pores, a few scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 28-42; D_1 5, D_2 5, D_3 6, D_4 6; clunals 10; L_1 44-48, L_2 5, L_3 6, L_4 131-137, L_5 7-11, L_6 9-11, L_7 12, L_8 314-329; M_1 5, M_2 9, M_3 153; anterior sublaterals 14; posterior sublaterals 12. Sternal scutum smooth, 2 pores and 3 pairs of setae. Ventrianal scutum with a pair of small round pores, 3 pairs of preanal setae, and slightly creased. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9-10 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 126-165, Sti IV 68-106, St IV 50-78. Genu II 2 - 2-2/0



Figs. 212-218. *Amblyseius multidentatus* (Chant): 212. Dorsal and leg structure of female, 213. Ventral scuta and setation of female, 214. Posterior peritremal and stigmatal development of female, 215. Spermathecal structure of female, 216. Cheliceral structure of female, 217. Ventrianal scutum of male, 218. Spermatodactyl structure of male.

- 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular unflared cervix 11-13 and differentiated atrium.

MALE — Similar to female but smaller. Spermatodactyl has foot terminal, lateral process indistinct, and the toe extends upward. Ventrianal scutum creased, a pair of pores, and 3 pairs of preanal setae.

DISCUSSION — This species is known only from Florida and has been recorded from *Sabal palmetto* (Walt.) Lodd. ex Schult. & Schutt f., *Senecio confusus* (DC.) Brittan, *Tillandsia usneoides* L., *Quercus* sp., *Pinus* sp., and in debris. Nothing is known of the food habits.

Amblyseius waltersi Schicha

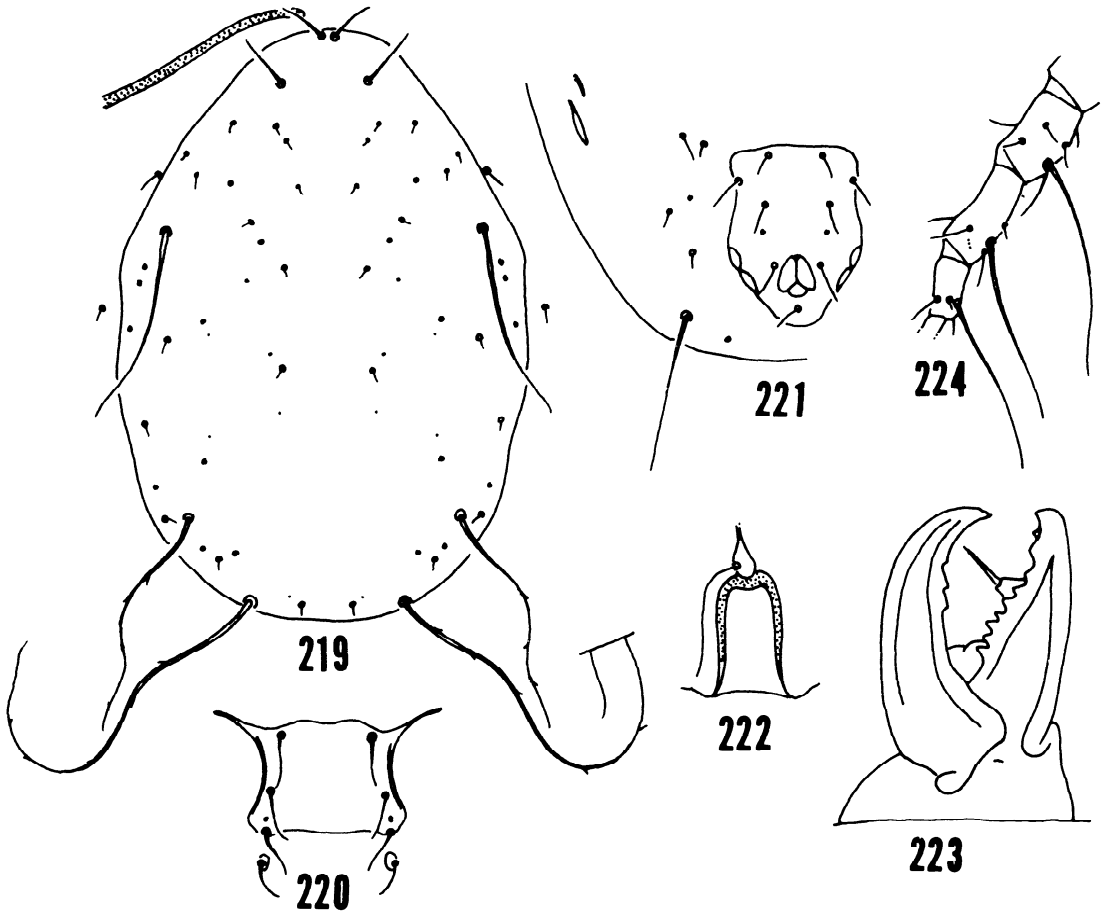
Fig. 219-224

Amblyseius waltersi Schicha, 1981: 40-42.

TYPE — Female holotype, Australia: New South Wales, Bega, 15 V 1980, P. Walters, on lucerne (BCRI).

DIAGNOSIS — See *Amblyseius multidentatus* (Chant).

FEMALE — Length 391-395; width at L_4 220-225. Dorsal scutum smooth with 6 large pores, 13 pairs of small pores, and 17 pairs of setae. Measurements of setae: verticals 30-31; D_1 4, D_2 4-7, D_3 3-7, D_4 8-9; clunals 11-12; L_1 42-43, L_2 6-7, L_3 6-7, L_4 133-139, L_5 5-8, L_6 9-10, L_7 5-9, L_8 302-304; M_1 4, M_2 6-9, M_3 163-179; anterior sublaterals 17-19; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Macrosetae Sge IV 149-154, Sti IV 120-126, St IV 113-120. Spermatheca with saccular



Figs. 219-224. *Amblyseius waltersi* Schicha: 219. Dorsal structure of female, 220. Sternal scutum of female, 221. Ventrianal scutum of female, 222. Spermathecal structure of female, 223. Cheliceral structure of female, 224. Leg IV of female (after Schicha).

slightly flared cervix 16 and nodular atrium.

MALE — Unknown.

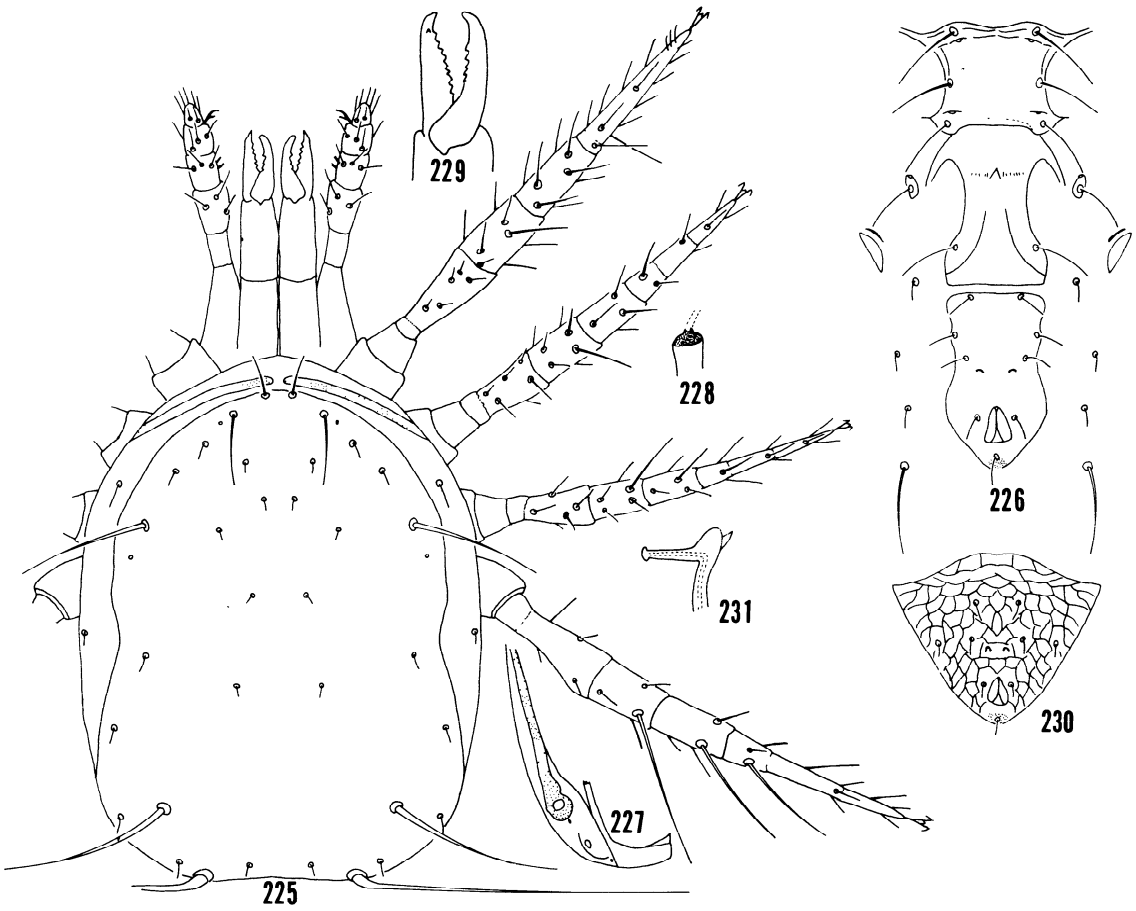
DISCUSSION — This species has been reported from New South Wales, Victoria, Kinglake, 1 VII 1978, R.P. Field, on strawberry; Invergordon, 24 V 1978, R.P. Field, on apple tree. Nothing is known of the biology of this mite. This information was taken from Schicha (1981). We have not seen specimens.

OPERCULATUS GROUP

Four species have been assigned to this group. The assigned species are *A. operculatus* De Leon, *A. shiganus* Ehara, *A. collaris* Karg, and *A. passiflorae* Blommers. Most of the species seem to lack a differentiated atrium and have a short to long saccular-fundibular cervix. Most species have part to all of the cervix darkened, perhaps sclerotized. *A. passiflorae* lacks the darkening; *A. operculatus* has a tiny bifid atrium.

Key to females in *operculatus* group

1. M_3 shorter than 100, Sti IV shorter than 75, St IV shorter than 30 ..... *passiflorae* Blommers, p. 49
— M_3 longer than 100, Sti IV longer than 75, St IV longer than 30 2
2. L_3 12, St IV shorer than 40 ..... *operculatus* De Leon, p. 47
— L_3 shorter than 12, St IV longer than 40 3
3. L_4 shorter than 100, L_8 shorter than 300, M_3 shorter than 150 ..... *shiganus* Ehara, p. 47
— L_4 longer than 100, L_8 longer than 300, M_3 150 or longer ..... *collaris* Karg, p. 48



Figs. 225-231. *Amblyseius operculatus* De Leon: 225. Dorsal and leg structure of female, 226. Ventral scuta and setation of female, 227. Posterior peritremal and stigmatal development of female, 228. Spermathecal structure of female, 229. Cheliceral structure of female, 230. Ventrianal scutum of male, 231. Spermatodactyl structure of male.

Amblyseius operculatus De Leon

Fig. 225-231

Amblyseius operculatus De Leon, 1967: 26.

TYPE — Female holotype, Trinidad: halfway between Simla and Arima, 14 X 1963, D. De Leon, on *Cephaelis* sp. (MCZ).

DIAGNOSIS — *Amblyseius operculatus* is similar to *Amblyseius shiganus* Ehara but differs in having L_2 12, L_3 12, L_4 106, St IV 36, and cervix of spermatheca 8 as apposed to L_2 16, L_3 8, L_4 90, St IV 71, and cervix 13-14 in *shiganus*.

FEMALE — Length 392; width at L_4 268. Dorsal scutum smooth with a few scattered small pores and 17 pairs of setae. Measurements of setae: verticals 32; D_1 9,D_2 5, D_3 12, D_4 14; clunals 10; L_1 58, L_2 12, L_3 12, L_4 106, L_5 13, L_6 10, L_7 14, L_8 277; M_1 6, M_2 12, M_3 144; anterior sublaterals 15; posterior sublaterals 11. Sternal scutum smooth with light creasing laterally, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth, 2 pairs of elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to the body size, fixed finger with 13-16 denticules, and movable finger with 4-5 denticules. Leg formula 4123. Macrosetae Sge IV 141, Sti IV 85, St IV 36. Genu II 2 - 2/1 - 2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with short saccular cervix 8 and slightly nodular atrium.

MALE — Similar to female but smaller. Spermatodactyl with foot subterminal and lateral process distinct. Ventrianal scutum heavily reticulated, a pair of pores, and 3 pairs of preanal setae.

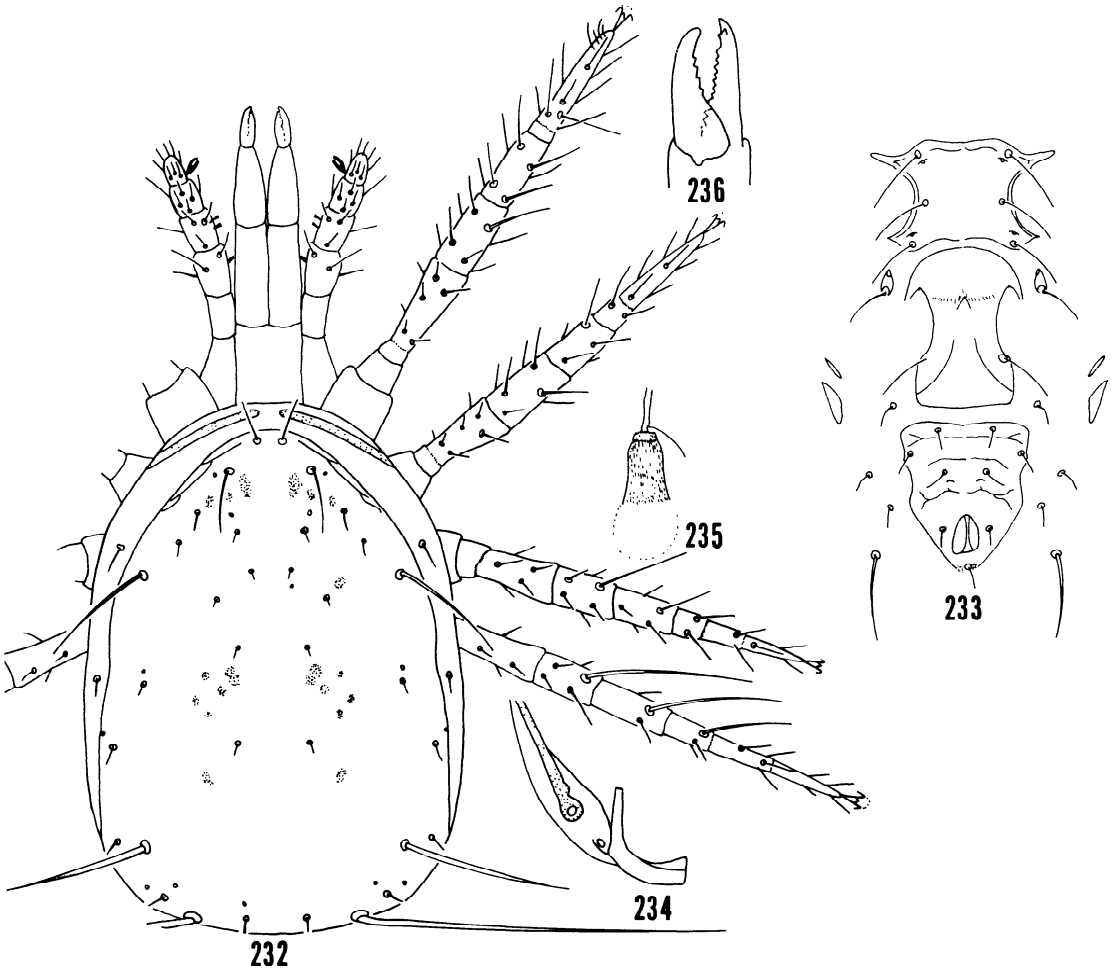
DISCUSSION — This species has been taken in Trinidad and Brazil. On occasion it has been found associated with *Brevipalpus phoenicis* (Geijskes).

Amblyseius shiganus Ehara

Fig. 232-236

Amblyseius shiganus Ehara, 1972: 160.

TYPE — Female holotype, Japan: Honshu, Shiga Heights, Nagano, 31 VII 1970, H. Mori, on a bamboo,



Figs. 232-236. *Amblyseius shiganus* Ehara: 232. Dorsal and leg structure of female, 233. Ventral scuta and setation of female, 234. Posterior peritremal and stigmatal development of female, 235. Spermathecal structure of female, 236. Cheliceral structure of female.

Sasa kurilensis (Rupr.) Makino and Shibata, in Biological Institute, Faculty of Education, Tottori University, Tottori, Japan.

DIAGNOSIS — See *Amblyseius operculatus* De Leon.

FEMALE — Length 384; width at L_4 232. Dorsal scutum smooth with scattered muscle marks, 5 to 6 small pores, and 17 pairs of setae. Measurements of setae: verticals 32; D_1 5,D_2 5, D_3 5, D_4 8; clunals 11; L_1 47, L_2 16, L_3 8, L_4 90, L_5 12, L_6 12, L_7 11, L_8 280; M_1 6, M_2 9, M_3 128; anterior sublaterals 20; posterior sublaterals 12. Sternal scutum smooth with 2 pores and 3 pairs of setae. Ventrianal scutum lightly creased, 2 pairs of crescent-shaped pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 13 denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 127, Sti IV 95, St IV 71. Genu II 2 - 2 - 2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular cervix 13-14 that is slightly restricted near undifferentiated atrium.

MALE — Unknown.

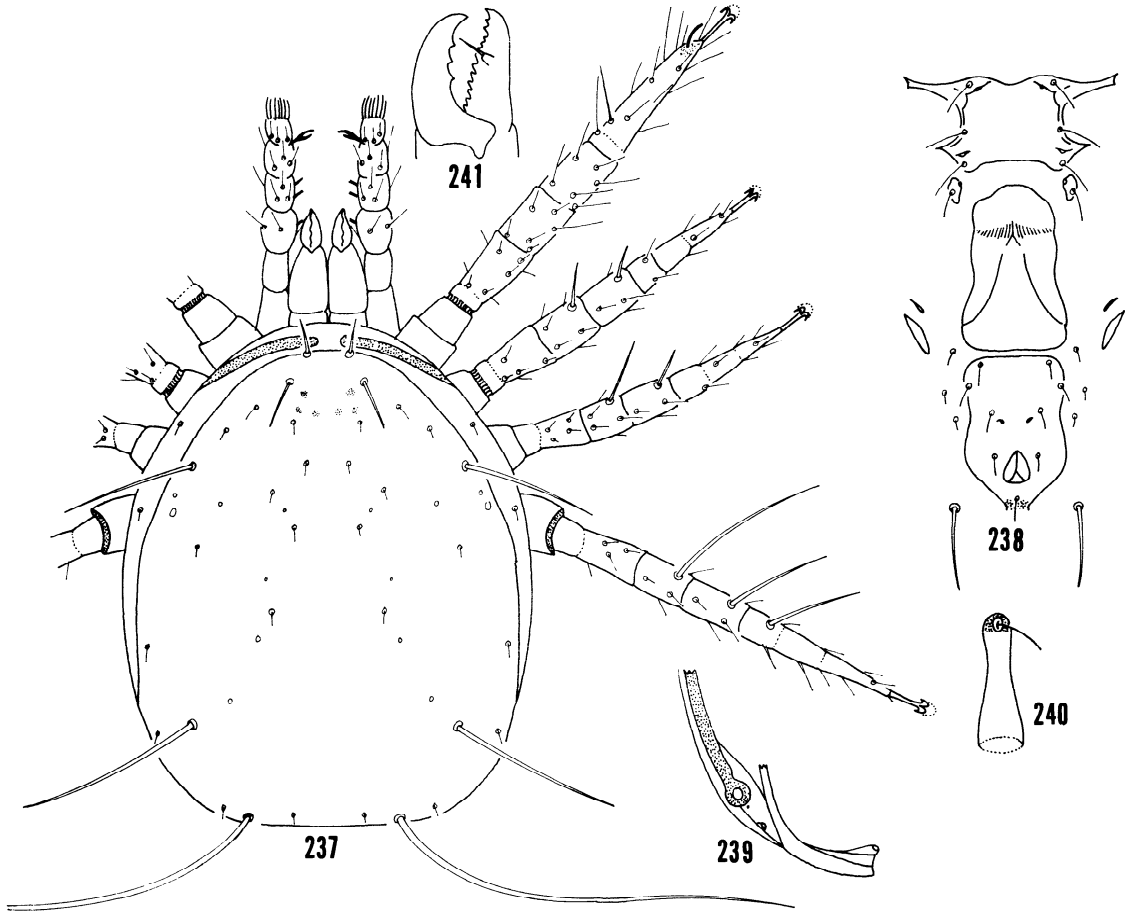
DISCUSSION — This species is known only in Japan taken on bamboo.

Amblyseius collaris Karg
Fig. 237-241

Amblyseius collaris Karg, 1983: 317.

TYPE — Female holotype, Venezuela: 1974, J. Balogh, in straw pile, in Academy of Agricultural Sciences of German Democratic Republic Institute for Plant Protection Research at Kleinmachnow, East Germany.

DIAGNOSIS — *Amblyseius collaris* is similar to *Amblyseius passiflorae* Blommers but differs in having L_1 12, L_3 6, L_4 125, M_3 157, Sge IV 137, Sti IV 86, St



Figs. 237-241. *Amblyseius collaris* Karg: 237. Dorsal and leg structure of female, 238. Ventral scuta and setation of female, 239. Posterior peritremal and stigmatal development of female, 240. Spermathecal structure of female, 241. Cheliceral structure of female.

IV 70, and cervix of spermatheca 25 as apposed to having L_2 8, $L_3$8, L_4 89, M_3 94, Sge IV 79, Sti IV 58, St IV 28, and cervix of spermatheca 8 in *passiflorae*.

FEMALE — Length 360; width at L_4 266. Dorsal scutum smooth with 6-7 small scattered pores, several muscle marks anteriorly, and 17 pairs of setae. Measurements of setae: verticals 28; D_1 5,D_2 5, D_3 5, D_4 6; clunals 8; L_1 36, L_2 12, L_3 6, L_4 125, L_5 11, L_6 10, L_7 11, L_8 330; M_1 5, M_2 11, M_3 157; anterior sublaterals 12; posterior sublaterals 10. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 137, Sti IV 86, St IV 70. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/0 - 2/1 - 1. Spermatheca with saccular cervix 25 and undifferentiated atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type records. Nothing is known about the biology of this species.

Amblyseius passiflorae Blommers

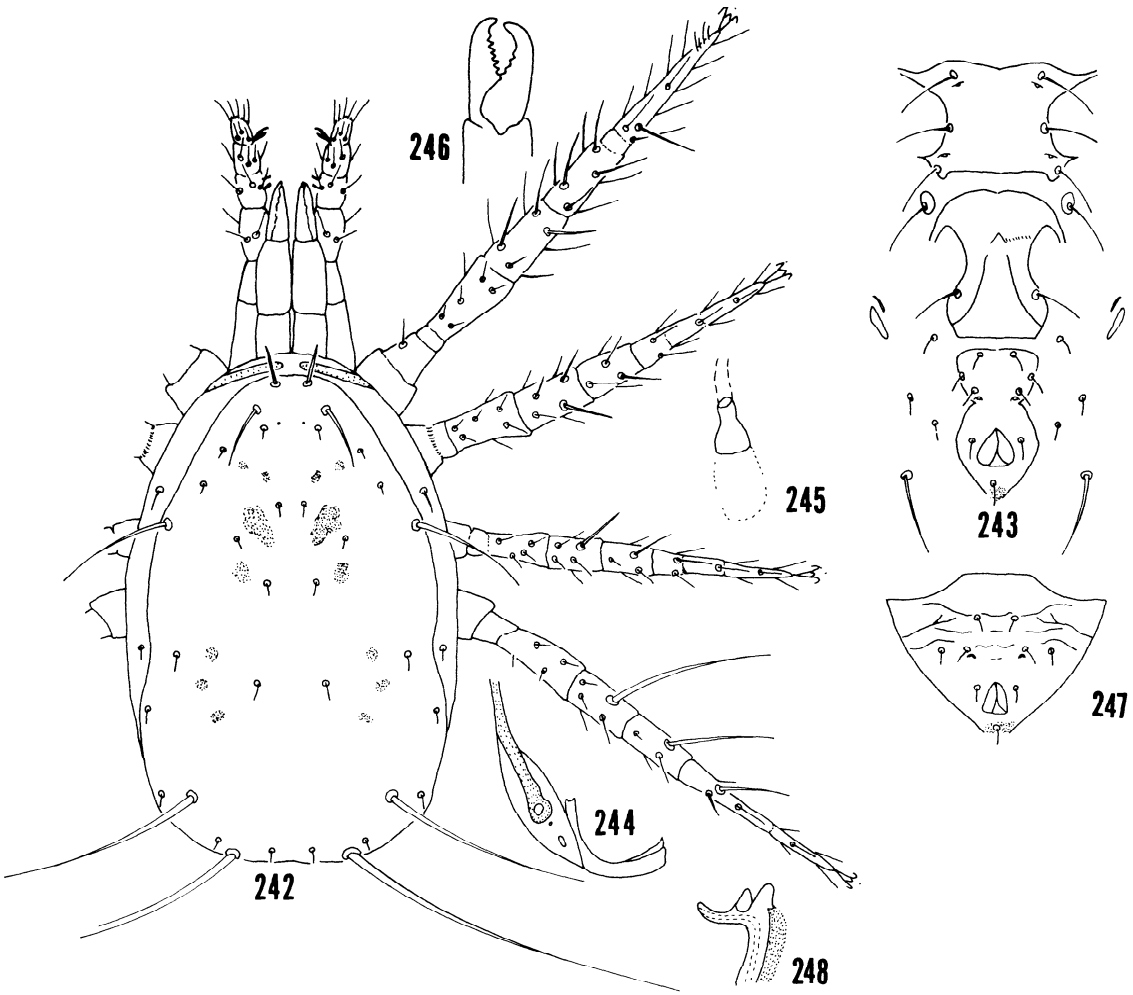
Fig. 242-248

Amblyseius passiflorae Blommers, 1974: 145.

TYPE — Female holotype, Madagascar: Ivoloina near Tamatave, 5 VII 1972, L. Blommers, on *Passiflora foetida* L., in Institute of Taxonomic Zoology (Zoologisch Museum) of the University of Amsterdam.

DIAGNOSIS — See *Amblyseius collaris* Karg.

FEMALE — Length 330; width at L_4 219. Dorsal scutum smooth with scattered muscle marks and 17 pairs of setae. Measurements of setae: verticals 28; D_1 8,D_2 8, D_3 8, D_4 11; clunals 9; L_1 44, L_2 8, L_3 8, L_4 89, L_5 8, L_6 8, L_7 8, L_8 266; M_1 6, M_2 9, M_3 94; anterior sublaterals



Figs. 242-248. *Amblyseius passiflorae* Blommers: 242. Dorsal and leg structure of female, 243. Ventral scuta and setation of female, 244. Posterior peritremal and stigmatal development of female, 245. Spermathecal structure of female, 246. Cheliceral structure of female, 247. Ventrianal scutum of male, 248. Spermatodactyl structure of male.

12; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth, acutely constricted laterally, a pair of elliptical pores, and pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Chelicerae normai in relation in body size, fixed finger with 9-10 denticules, and movable finger with 3-4 denticules. Leg formula 4123. Macrosetae Sge IV 79, Sti IV 58, St IV 28. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with goblet-like cervix 8 and undifferentiated atrium.

MALE — Similar to female but smaller in size. The ventrianal scutum lightly creased with a pair of elliptical pores and 3 pairs of preanal setae. The spermatodactyl with foot subterminal, toe normal in size, and lateral process present.

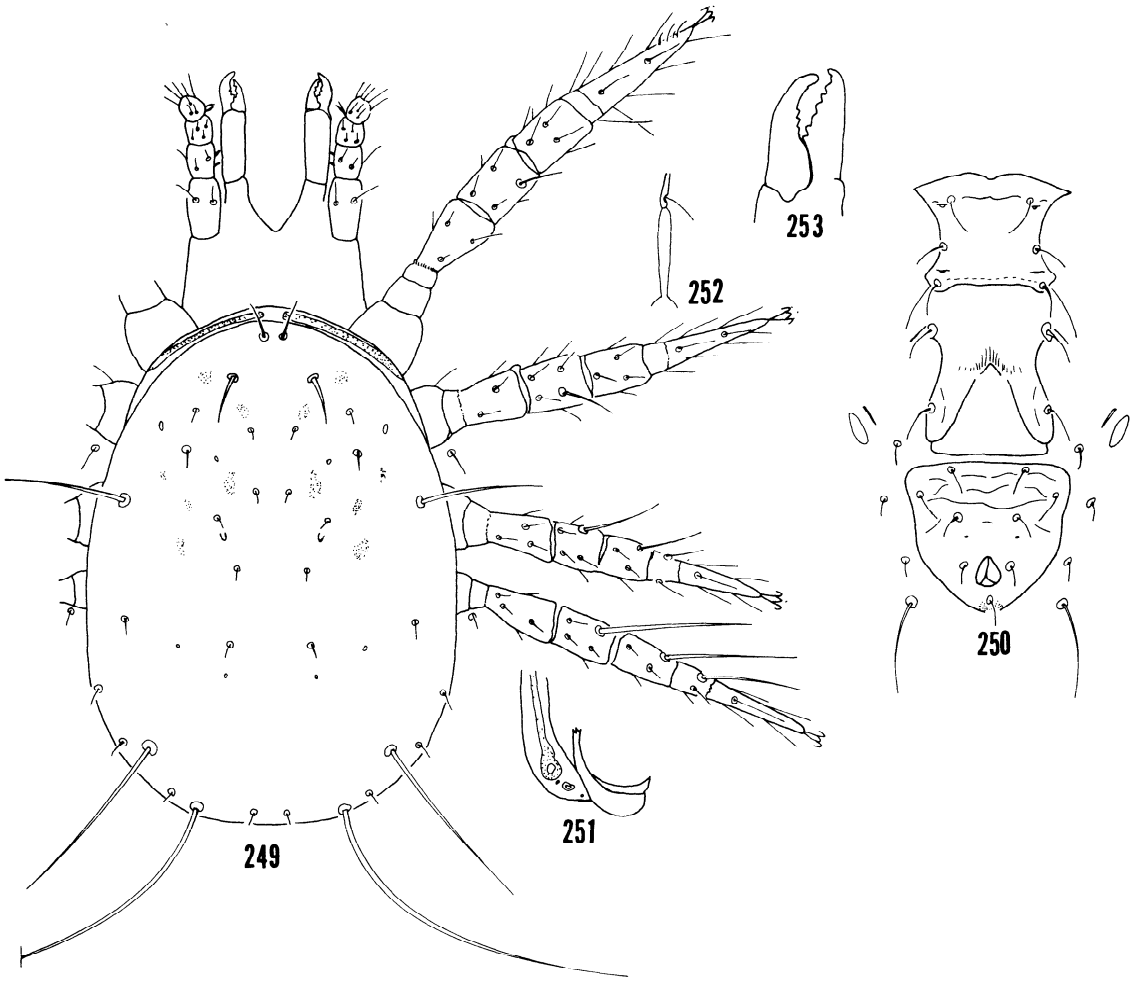
DISCUSSION — Nothing is known about the biology of this species. It has been collected in Madagascar on *Passiflora foetida.*

GRACILIS GROUP

Three species are assigned to this group. They are *A. gracilis* (Garman), *A. cessator* De Leon, and *A. chilcotti* Chant. All 3 species have a small differentiated to c-shaped atrium with a tubular-fundibular cervix.

Key to females in *gracilis* group

1. L_1 50 or longer, L_3 longer than 15, L_8 approximately 180, cervix longer than 20 ..... *cessator* De Leon, p. 52
— L_1 shorter than 50, L_3 shorter than 15, L_8 much longer or shorter than 180 2
2. L_8 300, M_3 160, Sge IV 139 ..... *gracilis* (Garman), p. 51
— L_8 165, M_3 120, Sge IV 95 ..... *chilcotti* Chant, p. 53



Figs. 249-253. *Amblyseius gracilis* (Garman): 249. Dorsal and leg structure of female, 250. Ventral scuta and setation of female, 251. Posterior peritremal and stigmatal development of female, 252. Spermathecal structure of female, 253. Cheliceral structure of female.

Amblyseius gracilis (Garman)

Fig. 249-253

Amblyseiopsis gracilis Garman, 1958: 79.
Typhlodromus (Amblyseius) gracilis, Chant, 1959: 95.
Amblyseius gracilis, Muma, 1961: 287.

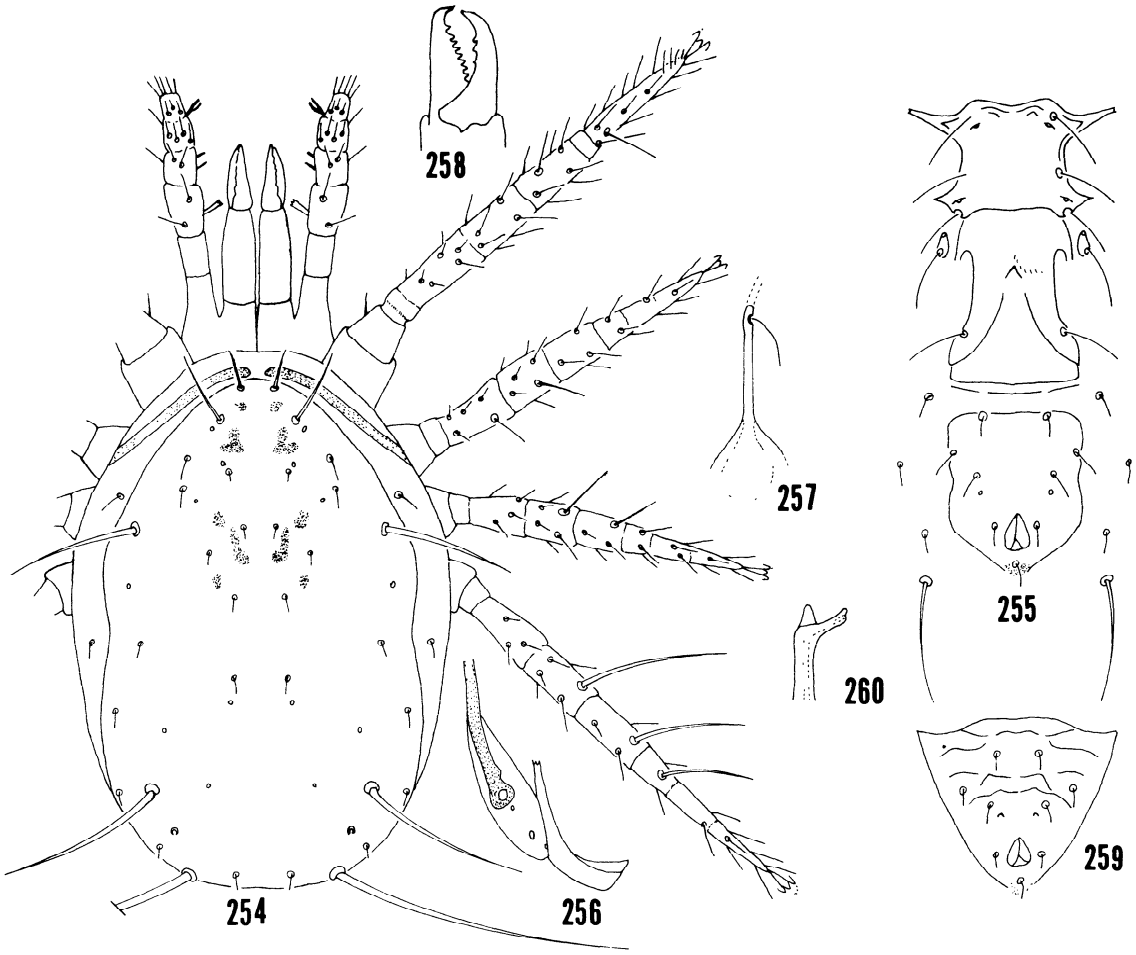
TYPE — Female holotype, Oregon: Portland, 29 I 1946, R. L. Post, on *Verbascum thapsus* L. (USNMNH).

DIAGNOSIS — *Amblyseius gracilis* is similar to *Amblyseius cessator* De Leon and *Amblyseius chilcotti* Chant but differs from these 2 species by having L_1 36, L_4 97, L_8 305, M_3 160, and Sge IV 139 as apposed to L_1 55-60, L_4 83-94, L_8 180-189, M_3 106-123, and Sge IV 97-112 in *cessator* and L_1 42, L_4 85, L_8 165, M_3 121, and Sge IV 97 in *chilcotti*.

FEMALE — Length 393; width at L_4 251. Dorsal scutum smooth with scattered muscle marks, 5 to 6 small to medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 27; D_1 5,D_2 5, D_3 5, D_4 11; clunals 9; L_1 39, L_2 9, L_3 13, L_4 97, L_5 13, L_6 10, L_7 10, L_8 305; M_1 5, M_2 13, M_3 160; anterior sublaterals 14; posterior sublaterals 9. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum lightly creased, a pair of small round pores, and 3 pairs of setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 8 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 139, Sti IV 105, St IV 68. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/0 - 1. Spermatheca with tubular-fundibular cervix 20 and differentiated atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type specimen. Nothing is known about its biology.



Figs. 254-260. *Amblyseius cessator* De Leon: 254. Dorsal and leg structure of female, 255. Ventral scuta and setation of female, 256. Posterior peritremal and stigmatal development of female, 257. Spermathecal structure of female, 258. Cheliceral structure of female, 259. Ventrianal scutum of male, 260. Spermatodactyl structure of male.

Amblyseius cessator De Leon

Fig. 254-260

Amblyseius cessator De Leon, 1962: 21.
Amblyseius opertus Zack, 1969: 71, NEW SYNONYM.

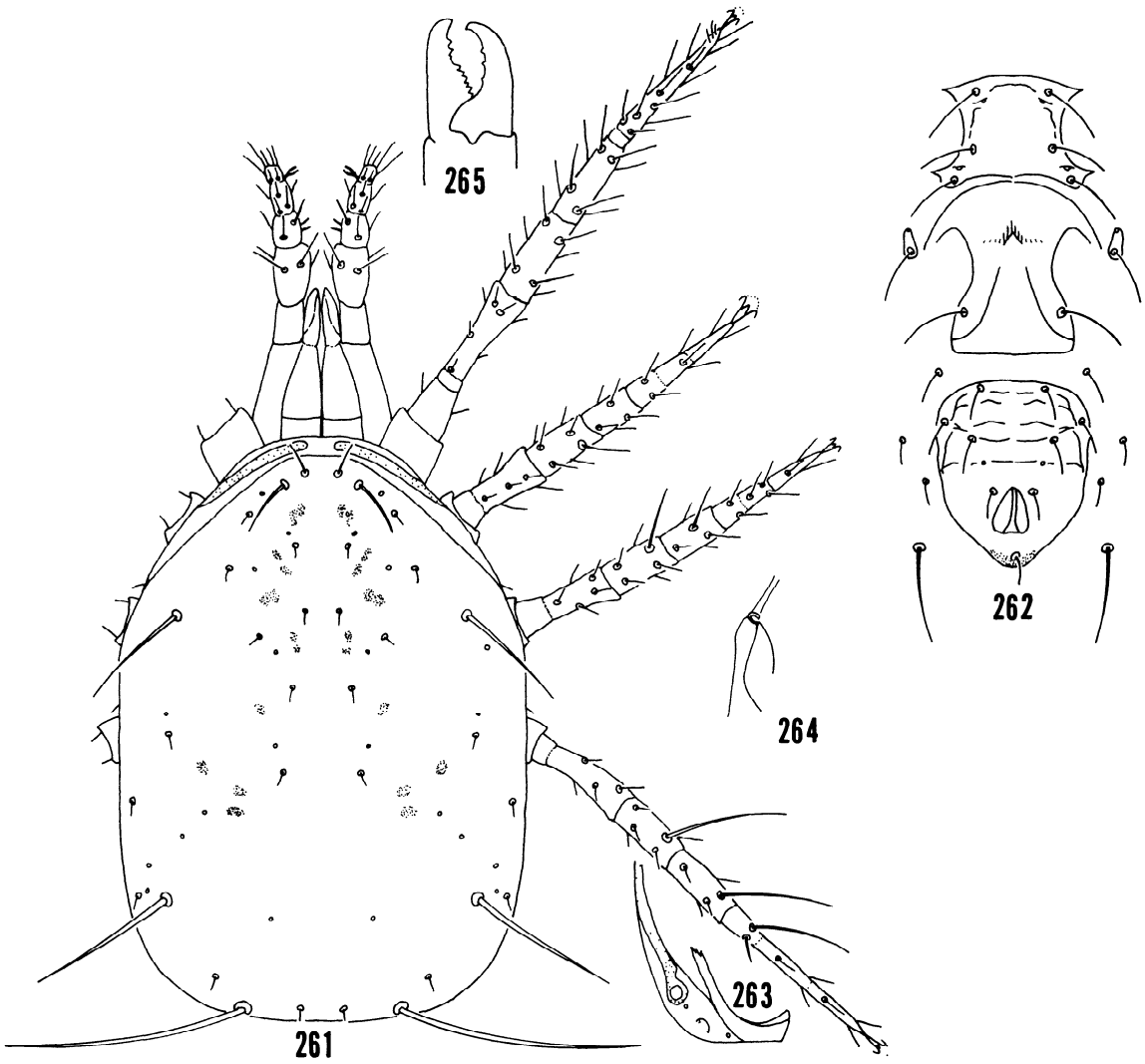
TYPE — Female holotype, Tennessee: Ervin, 15 IX 1960, D. De Leon, on *Rhododendron maximum* L. (MCZ).

DIAGNOSIS — See *Amblyseius gracilis* (Garman).

FEMALE — Length 388; width at L_4 215. Dorsal scutum smooth with scattered muscle marks anteriorly, 6-7 small pores, 1 medium-sized pore near L_7, and 17 pairs of setae. Measurements of setae: verticals 24-31; D_1 6,D_2 6, D_3 7, D_4 7; clunals 11; L_1 55-60, L_2 10-18, L_3 16-17, L_4 83-94, L_5 10-12, L_6 10-11, L_7 10-11, L_8 180-189; M_1 6, M_2 9, M_3 106-123; anterior sublaterals 17-20; posterior sublaterals 9-13. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with 2 small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 11-13 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 97-112, Sti IV 75-94, St IV 65-74. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with long tubular-fundibular cervix 24-31 and small differentiated atrium.

MALE — The male is similar to the female but smaller in size. The spermatodactyl has foot terminal, lateral process present, and toe slightly enlarged. The ventrianal scutum is lightly creased, a pair of small oval pores, and 3 pairs of preanal setae.

DISCUSSION — This species was collected from *Rhododendron maximum* in Tennessee, from surface litter in Columbia, Missouri, and described as *Amblyseius opertus* (Zack, 1969); it has also been collected in Wooster, Ohio from litter of *Abies alba* Mill. and *Quercus* sp. Nothing is known about the biology of this species.



Figs. 261-265. *Amblyseius chilcotti* Chant: 261. Dorsal and leg structure of female, 262. Ventral scuta and setation of female, 263. Posterior peritremal and stigmatal development of female, 264. Spermathecal structure of female, 265. Cheliceral structure of female.

Amblyseius chilcotti Chant

Fig. 261-265

Amblyseius chilcotti Chant & Hansell, 1971: 724.

TYPE — Female holotype, Northwest Territories: South end of Wharton Lake, 17 VIII 1966, D. A. Chant, on tundra grass-sod samples (CNC).

DIAGNOSIS — See *Amblyseius gracilis* (Garman),

FEMALE — Length 384; width at L_4 260. Dorsal scutum smooth with 10 to 12 small sized pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 24; D_1 7,D_2 7, D_3 8, D_4 11; clunals 8; L_1 42, L_2 10, L_3 11, L_4 85, L_5 12, L_6 10, L_7 10, L_8 165; M_1 7, M_2 11, M_3 121; anterior sublaterals 12; posterior sublaterals 7. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of small round pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 2-3 denticules, and movable finger with 9 denticules. Leg formula 1423. Macrosetae Sge IV 97, Sti IV 85, St IV 78. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with tubular-fundibular, almost vesicular cervix 16-19, and c-shaped atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type. Nothing is known about its food habits.

LARGOENSIS GROUP

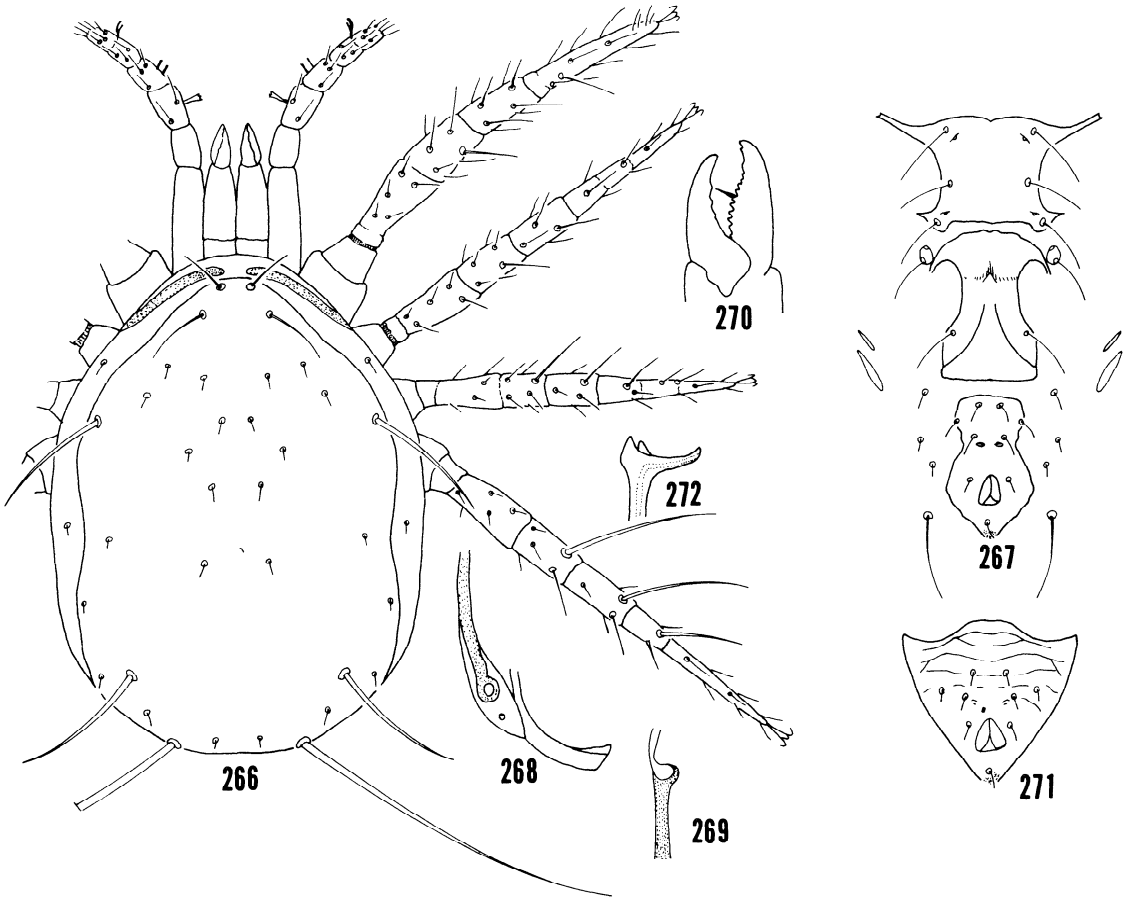
Eleven species are included in this large apparently ubiquitous species group. They are *A. largoensis* (Muma), *A. sakalava* Blommers, *A. herbicoloides* McMurtry and Moraes, *A. fijiensis* McMurtry and Moraes, *A. herbicolus* (Chant), *A. nambourensis* Schicha, *A. phillipsi* McMurtry and Schicha, *A. fletcheri* Schicha, *A. vazimba* Blommers, *A. adhatodae* Muma, and *A. ankaratrae* Blommers.

All known species have a long slender cervix that in most species is fundibular. Only *ankaratrae* has a long slender tubular cervix, but the fundibular cervix of *nambourensis* is irregular. Five of the species, *largoensis, sakalava, herbicoloides, fijiensis,* and *nambourensis*, have a nodular atrium; 4, *phillipsi, fletcheri, vazimba,* and *adhatodae,* have a flattened triangular atrium; 2, *herbicolus* and *ankaratrae* have a waferoid atrium. Most species have the internal portion of cervix flared, but *largoensis, herbicolus,* and *nambourensis* do not.

Other characters worthy of note include differences and similarities in the female ventrianal scuta and lengths of the female dorsal scutal lateral setae. Females of the first seven listed, diagnosed, and illustrated species have elongate, ventrianal scuta with an obvious constricted "waist" at about the level of the ventrianal pores; females of the last 4 species have short, pentagonal, ventrianal scuta with only a slight indistinct "waist." Further, the unique species, *ankaratrae,* has only L_1 and L_8 elongate and thickened. *A. adhatodae* Muma has a restricted "waist" on the ventrianal scutum on one side in the holotype, but such does not occur on the paratype. It has been drawn without the constriction.

Key to females in *largoensis* group

1. Spermatheca with tubular cervix 2
— Spermatheca with fundibular cervix 4
2. V less than 25, L_1 approximately 25, L_4 less than 25 .....*ankaratrae* Blommers, p. 64
— V more than 25, L_1 approximately 50, L_4 much longer than 25 3
3. L_8 275 or longer .....*sakalva* Blommers, p. 56
— L_8 approximately 200 ..*largoensis* (Muma), p. 55
4. L_8 less than 300 5
— L_8 approximately 300 or longer 7
5. L_8 less than 250, L_4 100, St IV 75 .....*herbicolus* Chant, p. 59
— L_8 more than 250, L_4 shorter or longer than 100, St IV shorter than 75 6
6. L_4 longer than 100, M_3 longer than 100 .....*adhatodae* Muma, p. 63
— L_4 less than 100, M_3 less tha 100 .....*fijiensis* McMurtry and Moraes, p. 58
7. M_3 less than 100 8
— M_3 much longer than 100 9
8. L_4 approximately 100 with a triangular-nodular atrium ....*phillipsi* McMurtry and Schicha, p. 61
— L_4 less than 100 with nodular-bifid atrium .....*herbicoloides* McMurtry and Moraes, p. 57
9. Sge IV more than 200, L_8 more than 350 .....*nambourensis* Schicha, p. 60
— Sge less than 200, L_8 less than 350 10
10. M_3 approximately 150, cervix 18 .....*fletcheri* Schicha, p. 61
— M_3 approximately 175, cervix 32 .....*vazimba* Blommers, p. 62



Figs. 266-272. *Amblyseius largoensis* (Muma): 266. Dorsal and leg structure of female, 267. Ventral scuta and setation of female, 268. Posterior peritremal and stigmatal development of female, 269. Spermathecal structure of female, 270. Cheliceral structure of female, 271. Ventrianal scutum of male, 272. Spermatodactyl structure of male.

Amblyseius largoensis (Muma)

Fig. 266-272

Amblyseiopsis largoensis Muma, 1955: 266; Garman, 1958: 76.

Amblyseiopsis largoensis (Muma), Ehara 1959: 293; Muma, Denmark, and De Leon, 1970: 69; Denmark and Muma, 1973: 238.

Typhlodromus (Amblyseius) largoensis (Muma), Chant, 1959: 96.

Amblyseius neolargoensis Van der Merwe, 1965: 59.

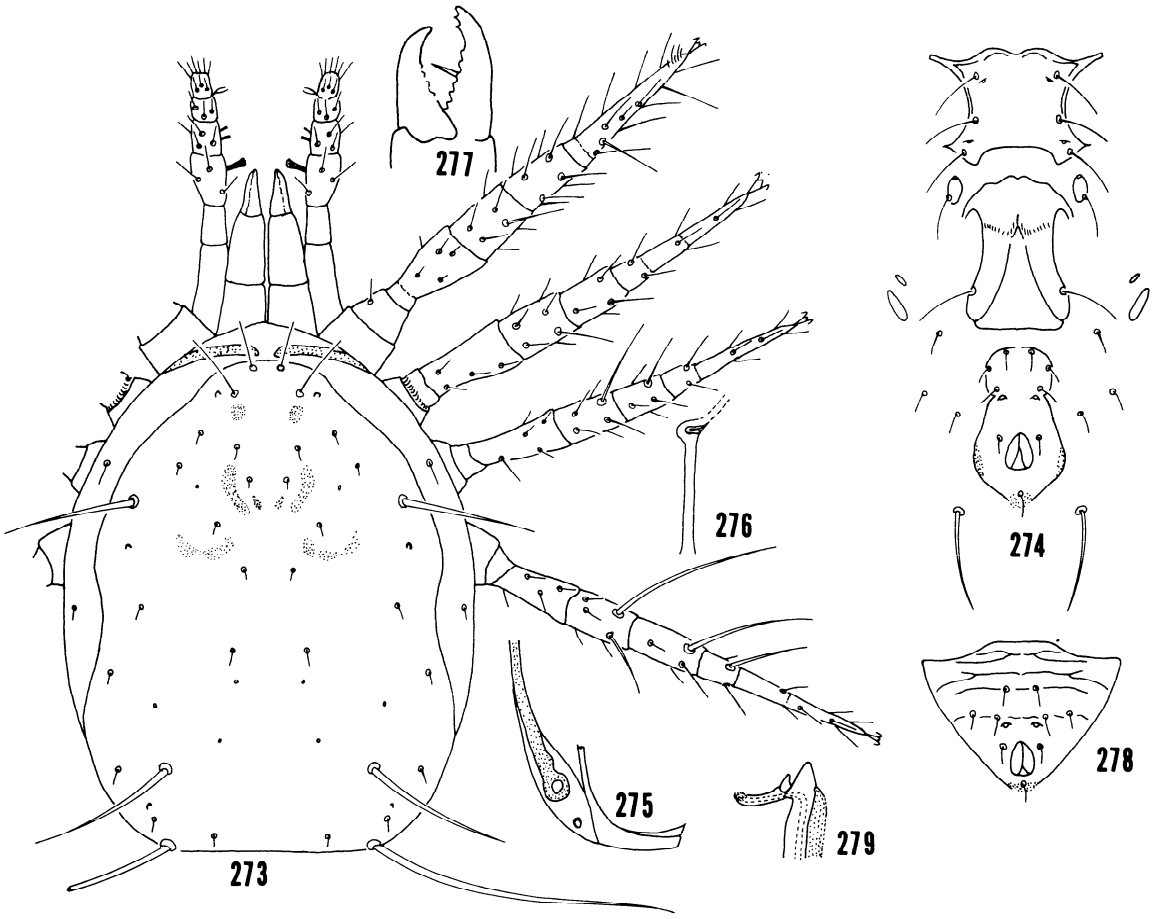
TYPE — Female holotype, U.S.A.: Florida, Key Largo, ? XII 1952, M.H. Muma, on key lime leaves (USNMNH).

DIAGNOSIS — *Amblyseius largoensis* is similar to *Amblyseius sakalava* Blommers but differs in having the cervix of the spermatheca 18 as apposed to 31 in *sakalava*. The movable cheliceral finger in *largoensis* has 3 denticules and 4 in *sakalava*. *A. sakalava* has 7 ± small pores scattered over the dorsum and none to 3 pairs in *largoensis*.

FEMALE — Length 370; width at L_4 225. Dorsal scutum smooth with 17 pairs of setae. Measurements of setae: verticals 38; D_1 5,D_2 5, D_3 6, D_4 6; clunals 6; L_1 49, L_2 6, L_3 6, L_4 94, L_5 11, L_6 12, L_7 11, L_8 206; M_1 6, M_2 12, M_3 96; anterior sublaterals 13; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth, a pair of elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to the body size, fixed finger with 9-11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 134, Sti IV 94, St IV 63. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with tubular unflared cervix 18 and nodular atrium.

MALE — Similar to female but smaller. Spermatodactyl with foot terminal and lateral process distinct. Ventrianal scutum lightly creased with a pair of elliptical pores and 3 pairs of preanal setae.

DISCUSSION — Muma and Denmark (1970) described *Amblyseius deleoni* from the paratype series



Figs. 273-279. *Amblyseius sakalava* Blommers: 273. Dorsal and leg structure of female, 274. Ventral scuta and setation of female, 275. Posterior peritremal and stigmatal development of female, 276. Spermathecal structure of female, 277. Cheliceral structure of female, 278. Ventrianal scutum of male, 279. Spermatodactyl structure of male.

of *A. largoensis*. *A. deleoni* already had been described by Chant (1959) as *Amblyseius herbicolus*. Chaudhri (1968) described this species as *Amblyseius impactus*. Daneshvar and Denmark (1982) reported *deleoni* and *impactus* as junior synonyms of *herbicolus*. Blommers (1976) suggested that Muma and Denmark (1970) renamed the other species found with *largoensis* as *deleoni*. *A. largoensis* is a valid name, and the above placement of *deleoni* corrected the problem (see *herbicolus)*. *A. largoensis* has been collected in Australia, southeastern U.S., Mexico, Guatemala, Jamaica, Bahamas, Puerto Rico, South Africa, India, and Thailand. Nothing is known of the food habits of this species.

Amblyseius sakalava Blommers

Fig. 273-279

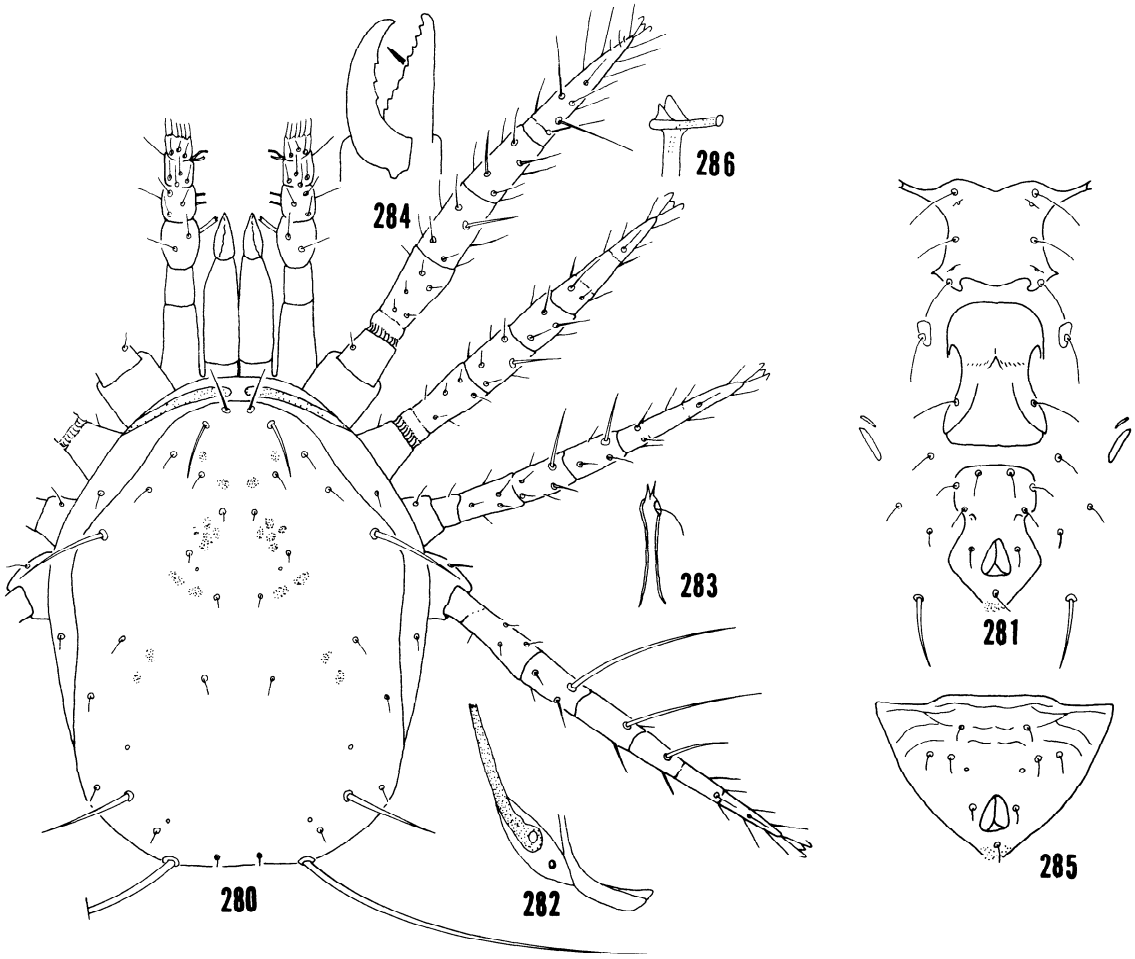
Amblyseius sakalava Blommers, 1976: 96.

TYPE — Female holotype, Madagascar: Tulear, 2 IV 1971, L. Blommers, on *Corchorus trilocularis* L., in Institute of Taxonomic Zoology (Zoologisch Museum) of the University of Amsterdam.

DIAGNOSIS — *Amblyseius sakalava* is similar to *Amblyseius largoensis* (Muma) but differs in having the spermatheca about ⅓ longer and L_2 approximately twice as long.

FEMALE — Length 400; width at L_4 251. Dorsal scutum smooth with 6-8 small to medium sized pores, scattered muscle marks anteriorly, and 17 pairs of setae. Measurements of setae: verticals 40; D_1 6,D_2 5, D_3 8, D_4 12; clunals 9; L_1 57, L_2 13, L_3 11, L_4 104, L_5 17, L_6 13, L_7 16, L_8 282; M_1 6, M_2 12, M_3 110; anterior sublaterals 19; posterior sublaterals 16. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth, acutely constricted laterally, a pair of elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Chelicerae normal in relation to body size, fixed finger with 9-10 denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 127, Sti IV 96, St IV 68. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with tubular slightly flared cervix 31 and nodular atrium.

MALE — Similar to female but smaller size. The ventrianal scutum lightly creased with a pair of elliptical



Figs. 280-286. *Amblyseius herbicoloides* McMurtry and Moraes: 280. Dorsal and leg structure of female, 281. Ventral scuta and setation of female, 282. Posterior peritremal and stigmatal development of female, 283. Spermathecal structure of female, 284. Cheliceral structure of female, 285. Ventrianal scutum of male, 286. Spermatodactyl structure of male.

pores and 3 pairs of preanal setae. The spermatodactyl with foot terminal, toe not enlarged, and lateral process present.

DISCUSSION — Blommers (1976) reported the vegetable spider mite *Tetranychus neocaledonocus* Andre was always present when *A. sakalava* was collected. It has been collected only in Madagascar (Malagasy Republic).

Amblyseius herbicoloides McMurtry & Moraes

Fig. 280-286

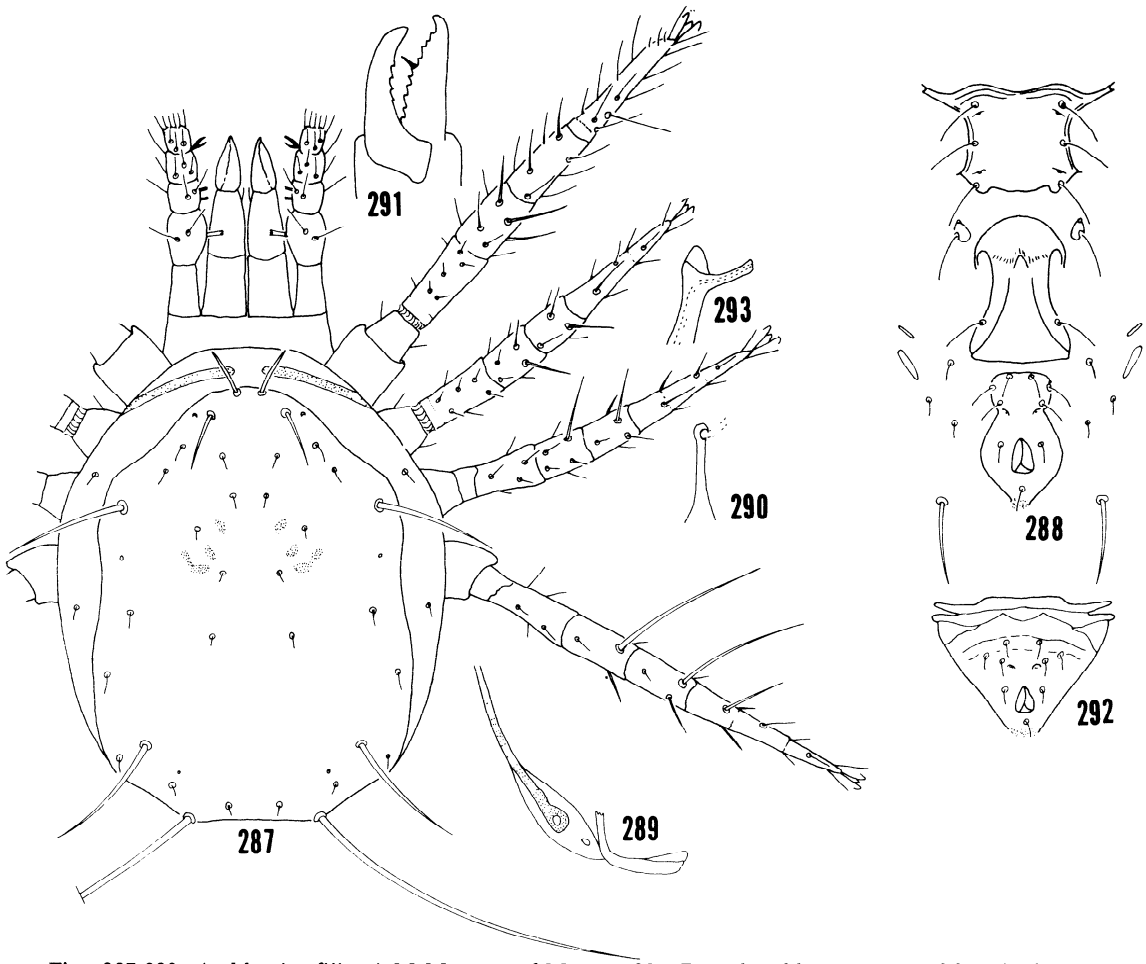
Amblyseius herbicoloides McMurtry and Moraes, 1984: 33-35.

TYPE — Female holotype, Fiji (New Hebrides): Luganville, Santo, 13 VIII 1979, J.A. McMurtry, on *Asteraceae* (USNMNH).

DIAGNOSIS — *Amblyseius herbicoloides* is similar to *Amblyseius fijiensis* McMurtry and Moraes but differs in having L_8 291-312, M_3 62, and with nodular bifid atrium as apposed to L_8 275, M_3 87, and with nodular atrium in *fijiensis*.

FEMALE — Length 356; width at L_4 244. Dorsal scutum smooth with scattered muscle marks, 2-3 medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 35; D_1 7,D_2 7, D_3 8, D_4 10; clunals 7; L_1 42, L_2 7-11, L_3 7-12, L_4 68-70, L_5 10, L_6 9, L_7 8, L_8 291-312; M_1 7, M_2 10, M_3 62; anterior sublaterals 8; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of elliptical pores, smooth, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size; fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 137, Sti IV 111, St IV 40. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with tubular flared cervix 21 and nodular bifid atrium.

MALE — Similar to female, but smaller. The ventrianal scutum with 3 pairs of preanal setae, lightly creased, and a pair of small round pores. The spermatodactyl with foot terminal and toe enlarged.



Figs. 287-293. *Amblyseius fijiensis* McMurtry and Moraes: 287. Dorsal and leg structure of female, 288. Ventral scuta and setation of female, 289. Posterior peritremal and stigmatal development of female, 290. Spermathecal structure of female, 291. Cheliceral structure of female, 292. Ventrianal scutum of male, 293. Spermatodactyl structure of male.

DISCUSSION — This species has been taken only in Fiji on an unknown species of Asteraceae. Nothing is known of its life cycle.

Amblyseius fijiensis McMurtry & Moraes

Fig. 287-293

Amblyseius fijiensis McMurtry and Moraes, 1984: 31-33.

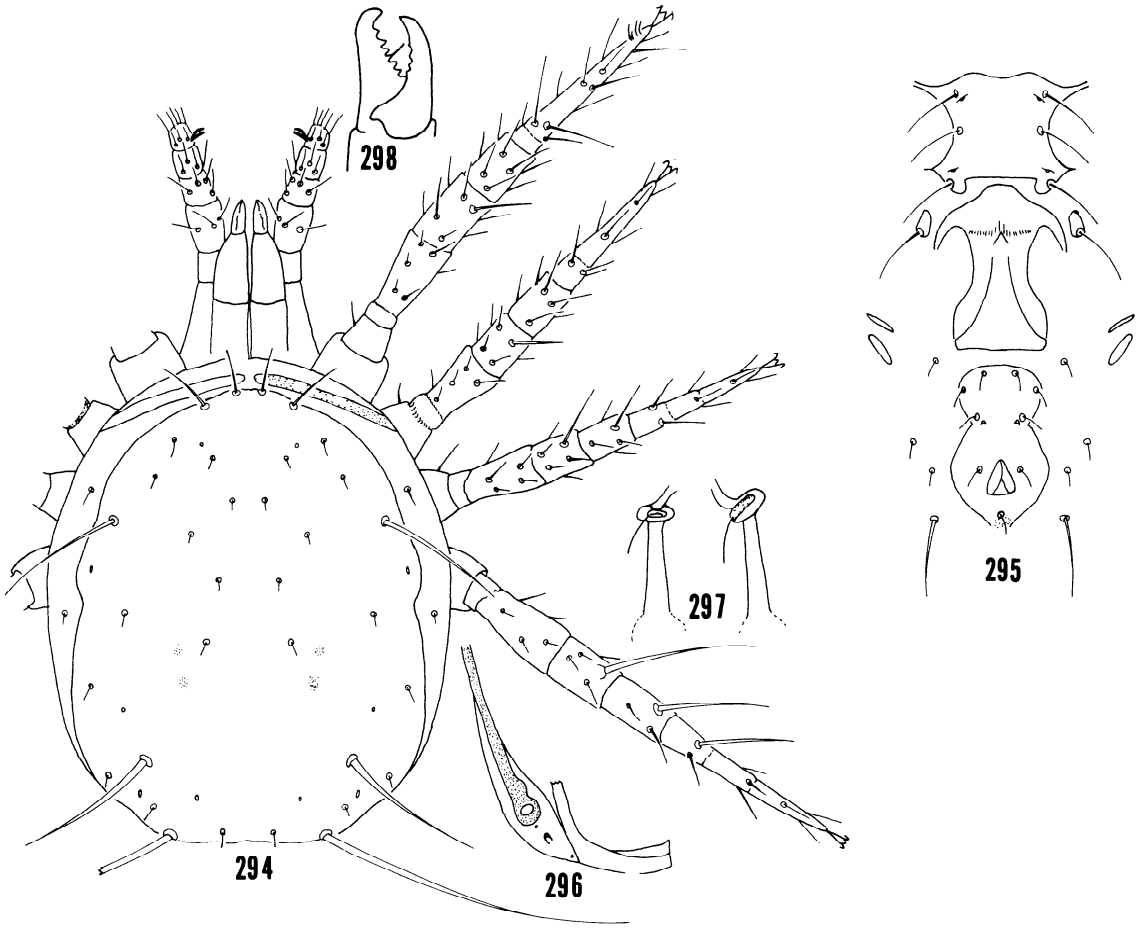
TYPE — Female holotype, Fiji: Savusavy (Vanua Levu), 30 VIII 1979, J.A. McMurtry, on *Artocarpus altilis (USNMNH).*

DIAGNOSIS — See *Amblyseius herbicoloides* McMurtry and Moraes.

FEMALE — Length 330; width at L_4 220. Dorsal scutum smooth with scattered muscle marks, 3-4 medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 32; D_1 7, D_2 6, D_3 8, D_4 9; clunals 6; L_1 42, L_2 13, L_3 10, L_4 89, L_5 11, L_6 11, L_7 8, L_8 275; M_1 6, M_2 10, M_3 87; anterior sublaterals 13; posterior sublaterals 9. Sternal scutum slightly creased anteriorly with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 13 denticules, and movable finger with 4 denticules. Leg formula 1432. Macrosetae Sge IV 137, Sti IV 98, St IV 48. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with tubular flared cervix 20 and nodular atrium.

MALE — Similar to female but smaller. Spermatodactyl with foot terminal and toe slightly enlarged. Lateral process distinct. Ventrianal scutum lightly creased, a pair of elliptical pores, and 3 pairs of preanal setae.

DISCUSSION — This species is known from Fiji and the Cook Islands, Rorotonga collected on breadfruit, *Artocarpus altilis*, and *Terminalia* sp. Nothing is known of the biology of this species.



Figs. 294-298. *Amblyseius herbicolus* Chant: 294. Dorsal and leg structure of female, 295. Ventral scuta and setation of female, 296. Posterior peritremal and stigmatal development of female, 297. Spermathecal structure of female, 298. Cheliceral structure of female.

Amblyseius herbicolus Chant

Fig 294-298

Amblyseius herbicolus Chant, 1959: 84; Daneshvar and Denmark, 1982: 5.

Amblyseius impactus Chaudhri, 1968: 553.

Amblyseius amitae Bhattacharyya, 1968: 677-680. NEW SYNONYM.

Amblyseius deleoni Muma and Denmark, 1970: 68. NEW SYNONYM.

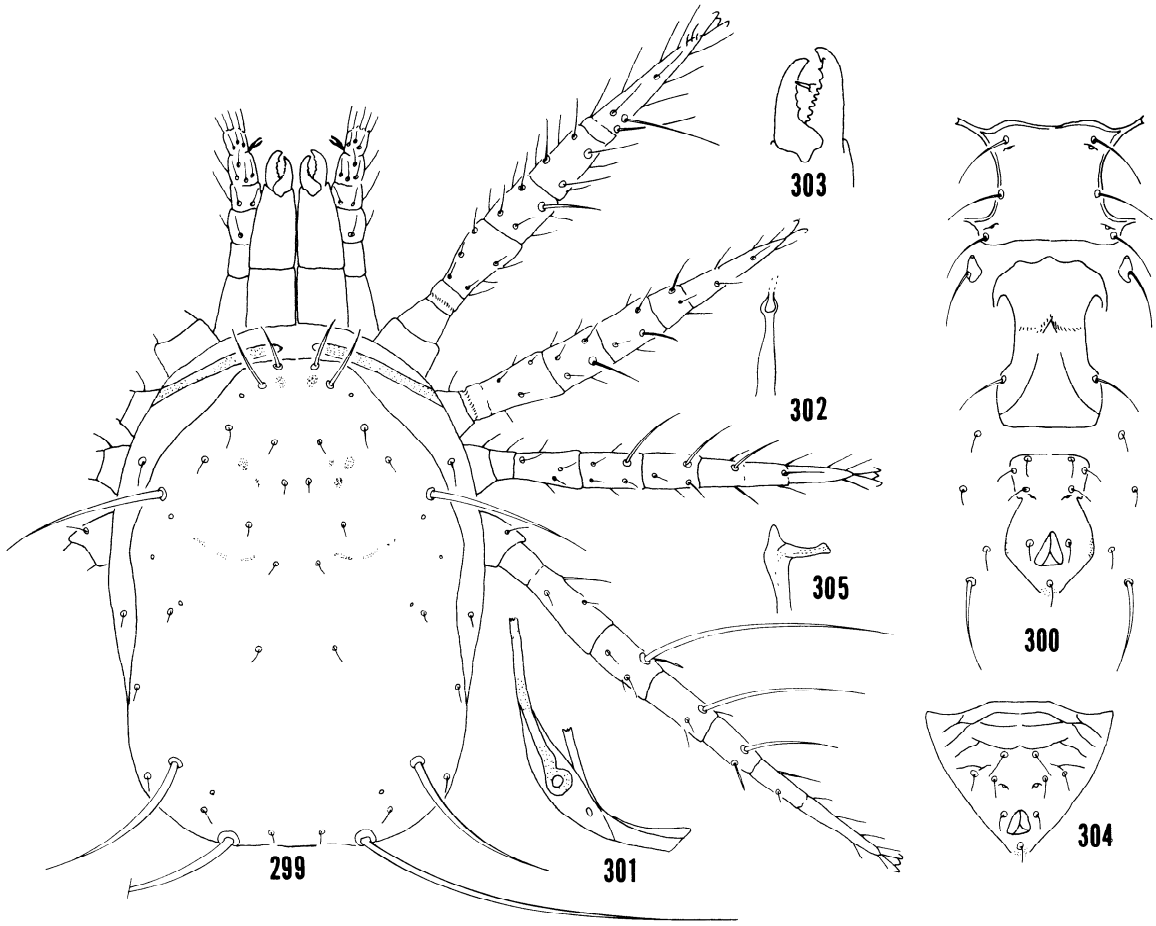
TYPE — Female holotype, Portugal: intercepted at Boston, Massachusetts, 13 VII 1955, J.D. Crump, on bromiliad (USNMNH).

DIAGNOSIS — *Amblyseius herbicolus* is similar to *Amblyseius nambourensis* Schicha but differs in having L_2 3, L_3 4, L_4 100, L_8 236, M_3 110, Sge IV 112, Sti IV 82 and St IV 76 as apposed to L_2 16, L_3 11, L_4 134, L_8 368, M_3 133, Sge IV 212, Sti IV 137, and St IV 74 in *nambourensis*.

FEMALE — Length 369; width at L_4 236. Dorsal scutum smooth with 4-5 small scattered pores, none to few scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 38; D_1 9,D_2 7, D_3 11, D_4 12; clunals 9; L_1 42, L_2 13, L_3 9, L_4 100, L_5 11, L_6 13, L_7 11, L_8 236; M_1 6, M_2 9, M_3 110; anterior sublaterals 15; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum with a pair of small pores near the posterior pair of preanal setae, smooth, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 11-12 denticules, and movable finger with 4 denticules. Leg formula 1423. Macrosetae Sge IV 112, Sti IV 82, St IV 76. Genu II 2 - 2 - 2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with slender fundibular cervix 18 and wafer-like nodular atrium.

MALE — Unknown.

DISCUSSION — This species has been collected in Portugal, Pakistan, India, South America, North America,



Figs. 299-305. *Amblyseius nambourensis* Schicha: 299. Dorsal and leg structure of female, 300. Ventral scuta and setation of female, 301. Posterior peritremal and stigmatal development of female, 302. Spermathecal structure of female, 303. Cheliceral structure of female, 304. Ventrianal scutum of male, 305. Spermatodactyl structure of male.

West Indies, Africa, Australia, Turkey, Egypt, Japan, and China. It has been taken on numerous plant hosts that range from grasses, litter, vines, weeds, woody ornamentals, fruit trees, and forest trees. It has been reported associated with spider mites.

Amblyseius nambourensis Schicha

Fig. 299-305

Amblyseius nambourensis Schicha, 1981: 102.

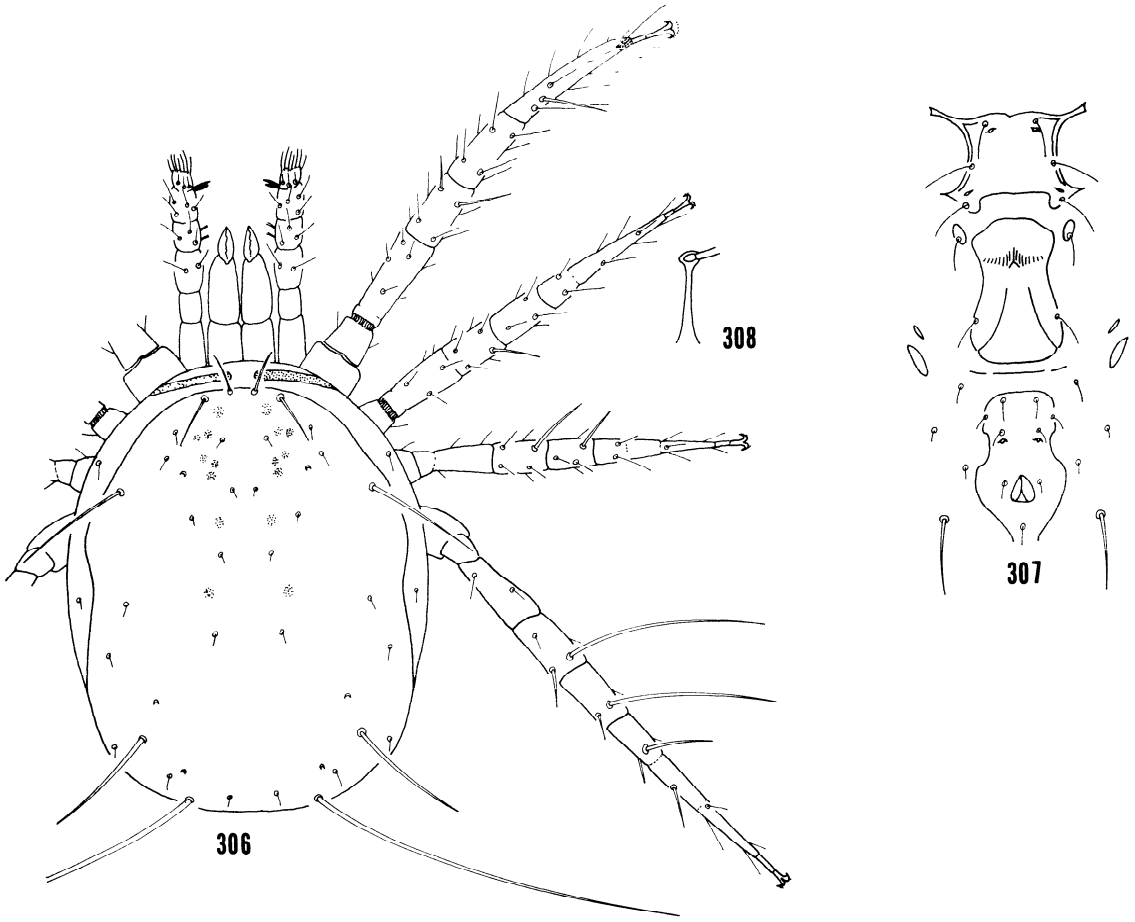
TYPE — Female holotype, Australia: Queensland, Nambour, 9 X 1973, D.A. Ironside, on *Macadamia tetraphylla* (BCRI).

DIAGNOSIS — See *Amblyseius herbicolus* Chant.

FEMALE — Length 397; width at L_4 243. Dorsal scutum smooth with 5-6 small pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 35; D_1 7,D_2 5, D_3 7, D_4 8; clunals 9; L_1 52, L_2 16, L_3 11, L_4 134, L_5 12, L_6 12, L_7 12, L_8 368; M_1 6, M_2 9, M_3 133; anterior sublaterals 19; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond verticals. Chelicerae normal in relation to body size, fixed finger with 12 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 212, Sti IV 137, St IV 74. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/0 - 1. Spermatheca with slender fundibular but irregular cervix 22 and nodular atrium.

MALE — Similar to female but smaller in size. Spermatodactyl with foot terminal, toe bifid, and lateral process indistinct. Ventrianal scutum lightly creased with a pair of elliptical pores and 3 pairs of preanal setae.

DISCUSSION — This species has been taken only in Queensland, Australia. Nothing is known about its biology.



Figs. 306-308. *Amblyseius phillipsi* McMurtry and Schicha: 306. Dorsal and leg structure of female, 307. Ventral scuta and setation of female, 308. Spermathecal structure of female.

Amblyseius phillipsi McMurtry and Schicha

Fig. 306-308

Amblyseius phillipsi McMurtry and Schicha, 1987: 80.

TYPE — Female holotype, Australia: Palm Cove, near Cairns, Queensland, 18 VII 1979, J.A. McMurtry, on mangrove (BCRI).

DIAGNOSIS — *Amblyseius phillipsi* is similar to *Amblyseius fletcheri* Schicha but differs in having L_4 106, M_3 95, Sti IV 126, St IV 59, and cervix of spermatheca 32 as apposed to L_4 126, M_3 146, Sti IV 110, St IV 73, and cervix 18 in *fletcheri*.

FEMALE — Length 366; width at L_4 235. Dorsal scutum smooth with a few scattered muscle marks, 3 medium-sized pores, and 17 pairs of setae. Measurements of setae: verticals 36; D_1 5,D_2 5, D_3 6, D_4 8; clunals 8; L_1 52, L_2 11, L_3 11, L_4 106, L_5 15, L_6 9, L_7 8, L_8 325; M_1 5, M_2 11, M_3 95; anterior sublaterals 15; posterior sublaterals 9. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger appears to have 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 165, Sti IV 126, St IV 59. Genu II 2 - 2 - 2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with slender fundibular cervix 32 and triangular-nodular atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type collection. Nothing is known about the biology of this species.

Amblyseius fletcheri Schicha

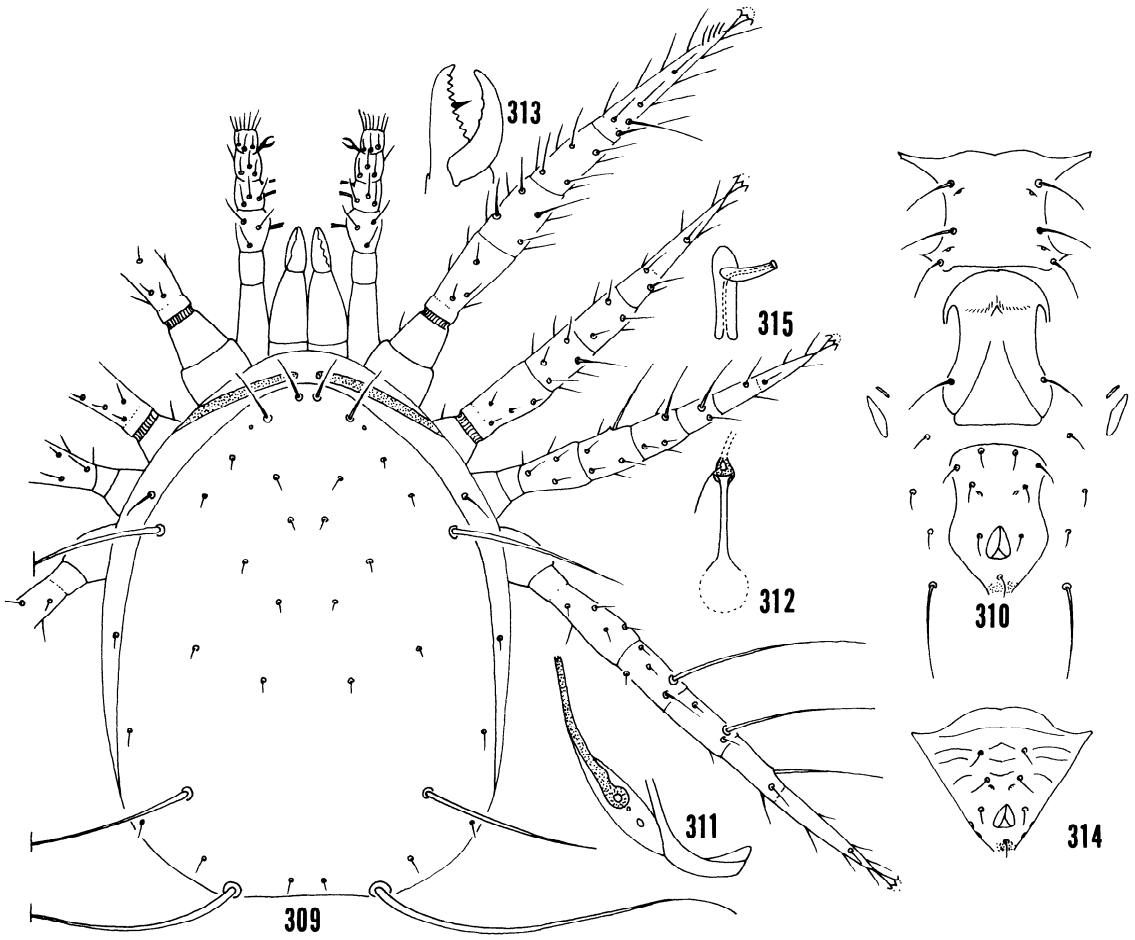
Fig. 309-315

Amblyseius fletcheri Schicha, 1981: 102-104.

TYPE — Female holotype, New Caledonia: 9 V 1978, J. Gutierrez, on *Musa paradisiaca*.

DIAGNOSIS — See *Amblyseius phillipsi* McMurtry and Schicha.

FEMALE — Length 353-372; width at L_4 201-208.



Figs. 309-315. *Amblyseius fletcheri* Schicha: 309. Dorsal and leg structure of female, 310. Ventral scuta and setation of female, 311. Posterior peritremal and stigmatal development of female, 312. Spermathecal structure of female, 313. Cheliceral structure of female, 314. Ventrianal scutum of male, 315. Spermatodactyl structure of male.

Dorsal scutum smooth with scattered pores and 17 pairs of setae. Measurements of setae: verticals 36-37; D_1 6,D_2 4, D_3 8, D_4 9; clunals 10; L_1 46, L_2 9, L_3 10, L_4 126, L_5 12, L_6 14, L_7 14, L_8 301; M_1 4, M_2 9, M_3 146; anterior sublaterals 14; posterior sublaterals 12. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 151, Sti IV 110, St IV 73. Genu II 2 - 2 - 2/0 - 1; genu III 1 - 2 - 2/0 - 1. Spermatheca with fundibular flared cervix 18 and triangular-nodular atrium.

MALE — Similar to female but smaller. Spermatodactyl with foot subterminal, slightly enlarged toe, lateral process indistinct. Ventrianal scutum lightly creased, elliptical pores, and 3 pairs of preanal setae.

DISCUSSION — This species is known only from New Caledonia. Nothing is known about its biology.

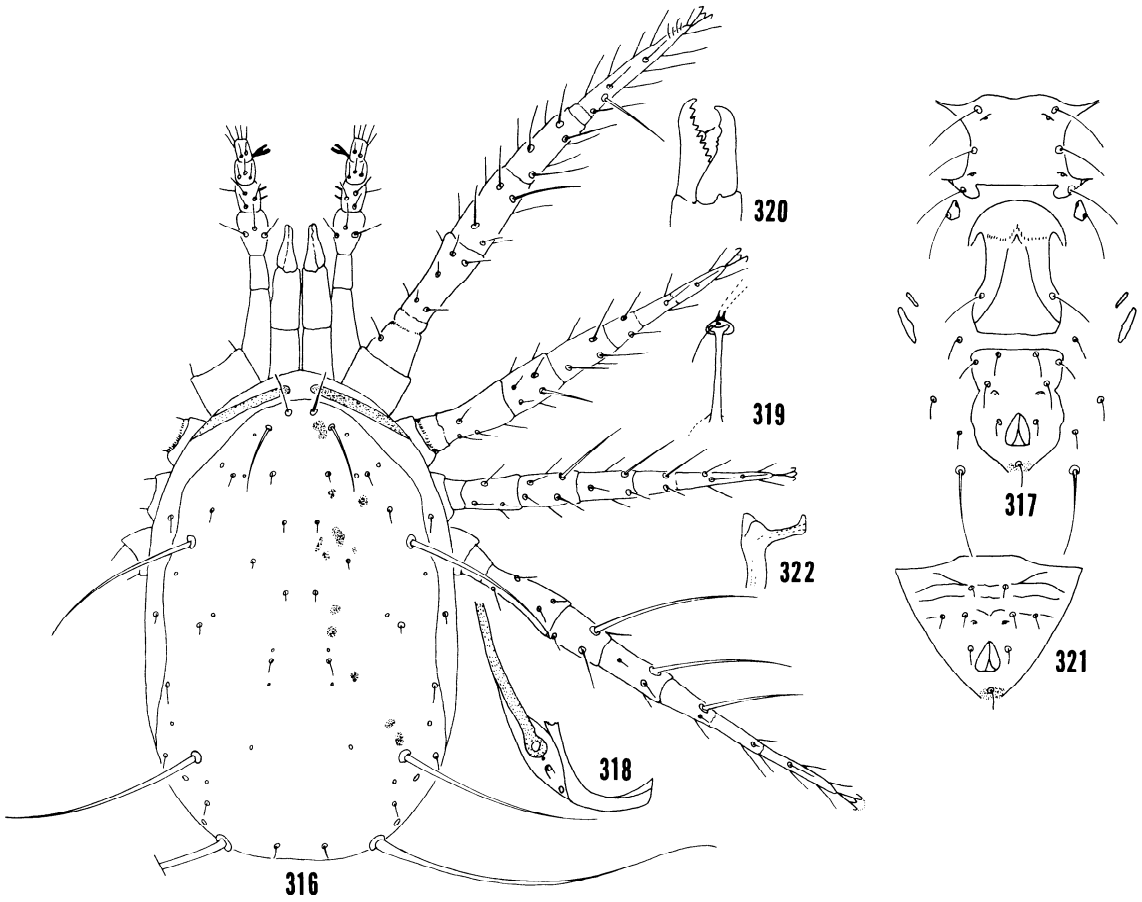
Amblyseius vazimba Blommers

Fig. 316-322

Amblyseius vazimba Blommers, 1974: 312.

TYPE — Female holotype, Madagascar: Agricultural Station in Tulear, 8-9 III 1971, L. Blommers, on *Lantana camara* L., *Lagerstroemia indica* L., and *Acalypha* sp. infested with *Tetranychus neocaledonicus* Andre, in Paris Museum.

DIAGNOSIS — *Amblyseius vazimba* is similar to *Amblyseius adhatodae* Muma and *Amblyseius ankaratrae* Blommers but differs in having L_1 55, L_4 136, L_8 314, M_3 176, Sge IV 188, Sti IV 125, St IV 94 and cervix of the spermatheca 32 and slender fundibular as apposed to L_1 51, L_4 122, L_8 286, M_3 131, Sge IV 137, Sti IV 105, St IV 64, and cervix of spermatheca 31 and slender fundibular in *adhatodae* and L_1 28, L_4 13, L_8 234, M_3 11, Sge IV 129, Sti IV 102, St IV 35 and cervix of spermatheca 19 and slender tubular with fundibular base in *ankaratrae*.



Figs. 316-322. *Amblyseius vazimba* Blommers: 316. Dorsal and leg structure of female, 317. Ventral scuta and setation of female, 318. Posterior peritremal and stigmatal development of female, 319. Spermathecal structure of female, 320. Cheliceral structure of female, 321. Ventrianal scutum of male, 322. Spermatodactyl structure of male.

FEMALE — Length 376; width at L_4 238. Dorsal scutum smooth with 10-12 small to medium sized pores scattered over the dorsum, several scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 38; D_1 5,D_2 5, D_3 5, D_4 7; clunals 7; L_1 55, L_2 11, L_3 11, L_4 136, L_5 11, L_6 11, L_7 11, L_8 314; M_1 5, M_2 6, M_3 176; anterior sublaterals 11; posterior sublaterals 6. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of pores, 3 pairs of preanal setae, and lateral sides acutely indented. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond verticals. Chelicerae normal in relation to body size, fixed finger with 12 denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 188, Sti IV 125, St IV 94. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with a slender fundibular cervix 32-34 and triangular-nodular atrium.

MALE — The male is similar to but smaller than the female. The ventrianal scutum is lightly creased with a pair of elliptical pores and 3 preanal setae. The spermatodactyl with foot terminal, toe enlarged, and lateral process present.

DISCUSSION — Phytoseiids were collected from *Lantana camara* L., *Lagerstroemia indica* L., and *Acalypa* sp., in the Agricultural Station in Tulear, Madagascar (Malegasy Republic). *A. vazimba* was taken from a mass rearing with the vegetable spider mite *Tetranychus neocaledonicus* Andre, as the host.

Amblyseius adhatodae Muma

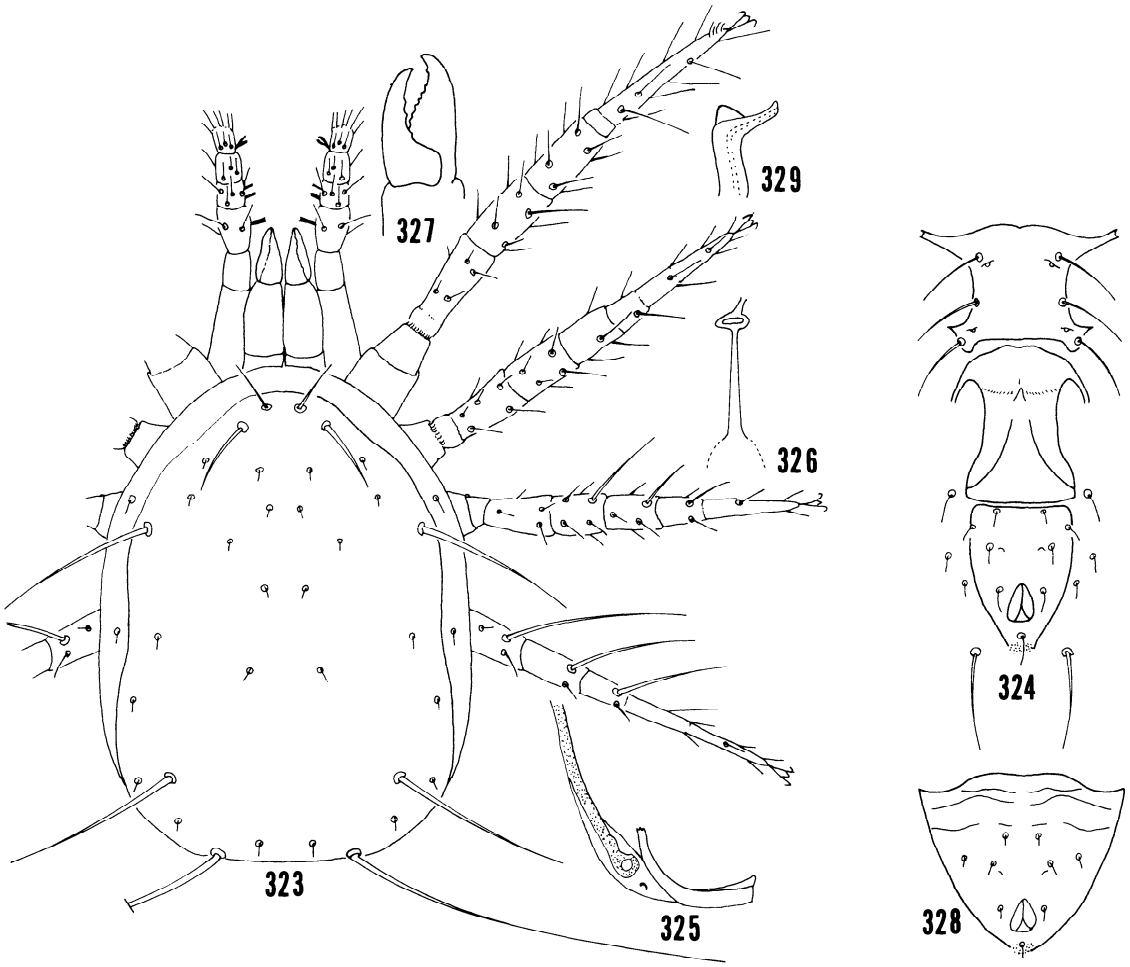
Fig. 323-329

Amblyseius adhatodae Muma, 1967: 268.

TYPE — Female holotype, India: Bombay, 4 IX 1964, M.A. Ghai, from *Adhatoda vasica* Nees (USNMNH).

DIAGNOSIS — See *Amblyseius vazimba* Blommers.

FEMALE — Length 375; width at L_4 274. Dorsal scutum smooth with 17 pairs of setae. Measurements of setae: verticals 42; D_1 6,D_2 4, D_3 4, D_4 4; clunals 11; L_1 51, L_2 6, L_3 8, L_4 122, L_5 6, L_6 7, L_7 11, L_8 286; M_1 4, M_2 7, M_3 131; anterior sublaterals 11; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs



Figs. 323-329. *Amblyseius adhatodae* Muma: 323. Dorsal and leg structure of female, 324. Ventral scuta and setation of female, 325. Posterior peritremal and stigmatal development of female, 326. Spermathecal structure of female, 327. Cheliceral structure of female, 328. Ventrianal scutum of male, 329. Spermatodactyl structure of male.

of setae. Ventrianal scutum with a pair of elliptical pores very close to the posterior pair of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9-11 small denticules, and movable finger with 1-2 denticules. Leg formula 4123. Macrosetae Sge IV 137, Sti IV 105, St IV 64. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with long slender fundibular flared cervix 31 and triangular-nodular atrium.

MALE — Similar to the female except smaller in size. The spermatodactyl has foot terminal, lateral process present, and toe up-turned. The ventrianal scutum lightly reticulated with a pair of elliptical pores and 3 pairs of preanal seate.

DISCUSSION — Nothing is known about the biology of this species. It has been collected in India on *Adhatoda vasica* Nees and *Ipomoea* sp.

Amblyseius ankaratrae Blommers

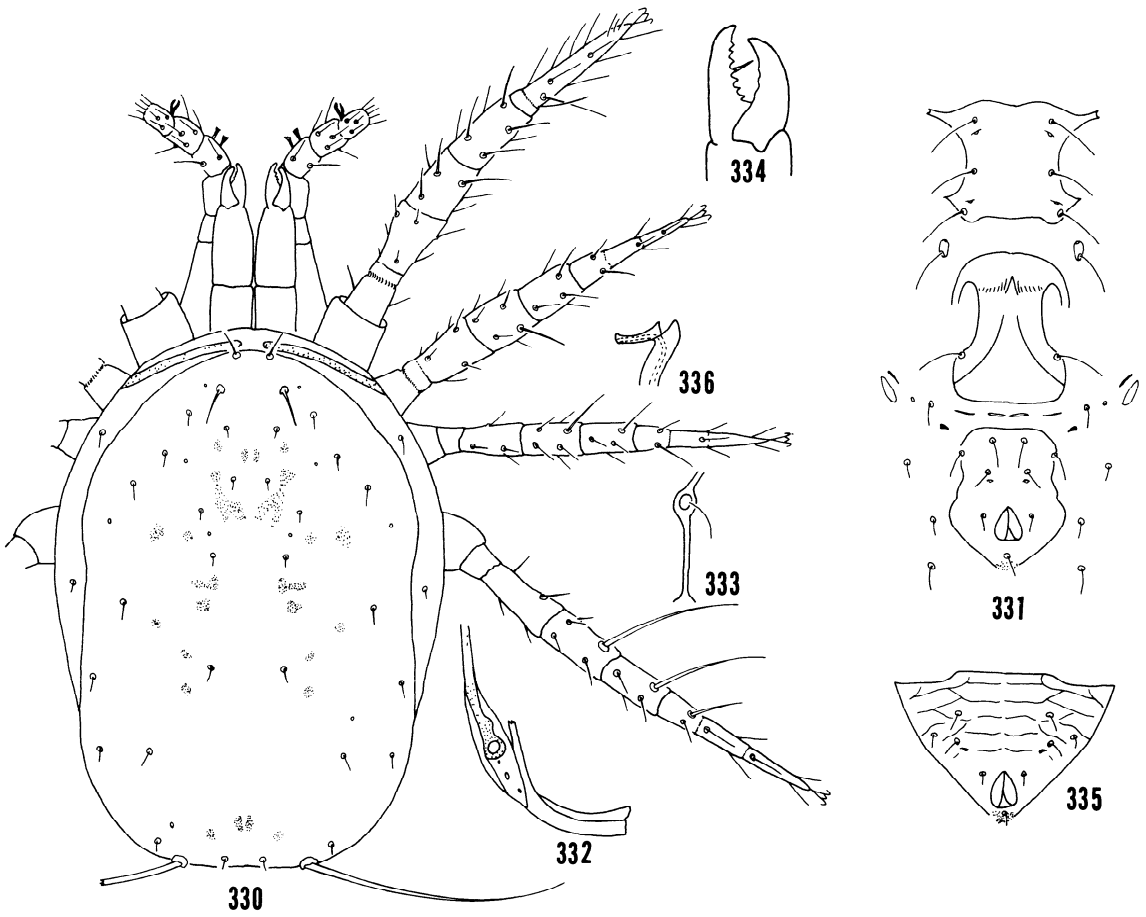
Fig. 330-336

Amblyseius ankaratrae Blommers, 1976: 92.

TYPE — Female holotype, Madagascar: Ankaratra Mountains, Manjakatompo Forest Station, 14 VIII 1971, L. Blommers, from *Dicoryphe* sp., in Institute of Taxonomic Zoology (Zoologisch Museum) of the University of Amsterdam.

DIAGNOSIS — See *Amblyseius vazimba* Blommers.

FEMALE — Length 361; width at L_4 282. Dorsal scutum smooth with scattered muscle marks, 5 to 6 small scattered pores, and 17 pairs of setae. Measurements of setae: verticals 19; D_1 6,D_2 8, D_3 8, D_4 11; clunals 9; L_1 28, L_2 12, L_3 9, L_4 13, L_5 11, L_6 11, L_7 9, L_8 234; M_1 7, M_2 11, M_3 11; anterior sublaterals 11; posterior sublaterals 11. Sternal scutum smooth, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum with a pair of elliptical pores posterior to the posterior pair of preanal setae,



Figs. 330-336. *Amblyseius ankaratrae* Blommers: 330. Dorsal and leg structure of female, 331. Ventral scuta and setation of female, 332. Posterior peritremal and stigmatal development of female, 333. Spermathecal structure of female, 334. Cheliceral structure of female, 335. Ventrianal scutum of male, 336. Spermatodactyl structure of male.

smooth, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 0-3 denticules. Leg formula 4123. Macrosetae Sge IV 129, Sti IV 102, St IV 35. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with tubular flared cervix 19 and wafer-like nodular atrium.

MALE — Similar to the female except smaller in size. The spermatodactyl has foot terminal, lateral process present, and toe not enlarged. The ventrianal scutum reticulated, with a pair of elliptical pores, and 3 pairs of preanal setae.

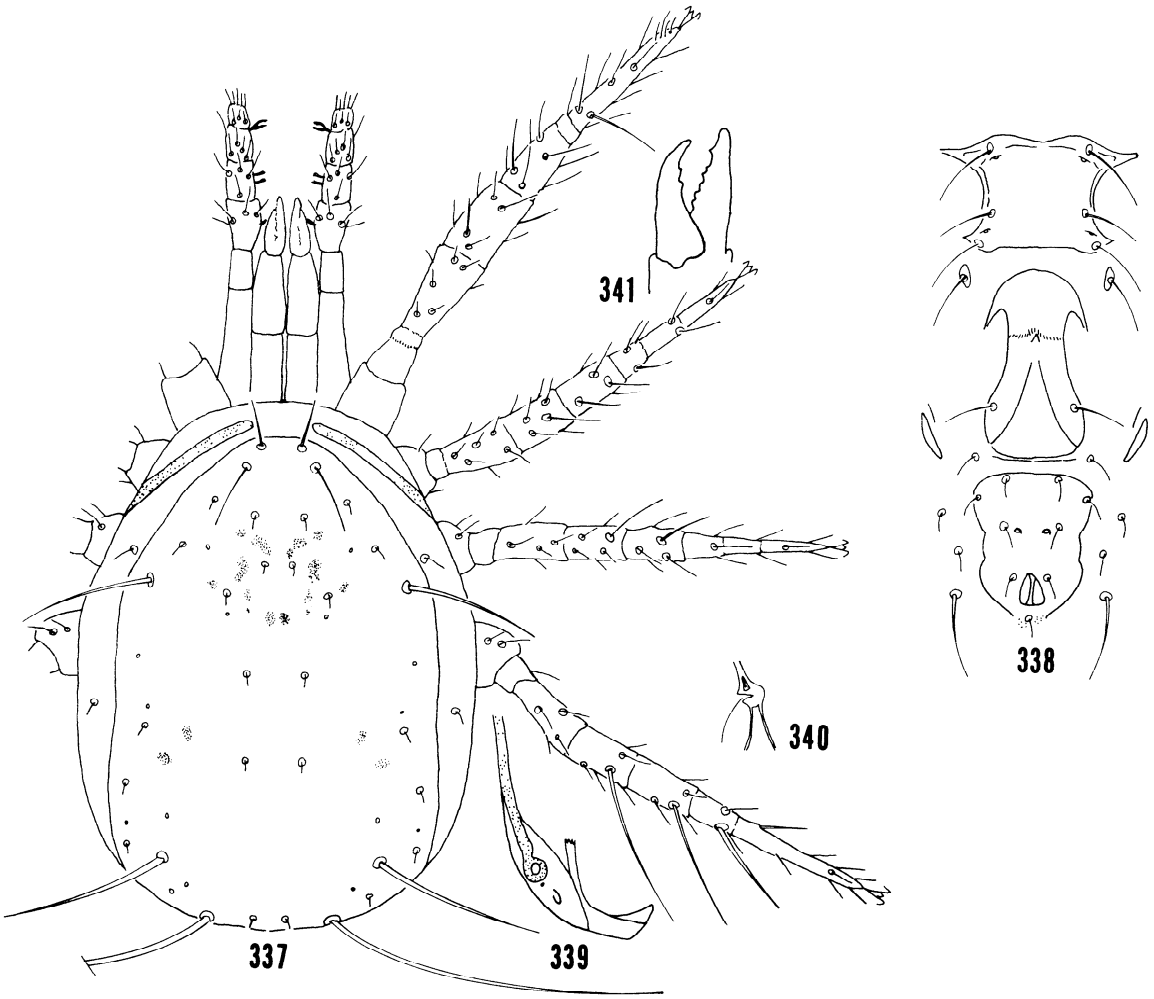
DISCUSSION — This species is known only in Madagascar taken on the plant *Dicoryphe* sp.

INVICTUS GROUP

Five species are assigned to this group. They are *A. invictus* Schuster, *A. chungas* Denmark and Muma n. sp., *A. genualis* De Leon, *A. adjaricus* Wainstein and Vartapetov, and *A. euanalis* Karg. Four species, *invictus, chungas, genualis,* and *adjaricus,* have spermathecae with nodular atria and short to long, slender fundibular cervices. However, the 5th species, *euanalis,* has the atrium differentiated but not noticeably swollen and the cervix elongate and broadly fundibular, almost saccular.

Key to females in *invictus* group

1. L_4 longer than 85, L_8 longer than 225, M_3 longer than 100, Sge IV longer than 100 2
— L_4 shorter than 85, L_8 shorter than 225, M_3 shorter than 100, Sge IV shorter than 100 ..... *adjaricus* Wainstein and Vartapetov, p. 69
2. Verticals shorter than 25, L_1 30 or shorter, L_4 longer than 130 ..... *euanalis* Karg, p. 69
— Verticals 25 or longer, L_1 longer than 30, L_4 shorter than 130 3
3. L_4 longer than 100, L_8 shorter than 250, M_3 longer than 125, cervix approximately 5 ..... *chungas* Denmark and Muma, p. 67
— L_4 100 or shorter, L_8 250 or longer, M_3 shorter than 125, cervix 10 or longer 4



Figs. 337-341. *Amblyseius invictus* Schuster: 337. Dorsal and leg structure of female, 338. Ventral scuta and setation of female, 339. Posterior peritremal and stigmatal development of female, 340. Spermathecal structure of female, 341. Cheliceral structure of female.

4. Large oval pores on the ventrianal scutum, Sti IV 90 or longer, L_1 50 or longer .... *invictus* Schuster, p. 66
— Pores elliptical on the ventrianal scutum, Sti IV shorter than 80, L_1 shorter than 50 .... *genualis* De Leon, p. 68

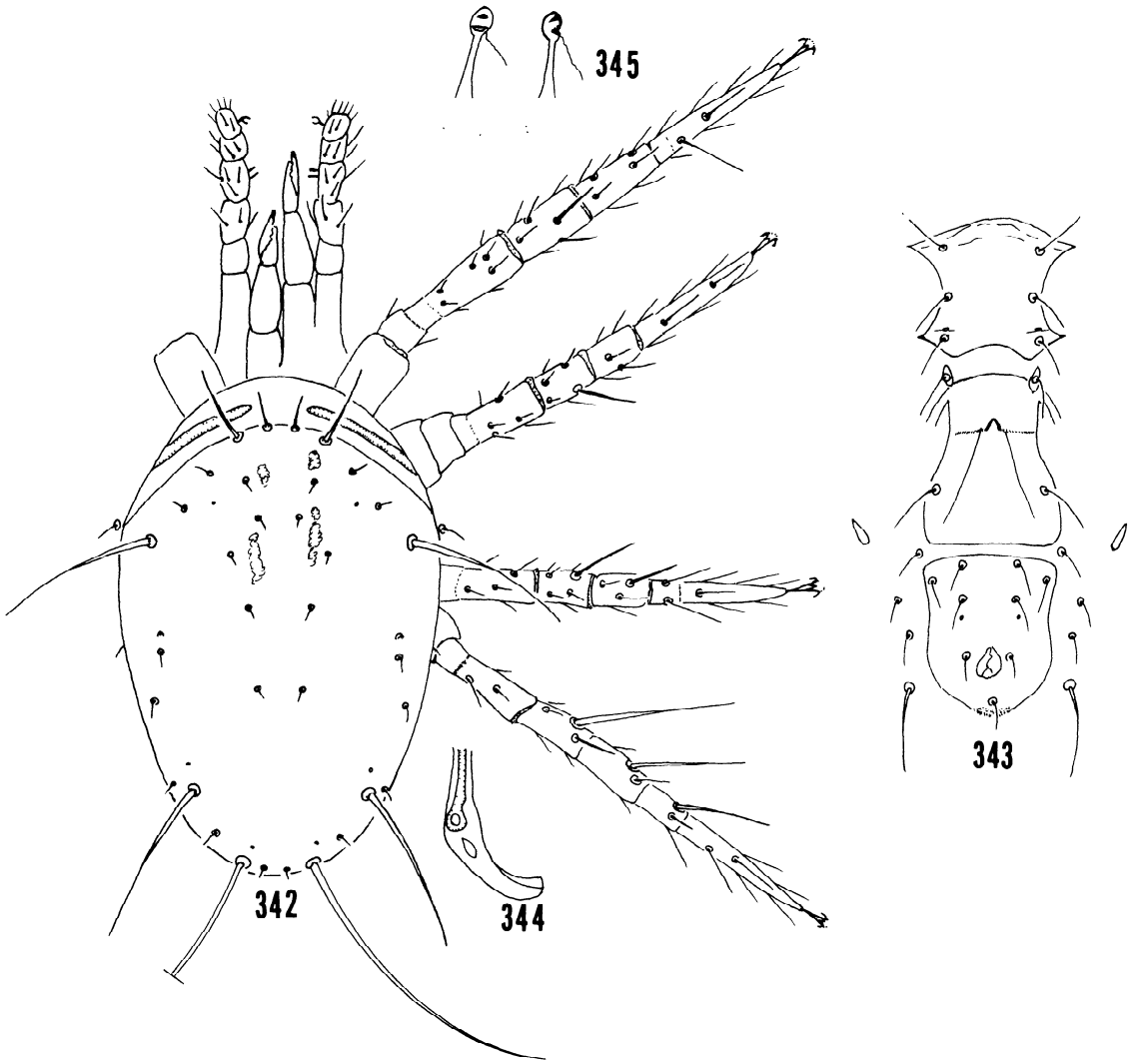
Amblyseius invictus Schuster
Fig. 337-341

Amblyseius invicus Schuster, 1966: 331-332.

TYPE — Female holotype, Galapagos: Isla Santa Cruz, 3 II 1964, R.O. Schuster, on mangrove leaves, in Department of Entomology, University of California, Davis.

DIAGNOSIS — *Amblyseius invictus* is similar to *Amblyseius chungas* Denmark and Muma but differs in having L_4 99, M_3 106, spermathecal cervix 11 with large round pores on the ventrianal scutum as apposed to L_4 118, M_3 131, spermathecal cervix 5 with small round pores on the ventrianal scutum in *chungas*.

FEMALE — Length 361; width at L_4 219. Dorsal scutum smooth with 6-8 small round pores, scattered muscle marks and 17 pairs of setae. Measurements of setae: verticals 33; D_1 5, D_2 5, D_3 6, D_4 6; clunals 8; L_1 52, L_2 8, L_3 11, L_4 99, L_5 8, L_6 6, L_7 8, L_8 259; M_1 5, M_2 7, M_3 106; anterior sublaterals 19; posterior sublaterals 8. Sternal scutum smooth with 2 pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical to round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 2 denticules. Leg formula 4123. Macrosetae Sge IV 110, Sti IV 94, St IV 75. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with short fundibular cervix 11 and nodular atrium.



Figs. 342-345. *Amblyseius chungas* Denmark and Muma n. sp.: 342. Dorsal and leg structure of female, 343. Ventral scuta and setation of female, 344. Posterior peritremal and stigmatal development of female, 345. Spermathecal structure of female.

MALE — Unknown.

DISCUSSION — This species has been taken only in the Galapagos Islands. Nothing is known about its biology.

Amblyseius chungas Denmark & Muma n. sp.

Fig. 342-345

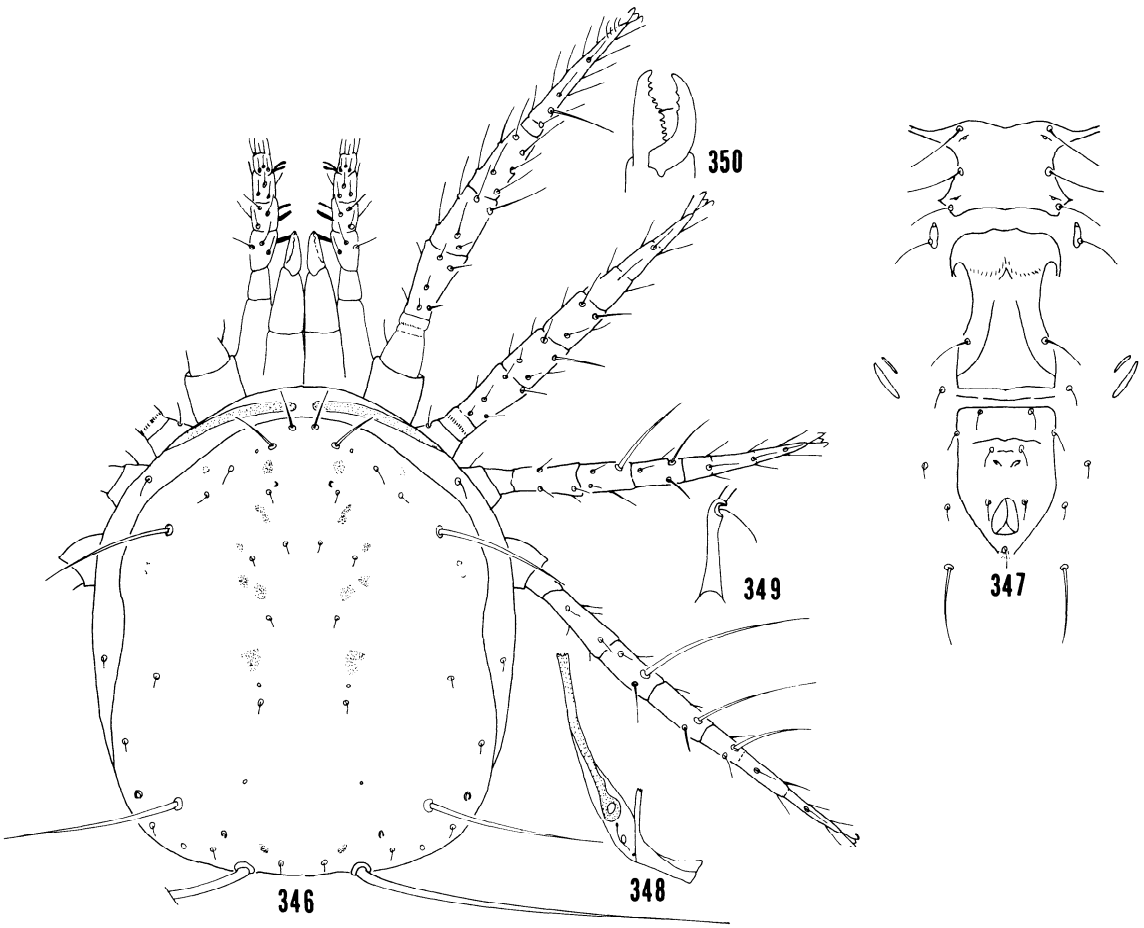
TYPE — Female holotype, Peru: Motupe, 13 X 1975, F. Chunga, on *Citrus reticulata* (FSCA). Two female paratypes collected with the holotype.

DIAGNOSIS — See *Amblyseius invictus* Schuster.

FEMALE — Length 329; width at L_4 226. Dorsal scutum smooth with 4-5 small scattered pores, muscle marks anteriorly, and 17 pairs of setae. Measurements of setae: verticals 27; D_1 3, D_2 3, D_3 5, D_4 5; clunals 8; L_1 59, L_2 11, L_3 8, L_4 118, L_5 7, L_6 9, L_7 7, L_8 235; M_1 4, M_2 6, M_3 131; anterior sublaterals 18; posterior sublaterals 9. Sternal scutum smooth with a pair of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores and 3 pairs of setae. Three pairs of setae surround the ventrianal scutum. Chelicerae normal in relation to body size, fixed finger with 9-10 denticules, and movable finger not visible. Leg formula 1432. Macrosetae Sge IV 112, Sti IV 86, St IV 66. Genu II 2 - 2 - 2/0 - 1; genu III 1 - 2/0 - 2/1 - 1. Spermatheca with short fundibular cervix 5 and nodular atrium.

MALE — Unknown.

DISCUSSION — Nothing is known about the biology and life history. It has been taken only in Peru.



Figs. 346-350. *Amblyseius genualis* De Leon: 346. Dorsal and leg structure of female, 347. Ventral scuta and setation of female, 348. Posterior peritremal and stigmatal development of female, 349. Spermathecal structure of female, 350. Cheliceral structure of female.

Amblyseius genualis De Leon
Fig. 346-350

Amblyseius genualis De Leon, 1967: 23.

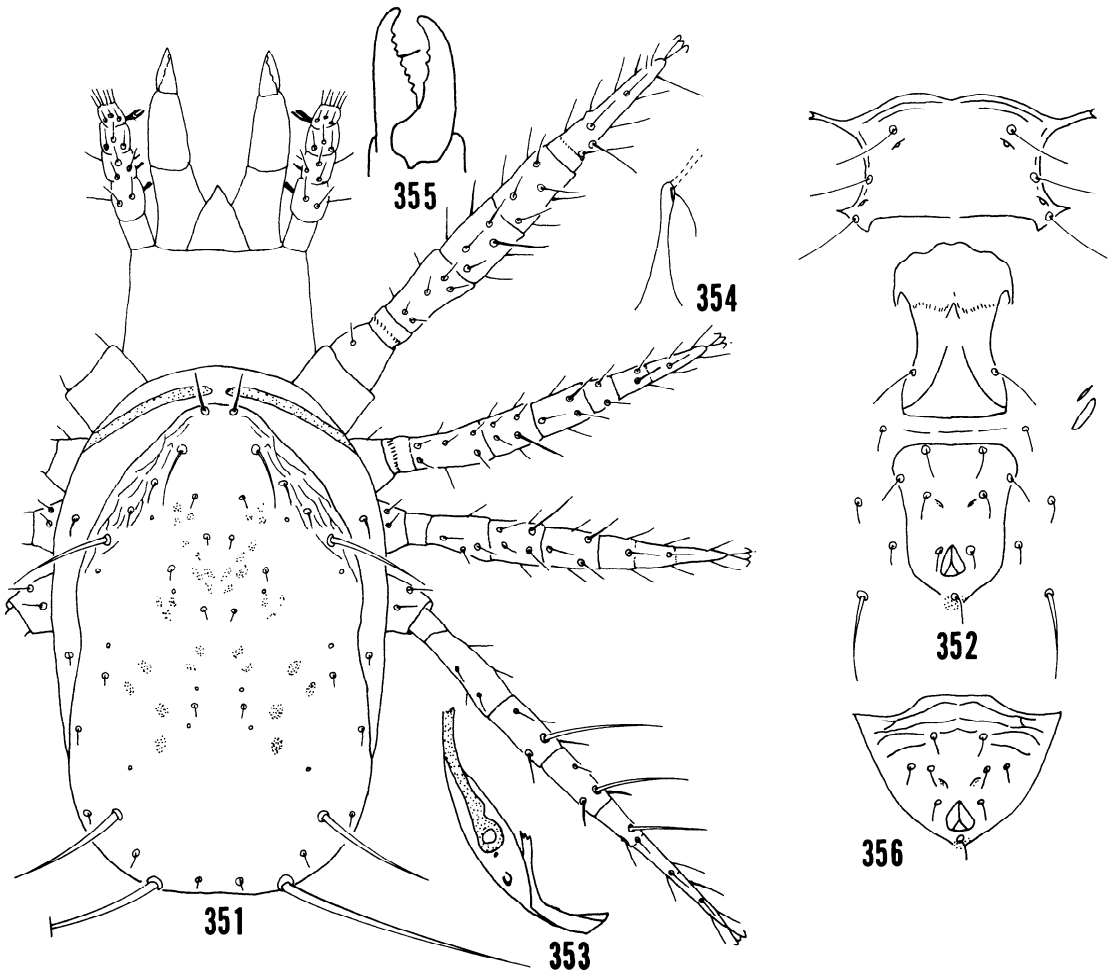
TYPE — Female holotype, Trinidad: between Simla and Arima, 14 X 1963, D. De Leon, on *Ryania speciosa* Vahl (MCZ).

DIAGNOSIS — *Amblyseius genualis* is similar to *Amblyseius adjaricus* Wainstein and Vartapetov and *Amblyseius euanalis* Karg but differs in having L_4 91, L_8 266, M_3 112, Sge IV 109, Sti IV 75, St IV 64, spermathecal cervix 14 with elliptical pores on the ventrianal scutum as apposed to L_4 71, L_8 178, M_3 72, Sge IV 79, Sti IV 70, St IV 58, spermathecal cervix 19 with elliptical pores on the ventrianal scutum in *adjaricus* and L_4 140, L_8 250, M_3 190, Sge IV 162, Sti IV 126, St IV 62, spermathecal cervix 22 with small round pores on the ventrianal scutum in *euanalis*.

FEMALE — Length 361; width at L_4 251. Dorsal scutum smooth with 2-3 small pores and 17 pairs of setae. Measurements of setae: verticals 35; D_1 5, D_2 5, D_3 6, D_4 8; clunals 9; L_1 44, L_2 10, L_3 9, L_4 91, L_5 11, L_6 11, L_7 12, L_8 266; M_1 5, M_2 9, M_3 112; anterior sublaterals 14; posterior sublaterals 9. Sternal scutum lightly creased around the anterior and lateral side, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth, a pair of crescent-shaped pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 12 denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 109, Sti IV 75, St IV 64. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with long fundibular cervix 14 and nodular atrium.

MALE — Unknown.

DISCUSSION — Nothing is known of the food habits. All specimens have been taken in Trinidad on *Ryania speciosa* Vahl, *Miconia* sp., and *Ficus* sp.



Figs. 351-356. *Amblyseius adjaricus* Wainstein and Vartapetov: 351. Dorsal and leg structure of female, 352. Ventral scuta and setation of female, 353. Posterior peritremal and stigmatal development of female, 354. Spermathecal structure of female, 355. Cheliceral structure of female, 356. Ventrianal scutum of male.

Amblyseius adjaricus Wainstein and Vartapetov
Fig. 351-356

Amblyseius adjaricus Wainstein and Vartapetov, 1972: 306.

TYPE — Female holotype, U.S.S.R.: Georgia, Chakvistavi (Kobuleti region), 31 VIII 1971, on *Juglans regia,* in Academy of Sciences of Ukrainian, S.S.R.

DIAGNOSIS — See *Amblyseius genualis* De Leon.

FEMALE — Length 345; width at L_4 196. Dorsal scutum smooth with creases along the anterior edge of dorsal scutum, scattered muscle marks, 6-8 small pores, and 17 pairs of setae. Measurements of setae: verticals 31; D_1 6, D_2 3, D_3 5, D_4 7; clunals 6; L_1 47, L_2 16, L_3 13, L_4 71, L_5 11, L_6 11, L_7 9, L_8 178; M_1 3, M_2 7, M_3 72; anterior sublaterals 19; posterior sublaterals 7. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 79, Sti IV 70, St IV 58. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with long fundibular cervix 19 and slightly nodular atrium.

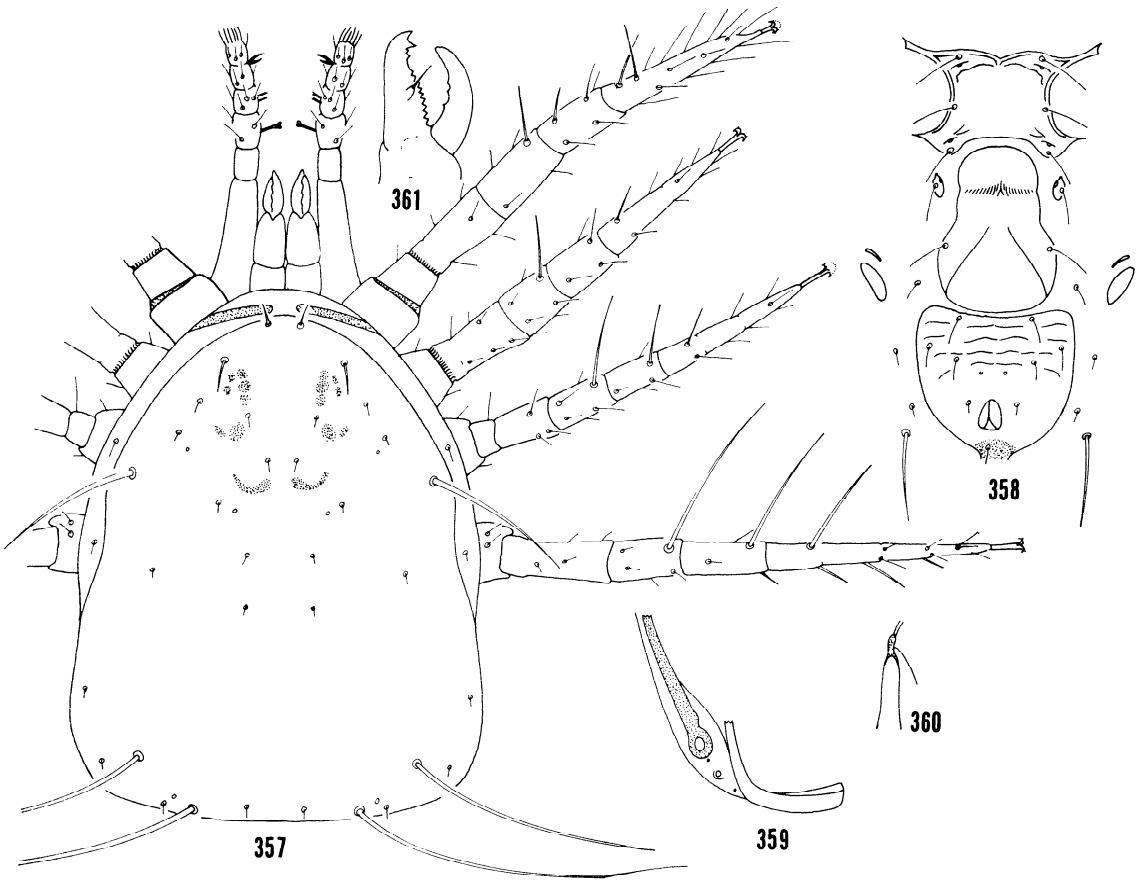
MALE — Unknown.

DISCUSSION — This species is known only from U.S.S.R.: Georgia (Kobuleti Region) on *Juglans regia*, *Castanea* sp., and *Corylus* sp. Nothing is known about its food habits.

Amblyseius euanalis Karg
Fig. 357-361

Amblyseius euanalis Karg, 1983: 310.

TYPE — Female holotype, Venezuela: 1973, J. Balogh, in Institute for Plant Protection Research,



Figs. 357-361. *Amblyseius euanalis* Karg: 357. Dorsal and leg structure of female, 358. Ventral scuta and setation of female, 359. Posterior peritremal and stigmatal development of female, 360. Spermathecal structure of female, 361. Cheliceral structure of female.

Kleinmachnow, East Germany.

DIAGNOSIS — See *Amblyseius genualis* De Leon.

FEMALE — Length 471; width at L_4 267. Dorsal scutum smooth with 3-4 small pores, muscle marks anteriorly, and 17 pairs of setae. Measurements of setae: verticals 22; D_1 8, D_2 8, D_3 11, D_4 12; clunals 9; L_1 29, L_2 10, L_3 10, L_4 140, L_5 12, L_6 12, L_7 12, L_8 250; M_1 10, M_2 8, M_3 190; anterior sublaterals 17; posterior sublaterals 8. Sternal scutum with light creases anteriorly and laterally, 2 pairs of pores and 3 pairs of setae. Ventrianal scutum lightly creased with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal setae. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 13 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 162, Sti IV 126, St IV 62. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/0 - 2/1 - 1. Spermatheca with long fundibular to saccular cervix 22 and elongate differentiated atrium.

MALE — Unknown.

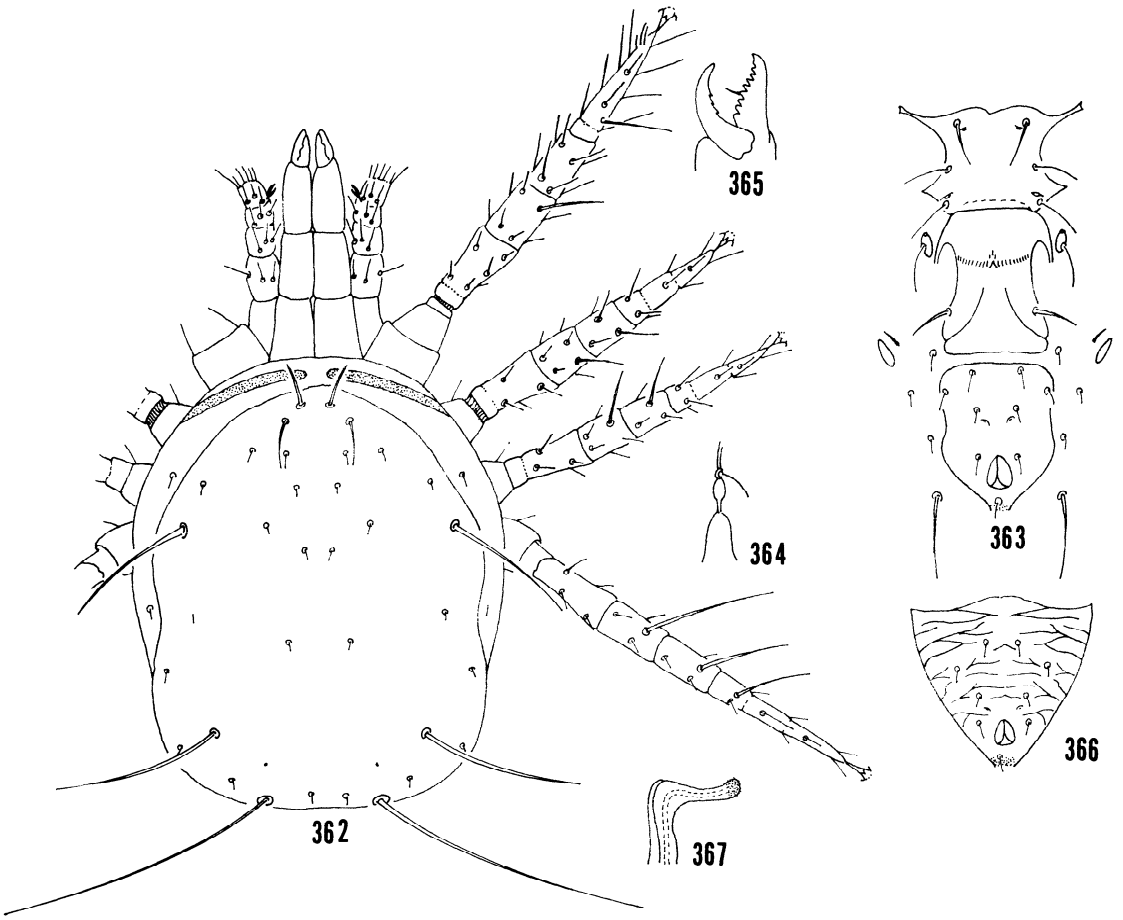
DISCUSSION — This species is known only from the type specimen. Nothing is known about its biology.

SAURUS GROUP

Two species are included in this group. They are *A. saurus* De Leon and *A. modestus* (Chant and Baker). Both species have the ectal end of a vesicular enlargement which seems to be the atrium in *modestus* and in a tubular-fundibular cervix but is part of the cervix in *saurus* and is saccular mesally; the atrium in *saurus* is nodular to c-shaped. Otherwise the two species are quite similar in general morphology except for lengths and placement of diagnostic setae.

Key to females in *saurus* group

1. L_4 approximately 100, L_8 250 or longer, M_3 125 or longer ..... *saurus* De Leon, p. 71
— L_4 approximately 50, L_8 shorter than 175, M_3 50 or longer ..... *modestus* (Chant and Baker), p. 72



Figs. 362-367. *Amblyseius saurus* De Leon: 362. Dorsal and leg structure of female, 363. Ventral scuta and setation of female, 364. Posterior peritremal and stigmatal development of female, 365. Spermathecal structure of female, 366. Cheliceral structure of female, 367. Ventrianal scutum of male, 367. Spermatodactyl structure of male.

Amblyseius saurus De Leon
Fig. 362-367

Amblyseius (A.) saurus De Leon, 1962: 19; Zack, 1969: 77; Wainstein, 1979: 141.

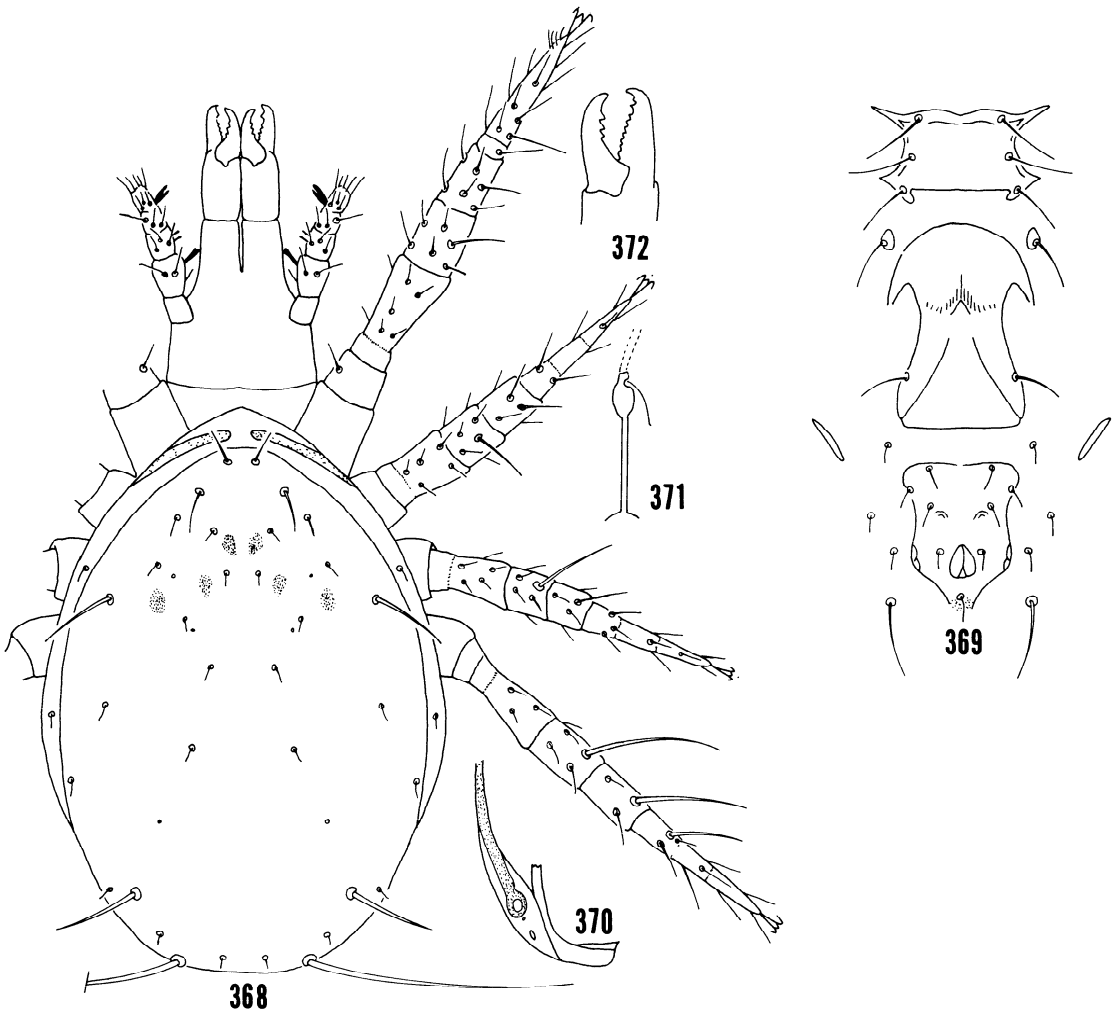
TYPE — Female holotype, U.S.A.: Tenn., Erwin, 6 VIII 1960, D. De Leon, on *Polystichum acrostichoides* (Michx.) Schott (MCZ).

DIAGNOSIS — *Amblyseius saurus* is similar to *Amblyseius modestus* (Chant and Baker) but differs in having L_4 100, L_8 259, M_3 128, Sti IV 80, and St IV 71 as apposed to L_4 53, L_8 160, M_3 58, Sti IV 66, and St IV 59 in *modestus*.

FEMALE — Length 353; width at L_4 235. Dorsal scutum smooth with scattered muscle marks, 3-4 small pores and 17 pairs of setae. Measurements of setae: verticals 27; D_1 5, D_2 6, D_3 6, D_4 6; clunals 8; L_1 32, L_2 16, L_3 6, L_4 100, L_5 7, L_6 6, L_7 6, L_8 259; M_1 6, M_2 9, M_3 128; anterior sublaterals 9; posterior sublaterals 6. Sternal scutum smooth, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum reticulated, a pair of oval pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 13 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 110, Sti IV 80, St IV 71. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/0 - 2/1 - 1. Spermatheca with cervix 20 sacculer-fundibular mesally, vesicular ectally, and short and tubular medially; atrium nodular to c-shaped.

MALE — Similar to female but smaller in size, spermatodactyl with foot terminal, lateral process indistinct, and toe enlarged and turned up. Ventrianal scutum reticulated with a pair of elliptical pores and 3 pairs of preanal setae.

DISCUSSION — This species has been taken in Tennessee on *Polystichum acrosticoides* (Michx.) Schott, *Hamamelis virginiana* L., and *Leucothoe racemosa* (L.) A. Gray. It has been collected in Ohio on *Viola candensis* L., *Elymus virginicus* L., *Rhododendron maximum* L., and on *Podophyllum peltatum* L. It has been taken in Missouri on *Helianthus petiolaris* Nutt. It has also been taken in the Matitime Provinces of the U.S.S.R. on an unknown host.



Figs. 368-372. *Amblyseius modestus* (Chant and Baker): 368. Dorsal and leg structure of female, 369. Ventral scuta and setation of female, 370. Posterior peritremal and stigmatal development of female, 371. Spermathecal structure of female, 372. Cheliçeral structure of female.

Amblyseius modestus (Chant and Baker) New Combination

Fig. 368-372

Iphiseius modestus Chant and Baker, 1965: 10.

TYPE — Female holotype, Honduras: Lancetilla, 21 XII 1958, J.G. Matthysse, on "leaf" (USNMNH).

DIAGNOSIS — See *Amblyseius saurus* De Leon.

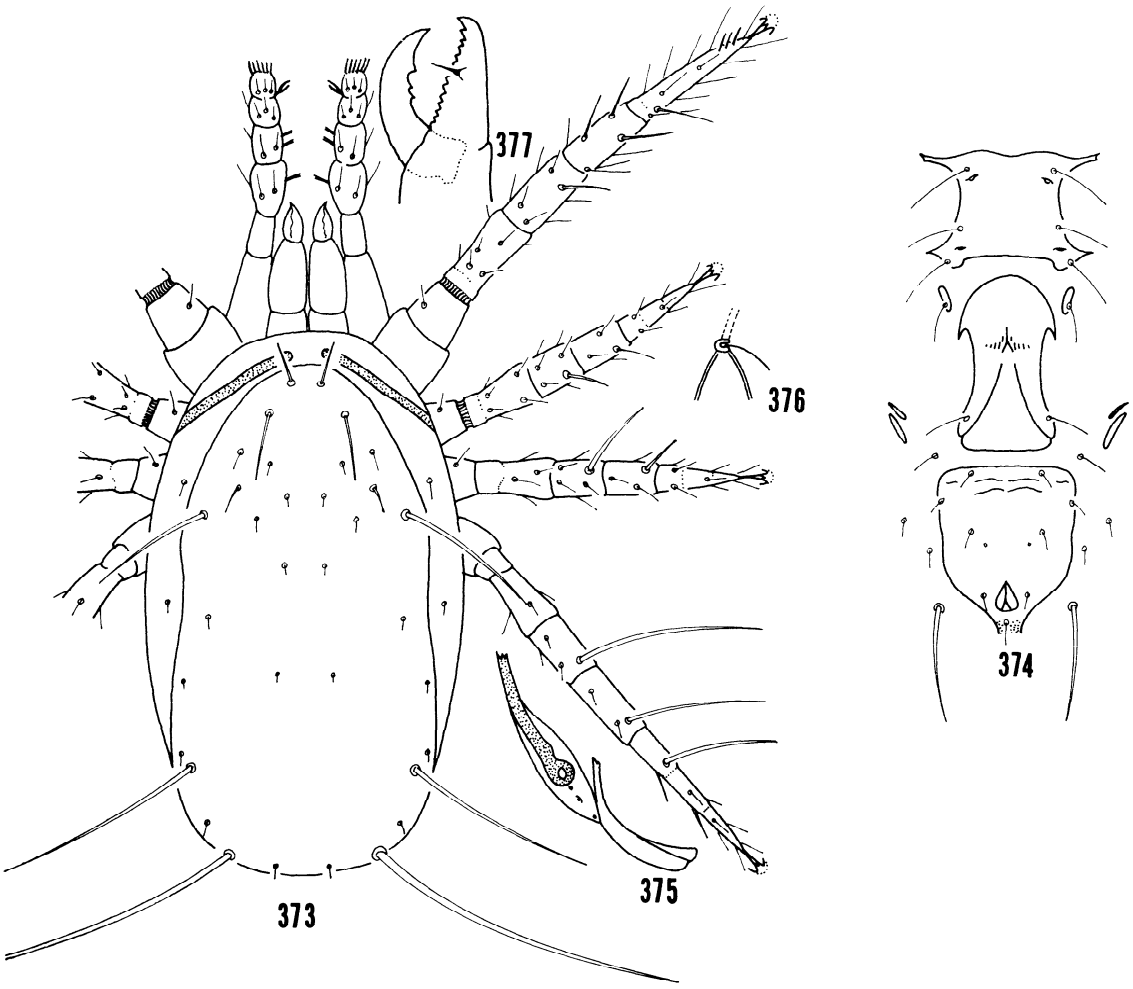
FEMALE — Length 408; width at L_4 243. Dorsal scutum smooth with 3-4 small pores, scattered muscle marks anteriorly, and 17 pairs of setae. Measurements of setae: verticals 25; D_1 8, D_2 8, D_3 10, D_4 14; clunals 6; L_1 28, L_2 12, L_3 10, L_4 53, L_5 12, L_6 10, L_7 9, L_8 160; M_1 11, M_2 13, M_3 58; anterior sublaterals 15; posterior sublaterals 11. Sternal scutum smooth with 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 98, Sti IV 66, St IV 59. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with tubular-fundibular cervix 27 and nodular to vesicular atrium.

MALE — Unknown.

DISCUSSION — Nothing is known of the biology of this species. It has been collected on "leaf" and sugarcane in Honduras.

SILVATICUS GROUP

Two species are assigned to this group. They are *A. silvaticus* (Chant) and *A. sylvestris* Denmark and Muma. Both species have short pocular cervices. The former species has a large distinct, c-shaped atrium; the latter an undifferentiated atrium.



Figs. 373-377. *Amblyseius silvaticus* (Chant): 373. Dorsal and leg structure of female, 374. Ventral scuta and setation of female, 375. Posterior peritremal and stigmatal development of female, 376. Spermathecal structure of female, 377. Cheliceral structure of female.

Key to females in *silvaticus* group

1. L_7 20 or longer, Sti IV 100 or longer, St IV 75 or longer ..... *silvaticus* Chant, p. 73
— L_2 shorter than 10, Sti IV shorter than 100, St IV shorter than 75 ..... *sylvestris* Denmark and Muma, p. 74

Amblyseius silvaticus (Chant)

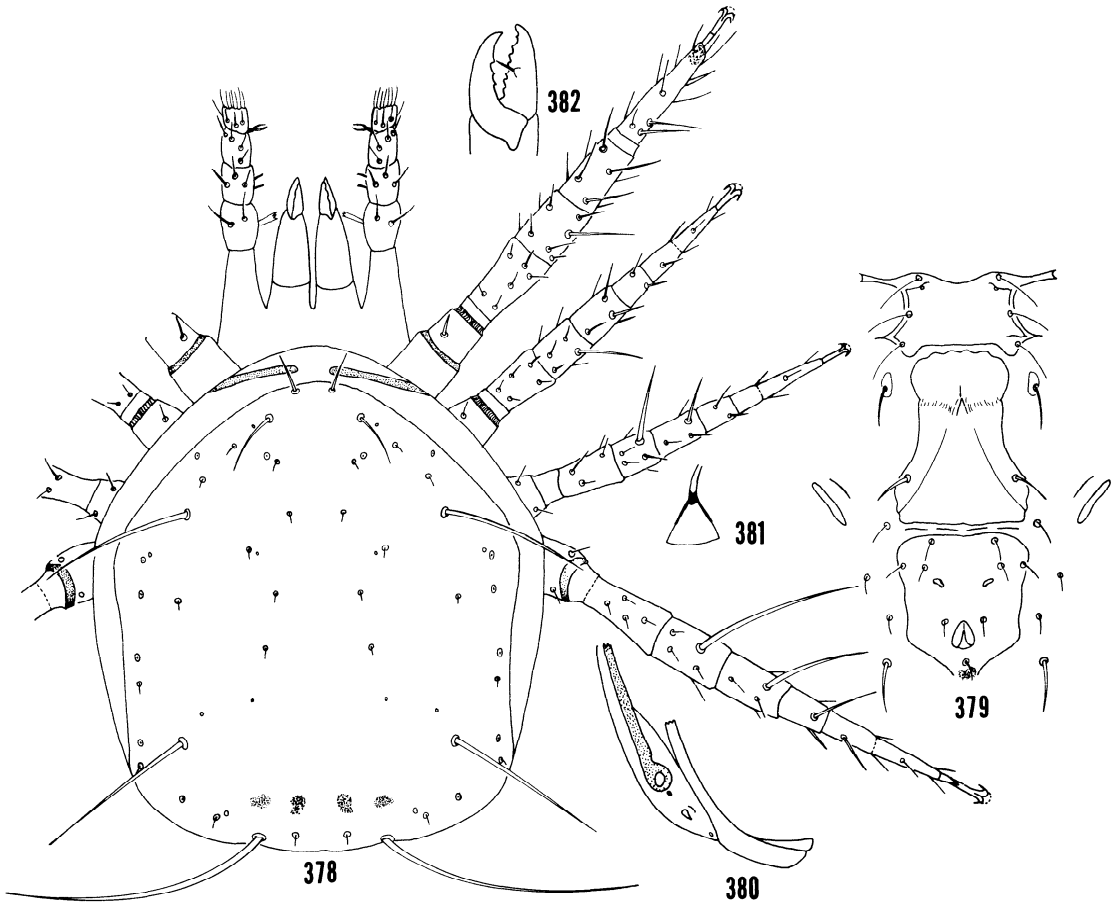
Fig. 373-377

Typhlodromus (Amblyseius) silvaticus Chant, 1959: 94.
Amblyseius patrius Karg, 1970: 295. NEW SYNONYM.

TYPE — Female holotype, Switzerland: Feldmeilen, 24 XI 1955, D.A. Chant, on bark of *Picea* sp. (CNC No. 6861).

DIAGNOSIS — *Amblyseius silvaticus* is similar to *Amblyseius sylvestris* Denmark and Muma but differs in having L_2 22, L_3 32, Sti IV 108, St IV 79, and pores on ventrianal scutum small and round as apposed to L_2 6, L_3 6, Sti IV 81, St IV 53, and pores and ventrianal scutum large elliptical in *sylvestris*.

FEMALE — Length 367; width at L_4 223. Dorsal scutum smooth with 2-4 small pores anteriorly, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 24; D_1 4, D_2 4, D_3 4, D_4 5; clunals 5; L_1 58, L_2 22, L_3 32, L_4 117, L_5 7, L_6 10, L_7 5, L_8 243; M_1 4, M_2 5, M_3 149; anterior sublaterals 24; posterior sublaterals 8. Sternal scutum smooth with 3 pairs of setae. Ventrianal scutum with a pair of small round pores posterior to posterior pair of preanal setae, 3 pairs of preanal setae, and smooth. Three pairs of setae surround the ventrianal scutum. Peritreme extending forward beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 12-13 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 126, Sti IV 108, St IV 79. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with pocular cervix 16 and c-shaped atrium.



Figs. 378-382. *Amblyseius silvestris* Denmark and Muma n. sp.: 378. Dorsal and leg structure of female, 379. Ventral scuta and setation of female, 380. Posterior peritremal and stigmatal development of female, 381. Spermathecal structure of female, 382. Cheliceral structure of female.

MALE — Unknown.

DISCUSSION — This species in known only from England and Switzerland. The 2 plant hosts are *Picea* sp. and *Malus* sp. Nothing is known about the food habits. *A. patrius* Karg was examined and found to be a junior synonym of *silvaticus*.

Amblyseius sylvestris Denmark and Muma n. sp.
Fig. 378-382

Amblyseius spiculatus Denmark & Muma (misidentified).

TYPE — Female holotype, Brazil: Campos do Gordao, Sao Paulo, 20 II 1968, C.H.W. Flechtmann, on *Malus sylvestris* (FSCA).

DIAGNOSIS — See *Amblyseius silvaticus* Chant.

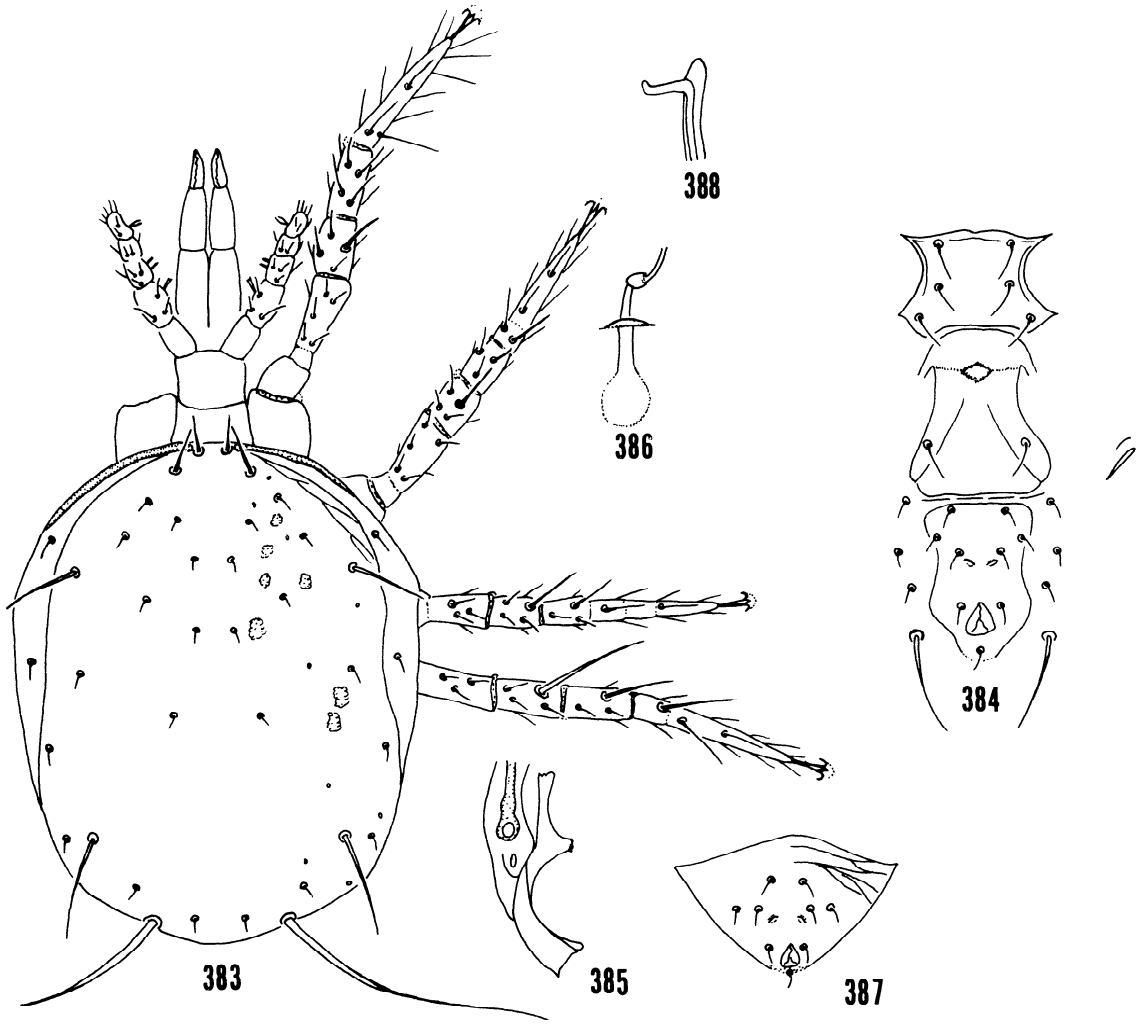
FEMALE — Length 380; width at L_4 282. Dorsal scutum smooth with 3-4 muscle marks middorsally, 13-14 small to medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 28; D_1 5, D_2 5, D_3 6, D_4 6; clunals 6; L_1 42, L_2 6, L_3 6, L_4 120, L_5 9, L_6 10, L_7 8, L_8 219; M_1 5, M_2 9, M_3 141; anterior sublaterals not visible; posterior sublaterals not visible. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of large elongate pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 126, Sti IV 81, St IV 53. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with pocular cervix 8 and undifferentiated atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type specimen. Nothing is known about the biology of this species.

UNASSIGNED SPECIES GROUP

Eight species are assigned here because of our inability to place them in any of the 16 previously cited groups. Each would necessitate the erection of a new group, which seems to us illogical. For the present they are recognized as unassigned because of their uniquely



Figs. 383-388. *Amblyseius acalyphus* Denmark and Muma: 383. Dorsal and leg structure of female, 384. Ventral scuta and setation of female, 385. Posterior peritremal and stigmatal development of female, 386. Spermathecal structure of female, 387. Cheliceral structure of female, 388. Spermatodactyl structure of male.

different spermathecae.

The unassigned species are:

A. acalyphus Denmark and Muma
A. boina Blommers
A. cucurbitae Rather
A. hainanensis Wu
A. irinae Wainstein and Aruntunjan
A. lentiginosus Denmark and Schicha
A. megaporus De Leon

Amblyseius acalyphus Denmark & Muma

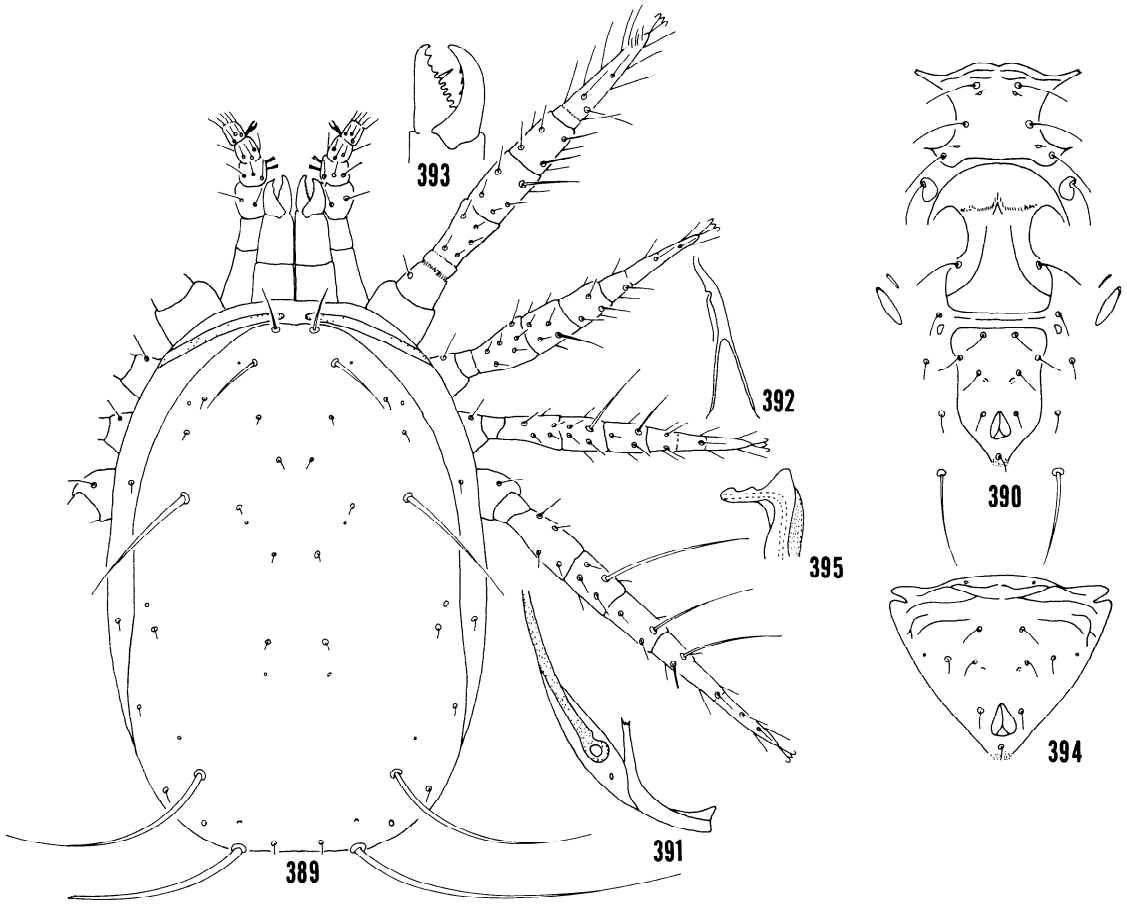
Fig. 383-388

Amblyseius acalyphus, 1973: 243.

TYPE — Female holotype, Brazil: Rio Claro, Sao Paulo, 1 IV 1970, M.S. Hebling, on *Acalypha* sp. (ESALQ).

DIAGNOSIS — *Amblyseius acalyphus* is not similar to any known species: the spermatheca may represent an artifact but is unique.

FEMALE — Length 356; width at L_4 238. Dorsal scutum smooth with scattered muscle marks, 7-8 small pores, and 17 pairs of setae. Measurements of setae: verticals 27; D_1 6, D_2 5, D_3 6, D_4 10; clunals 6; L_1 38, L_2 12, L_3 18, L_4 61, L_5 11, L_6 11, L_7 9, L_8 220; M_1 6, M_2 12, M_3 79; anterior sublaterals 13; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 86, Sti IV 58-59, St IV 54-57. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/0 - 2/1 - 2. Spermatheca



Figs. 389-395. *Amblyseius boina* Blommers: 389. Dorsal and leg structure of female, 390. Ventral scuta and setation of female, 391. Posterior peritremal and stigmatal development of female, 392. Spermathecal structure of female, 393. Cheliceral structure of female, 394. Ventrianal scutum of male, 395. Spermatodactyl structure of male.

with tubular-pocular-saccular cervix 19 and nodular atrium. A lateral process occurs about midway of cervix.

MALE — The male is similar to the female but smaller in size. The spermatodactyl has foot subterminal and toe slightly enlarged and upturned. The ventrianal scutum is lightly reticulated with elliptical pores and 3 pairs of preanal setae.

DISCUSSION — This species is known only from the type specimens. Nothing is known about the biology of this species.

Amblyseius boina Blommers
Fig. 389-395

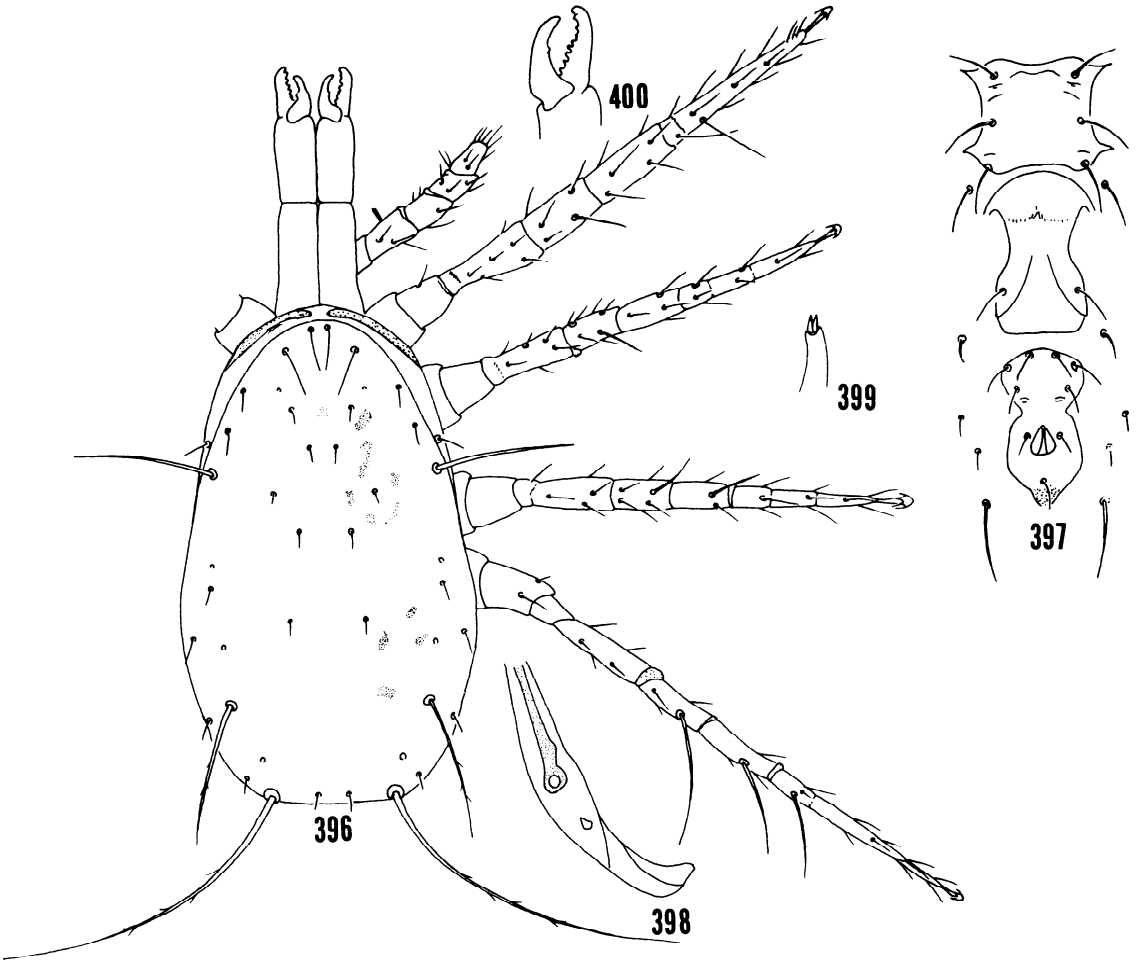
Amblyseius boina Blommers, 1976: 92.

TYPE — Female holotype, Madagascar: Majunja province, near Ambato Boeni, 24 IV 1972, L. Blommers, on *Alchornea* sp., in Institute of Taxonomic Zoology (Zoologisch Museum) of the University of Amsterdam.

DIAGNOSIS — *Amblyseius boina* is not similar to any known species: both the spermatheca and spermatodactyl are unique.

FEMALE — Length 332; width at L_4 246. Dorsal scutum smooth with 7-8 small to medium sized pores scattered over the dorsum and 17 pairs of setae. Measurements of setae: verticals 29; D_1 8, D_2 8, D_3 8, D_4 9; clunals 8; L_1 42, L_2 11, L_3 10, L_4 94, L_5 9, L_6 11, L_7 9, L_8 264; M_1 8, M_2 9, M_3 130; anterior sublaterals 13; posterior sublaterals 9. Sternal scutum smooth, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth, with a pair of elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritremes extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 110, Sti IV 89, St IV 81. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with broadly fundibular cervix 15 with an elongate differentiated atrium.

MALE — Similar to the female except smaller in size. The spermatodactyl has foot terminal, lateral process present, and toe slightly enlarged. The ventrianal scutum lightly reticulated, with a pair of elliptical pores, and 3 pairs of preanal pores.



Figs. 396-400. *Amblyseius cucurbitae* Rather: 396. Dorsal and leg structure of female, 397. Ventral scuta and setation of female, 398. Posterior peritremal and stigmatal development of female, 399. Spermathecal structure of female, 400. Cheliceral structure of female.

DISCUSSION — Nothing is known about the biology of this species. It has been collected only in Madagascar on *Alchornea* sp.

Amblyseius cucurbitae Rather

Fig. 396-400

Amblyseius cucurbitae Rather 1985: 291-293.

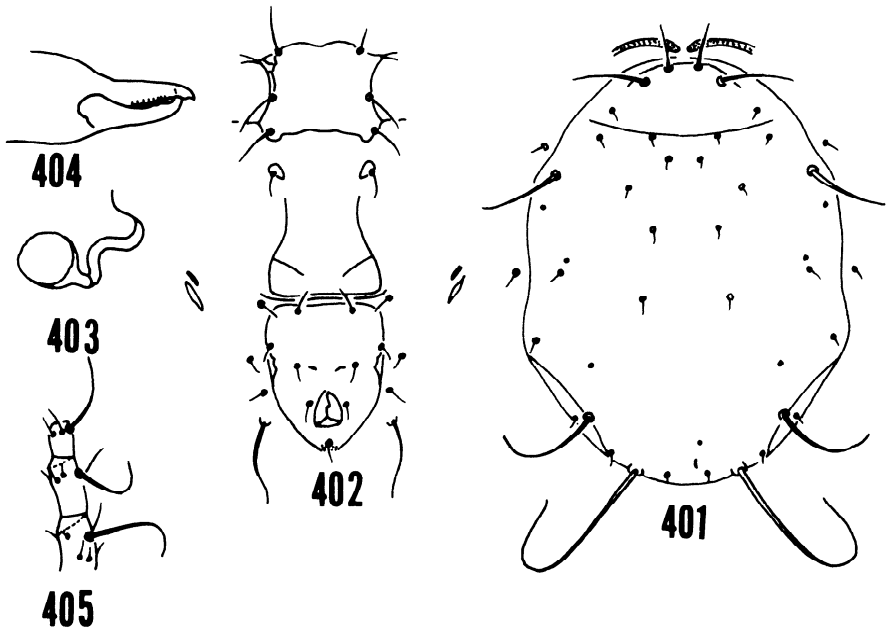
TYPE — Female holotype, India: Srinagar, 14 VIII 1977, A.Q. Rather, on *Cucurbita* sp., (FSCA).

DIAGNOSIS — *Amblyseius cucurbitae* Rather has not been placed in any species group. It has a unique spermatheca.

FEMALE — Length 365; width at L_4 97. Dorsal scutum smooth, 3-4 medium sized pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 33; D_1 9, D_2 6, D_3 9, D_4 10; clunals 9; L_1 38, L_2 13, L_3 13, L_4 97, L_5 13, L_6 13, L_7 8, L_8 235; M_1 8, M_2 11, M_3 109; anterior sublaterals 19; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 8-9 denticules, and movable finger with 1 denticule. Leg formula 4123. Macrosetae Sge IV 137, Sti IV 74, St IV 74. Genu II 1 - 2/1 - 2/0 - 1; genu III 1 - 2/0 - 2/1 - 1. Spermatheca with a slightly corniform cervix 13 and bifid atrium.

MALE — Unknown.

DISCUSSION — Nothing is known about the biology of this species. It has been collected only in India and is known only from the type collection.



Figs. 401-405. *Amblyseius hainanensis* Wu: 401. Dorsal and leg structure of female, 402. Ventral scuta and setation of female, 403. Spermathecal structure of female, 404. Cheliceral structure of female, 405. Leg IV female (after Wu).

Amblyseius hainanensis Wu

Fig. 401-405

Amblyseius (Amblyseius) hainanensis Wu, 1983: 264.

TYPE — Female holotype, China: Guangdong (Hainan), 3 X 1980, Qian Xing, on citrus, in Guangdong Entomological Institute Guanazhou, China.

DIAGNOSIS — This species is unique in having a pocular-form-like spermathecal cervix. This species is included to illustrate the original drawing. No measurements were given in the original description. The authors were unable to see this species.

Amblyseius irinae Wainstein and Aruntunjan

Fig. 406-411

Amblyseius irinae Wainstein and Aruntunjan, 1973: 55.

TYPE — Female holotype, U.S.S.R.: Armenian Soviet Republic in the Stepanavan District, 2 VII 1971, on strawberry preparation No. 643, in Zoological Institute of the Academy of Science of the Armenian S.S.R.

DIAGNOSIS — *Amblyseius irinae* is not compared with any other species. It has a unique spermatheca.

FEMALE — Length 390; width at L_4 245. Dorsal scutum smooth with 8-10 small pores, 4-5 medium sized pores, and 17 pairs of setae. Measurements of selected setae: verticals 22; L_1 58, L_4 110, L_8 250; M_3 135. All remaining setae less than 10. Sternal scutum with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending to verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 125, Sti IV 105, St IV 90. Spermatheca with an odd fundibular flared cervix and differentiated elongate atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type collection. Nothing is known about its biology. This is a translation of the original description. The authors were unable to see this specimen.

Amblyseius lentiginosus Denmark and Schicha

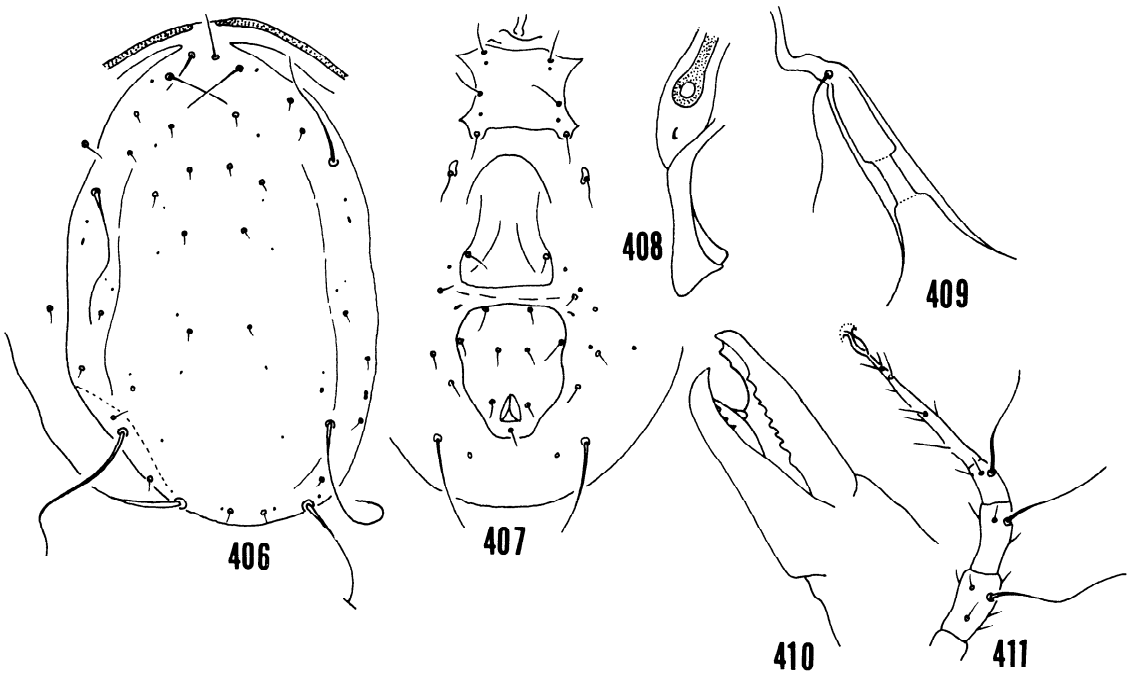
Fig. 412-418

Amblyseius lentiginosus Denmark and Schicha, 1974: 145.

TYPE — Female holotype, Australia: Bathurst, N.S.W., 28 I 1971, E. Schicha, on apple trees (BCRI).

DIAGNOSIS — *Amblyseius lentiginosus* is not similar to any known species: the spermatheca is unique.

FEMALE — Length 376; width at L_4 219. Dorsal scutum smooth with scattered muscle marks, 8 to 10 small pores, and 17 pairs of setae. Measurements of setae: verticals 36; D_1 3, D_2 5, D_3 6, D_4 6; clunals 6; L_1 57, L_2 5, L_3 5, L_4 97, L_5 7, L_6 7, L_7 6, L_8 227; M_1 5, M_2 6, M_3 125; anterior sublaterals 17; posterior sublaterals 10.



Figs. 406-411. *Amblyseius irinae* Wainstein and Aruntunjan: 406. Dorsal and leg structure of female, 407. Ventral scuta and setation of female, 408. Posterior peritremal and stigmatal development of female, 409. Spermathecal structure of female, 410. Cheliceral structure of female, 411. Leg IV of female (after Wainstein and Aruntunjan).

Sternal scutum smooth with 2 small pores and 3 pairs of setae. Ventrianal scutum with a pair of elliptical pores, lightly creased, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 8 denticules, and movable finger with 3 denticules. Leg formula 1432. Macrosetae Sge IV 118, Sti IV 94, St IV 78. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with a tubular-nodular-pocular cervix 19 and undifferentiated atrium.

MALE — Similar to female but smaller. Spermatodactyl with foot terminal, enlarged toe, lateral process indistinct. Ventrianal scutum lightly creased, elliptical pair of pores, 3 small round pores, and 3 pairs of preanal setae.

DISCUSSION — This species is known only from Australia where it is found on apple trees. Schicha (1977) described the larval and nymphal stages.

Amblyseius megaporos De Leon

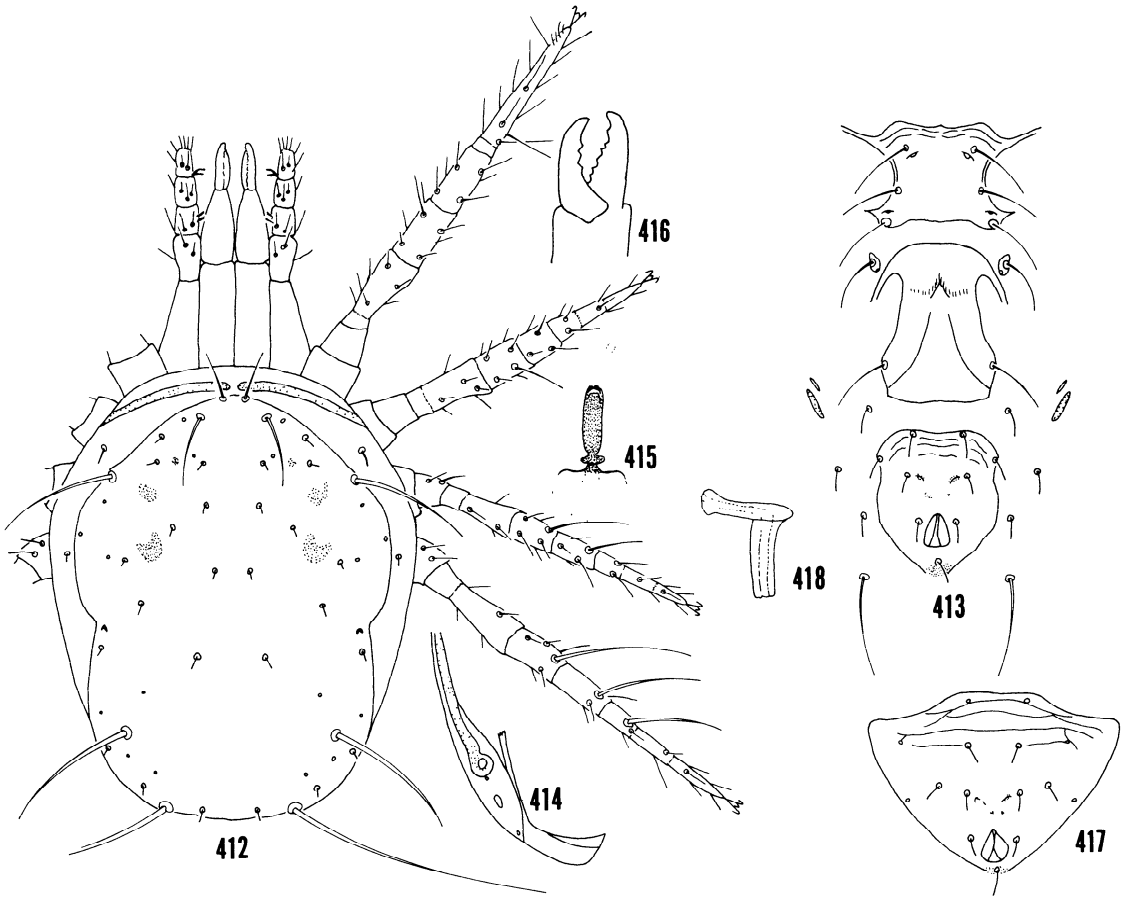
Fig. 419-422

Amblyseius megaporos De Leon, 1961: 85.

TYPE — Female holotype, Mexico: Veracruz, Veracruz, 1 I 1957, D. De Leon, on *Bumelia* sp. (MCZ).

DIAGNOSIS — *A. megaporos* belongs in *Amblyseius (Amblyseius)* but cannot be placed as the spermatheca is not visible.

FEMALE — Length 355; width at L_4 235. Dorsal scutum smooth, scattered muscle marks, scattered medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 24-26; D_1 10, D_2 10, D_3 10, D_4 10; L_1 34-35, L_2 14, L_3 11, L_4 56, L_5 13, L_6 12, L_7 11, L_8 195; clunals 8; M_1 10, M_2 11, M_3 56; anterior sublaterals 17; posterior sublaterals 12. Sternal scutum smooth with a pair of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of large elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 10 to 11 denticules, and movable finger with



Figs. 412-418. *Amblyseius lentiginosus* Denmark and Schicha: 412. Dorsal and leg structure of female, 413. Ventral scuta and setation of female, 414. Posterior peritremal and stigmatal development of female, 415. Spermathecal structure of female, 416. Cheliceral structure of female, 417. Ventrianal scutum of male, 418. Spermatodactyl structure of male.

3 denticules. Leg formula 4123. Macrosetae Sge IV 105, Sti IV 66, St IV 56. Spermatheca appears to be short fundibular with a nodular atrium but was not distinctly definable. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1.

MALE — Unknown.

DISCUSSION — *A. megaporos* is known only from Mexico. It was collected in association with *Brevipalpus* sp.

SPECIES GROUPS OF *AMBLYSEIUS (MULTISEIUS)* DENMARK AND MUMA N. SUBGEN.

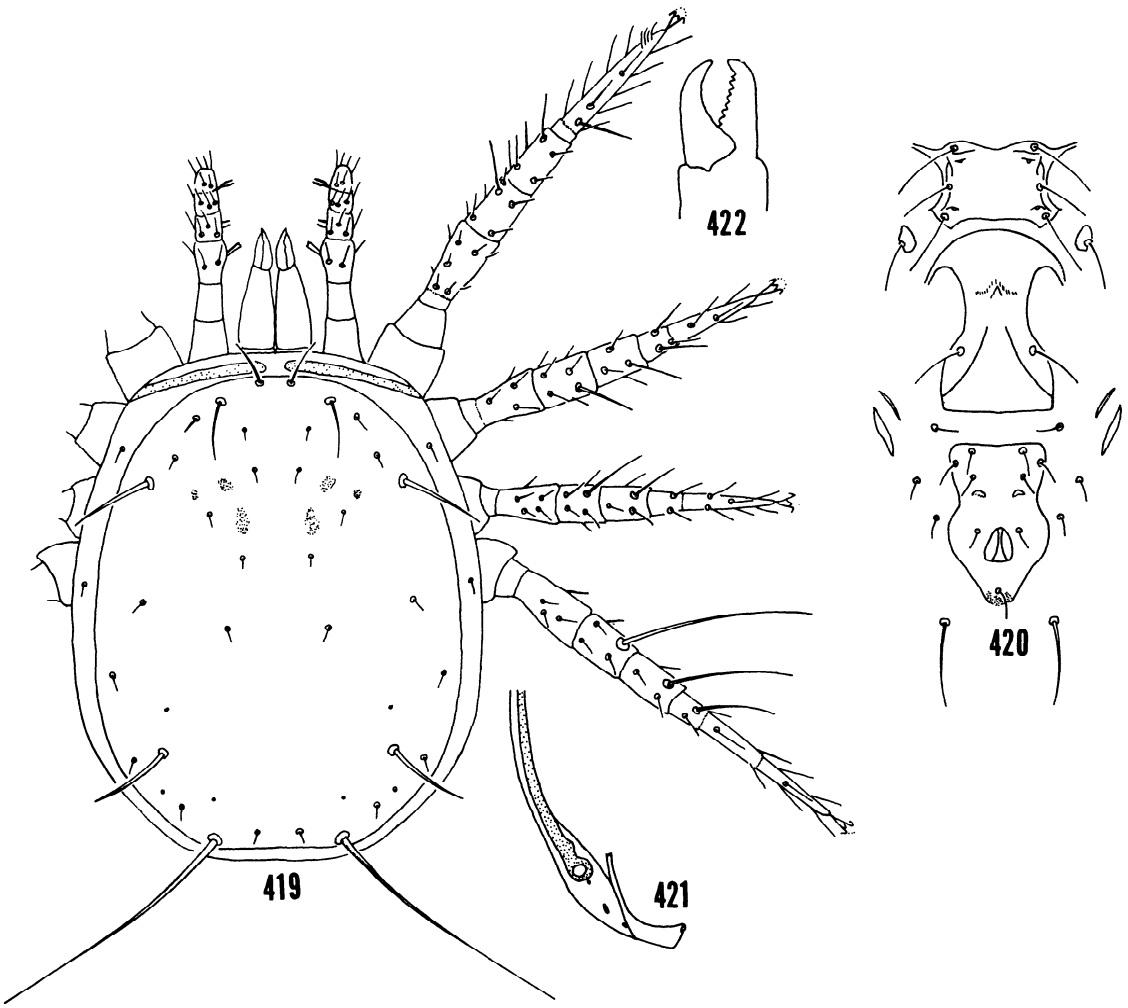
TYPE SPECIES — *Amblyseius andersoni* Chant, 1957 by present designation here.

Females of this subgenus always have Sge IV longer than Sti IV, but longer than, shorter than, or equal to St IV. Chelicerae with dentition of 8 or more on ff and 1-4 on mf. L_8 long (usually less than 200). M_3 long (usually less than 100). Species in this subgenus are found on fruit trees, shade trees, ornamental shrubs, vines, grasses, and in ground surface litter.

The following species groups are placed in the subgenus *Multiseius*:

ANDERSONI GROUP
A. andersoni Chant
A. intermedius Gonzales and Schuster
A. excelsus Chaudhri
A. potentillae (Garman)
A. meghriensis Arutunjan
A. riodocei El Banhawy
A. paucisetosus McMurtry and Moraes
A. filixis Karg.
A. charui Gupta
A. impeltatus Denmark and Muma
A. patellae Karg
A. angulatus Karg.

CHIAPENSIS GROUP
A. chiapensis De Leon
A. compositus Denmark and Muma
A. cupulus Denmark and Muma n. sp.
A. haleakalus Prasad
A. incognitus Schuster
A. colimensis Aponte and McMurtry
A. nayaritensis De Leon



419-422.*Amblyseius megaporus* De Leon: 419. Dorsal and leg structure of female, 420. Ventral scuta and setation of female, 421. Posterior peritremal and stigmatal development of female, 422. Cheliceral structure of female.

CIRCUMFLEXIS GROUP
A. circumflexis De Leon
A. begljarovi Abbasova
A. spiculatus Denmark and Muma

CINCTUS GROUP
A. cinctus Corpus and Rimando
A. mcmurtryi Muma

PERDITUS GROUP
A. perditus (Chant and Baker) New Combination
A. hurlbutti Denmark and Muma n. sp.

MONACUS GROUP
A. monacus Wainstein
A. koreaensis Denmark and Muma n. sp.

IPOMOEAE GROUP
A. ipomoeae Ghai and Menon
A. guianensis De Leon
A. morii Ehara

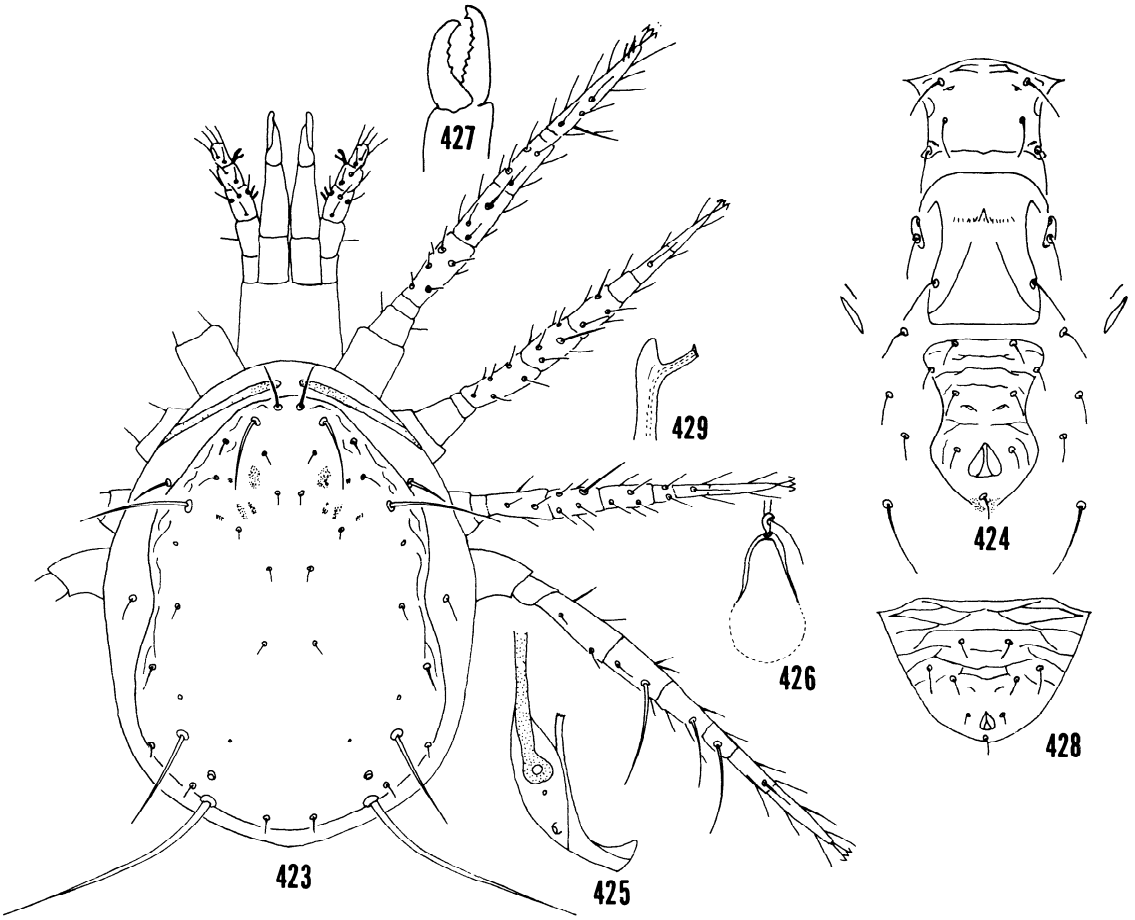
ITALICUS GROUP
A. italicus Chant
A. microorientalis Wainstein and Begljarov

BAYONICUS GROUP
*A. bayonicus*Athias-Henriot
A. salinellus Athias-Henriot
A. aricae Karg
A. franzellus Athias-Henriot
A. ovalitectus Van der Merwe
A. valpoensis Gonzalez and Schuster

FERNANDEZI GROUP
A. fernandezi Chant and Baker
A. martus De Leon

COFFEAE GROUP
A. coffeae De Leon
A. divisus De Leon

OBTUSERELLUS GROUP
A. obtuserellus Wainstein and Begljarov
A. asperocervix McMurtry

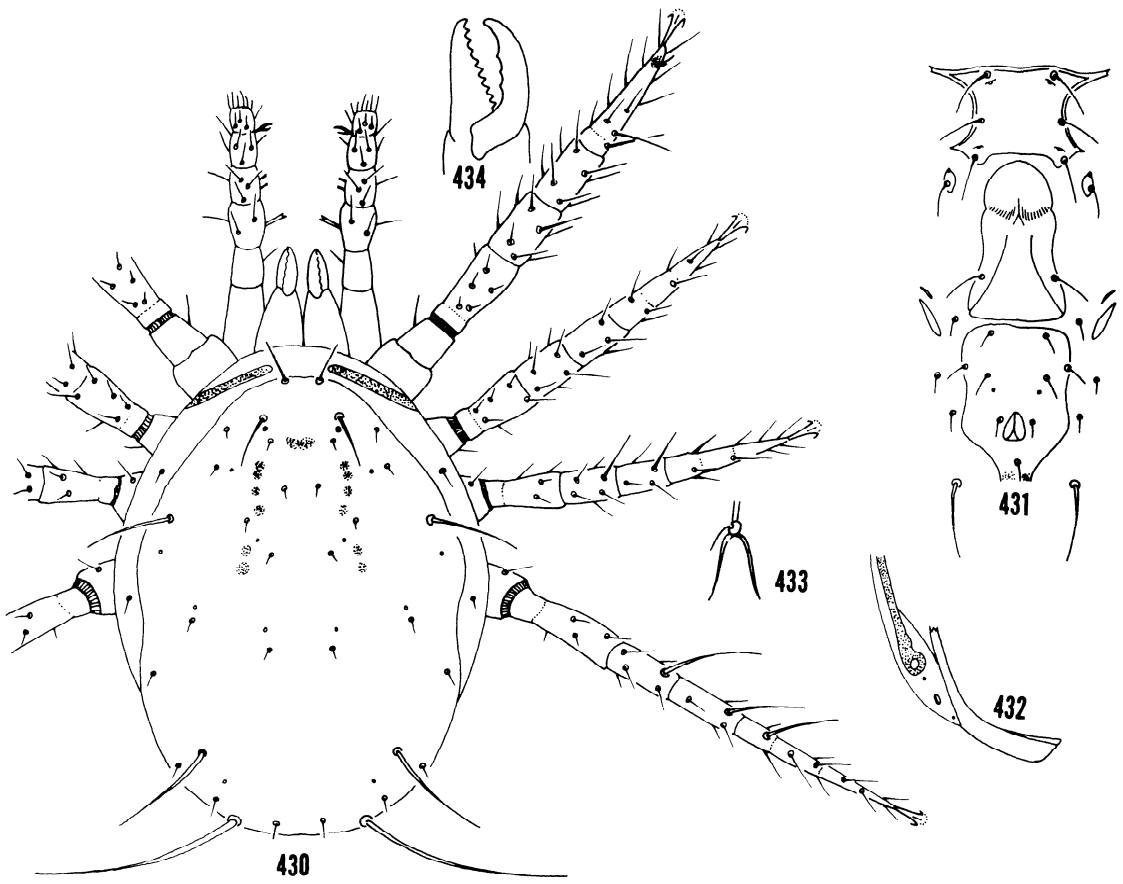


Figs. 423-429. *Amblyseius andersoni* (Chant): 423. Dorsal and leg structure of female, 424. Ventral scuta and setation of female, 425. Posterior peritremal and stigmatal development of female, 426. Spermathecal structure of female, 427. Cheliceral structure of female, 428. Ventrianal scutum of male, 429. Spermatodactyl structure of male.

UNASSIGNED SPECIES GROUP
A. segregans De Leon
A. sinuatus De Leon
A. paraaerialis Muma
A. anomalus Van der Merwe
A. deleonellus Athias-Henriot
A. reflexus Denmark and Knisley

Key to the species groups in the subgenus *Amblyseius* (*Multiseius*)

1. Cervix pocular with various modifications 2
— Cervix not pocular 3
2. Cervix pocular with slightly longer than wide with nodular atria, or as wide as or wider than long and wall cervix straight or bowed with nodular or small c-shaped atria .....*Andersoni* group, p. 83
— Cervix pocular with bifid-nodular, bifid, or large c-shaped atria; lateral walls of cervix straight rather than bowed .....*Chiapensis* group, p. 93
3. Cervix tubular with various modifications 4
— Cervix not tubular 5
4. Cervix long tubular flared with nodular atria .....*Circumflex* group, p. 100
— Cervix short tubular flared with undifferentiated atria .....*Cinctus* group, p. 103
— Cervix tubular-pocular with nodular atria .....*Perditus* group, p. 105
5. Cervix vesicular with various modifications 6
— Cervix not vesicular with various modifications .7
6. Cervix weakly vesicular with undifferentiated atria .....*Monacus* group, p. 107
— Cervix vesicular with nodular atria .....*Ipomoeae* group, p. 109
— Cervix weakly vesicular flared with undifferentiated atria .....*Italicus* group, p. 112
7. Cervix saccular with various modifications 8
— Cervix not saccular with various modifications .9
8. Cervix saccular-flared with nodular, widely bifid, or c-shaped atria .....*Bayonicus* group, p. 114
— Cervix saccular with undifferentiated atria .....*Fernandezi* group, p. 120
— Cervix saccular with rough granular cervix wall .....*Obtuserellus* group, p. 124
9. Cervix fundibular at both ends with undifferentiated atria .....*Coffeae* group, p. 122



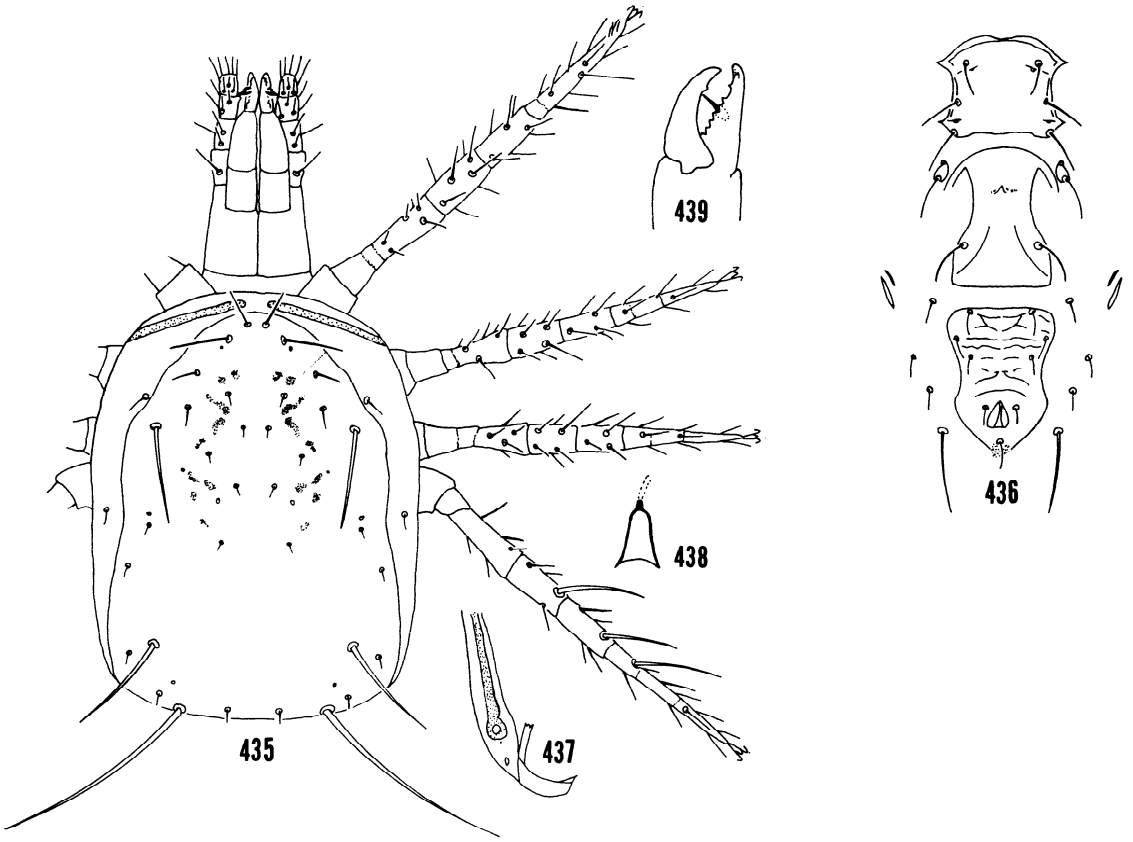
Figs. 430-434. *Amblyseius intermedius* Gonzales and Schuster: 430. Dorsal and leg structure of female, 431. Ventral scuta and setation of female, 432. Posterior peritremal and stigmatal development of female, 433. Spermathecal structure of female, 434. Cheliceral structure of female.

ANDERSONI GROUP

Twelve species are assigned to this group. They are *A. andersoni* (Chant), *A. intermedius* Gonzales and Schuster, *A. excelsus* Chaudhri, *A. potentillae* (Garman), *A. meghriensis* Arutunjan, *A. riodocei* El Banhawy, *A. paucisetosus* McMurtry and Moraes, *A. filixis* Karg, *A. charui* Gupta, *A. impeltatus* Denmark and Muma, *A. patellae* Karg, and *A. angulatus* Karg. The first 5 species have the pocular cervix slightly longer than wide with nodular atria. The other 7 species have the cervix as wide as or wider than long. Further, *riodocei, paucisetosus,* and *filixis* have the lateral walls of the cervix straight with atria nodular or c-shaped; *charui, impeltatus, patellae,* and *angulatus* have these walls bowed.

Key to females in *Andersoni* group

1. Pocular cervix slightly longer than wide 2
— Pocular cervix as wide as or wider than long...6
2. Pores on ventrianal scutum small round ....*intermedius* Gonzalez and Schuster, p. 85
— Pores on ventrianal scutum elliptical 3
3. L_4 longer than M_3 4
— L_4 as long as or shorter than M_3.....5
4. L_8 longer than 150 .....*andersoni* Chant, p. 82
— L_8 shorter than 150 ....*potentillae* (Garman), p. 86
5. L_4 shorter than M_3 .....*excelsus* Chaudhri, p. 85
—L_4 approximately as long as M_3 ....*meghriensis* Arutunjan, p. 87
6. M_2 missing..... .....*paucisetosus* McMurtry and Moraes, p. 88
— M_2 present 7
7. Pores on ventrianal scutum small round ....*fixillis* Karg, p. 89
— Pores on ventrianal scutum elliptical 8
8. L_8 approximately 3 times as long as M_3 9
— L_8 less than 3 times as long as M_3 10
9. M_3 longer than 50, L_1 approximately 30 ....*riodecei* El Banhawy, p. 88
— M_3 shorter than 50, L_1 approximately 20..... .....*impeltatus* Denmark and Muma, p. 91
10. M_3 90 or longer; Sge IV approximately 80 ....*angulatus* Karg, p. 92
— M_3 shorter than 90; Sge IV shorter than 80 ...11
11. D_1 3, D_2 3, L_5 7, L_8 85-90, and Sge IV 47 ....*chauri* Gupta, p. 90
— D_1 9, D_2 8, L_5 18, L_8 134, and Sge IV 70..... .....*patellae* Karg, p. 92



Figs. 435-439. *Amblyseius excelsus* Chaudhri: 435. Dorsal and leg structure of female, 436. Ventral scuta and setation of female, 437. Posterior peritremal and stigmatal development of female, 438. Spermathecal structure of female, 439. Cheliceral structure of female.

Amblyseius andersoni (Chant)

Fig. 423-429

Typhlodromus (Amblyseius) andersoni Chant, 1959: 296.
Amblyseius andersoni (Chant), Athias-Henriot, 1958:33; Muma, 1961: 287.

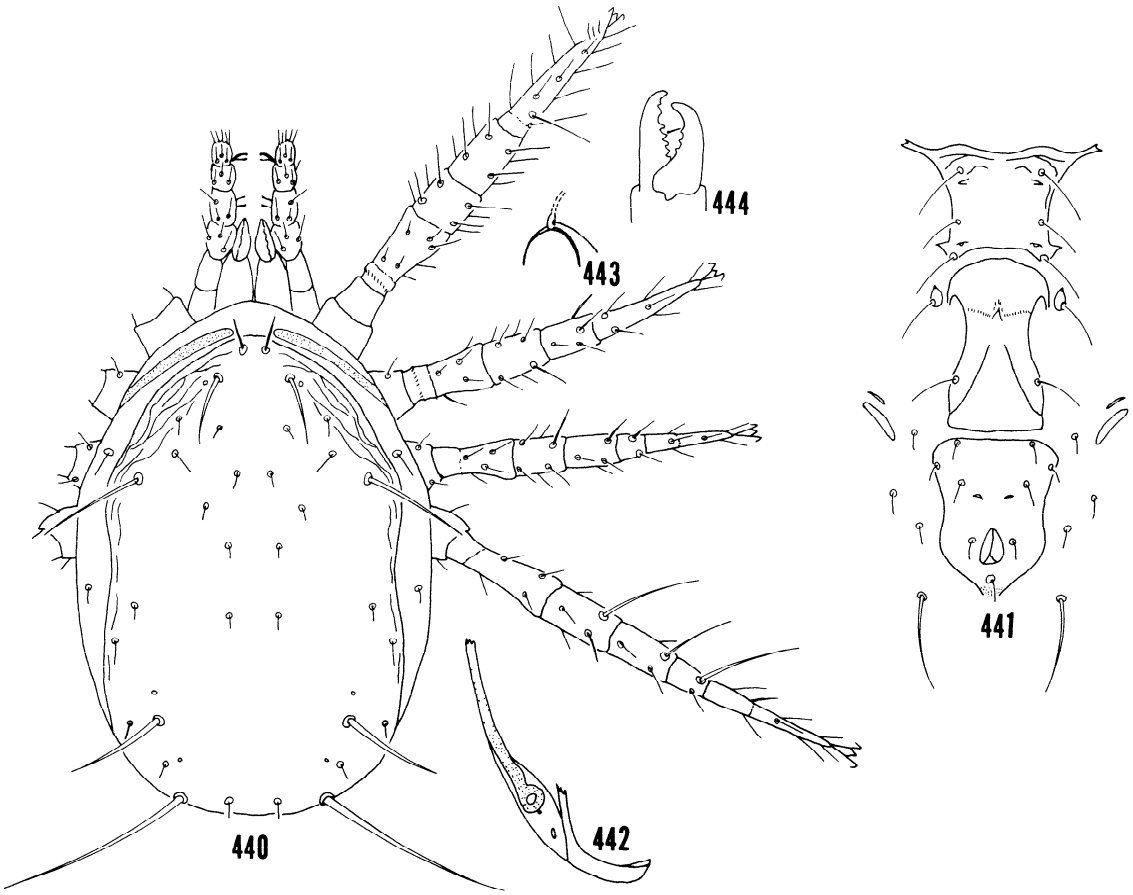
TYPE — Female holotype, Canada: British Columbia, Rosedale, 21 VII 1955, N.H. Anderson, on *Prunus* sp. (CNC).

DIAGNOSIS — *Amblyseius andersoni* is similar to *Amblyseius potentillae* (Garman), but differs in having L_4 88, L_8 197, and M_3 75, as apposed to L_4 75, L_8 134, M_3 68, in *potentillae*.

FEMALE — Length 330; width at L_4 204. Dorsal scutum smooth with 4-5 small to medium sized pores, 1 large pore near L_7, scattered muscle marks anteriorly, and 17 pairs of setae. Measurements of setae: verticals 30; D_1 6, D_2 6, D_3 7, D_4 8; clunals 8; L_1 57, L_2 11, L_3 14, L_4 88, L_5 19, L_6 11, L_7 11, L_8 197; M_1 6, M_2 7, M_3 75; anterior sublaterals 28; posterior sublaterals 17. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum lightly reticulated with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 8 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 78, Sti IV 55, St IV 71. Genu II 2 — 2-2/0 — 1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with pocular cervix 9 and nodular atrium.

MALE — The male is similar to the female but smaller in size. The spermatodactyl has foot terminal and toe slightly enlarged. The ventrianal scutum is reticulated with a pair of elliptical pores and 3 pairs of preanal setae.

DISCUSSION — This species has been collected on woody plants in British Columbia; in ground litter and limb canker on *Prunus* sp. in Ontario; on peach feeding on *Panonychus ulmi* Koch on the Niagara peninsula; on bush lima bean feeding on *Tetranychus pacificus* McGregor in Toronto; on raspberry at Prince Edward Island; on mowed herbs and *Quercus* sp. in Corsica; in *Malus* sp. and *Prunus* sp. orchards feeding on *Panonychus ulmi* Koch and *Tetranychus urticae* Koch in Poland; on *Prunus avium* and *Frageria* sp. feeding on *Eriophyes* sp. and *Tydeus* sp. in Beiralitoral and Coimbra, Portugal; on *Prunus domestica* feeding on *Tydeus* sp. in Minho, Vianado, Castelo, and Anka, Portugal; on *Vitis* sp. feeding on an eriophid mite *Calepitrimerus* sp. in Jeronimo de Real, Portugal; on *Prunus* sp., *Vitis* sp. *Malus* sp., *Acer* sp., and *Celtis* sp. at Columbus, Ohio; at Moldavian, U.S.S.R.; on *Galium mollugo* L. feeding on *Eriophyes galii* Karp in Yugoslavia. The life history of this mite was studied by Amano and Chant (1978).



Figs. 440-444. *Amblyseius potentillae* (Garman): 440. Dorsal and leg structure of female, 441 Ventral scuta and setation of female, 442. Posterior peritremal and stigmatal development of female, 443. Spermathecal structure of female, 444. Cheliceral structure of female.

Amblyseius intermedius Gonzales & Schuster

Fig. 430-434

Amblyseius intermedius Gonzales and Schuster, 1962: 14.

TYPE — Female holotype, Chile: Jardin Botanico Nacional, Vina del Mar, Valparaiso, 21 IV 1961, L. M. Smith, in soil and humus (USNMNH).

DIAGNOSIS — *Amblyseius intermedius* is similar to *Amblyseius paucisetosus* McMurtry and Moraes but differs in having verticals 33; L_1 44, L_4 75, M_3 89, Sge IV 79, Sti IV 59, St IV 68, and small round pores on the ventrianal scutum as apposed to verticals 20, L_1 33, L_4 59, M_3 52, Sge IV 50, Sti IV 50, St IV 57, and elliptical pores on the ventrianal scutum in *paucisetosus*.

FEMALE — Length 384; width at L_4 250. Dorsal scutum smooth with scattered muscle marks, 7-8 small pores, and 17 pairs of setae. Measurement of setae: verticals 31; D_1 5, D_2 5, D_3 5, D_4 6; clunals 9; L_1 44, L_2 6, L_3 7, L_4 75, L_5 12, L_6 11, L_7 10, L_8 167; M_1 5, M_2 9, M_3 89; anterior sublaterals 16; posterior sublaterals 10. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 79, Sti IV 59, St IV 68. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with pocular cervix 12 and nodular atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type collection. Nothing is known about its biology.

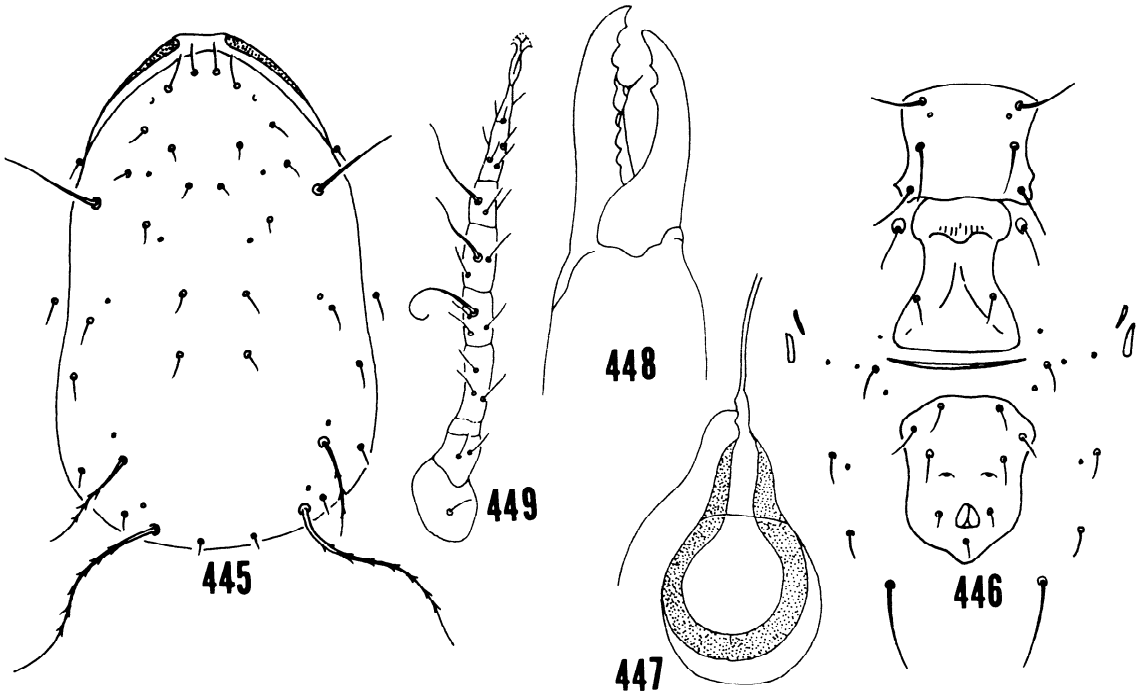
Amblyseius excelsus Chaudhri

Fig. 435-439

Amblyseius excelsus Chaudhri, 1979: 68.

TYPE — Female holotype, Pakistan: 2 miles E. Abbotabad, 19 IX 1969, W. M. Chaudhri, from *Ricinus communis,* in Department of Entomology, University of Agriculture, Faisalabad, Pakistan.

DIAGNOSIS — *Amblyseius excelsus* is similar to *Amblyseius meghriensis* Arutunjan but differs in having D_1 4, D_3 6, D_4 6, L_1 20, L_5 9, M_2 6, and M_3 90 as apposed



Figs. 445-449. *Amblyseius meghriensis* Arutunjan: 445. Dorsal and leg structure of female, 446. Ventral scuta and setation of female, 447. Spermathecal structure of female, 448. Cheliceral structure of female, 449. Leg IV setation of female (after Arutunjan).

to D_1 10, D_3 13, D_4 13, L_5 15, M_2 13, M_3 78 in *meghriensis*.

FEMALE — Length 361; width at L_4 196. Dorsal scutum smooth with 4-6 small scattered pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 28; D_1 4, D_2 4, D_3 6, D_4 6; clunals 12; L_1 50, L_2 20, L_3 19, L_4 78, L_5 9, L_6 9, L_7 8, L_8 157; M_1 4, M_2 6, M_3 90; anterior sublaterals 19; posterior sublaterals 12. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum lightly creased with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 1 denticule. Leg formula 4123. Macrosetae Sge IV 66, Sti IV 56, St IV 74. Genu II 2 — 2/1 — 2/0 — 1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with pocular cervix 11 and nodular atrium.

MALE — Unknown.

DISCUSSION — This mite also has been collected at Balakot from tree bark, Chakkar from unknown host plant, Madyan from unknown host plant, Muzaffarabad from unknown host plant, and Azad, Kashmir from *Cannabis sativa*.

Amblyseius potentillae (Garman)

Fig. 440-444

Amblyseiopsis potentillae Garman, 1958: 76.

Typhlodromus (*Amblyseius*) *potentillae* (Garman), Chant, 1959: 93; Van de Vrie, 1972: 17.

Amblyseius potentillae (Garman), Athias-Henriot, 1966: 195; McMurtry, 1976: 23; McMurtry, 1977: 27; Athias-Henriot, 1978: 695.

Typhlodromus potentillae (Garman), Dabrowski, 1970: 119; Kropczynska, 1971: 225.

Typhlodromus italicus Chant, Ivancich-Gambaro, 1975: 169 (misidentification, McMurtry, 1977).

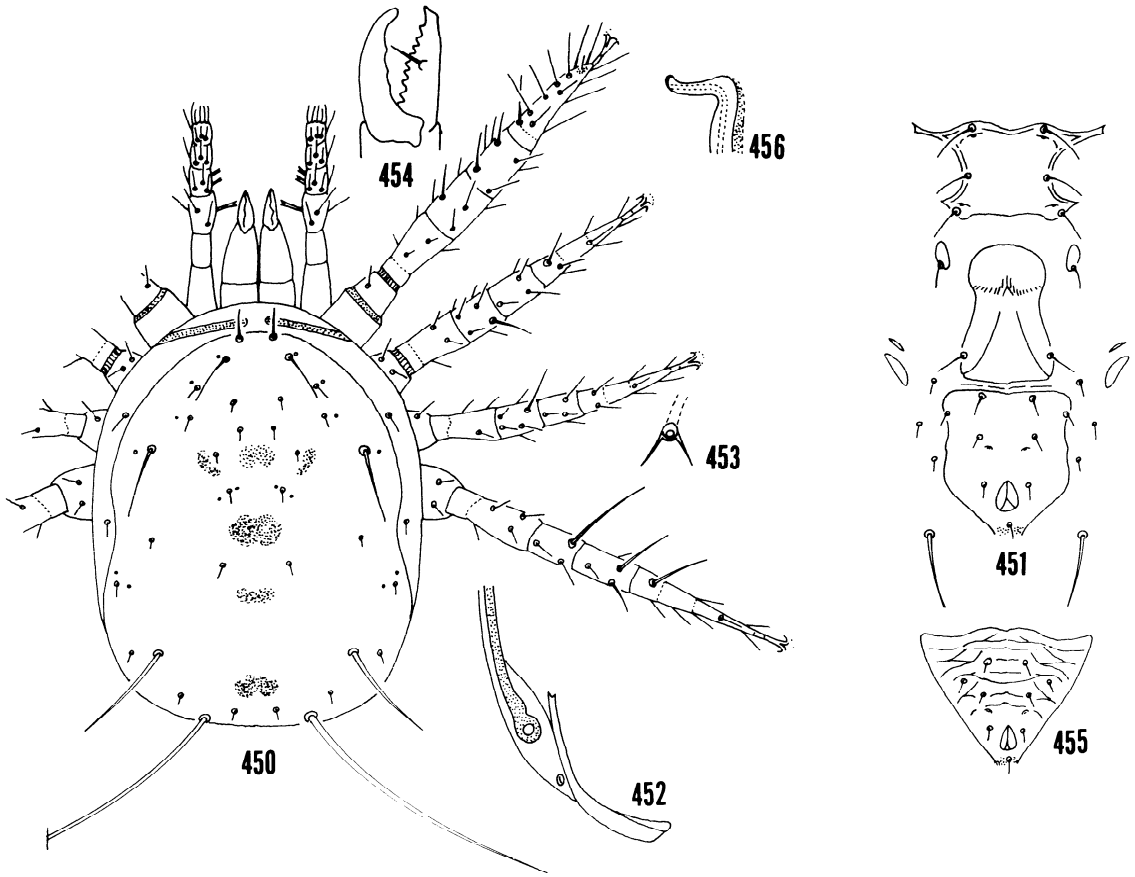
Amblyseius andersoni Chant, Athias-Henriot, 1961: 419; Schruft, 1967: 190 (misidentification, McMurtry, 1977).

Amblyseius reflexus Denmark and Knisley, 1978: 9 NEW SYNONYM.

TYPE — Female holotype, Holland: intercepted at Hoboken, N.J. 11 XII 1953, D. Kampers, on *Potentilla fruticosa* (USNMNH).

DIAGNOSIS — See *Amblyseius andersoni* Chant.

FEMALE — Length 361; width at L_4 196. Dorsal scutum with light creases on the anterior-lateral edge of scutum, otherwise smooth with 3-4 medium size pores and 17 pairs of setae. Measurements of setae: verticals 28; D_1 9, D_2 8, D_3 11, D_4 8; clunals 8; L_1 52, L_2 13, L_3 21, L_4



Figs. 450-456. *Amblyseius riodocei* El Banhawy: 450. Dorsal and leg structure of female, 451. Ventral scuta and setation of female, 452. Posterior peritremal and stigmatal development of female, 453. Spermathecal structure of female, 454. Cheliceral structure of female, 455. Ventrianal scutum of male, 456. Spermatodactyl structure of male.

75, L_5 18, L_6 10, L_7 9, L_8 134; M_1 6, M_2 11, M_3 68; anterior sublaterals 25; posterior sublaterals 14. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surrounding the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 70, Sti IV 55, St IV 75. Genu II 2 — 2-2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with pocular cervix 7 and nodular atrium.

MALE — Unknown.

DISCUSSION — This species is found primarily in Europe and the Mediterranean areas. It is an effective predator of *Panonychus ulmi* (Koch) (Van de Vrie, 1972). McMurtry (1977) did cross-breeding tests from Italian stock and specimens from Holland.

Amblyseius meghriensis Arutunjan

Fig. 445-449

Amblyseius meghriensis Arutunjan, 1968: 32; 1971: 42; 1977: 35, 75.

TYPE — Female holotype — U.S.S.R.: Armenian S.S.R., Nuvaldi, about 600 m above sea level, Meghrinsky region, 12 V 1966 on *Symphytum asperum* Lepech, in Academy of Sciences of Armenian S.S.R.

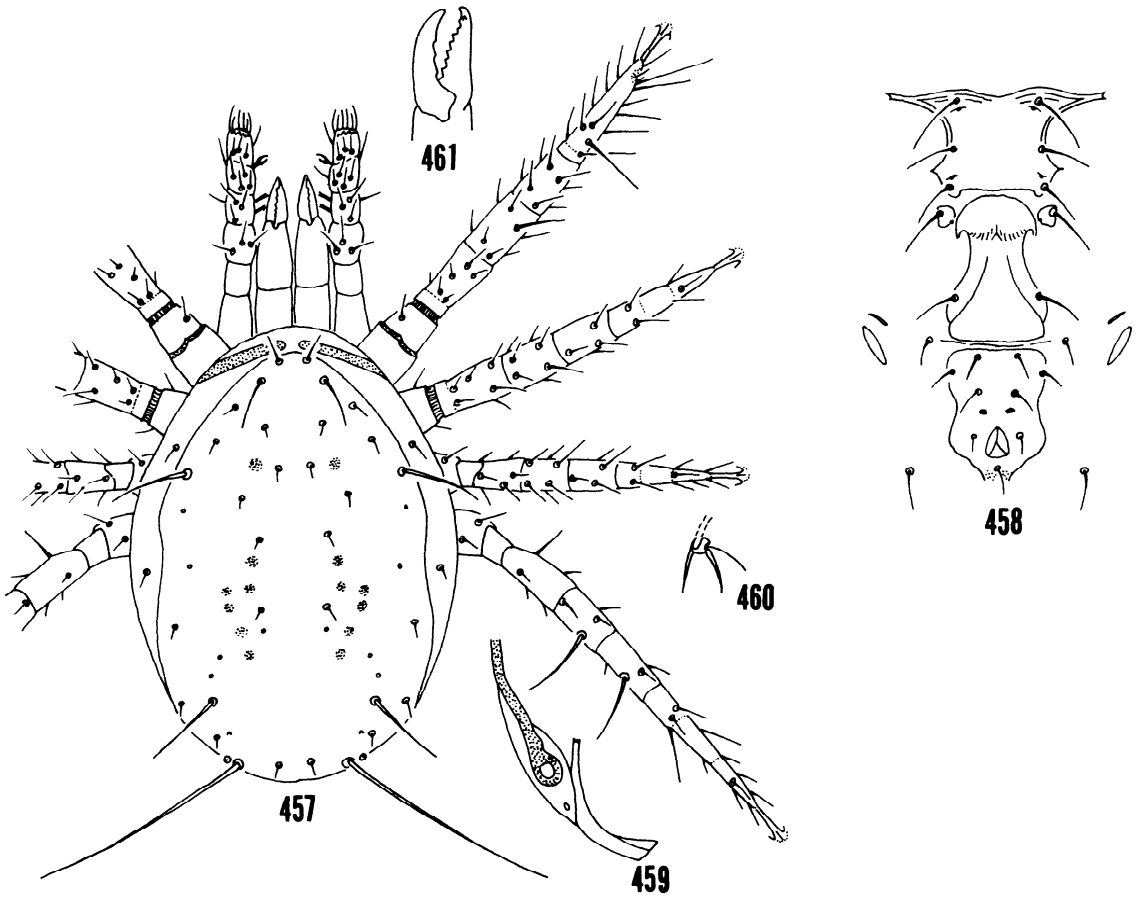
DIAGNOSIS — See *Amblyseius excelsus* Chaudhri.

FEMALE — Length 348; width at widest point 264. Dorsal scutum smooth with 6 medium sized pores and 17 pairs of setae. Measurements of setae: verticals 27.5; D_1 10, D_2 7.5, D_3 12.5, D_4 12.5; clunals 10; L_1 50, L_2 15, L_3 15, L_4 75, L_5 15, L_6 10, L_7 7.5, L_8 150; M_1 7.5, M_2 12.5, M_3 77.5. Sternal scutum smooth, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth, a pair of elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventiranal scutum. Peritreme extending anteriorly to L_1. Chelicerae normal in relation to body size, fixed finger with 8 denticules, and movable finger with 2 denticules. Leg formula 4123. Macrosetae Sge IV 65, Sti IV 55, St IV 75. Spermatheca with pocular cervix and nodular atrium.

MALE — Unknown.

DISCUSSION — This species has been taken in the Meghrinsky region of Armenian S.S.R. on *Symphytum asperum* and occasionally on pomegranate leaves. Nothing is known about its biology.

The type of *Amblyseius excelsus* Chaudhri was found



Figs. 457-461. *Amblyseius paucisetosus* McMurtry and Moraes: 457. Dorsal and leg structure of female, 458. Ventral scuta and setation of female, 459. Posterior peritremal and stigmatal development of female, 460. Spermathecal structure of female, 461. Cheliceral structure of female.

to be very close to *meghriensis*. Until a series of both species can be examined it is left as a valid species. Drawing from Arutunjan (1968).

Amblyseius riodocei El Banhawy

Fig. 450-456

Amblyseius riodocei El Banhawy, 1984: 136.

TYPE — Female holotype, Brazil: Sooretama, Spirito Santo, 20 XI 1976, El Banhawy, on leaves of unknown plant (CNC).

DIAGNOSIS — See *Amblyseius paucisetosus* McMurtry and Moraes.

FEMALE — Length 299; width at L_4 198. Dorsal scutum smooth with scattered muscle marks, 8 pairs of pores, and 17 pairs of setae. Measurements of setae: verticals 22; D_1 5, D_2 5, D_3 5, D_4 5; clunals 6; L_1 33, L_2 9, L_3 9, L_4 60, L_5 11, L_6 10, L_7 11, L_8 210; M_1 5, M_2 9, M_3 75; anterior sublaterals 12; posterior sublaterals 6. Sternal scutum smooth, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 65, Sti IV 33, St IV 42. Genu II 2 — 2/0 — 1/0 - 1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with short pocular cervix 8 and round nodular atrium.

MALE — Similar to the female but smaller. Spermatodactyl with foot terminal, lateral process not evident, and toe slightly enlarged. Ventrianal scutum reticulated with a pair of elliptical pores and 3 pairs of preanal setae.

DISCUSSION — This species is known only from the type collection. Nothing is known about its biology.

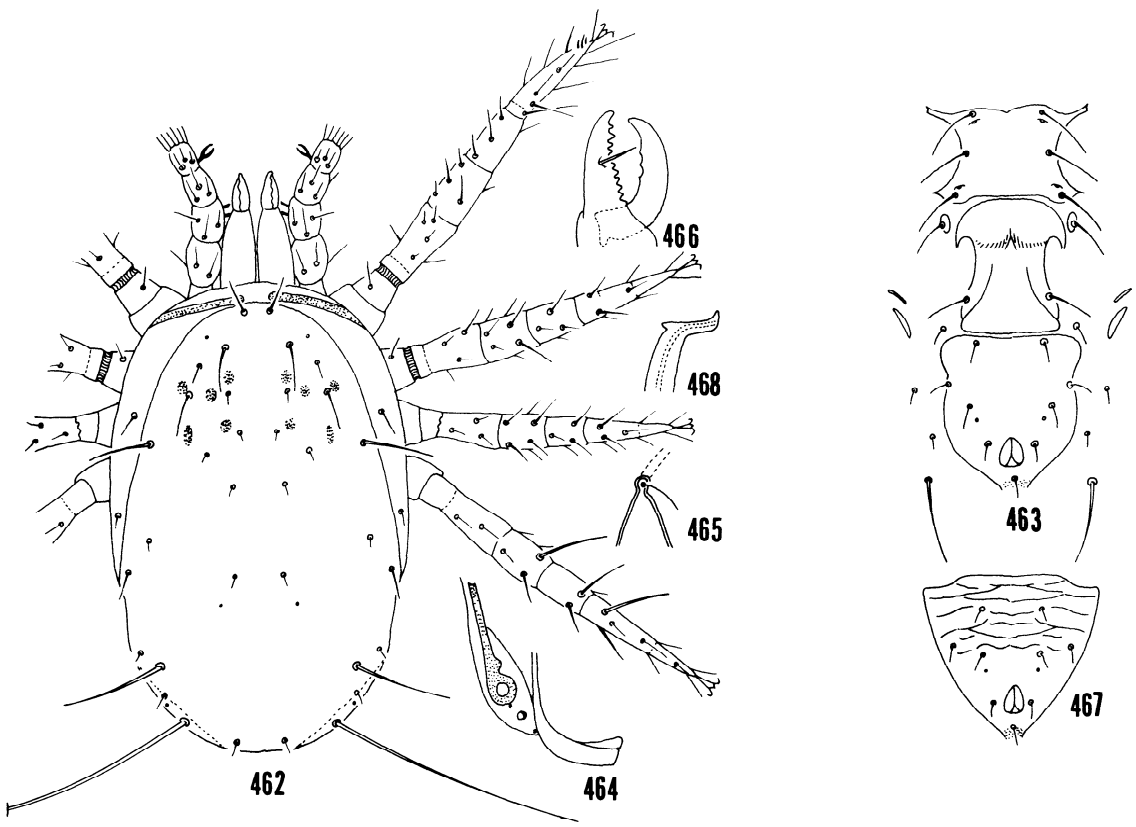
Amblyseius paucisetosus McMurtry and Moraes

Fig. 457-461

Amblyseius paucisetosus McMurtry and Moraes, 1985: 83.

TYPE — Female holotype, New Guinea: Wau, Papau, 26 V 1979, J.A. McMurtry, on *Crytocarya* sp., in University of California, Riverside.

DIAGNOSIS — *Amblyseius paucisetosus* is similar



Figs. 462-468. *Amblyseius filixis* Karg: 462. Dorsal and leg structure of female, 463. Ventral scuta and setation of female, 464. Posterior peritremal and stigmatal development of female, 465. Spermathecal structure of female, 466. Cheliceral structure of female, 467. Ventrianal scutum of male, 468. Spermatodactyl structure of male.

to *Amblyseius riodocei* El Banhawy but differs in having M_2 missing and only 1 seta on either side of the ventrianal scutum as apposed to having M_2 and 3 pairs of setae surround the ventrianal scutum in *riodocei*.

FEMALE — Length 307; width at L_4 189. Dorsal scutum smooth with 6-7 small pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 20; L_1 33, L_2 6, L_3 6, L_4 59, L_5 9, L_6 8, L_7 9, L_8 146; M_1 5, M_2 (missing), M_3 52; anterior sublaterals 11; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Only 1 pair of setae located on each side of the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 12 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 52, Sti IV 50, St IV 57. Genu II 2 — 2 — 2/0 — 1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with pocular cervix 8 and nodular atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the holotype. Nothing is known about the biology of this species.

Amblyseius filixis Karg

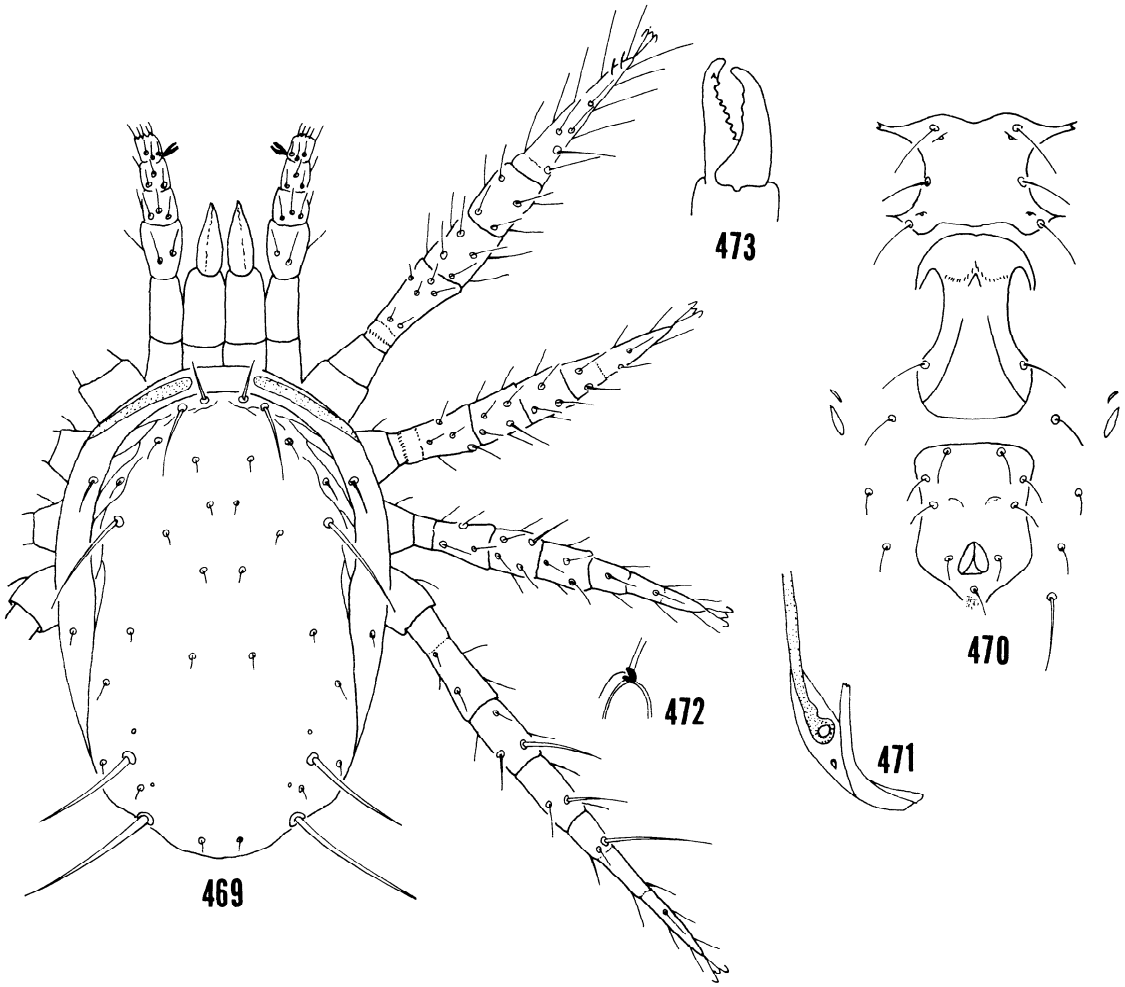
Fig. 462-468

Amblyseius filixis Karg, 1970: 296.

TYPE — Female holotype, East Germany: Elsterhand near Rottis (Vogtland), Karl Mary Stadt, 1970, on fern, in Institute for Plant Protection, Kleinmachnow, East Germany.

DIAGNOSIS — *Amblyseius filixis* Karg is similar to *Amblyseius intermedius* Gonzalez & Schuster but differs in having L_3 28, L_4 44, M_3 65, Sge IV 53, Sti IV 40, St IV 50 as apposed to L_3 6, L_4 72, M_3 90, Sge IV 77, Sti IV 62, and St IV 70 in *intermedius*.

FEMALE — Length 357; width at L_4 190. Dorsal scutum smooth with scattered muscle marks anteriorly, 3 to 4 small to medium sized pores, and 17 pairs of setae. Measurement of setae: verticals 27; D_1 8, D_2 6, D_3 6, D_4 8; clunals 12; L_1 35, L_2 12, L_3 28, L_4 44, L_5 12, L_6 6, L_7 7, L_8 164; M_1 6, M_2 6, M_3 65; anterior sublaterals 14; posterior sublaterals 9. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 53, Sti IV 40, St IV



Figs. 469-473. *Amblyseius charui* Gupta: 469. Dorsal and leg structure of female, 470. Ventral scuta and setation of female, 471. Posterior peritremal and stigmatal development of female, 472. Spermathecal structure of female, 473. Cheliceral structure of female.

50. Genu II 2 — 2-2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with pocular cervix 13 long and nodular atrium.

MALE — Unknown.

DISCUSSION — This species has been collected in East Germany on fruit trees. Nothing is known about the biology of this species.

Amblyseius charui Gupta

Fig. 469-473

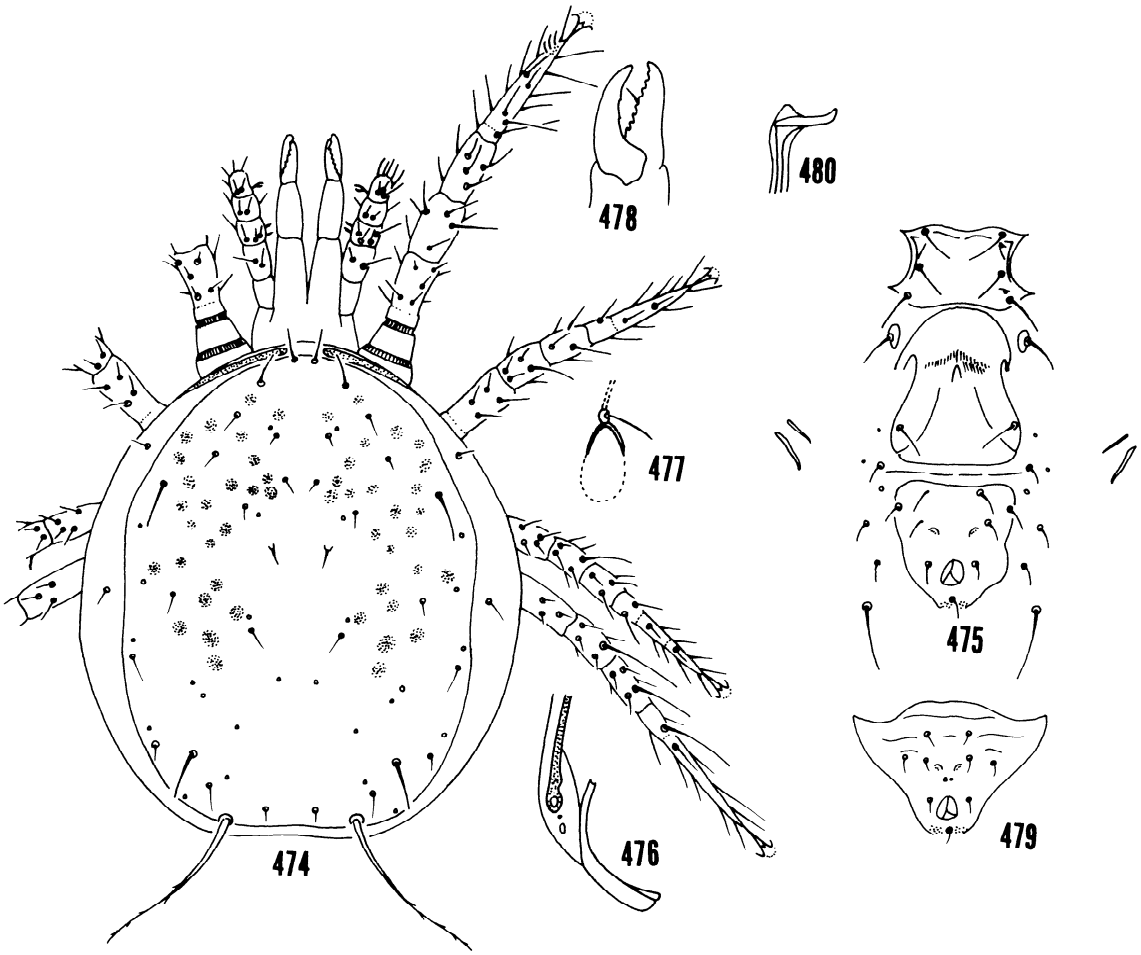
Amblyseius charui Gupta, 1969: 126.

TYPE — Female holotype, India: Calcutta, West Bengal, ? XI 1966, S. K. Gupta, on *Magnolia champa*, in National Collection of the Zoological Survey of India, Calcutta.

DIAGNOSIS — *Amblyseius charui* is similar to *Amblyseius potentillae* Garman but differs in having L_5 7, L_8 85-90, Sge IV 47, Sti IV 36, St IV 65, atrium is c-shaped as apposed to L_5 18, L_8 134, Sge IV 70, Sti IV 55, St IV 75, atrium more elongate rather than c-shaped.

FEMALE — Length 315-330; width at L_4 176. Dorsal scutum smooth with 2-3 small pores, reticulated dorsolaterally on anterior part of scutum, and 17 pairs of setae. Measurements of setae: verticals 25; D_1 3, D_2 3, D_3 7, D_4 5; clunals 4; L_1 40-45, L_2 9, L_3 20, L_4 62-72, L_5 7, L_6 5, L_7 5, L_8 85-90; M_1 6, M_2 11, M_3 68; anterior sublaterals 16; posterior sublateral 4. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 47, Sti IV 36, St IV 65. Genu II 2 — 2-2/0 — 1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with pocular cervix 8 and small c-shaped atrium.

MALE — Unknown.



Figs. 474-480. *Amblyseius impeltatus* Denmark and Muma: 474. Dorsal and leg structure of female, 475. Ventral scuta and setation of female, 476. Posterior peritremal and stigmatal development of female, 477. Spermathecal structure of female, 478. Cheliceral structure of female, 479. Ventrianal scutum of male, 480. Spermatodactyl structure of male.

DISCUSSION — This species is known from West Bengal, Calcutta, India on *Magnolia champa* and *Calophyllum inophyllum*. Dr. Gupta reported these mites feeding on phytophagous mites. Nothing is known about the biology of this mite.

Amblyseius impeltatus Denmark & Muma

Fig. 474-480

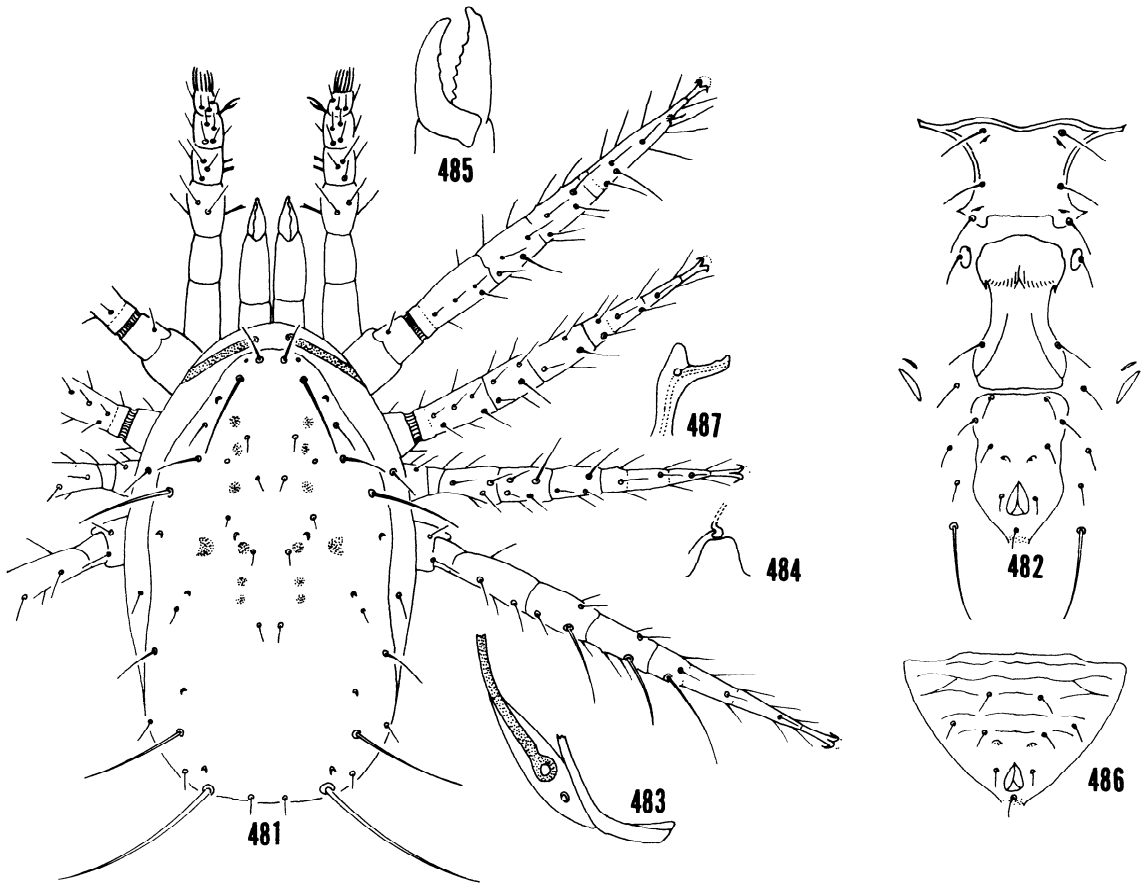
Amblyseius impeltatus Denmark and Muma, 1973: 241.

TYPE — Female holotype, Brazil: Pariguera-acu, Sao Paulo, 6 VI 1967, C. H. Flechtmann, on *Theobrama* sp. (ESALQ).

DIAGNOSIS — *Amblyseius impeltatus* is similar to *Amblyseius potentillae* (Garman) but differs in having L_1 22, L_4 35, L_8 118, M_3 33, the dorsal scutum is smooth with 10-12 small to medium sized pores and many muscle marks scattered over the anterior and middorsal areas as apposed to L_1 52, L_4 75, L_8 134, M_3 68, the dorsal scutum smooth other than creases around the anterior and lateral edges, and 3-4 small pores.

FEMALE — Length 340; width at L_4 220. Dorsal scutum smooth, 10-12 small to medium pores and many muscle marks scattered over the anterior and middorsal areas, and 17 pairs of setae. Measurements of setae: verticals 19;D_1 10, D_2 6, D_3 7, D_4 11; clunals 5; L_1 22, L_2 13, L_3 10, L_4 35, L_5 14, L_6 11, L_7 11, L_8 118; M_1 8, M_2 10, M_3 33; anterior sublaterals 11; posterior sublaterals 10. Sternal scutum smooth with creases around the anterior and lateral areas, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 2 denticules. Leg formula 1423. Macrosetae Sge IV 52, Sti IV 44, St IV 47. Genu II 1 — 2-2/0 — 1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with pocular cervix 6 and nodular atrium.

MALE — Similar to female but smaller in size. The ventrianal scutum lightly creased with a pair of elliptical



Figs. 481-487. *Amblyseius patellae* Karg: 481. Dorsal and leg structure of female, 482. Ventral scuta and setation of female, 483. Posterior peritremal and stigmatal development of female, 484. Spermathecal structure of female, 485. Cheliceral structure of female, 486. Ventrianal scutum of male, 487. Spermatodactyl structure of male.

pores and 3 pairs of preanal setae. The spermatodactyl with foot terminal and toe slightly upturned.

DISCUSSION — This species is known only from the type specimen. Nothing is known about the biology of this species.

Amblyseius patellae Karg

Fig. 481-487

Amblyseius patellae Karg, 1982: 204.

TYPE — Female holotype, Poland: 1982, in orchard, in Institute for Plant Protection Research, Kleinmachnow, East Germany.

DIAGNOSIS — See *Amblyseius andersoni* Chant.

FEMALE — Length 330; width at L_4 267. Dorsal scutum smooth with scattered muscle marks, 7-8 small to medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 30; D_1 9, D_2 9, D_3 9, D_4 11; clunals 11; L_1 52, L_2 20, L_3 30, L_4 75, L_5 31, L_6 19, L_7 12, L_8 148; M_1 8, M_2 12, M_3 69; anterior sublaterals 25; posterior sublaterals 20. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 8 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 63, Sti IV 53, St IV 69. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 1. Spermatheca with pocular cervix 8 and c-shaped atrium.

MALE — Similar to the female but smaller. Spermatodactyl with foot terminal, toe upturned, and lateral process indistinct. Ventrianal scutum lightly creased with a pair of elliptical pores and 3 pairs of preanal setae.

DISCUSSION — This species is known only from East Germany. Nothing is known about its biology.

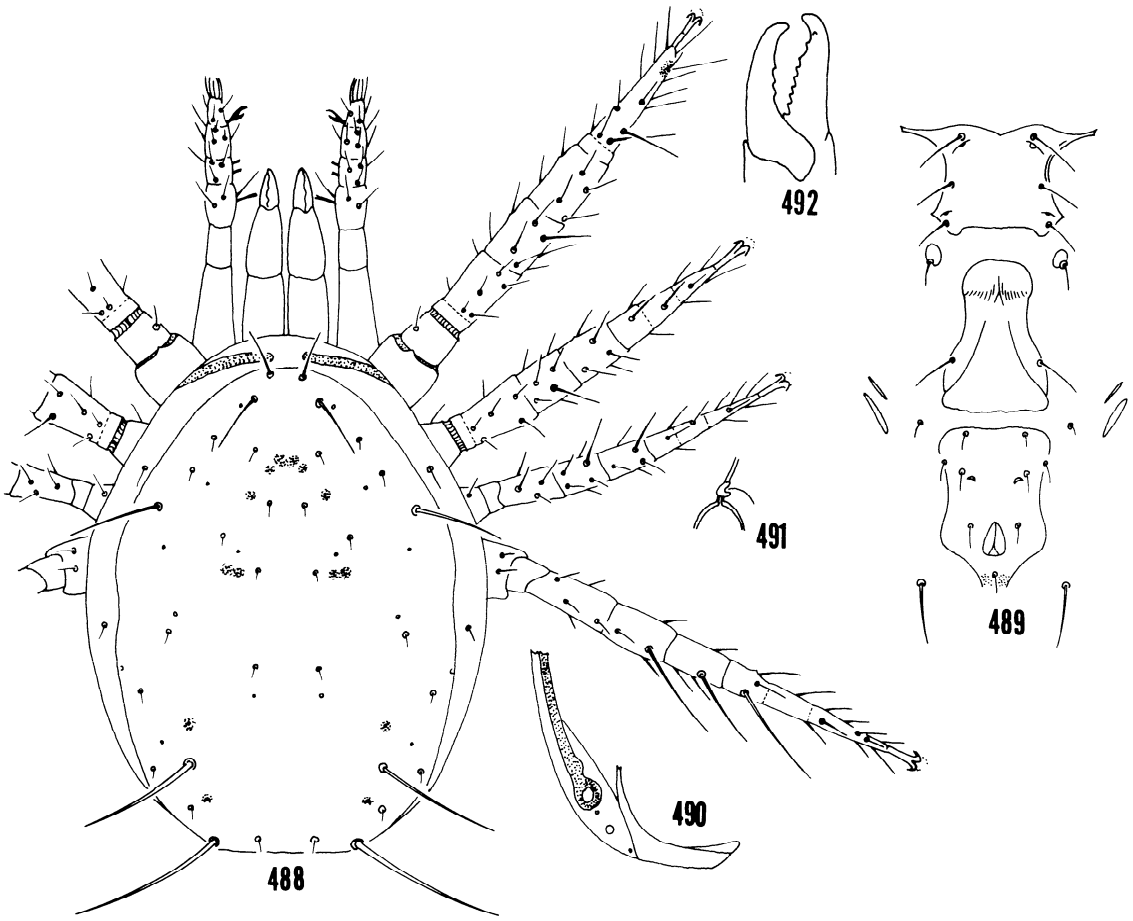
Amblyseius angulatus Karg

Fig. 488-492

Amblyseius angulatus Karg, 1982: 204.

TYPE — Female holotype, Switzerland: 4 III 1974, in orchard, in Institute for Plant Protection Research, Kleinmachnow, East Germany.

DIAGNOSIS — See *Amblyseius andersoni* Chant.



Figs. 488-492. *Amblyseius angulatus* Karg: 488. Dorsal and leg structure of female, 489. Ventral scuta and setation of female, 490. Posterior peritremal and stigmatal development of female, 491. Spermathecal structure of female, 492. Cheliceral structure of female.

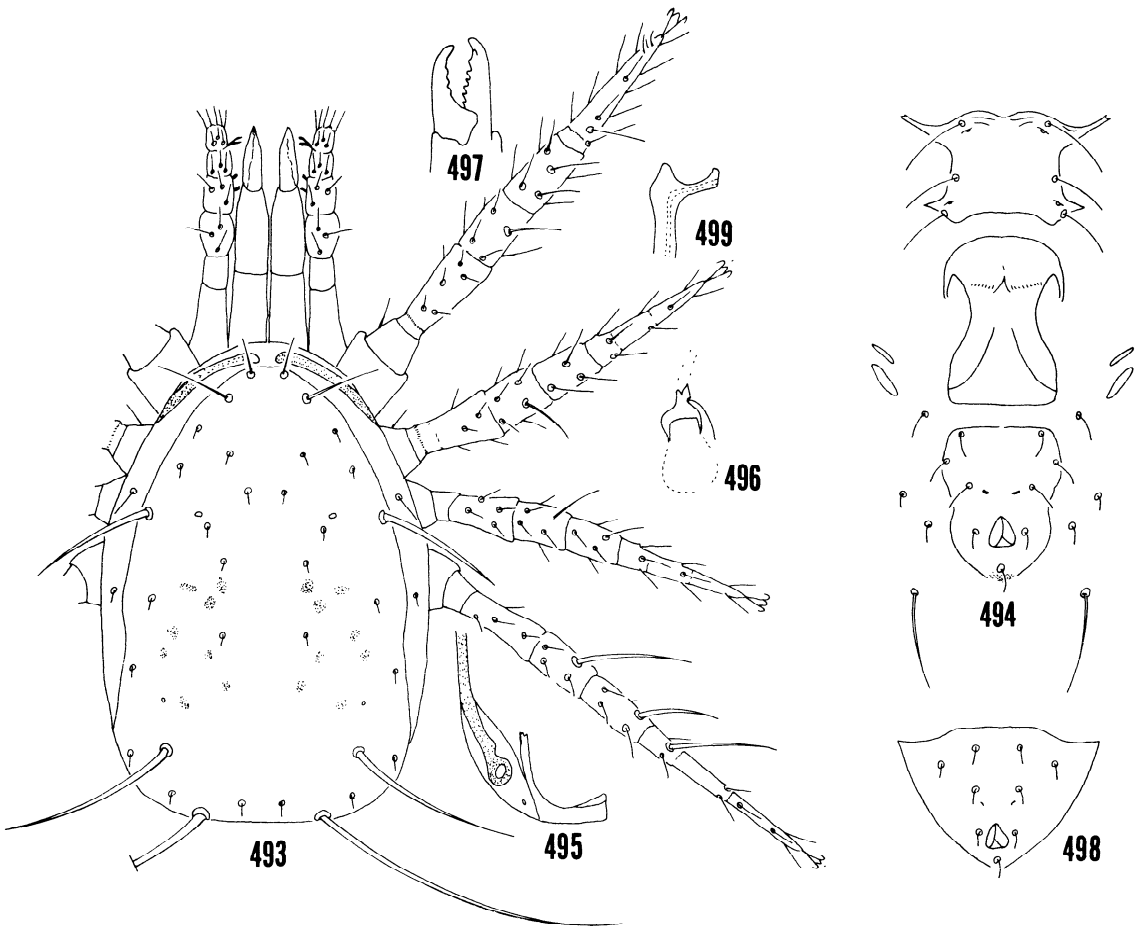
FEMALE — Length 369; width at L_4 220. Dorsal scutum smooth with several muscle marks dorsocentrally, 9 small to medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 27; D_1 5, D_2 5, D_3 5, D_4 6; clunals 7; L_1 39, L_2 10, L_3 9, L_4 68, L_5 11, L_6 8, L_7 5, L_8 113; M_1 5, M_2 7, M_3 95; anterior sublaterals 18; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Only 1 pair of setae was visible at the anterior position of the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 80, Sti IV 52, St IV 74. Genu II 2 — 2-2/1 — 1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with pocular cervix 8 and c-shaped atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type collection. Nothing is known about the biology of this species.

CHIAPENSIS GROUP

Seven species are assigned to this group. All have pocular cervices and bifid-nodular, bifid, or large c-shaped atria. They are *A. chiapensis* De Leon, *A. compositus* Denmark and Muma, *A. cupulus* Denmark and Muma, *A. haleakalus* Prasad, *A. incognitus* Schuster, *A. colimensis* Aponte and McMurtry, and *A. nayaritensis* De Leon. The first species has bifid-nodular atrium, the next 5 have bifid atria, and the last has a c-shaped atrium. In addition, the species *haleakalus* has the lateral walls of the cervix straight, rather than bowed, and *incognitus* and *colimensis* both have a curious mesal extension of the cervix that may be part of the cervix or part of the inner spermathecal storage sack.



Figs. 493-499. *Amblyseius chiapensis* De Leon: 493. Dorsal and leg structure of female, 494. Ventral scuta and setation of female, 495. Posterior peritremal and stigmatal development of female, 496. Spermathecal structure of female, 497. Cheliceral structure of female, 498. Ventrianal scutum of male, 499. Spermatodactyl structure of male.

Key to females in *Chiapensis* group

1. Spermatheca with pocular cervix and bifid atrium 2
— Spermatheca with pocular cervix and c-shaped atrium ..... *nayaritensis* De Leon, p. 99
2. Pores on the ventrianal scutum small round ..... *incognitus* Schuster, p. 97
— Pores on the ventrianal scutum elliptical 3
3. L_8 shorter than 200, M_3 shorter than 100 4
— L_8 longer than 200, M_3 longer than 100 5
4. L_4 and M_3 approximately same length ..... *compositus* Denmark and Muma, p. 95
— L_4 shorter than M_3 ..... *colimensis* Aponte and McMurtry, p. 98
5. M_3 longer than 130, St IV 90 or longer ..... *haleakalus* Prasad, p. 97
— M_3 shorter than 130, St IV shorter than 90 6
6. Spermatheca with bifid-nodular atrium, L_2 shorter than 15 ..... *chiapensis* De Leon, p. 94
— Spermatheca with bifid atrium, L_2 longer than 15 ..... *cupulus* Denmark and Muma, p. 96

Amblyseius chiapensis De Leon

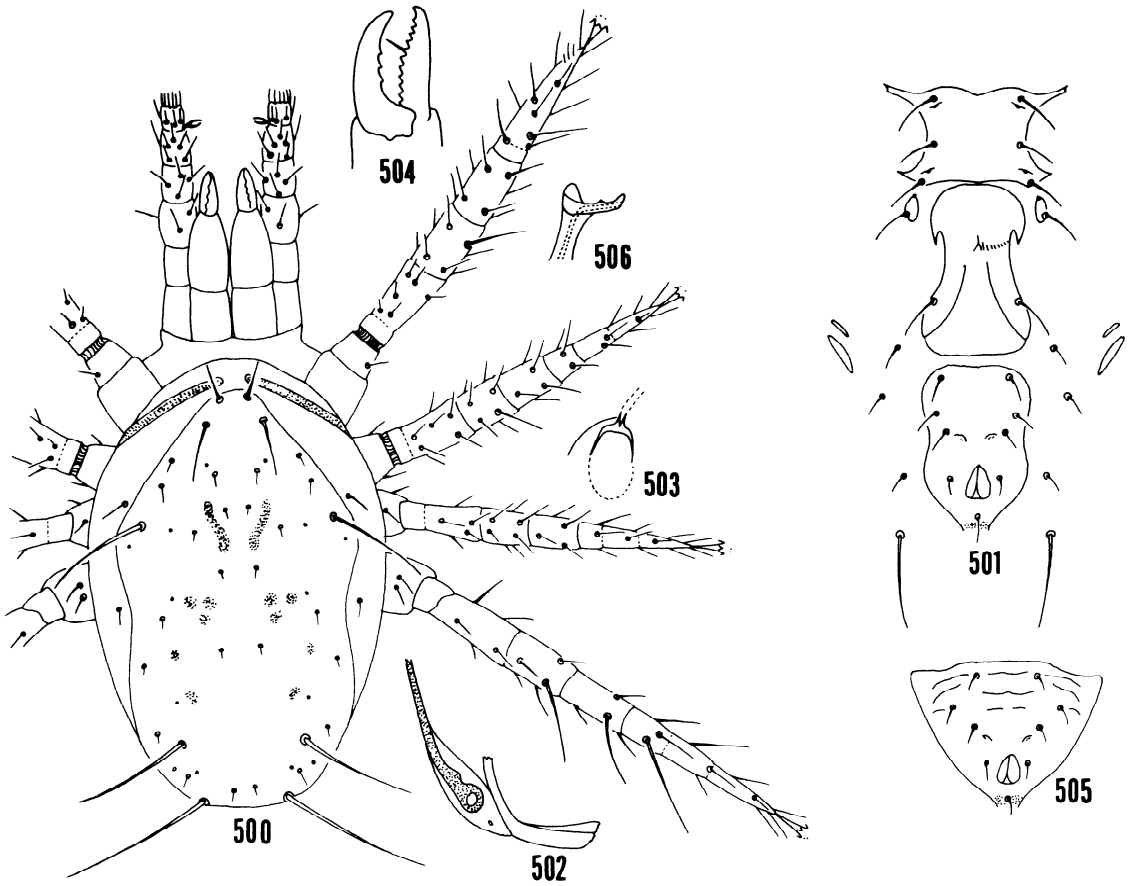
Fig. 493-499

Amblyseius chiapensis De Leon, 1961: 85; Denmark and Muma, 1973: 247; Denmark and Muma, 1975: 286; Moraes et al. 1982: 18.

Amblyseius triplaris De Leon — NEW SYNONYM.

TYPE — Female holotype, Mexico: Tuxtla Gutierrez, Chiapas, 18 I 1957, D. De Leon, on *Ceiba pentandra* (L.) Gaertn. (MCZ).

DIAGNOSIS — *Amblyseius chiapensis* is similar to *Amblyseius compositus* Denmark and Muma, *Amblyseius incognitus* Schuster, *Amblyseius haleakalus* Prasad, *Amblyseius cupulus* Denmark and Muma n. sp., and *Amblyseius colimensis* Aponte and McMurtry but differs in having a bifid-nodular atrium, L_1 54, L_4 100, L_8 219-251, and M_3 104-109 as apposed to a bifid atrium, L_1 35, L_4 83, L_8 104, and M_3 86 in *compositus*, a bifid atrium, L_1 51, L_4 105, L_8 158, and M_3 105 in *incognitus*, a bifid atrium, L_1 47, L_4 108-115, L_8 257-313, and M_3 138 in *haleakalus*, a bifid atrium, L_1 47, L_4 64, L_8 165, and M_3 85 in *colimensis*, and a bifid atrium, L_1 40, L_4 90, L_8 235, and M_3 112 in *cupulus*.



Figs. 500-506. *Amblyseius compositus* Denmark and Muma: 500. Dorsal and leg structure of female, 501. Ventral scuta and setation of female, 502. Posterior peritremal and stigmatal development of female, 503. Spermathecal structure of female, 504. Cheliceral structure of female, 505. Ventrianal scutum of male, 506. Spermatodactyl structure of male.

FEMALE — Length 329-345; width at L_4 181-220. Dorsal scutum smooth with scattered muscle marks, 3-5 small pores, 17 pairs of setae. Measurments of setae: verticals 27-32; D_1 5-8, D_2 5, D_3 7-8, D_4 7-8; clunals 8; L_1 53-54, L_2 11-14, L_3 9-14, L_4 99-109, L_5 11, L_6 9-12, L_7 8, L_8 219-251; M_1 5, M_2 5-9, M_3 104-109; anterior sublaterals 20-22; posterior sublaterals 9-11. Sternal scutum smooth, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth, a pair of small elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9-11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 86-99, Sti IV 59-63, St IV 63-79. Genu II 2 — 2-2/0 — 1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with pocular cervix 5 and bifid-nodular atrium.

MALE — The male is similar to the female but smaller in size. The spermatodactyl has foot terminal, lateral process present, and toe turned up. The ventrianal scutum smooth, a pair of elliptical pores, and 3 pairs of preanal setae.

DISCUSSION — De Leon (1967) separated *Amblyseius chiapensis* and *Amblyseius triplaris* De Leon on the basis of 1 denticule on the movable digit in *chiapensis* and 3 in *triplaris*. The holotype of *chiapensis* has 3 small denticules, and close observations show the spermatodactyls to be very similar.

This species has been collected in Mexico, Puerto Rico, and Brazil on the following hosts: *Ceiba pentandra* (L.) Gaertn., *Spathodea* sp., *Mespilus germanica, Thuya* sp., *Pinus elliottii, Pinus palustris, Pinus ponderosa, Caesalpinia* sp., and *Muntingia calabura*. Nothing is known about the biology of this mite.

Amblyseius compositus Denmark & Muma

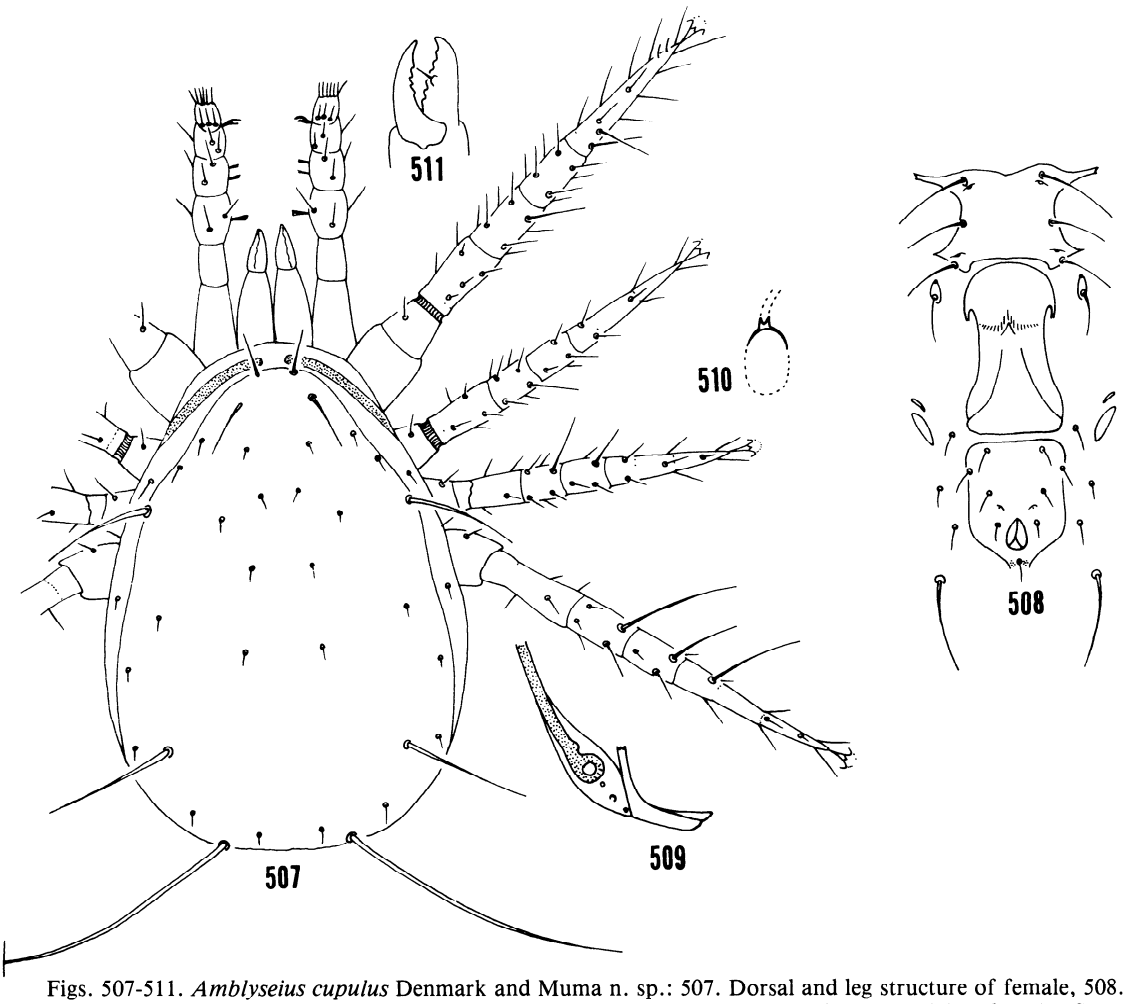
Fig. 500-506

Amblyseius compositus Denmark and Muma, 1973: 240; Moraes and McMurtry, 1983: 134.

TYPE — Female holotype, Brazil: Sao Paulo, ? IX 1968, W.M. Vila, on *Spathodea* sp. (ESALQ).

DIAGNOSIS — See *Amblyseius chiapensis* De Leon.

FEMALE — Length 330; width at L_4 187. Dorsal scutum smooth with muscle marks dorsocentrally 6-7 scattered small pores, and 17 pairs of setae. Measurements of setae: verticals 25; D_1 9, D_2 5, D_3 5, D_4 5; clunals 5;



Figs. 507-511. *Amblyseius cupulus* Denmark and Muma n. sp.: 507. Dorsal and leg structure of female, 508. Ventral scuta and setation of female, 509. Posterior peritremal and stigmatal development of female, 510. Spermathecal structure of female, 511. Chelicеral structure of female.

M_1 5, M_2 6, M_3 86; anterior sublaterals 19; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9-11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 58, Sti IV 54, St IV 69. Genu II 2 — 2-2/0 — 1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with pocular cervix 5 and bifid atrium.

MALE — Similar to female, but smaller. Foot of spermatodactyl terminal with heel distinct and toe bent forward. Ventrianal scutum lightly creased with a pair of elliptical pores and 3 pairs of preanal setae.

DISCUSSION — This species has been taken in Brazil. Sao Paulo: *Pinus pinaster*, *Pinus elliottii*, *Pinus taeda*, *Araucaria angustifolia*, *Melia azedarach*, *Quercus* sp., *Taxodium distichum*, *Roupala* sp., *Eucalyptus saligna*, *Malus sylvestris*, *Mespilus germanica*, *Spathodea* sp., and Leguminosae (Denmark and Muma, 1973, Irece-Bahia: *Psidium guajava* (Moraes and McMurtry, 1983). Nothing is known about the biology of this species.

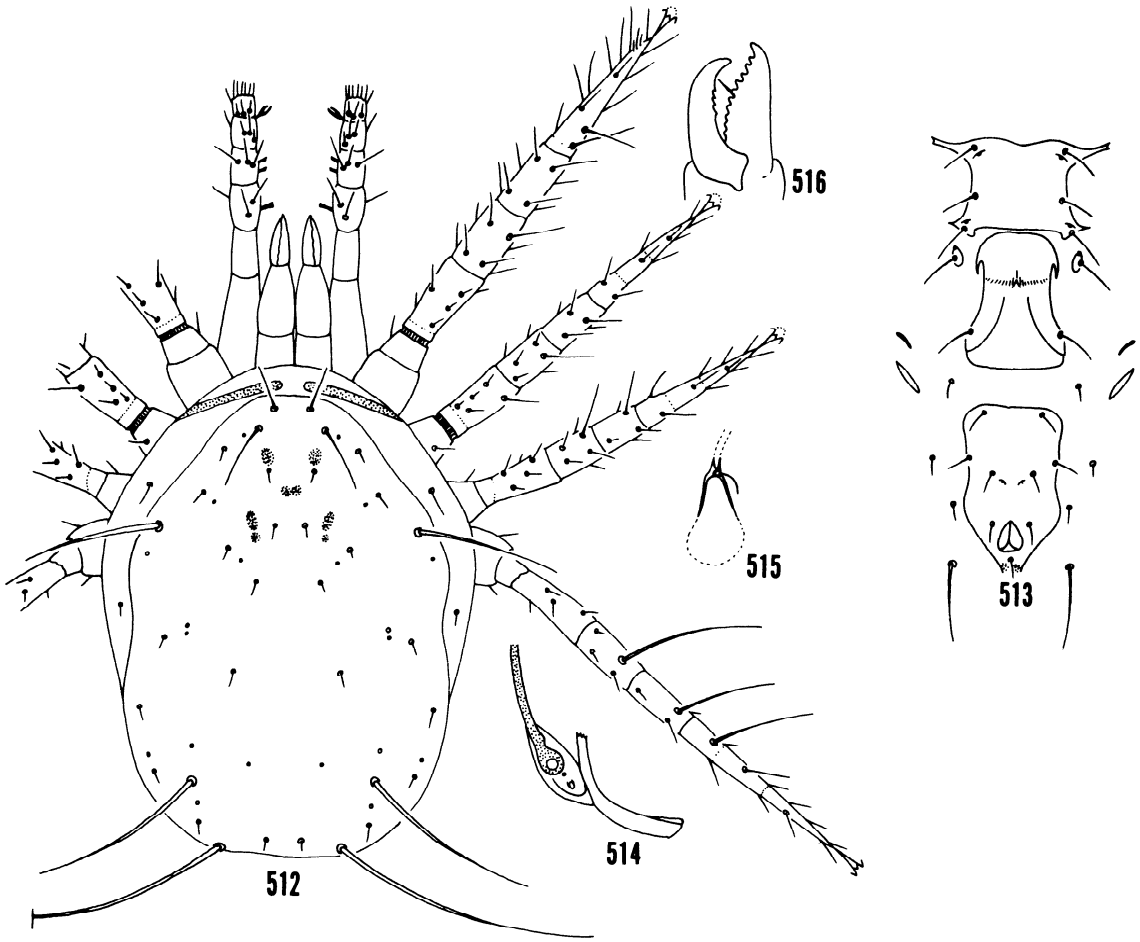
Amblyseius cupulus Denmark & Muma n. sp.
Fig. 507-511

TYPE — Female holotype, Costa Rica: Cota, 1 VII 1957, E. Dixon, in moss on trees (FSCA).

DIAGNOSIS — See *Amblyseius chiapensis* De Leon.

FEMALE — Length 373; width at L_4 224. Dorsal scutum smooth with 17 pairs of setae. Measurements of setae: verticals 31; D_1 6, D_2 6, D_3 6, D_4 7; clunals 7; L_1 40, L_2 19, L_3 17, L_4 90, L_5 7, L_6 6, L_7 11, L_8 235; M_1 6, M_2 7, M_3 112; anterior sublaterals 17; posterior sublaterals 12. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to the body size, fixed finger with 12 denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 102, Sti IV 62, St IV 79. Genu II 2 — 2/1 — 2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with pocular cervix 5 and bifid atrium.

MALE — Unknown.



Figs. 512-516. *Amblyseius haleakalus* Prasad: 512. Dorsal and leg structure of female, 513. Ventral scuta and setation of female, 514. Posterior peritremal and stigmatal development of female, 515. Spermathecal structure of female, 516. Cheliceral structure of female.

DISCUSSION — This species is known only from the type specimen, and nothing is known about its biology.

Amblyseius haleakalus Prasad

Fig. 512-516

Amblyseius haleakalus Prasad, 1968: 1516.

TYPE — Female holotype, U.S.A.: Hawaii, Volcano, 16 VI 1966, F.H. Haramoto, from conifer leaves, in B.P. Bishop Museum.

DIAGNOSIS — See *Amblyseius chiapensis* De Leon.

FEMALE — Length 351-417; width at L_4 245. Dorsal scutum smooth with muscle marks dorsocentrally, 10-12 small to medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 31-42; D_1 5-7, D_2 5, D_3 5, D_4 6-8; clunals 7-11; L_1 47, L_2 10-13, L_3 11-13, L_4 108-115, L_5 12-14, L_6 11-14, L_7 12-14, L_8 257-313; M_1 5, M_2 11, M_3 138; anterior sublaterals 14-20; posterior sublaterals 12. Sternal scutum smooth with 2 pairs of pores and 3 pairs setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 15-16 denticules, and movable finger with 4 denticules. Leg formula 1423. Macrosetae Sge IV 110-124, Sti IV 81-86, St IV 91-95. Genu II 2 — 2-2/0 — 1; genu III 1 - 2-2/1 - 1. Spermatheca with pocular cervix 11 and bifid atrium.

MALE — Unknown.

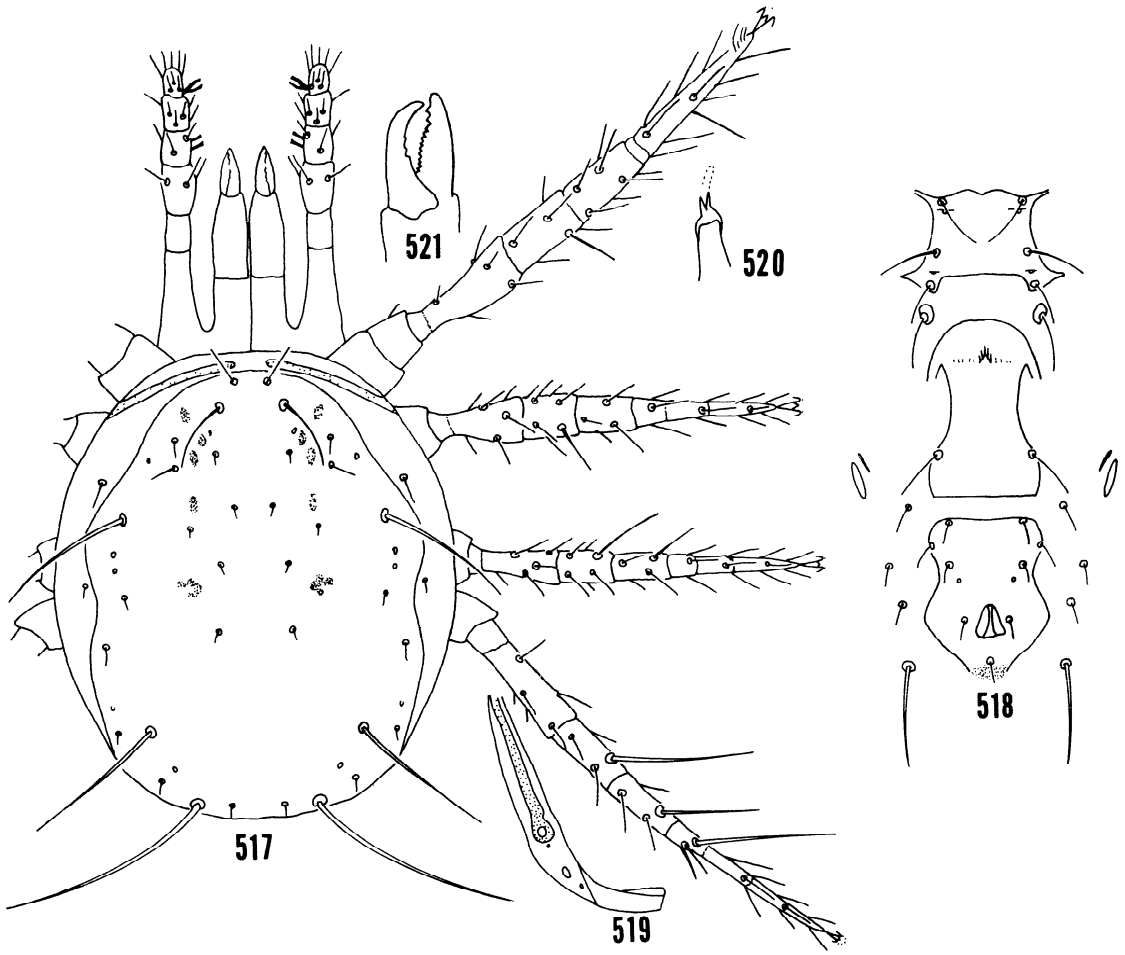
DISCUSSION — This species has been found in Hawaii: Mountain View from cypress, Volcano from, conifer leaves; Kauai: Waimea Canyon from grass and cypress, Upper Kula from bamboo leaf, Kula from grass. Nothing is known about the biology of this species.

Amblyseius incognitus Schuster

Fig. 517-521

Amblyseius incognitus Schuster, 1966: 334.

TYPE — Female holotype, Galapagos Islands: Isla Santa Cruz, Darwin Research Station, 7 II 1964, D.Q.



Figs. 517-521. *Amblyseius incognitus* Schuster: 517. Dorsal and leg structure of female, 518. Ventral scuta and setation of female, 519. Posterior peritremal and stigmatal development of female, 520. Spermathecal structure of female, 521. Cheliceral structure of female.

Cavagnaro, on *Croton* sp., in Department of Entomology, University of California, Davis.

DIAGNOSIS — See *Amblyseius chiapensis* De Leon.

FEMALE — Length 361; width at L_4 251. Dorsal scutum smooth with scattered muscle marks, 4-5 medium sized pores scattered over the dorsum, and 17 pairs of setae. Measurements of setae: verticals 28; D_1 5, D_2 5, D_3 6, D_4 8; clunals 8; L_1 51, L_2 14, L_3 19, L_4 105, L_5 11, L_6 6, L_7 6, L_8 158; M_1 5, M_2 8, M_3 105; anterior sublaterals 17; posterior sublaterals 7. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to the body size, fixed finger with 17 (2 large plus 15 small) denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 94, Sti IV 74, St IV 104. Genu II 2 — 2-2/0 — 1; genu III 1 — 2/0 — 2/1 — 1. Spermatheca with pocular cervix 13-17 and bifid atrium.

MALE — Unknown.

DISCUSSION — Nothing is known about the biology of this species. It has been taken only on the Galapagos Islands.

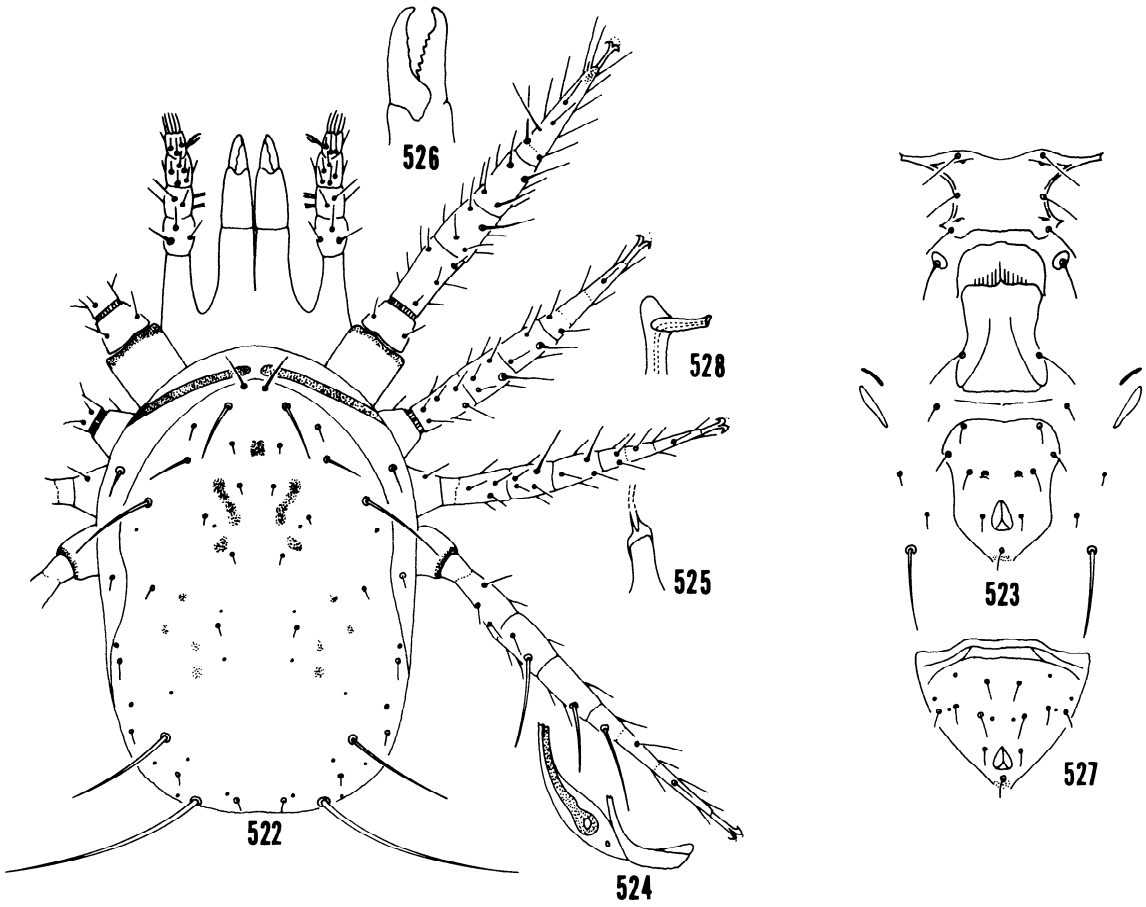
Amblyseius colimensis Aponte and McMurtry
Fig. 522-528

Amblyseius colimensis Aponte and McMurtry, 1987: 201.

TYPE — Mexico: Santiago, Manzanilla, 6 I 1975, P. De Bach and M. Rose, on citrus leaves (USNMNH).

DIAGNOSIS — See *Amblyseius chiapensis* De Leon.

FEMALE — Length 345; width at L_4 212. Dorsal scutum smooth with 8-9 small pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 27; D_1 5, D_2 5, D_3 5, D_4 5; clunals 9; L_1 47, L_2 12, L_3 28, L_4 64, L_5 12, L_6 9, L_7 8, L_8 165; M_1 5, M_2 5, M_3 85; anterior sublaterals 17; posterior sublaterals 10. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in



Figs. 522-528. *Amblyseius colimensis* Aponte and McMurtry: 522. Dorsal and leg structure of female, 523. Ventral scuta and setation of female, 524. Posterior peritremal and stigmatal development of female, 525. Spermathecal structure of female, 526. Cheliceral structure of female, 527. Ventrianal scutum of male, 528. Spermatodactyl structure of male.

relation to the body size, fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 62, Sti IV 52, St IV 68. Genu II 2 — 2-2/0 — 1; genu III 1 — 2/1 — 1/0 — 1. Spermatheca with pocular cervix 16 and bifid atrium.

MALE — The male is similar to female but smaller. Spermatodactyl has foot terminal, lateral process indistinct, and toe not enlarged. Ventrianal scutum lightly creased with elliptical pores near posterior pair of preanal setae, 3 pairs of small round pores, and 3 pairs of preanal setae.

DISCUSSION — In addition to the holotype, specimens were collected at Manzanillo, Colima from citrus leaves. Specimens were laboratory reared in November 1976. A male allotype is also in USNMNH. Fourteen other paratypes with the same data as the allotype are in FSCA.

Amblyseius nayaritensis De Leon

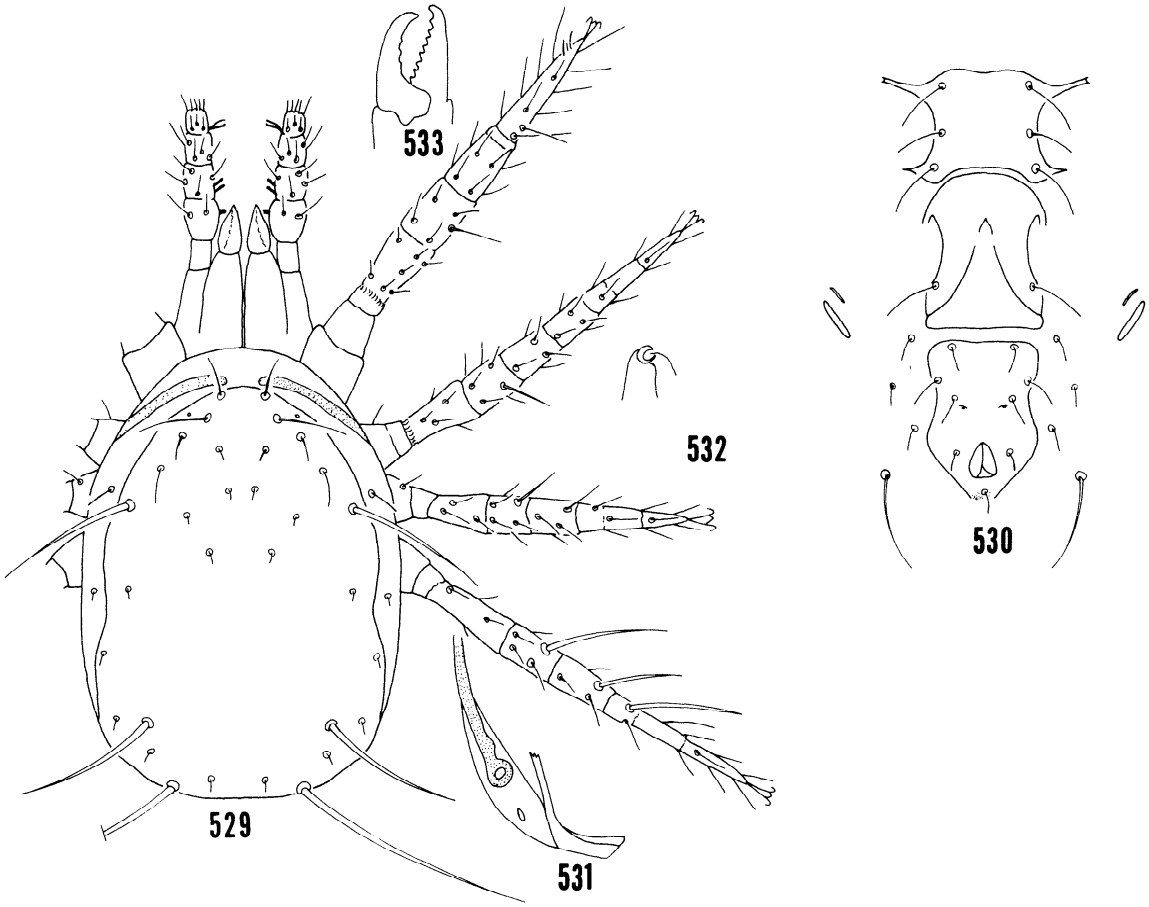
Fig. 529-533

Amblyseius nayaritensis De Leon, 1961: 88.

TYPE — Female holotype, Mexico: San Blas, Nayarit, 28 III 1957, D. De Leon, on Casearia arguta HBK (MCZ).

DIAGNOSIS — *Amblyseius nayaritensis* differs from the other species in this species group by having a c-shaped atrium as apposed to nodular atrium.

FEMALE — Length 305; width at L_4 188. Dorsal scutum smooth with 17 pairs of setae. Measurements of setae: verticals 28; D_1 6, D_2 6, D_3 6, D_4 6; clunals 9; L_1 52, L_2 21, L_3 27, L_4 99, L_5 8, L_6 8, L_7 9, L_8 172; M_1 6, M_2 8, M_3 94; anterior sublaterals 22; posterior sublaterals 8. Sternal scutum smooth with 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9-11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 73, Sti IV 55, St IV 83. Genu II 2 — 2-2/0 —



Figs. 529-533. *Amblyseius nayaritensis* De Leon: 529. Dorsal and leg structure of female, 530. Ventral scuta and setation of female, 531. Posterior peritremal and stigmatal development of female, 532. Spermathecal structure of female, 533. Cheliceral structure of female.

1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with poculiform cervix 8 and c-shaped atrium.

DISCUSSION — Nothing is known about the biology of this species. It has been collected in San Blas, Nayarit, Mexico on *Casearia arguta* HBK and *Annona* sp. Specimens collected on *Orbignya guacuyule* at Atirama, Nayarit were in association with *Tenuipalpus coyacus* De Leon.

CIRCUMFLEXIS GROUP

Three species are assigned to this group that have a spermathecal combination of a nodular atrium and a tubular flared cervix. In *A. circumflexis* De Leon the atrium is also bifid and the tubular part of the cervix is long; in *A. begljarovi* Abbasova the atrium apparently is not bifid and the tubular part of the cervix is short; in *A. spiculatus* Denmark and Muma the atrium is not bifid and the cervix is constricted just mesal of the atrium.

Key to females in *circumflexis* group

1. Spermatheca with bifid-nodular atrium, Sti IV 30 or shorter ..... *circumflexis* De Leon, p. 100
— Spermatheca with nodular atrium, Sti IV longer than 30 2
2. Cervix 34, Sge IV 89, St IV 61 ..... *spiculatus* Denmark and Muma, p. 102
— Cervix 23, Sge IV 52, St IV 52 ..... *begljarovi* Abbasova, p. 101

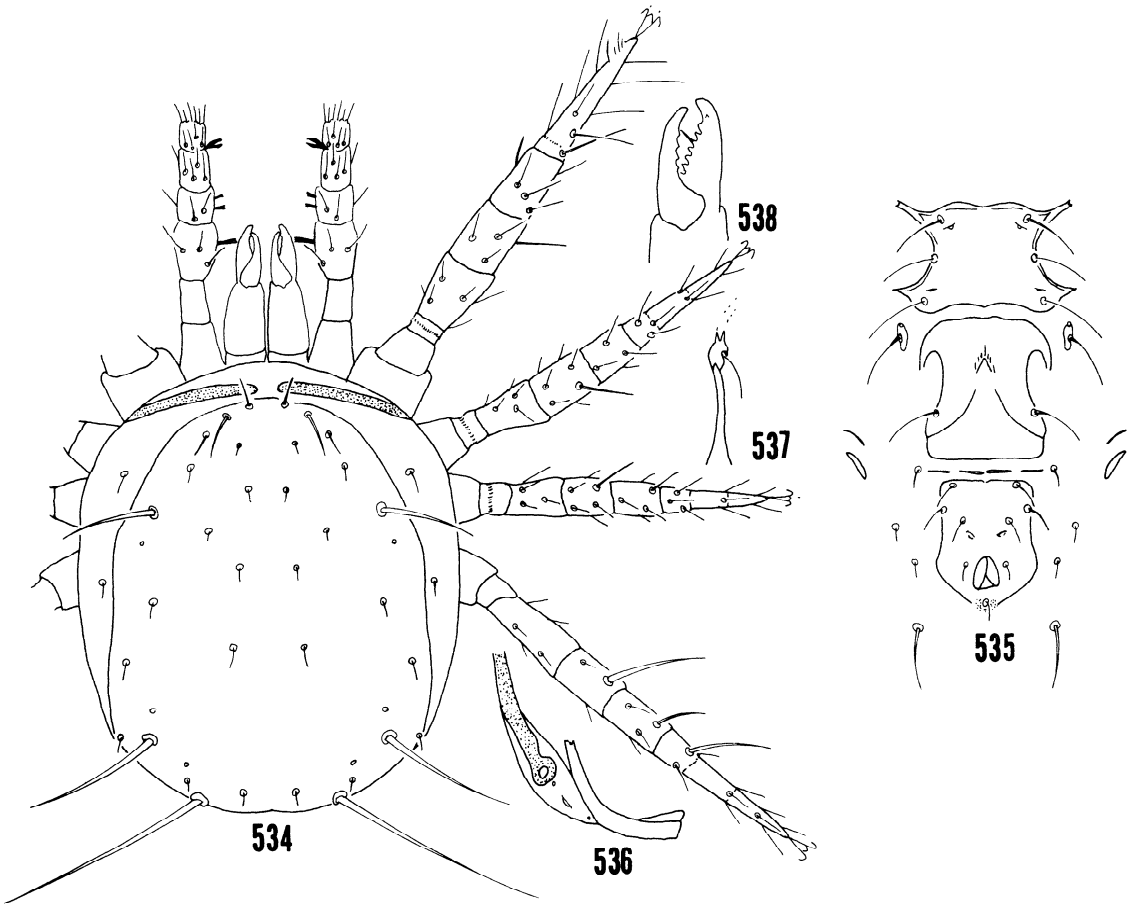
Amblyseius circumflexis De Leon

Fig. 534-538

Amblyseius circumflexis De Leon, 1966: 91.

TYPE — Female holotype, British Guyana: Nature Reserve, Bartica, 26 X 1963, D. De Leon, on *Licaria* sp. (MCZ).

DIAGNOSIS — *Amblyseius circumflexis* is similar to *Amblyseius spiculatus* Denmark and Muma and *Amblyseius begljarovi* Abbasova but differs in having the spermatheca with a bifid-nodular atrium, verticals 19,



Figs. 534-538. *Amblyseius circumflexis* De Leon: 534. Dorsal and leg structure of female, 535. Ventral scuta and setation of female, 536. Posterior peritremal and stigmatal development of female, 537. Spermathecal structure of female, 538. Cheliceral structure of female.

L_1 23, L_6 9, L_7 8, M_3 70, Sge IV 59, Sti IV 29, St IV 53 as apposed to nodular atrium, verticals 33, L_1 56, L_6 17, L_7 18, M_3 87, Sge IV 89, Sti IV 53, St IV 61 in *spiculatus*; nodular atrium, verticals 27, L_1 41, L_6 11, L_7 10, M_3 86, Sge IV 52, Sti IV 38, St IV 52 in *begljarovi*.

FEMALE — Length 298; width at L_4 188. Dorsal scutum smooth, 2-3 small pores, 17 pairs of setae. Measurements of setae: verticals 19; D_1 7, D_2 7, D_3 7, D_4 8; clunals 6; L_1 23, L_2 13, L_3 7, L_4 67, L_5 9, L_6 9, L_7 8, L_8 149; M_1 7, M_2 7, M_3 70; anterior sublaterals 14; posterior sublaterals 9. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth, a pair of elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 11-12 denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 59, Sti IV 29, St IV 53. Genu II 2 — 2-2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with tubular flared cervix 20 and bifid nodular atrium.

MALE — Unknown.

DISCUSSION — This species has been collected in British Guyana: Natural Reserve, Bartica on *Quiina albiflora* and Bartica-Potaro road on *Licaria* sp. Nothing is known about the biology of this species.

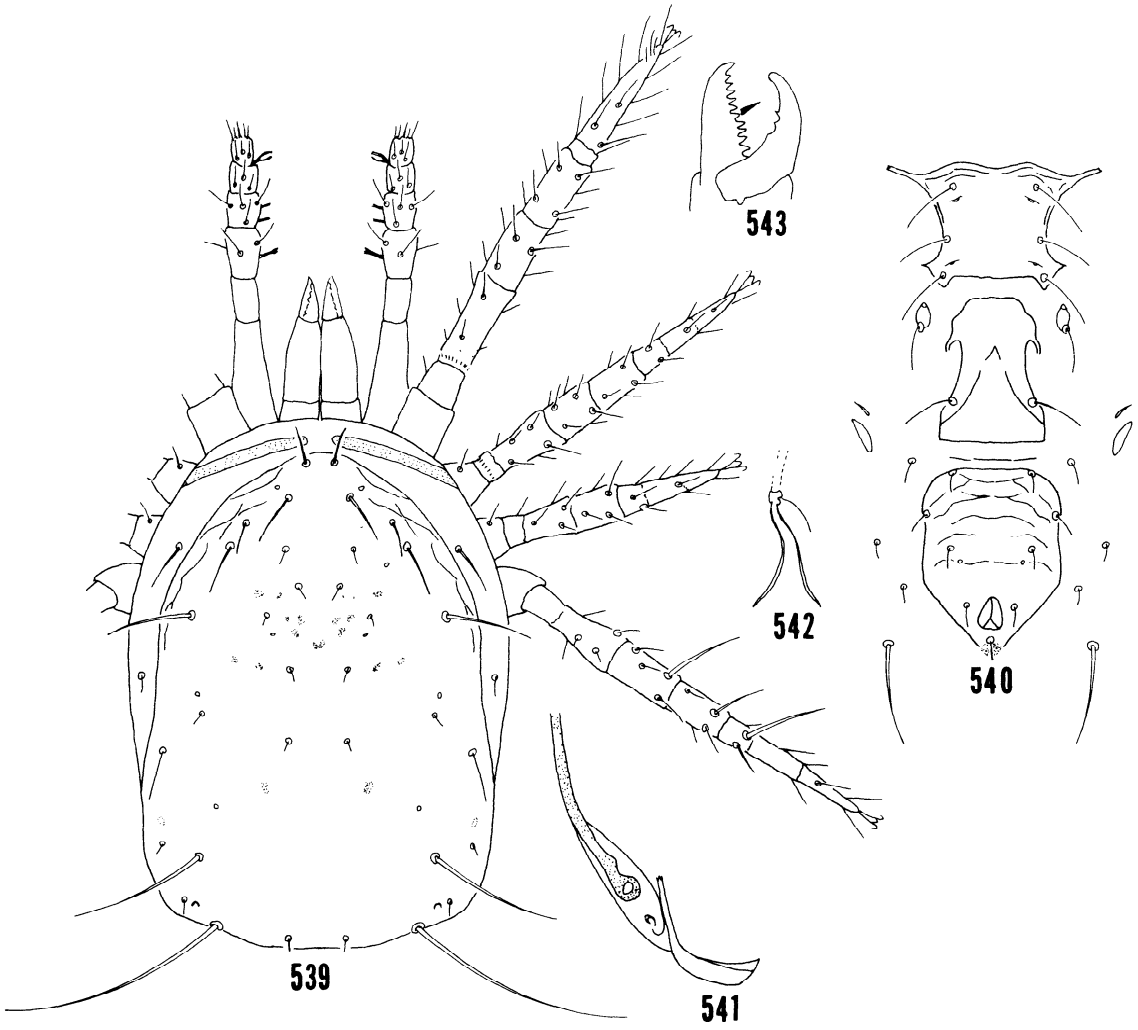
Amblyseius begljarovi Abbasova

Fig. 539-543

Amblyseius begljarovi Abbasova, 1970: 51.

TYPE — Female holotype, U.S.S.R.: Azerbaijan, in nest of rodent, *Micromys minutus*, 1970, in Institute of Zoology, Academy of Science of the Azerbaijan S.S.R., Baku.

DIAGNOSIS — Length 353; width at L_4 220. Dorsal scutum smooth with scattered muscle marks, 6 to 8 small to medium sized pores and 17 pairs of setae. Measurements of setae: verticals 27; D_1 9, D_2 6, D_3 11, D_4 8; clunals 12; L_1 41, L_2 25, L_3 26, L_4 55, L_5 38, L_6 11, L_7 10, L_8 141; M_1 6, M_2 9, M_3 86; anterior sublaterals 26; posterior sublaterals 15. Sternal scutum smooth with 2 pairs of pores and 3 pairs of seate. Ventrianal scutum lightly creased with a pair of small round pores and 3 pairs



Figs. 539-543. *Amblyseius begljarovi* Abbasova: 539. Dorsal and leg structure of female, 540. Ventral scuta and setation of female, 541. Posterior peritremal and stigmatal development of female, 542. Spermathecal structure of female, 543. Cheliceral structure of female.

of preanal sete. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 52, Sti IV 38, St IV 52. Genu II 2 — 2/1 — 2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with tubular flared cervix 23 and nodular atrium.

MALE — Unknown.

DISCUSSION — In addition to the type specimens, this species has been collected in the Ukrainian Soviet Socialist Cape Kazatin, Crimea on thistle, *Carduus* sp. Nothing is known about its biology.

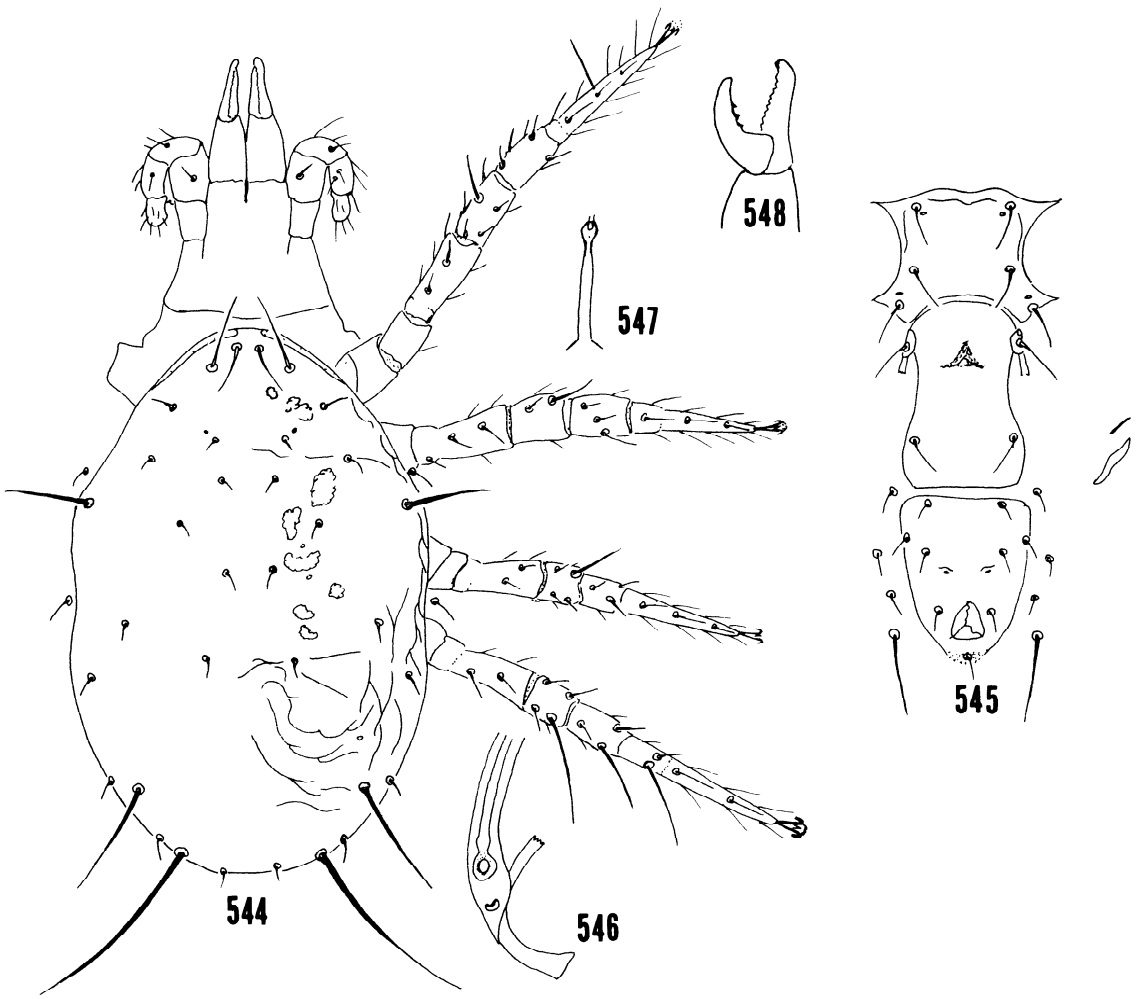
Amblyseius spiculatus Denmark & Muma
Fig. 544-548

Amblyseius spiculatus Denmark and Muma, 1973: 239.

TYPE — Female holotype, Brazil: Paraguacu Paulista, Sao Paolo, ? IX 1968, W.M. Vila, on *Eucalyptus alba* (ESALQ).

DIAGNOSIS — See *Amblyseius circumflexis* De Leon.

FEMALE — Length 369; width at L_1 218. Dorsal scutum lightly reticulated laterally and posteriorly with 3-4 medium sized pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 33; D_1 8, D_2 8, D_3 11, D_4 11; clunals 9; L_1 56, L_2 16, L_3 14, L_4 67, L_5 17, L_6 17, L_7 18, L_8 138; M_1 9, M_2 11, M_3 87; anterior sublaterals 18; posterior sublaterals 17. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 89, Sti IV 53, St IV 61. Genu II 2 — 2-2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with tubular



Figs. 544-548. *Amblyseius spiculatus* Denmark and Muma: 544. Dorsal and leg structure of female, 545. Ventral scuta and setation of female, 546. Posterior peritremal and stigmatal development of female, 547. Spermathecal structure of female, 548. Cheliceral structure of female.

flared cervix 34 and nodular atrium.

MALE — Unknown.

DISCUSSION — This species has been taken in Sao Paulo, Brazil on *Eucalyptus alba*. Nothing is known about the biology of *spiculatus*.

CINCTUS GROUP

Two species are assigned to this group. They are *A. cinctus* Corpuz and Rimando and *A. mcmurtryi* Muma. Both have short tubular flared cervices and undifferentiated atria. They are most readily distinguished by minor differences in setal lengths and position.

Key to females in *cinctus* group

1. Sge IV 89, leg formula 1423 ..... *cinctus* Corpuz and Rimando, p. 103
— Sge IV 65, leg formula 4123 ..... *mcmurtryi* Muma, p. 104

Amblyseius cinctus Corpuz and Rimando

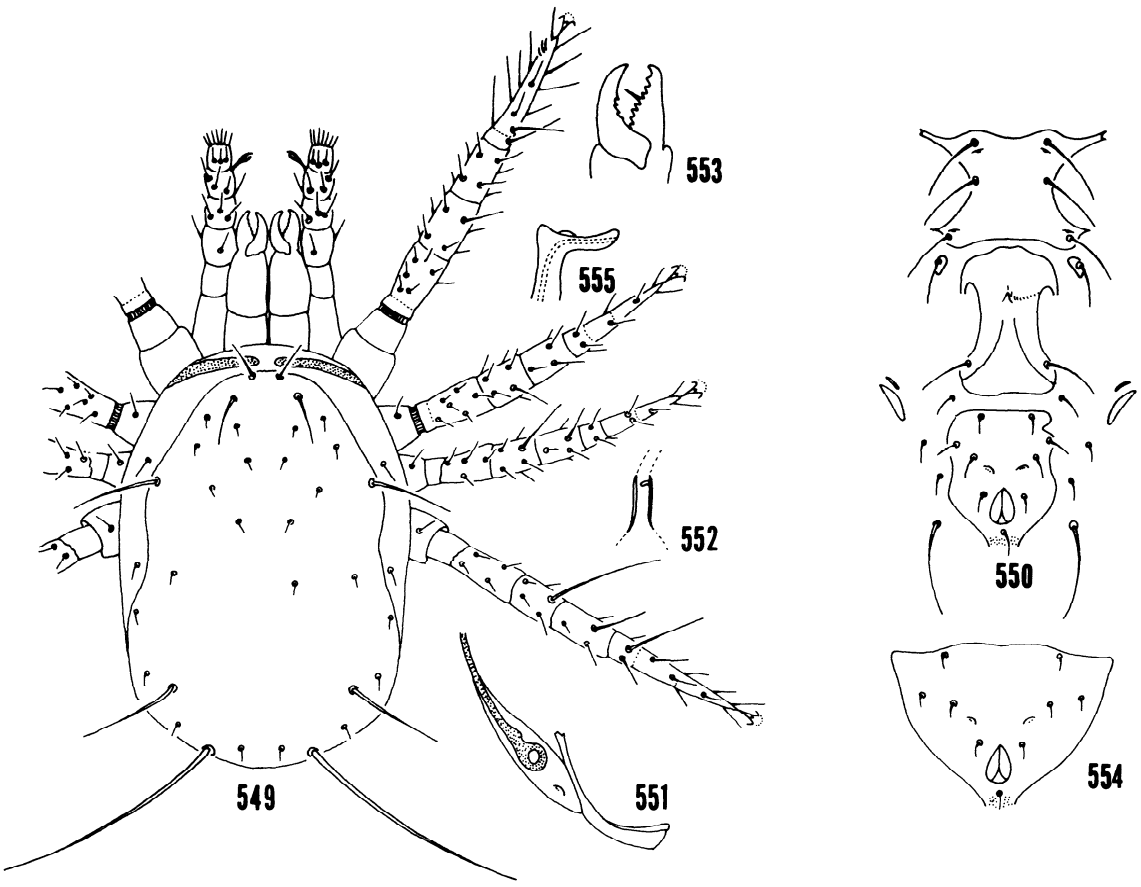
Fig. 549-555

Amblyseius cinctus Corpuz and Rimando, 1966: 119; Swirski and Golan, 1967: 226; Ehara and Bhandhufalck, 1977: 70.

TYPE — Female holotype, Philippines: Gamu, Isabela, 25 XII 1962, L.A. Corpuz on *Panicum pilipes*, in Department of Entomology, University of Philippines.

DIAGNOSIS — *Amblyseius cinctus* is similar to *Amblyseius mcmurtryi* Muma but differs in having Sge IV 89, leg formula 1423 as apposed to Sge IV 65 and leg formula 4123 in *mcmurtryi*.

FEMALE — Length 314; width at L_4 173. Dorsal scutum smooth with 17 pairs of setae. Measurements of setae: verticals 24; D_1 5, D_2 4, D_3 5, D_4 5; clunals 6; L_1 37, L_2 8, L_3 7, L_4 62, L_5 7, L_6 7, L_7 7, L_8 173; M_1 5, M_2 6, M_3 79; anterior sublaterals 12; posterior sublaterals 9. Sternal scutum smooth with 2 pairs of very small pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three



Figs. 549-555. *Amblyseius cinctus* Corpus and Rimando: 549. Dorsal and leg structure of female, 550. Ventral scuta and setation of female, 551. Posterior peritremal and stigmatal development of female, 552. Spermathecal structure of female, 553. Cheliceral structure of female, 554. Ventrianal scutum of male, 555. Spermatodactyl structure of male.

pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to the body size, fixed finger with 9-12 denticules, and movable finger with 4 denticules. Leg formula 1423. Macrosetae Sge IV 89, Sti IV 44, St IV 59. Genu II 2 — 2-2/0 — 1; genu III 1 — 2-2/0 — 1. Spermatheca with tubular-flared cervix 9 and undifferentiated atrium.

MALE — Similar to female but smaller. Spermatodactyl with heel terminal and toe slightly enlarged. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae.

DISCUSSION — This species is known from the Philippines on *Panicum pilipes* and *Streblus asper*; Thailand: Thon Buri on *Acalypha* sp.; Sam Phron on *Vitis* sp.; Korat on mulberry; Chiang Mai on *Juniper* sp. and *Citrus* sp.; San Pa Tong on *Citrus* sp., longan, *Sida rhombifolia*; Ban Kad on bamboo, litchi; Sarapee on *Citrus* sp.; Chiang Mai on *Citrus* sp.; San Pa Tong on bamboo, Citrus sp., *Sida rhombifolia*, longan; Sarapee on *Citrus* sp.; Chiang Dao on bamboo grass, papaya; Fang on *Citrus* sp.; Chiang Rai on *Casuarina* sp. and *Hibiscus* sp. Nothing is known about the biology of this species.

Amblyseius mcmurtryi Muma

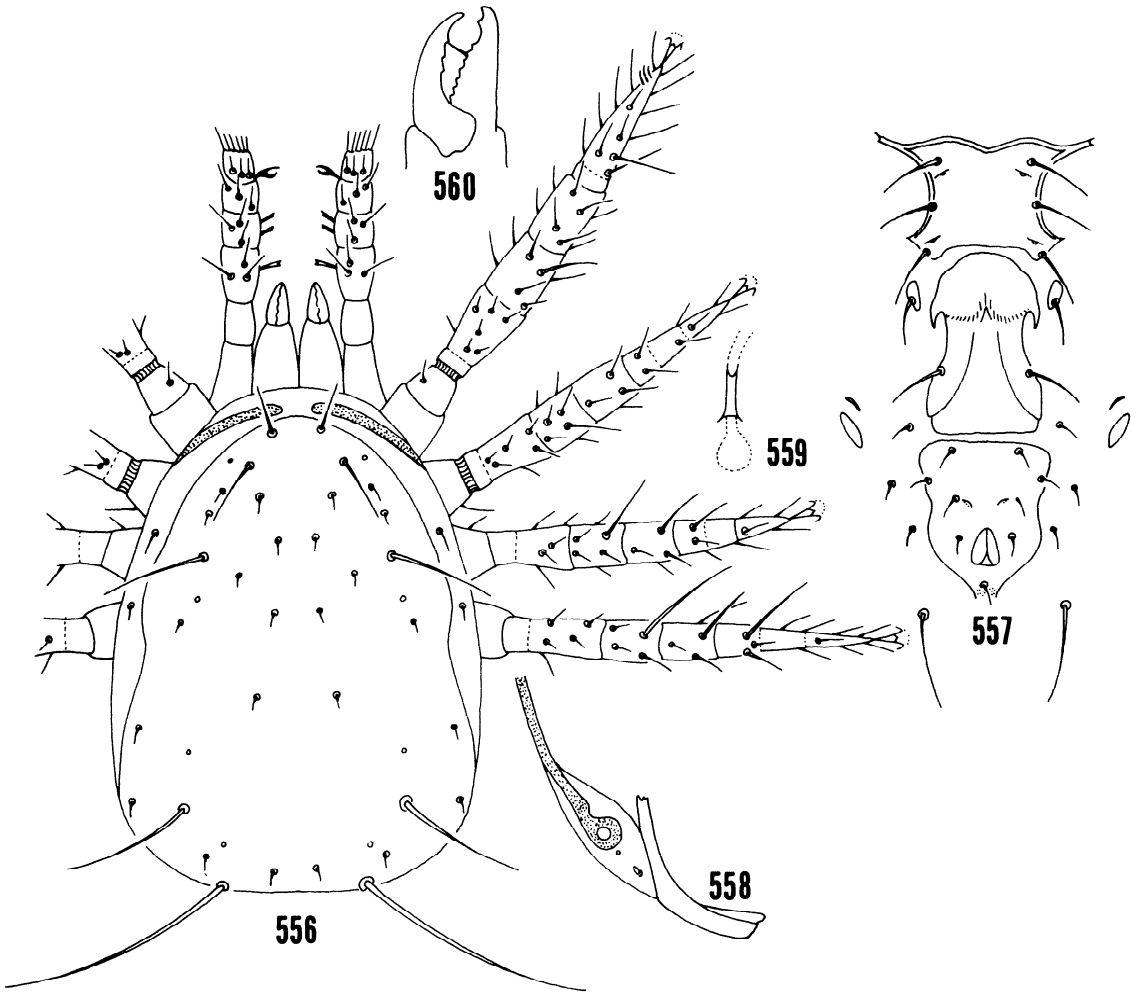
Fig. 556-560

Amblyseius mcmurtryi Muma, 1967: 270; Gupta, 1978: 67.

TYPE — Female holotype, India: Assam, 5 XI 1962, T. Manjernath, on *Citrus* sp. (FSCA).

DIAGNOSIS — See *Amblyseius cinctus* Corpuz and Rimando.

FEMALE — Length 315; width at L_4 180. Dorsal scutum smooth with 4 pairs of small to medium sized pores and 17 pairs of setae. Measurements of setae: verticals 27; D_1 5, D_2 5, D_3 5, D_4 5; clunals 5; L_1 44, L_2 9, L_3 8, L_4 67, L_5 6, L_6 5, L_7 5, L_8 162; M_1 5 , M_2 5 , M_3 88; anterior sublaterals 12; posterior sublaterals 6. Sternal scutum smooth with a pair of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to the body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 65, Sti IV 42, St IV 59. Genu II 2 — 2-2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with



Figs. 556-560. *Amblyseius mcmurtryi* Muma: 556. Dorsal and leg structure of female, 557. Ventral scuta and setation of female, 558. Posterior peritremal and stigmatal development of female, 559. Spermathecal structure of female, 560. Cheliceral structure of female.

short tubular-flared cervix 10 and undifferentiated atrium.

MALE — Unknown.

DISCUSSION — This species has been collected in India at Assam on citrus, Meghalaya on guava, and Nowgong on citrus. Nothing is known about the biology of this species.

PERDITUS GROUP

Two species are assigned to this group. They are *A. perditus* Chant and Baker and *A. hurlbutti* Denmark and Muma n. sp. Both species have a nodular atrium and a tubular-pocular cervix. They may be identified by scutal characters and lengths and positions of setae.

Key to females in *perditus* group

1. Ventrianal scutum divided .... *perditus* Chant and Baker, p. 105
— Ventrianal scutum not divided .... *hurlbutti* Denmark and Muma n. sp., p. 106

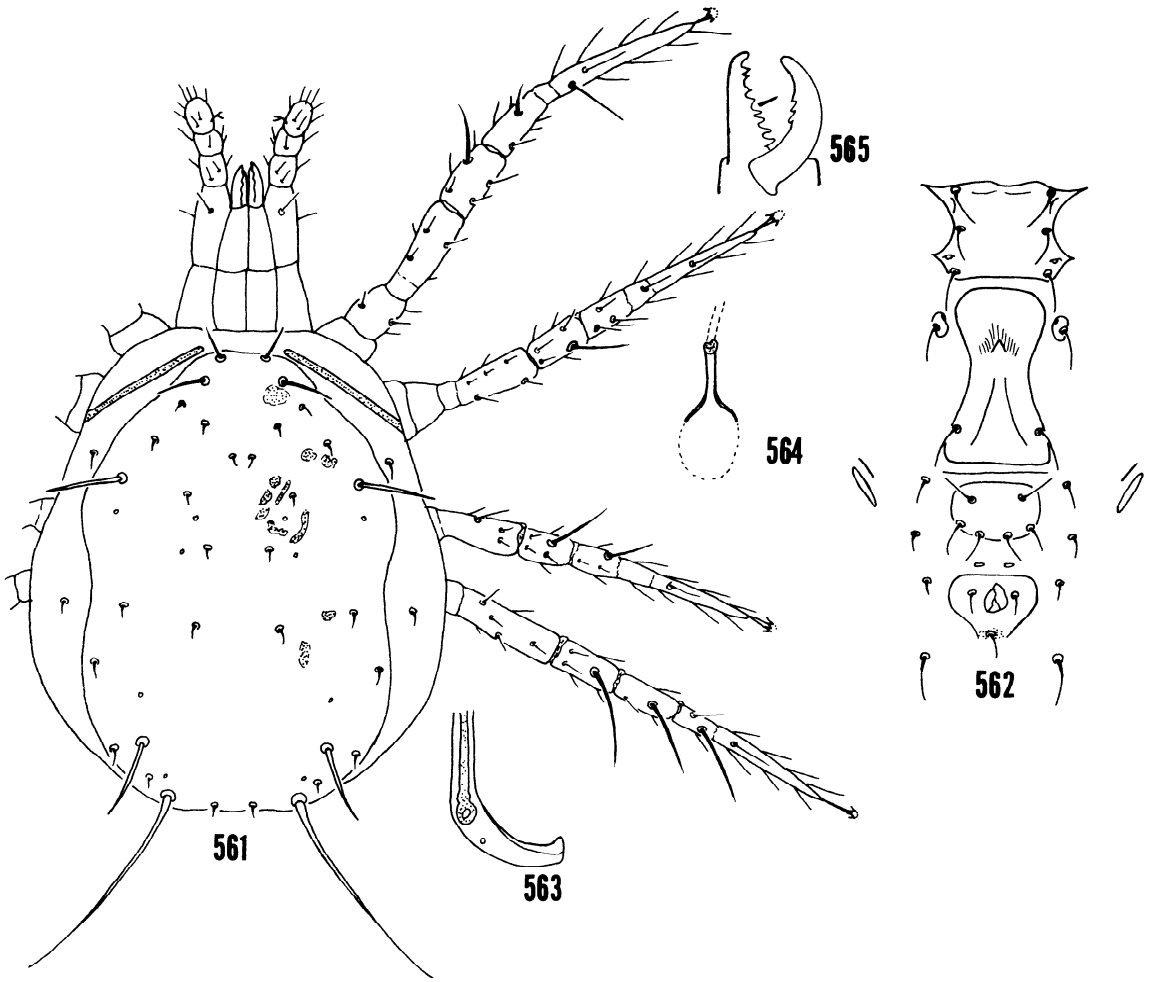
Amblyseius perditus (Chant and Baker) New Combination

Fig 561-565

Iphiseius perditus Chant and Baker, 1965: 16.

TYPE — Female holotype, Honduras: Lancetilla, 21 XII 1959, on "leaf" (USNMNH).

DIAGNOSIS — *Amblyseius perditus* is similar to *Amblyseius hurlbutti* but differs in having the ventrianal scutum divided as apposed to non-divided ventrianal



Figs. 561-565. *Amblyseius perditus* (Chant and Baker): 561. Dorsal and leg structure of female, 562. Ventral scuta and setation of female, 563. Posterior peritremal and stigmatal development of female, 564. Spermathecal structure of female, 565. Cheliceral structure of female.

scutum in *hurlbutti.*

FEMALE — Length 351; width at L_4 212. Dorsal scutum smooth with 4-6 medium sized pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 31; D_1 4, D_2 4, D_3 6, D_4 7; clunals 6; L_1 36, L_2 6, L_3 8, L_4 55, L_5 11, L_6 8, L_7 6, L_8 178; M_1 4, M_2 8, M_3 50; anterior sublaterals 16; posterior sublaterals 5. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of elliptical pores located between the divided scutum and 3 pairs of preanal setae located on the anterior portion of the divided scutum. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to L_1. Chelicerae normal in relation to body size, fixed finger with 10 denticules, movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 78, Sti IV 58, St IV 64. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with tubular-pocular cervix 18 and nodular atrium.

MALE — Unknown.

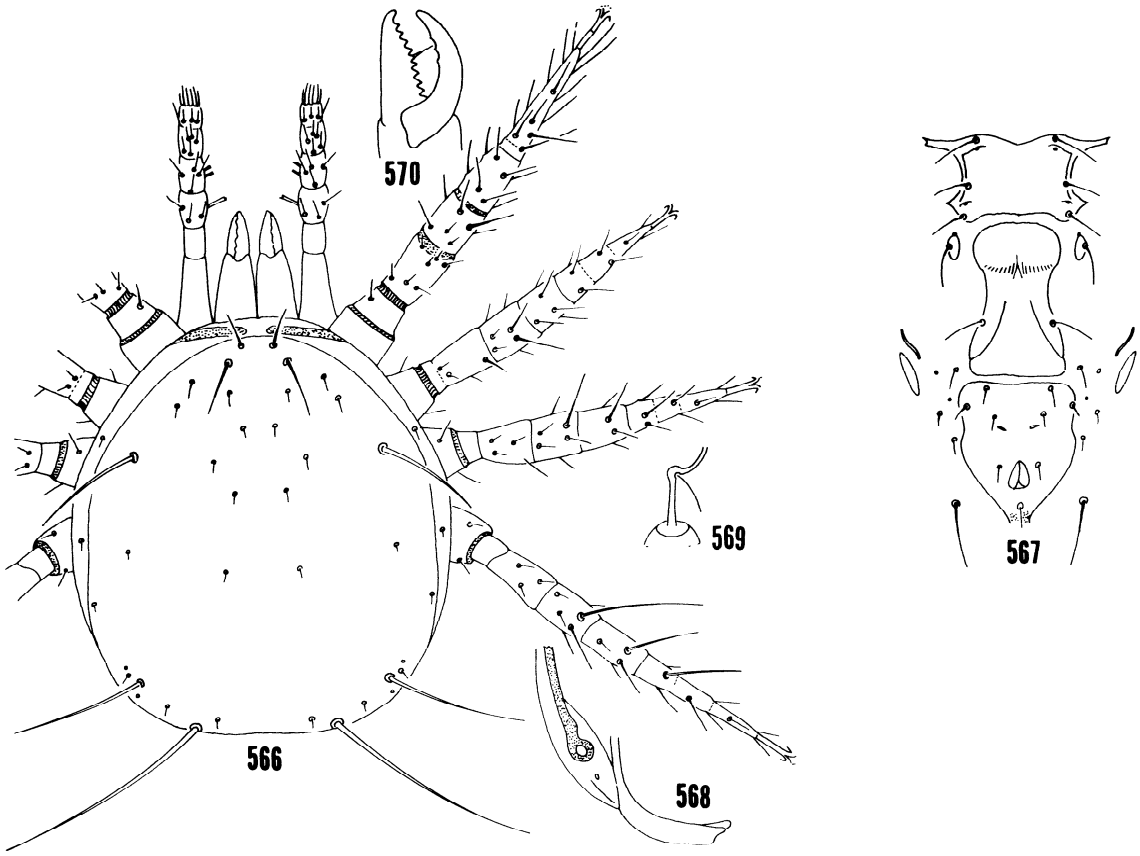
DISCUSSION — This species has been taken only in Honduras. Nothing is known about its biology. It is known only from the type specimen.

Amblyseius hurlbutti Denmark and Muma n. sp.
Fig. 566-570

TYPE — Female holotype, Tanzania: Chaza Forest north Turiani, 2 X 1966, H. Hurlbutt, host? (FSCA).

DIAGNOSIS — See *Amblyseius perditus* Chant and Baker.

FEMALE — Length 330; width at L_4 227. Dorsal scutum smooth with 2 medium sized pores and 17 pairs of setae. Measurements of setae: verticals 25; D_1 8, D_2 8, D_3 9, D_4 9; clunals 9; L_1 39, L_2 9, L_3 9, L_4 87, L_5 10, L_6 11, L_7 6, L_8 157; M_1 9, M_2 10, M_3 113; anterior sublaterals 9; posterior sublaterals 6. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae.



Figs. 566-570. *Amblyseius hurlbutti* Denmark and Muma n. sp.: 566. Dorsal and leg structure of female, 567. Ventral scuta and setation of female, 568. Posterior peritremal and stigmatal development of female, 569. Spermathecal structure of female, 570. Cheliceral structure of female.

Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 94, Sti IV 45, St IV 55. Genu II 2 - 2 - 2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca tubular-pocular cervix 13 and nodular atrium.

MALE — Unknown.

DISCUSSION — This species known only from the type specimen. Nothing is known about the biology of this species.

MONACUS GROUP

Two species are assigned to this group. They are *A. monacus* Wainstein and *A. koreaensis* Denmark and Muma n. sp. Both species have a weakly vesicular cervix, but the location and form of the atrium cannot be deduced on *monacus* since it is not differentiated. On *koreaensis* its location can be deduced by the presence of the minor duct, but its form is undifferentiated as it appears to be within the cervix.

Key to females in *monacus* group

1. L_2 20, L_3 20, and L_8 126..... ..... *monacus* Wainstein, p. 107
— L_2 9, L_3 8, and L_8 196..... ...*koreaensis* Denmark and Muma n. sp., p. 108

Amblyseius monacus Wainstein

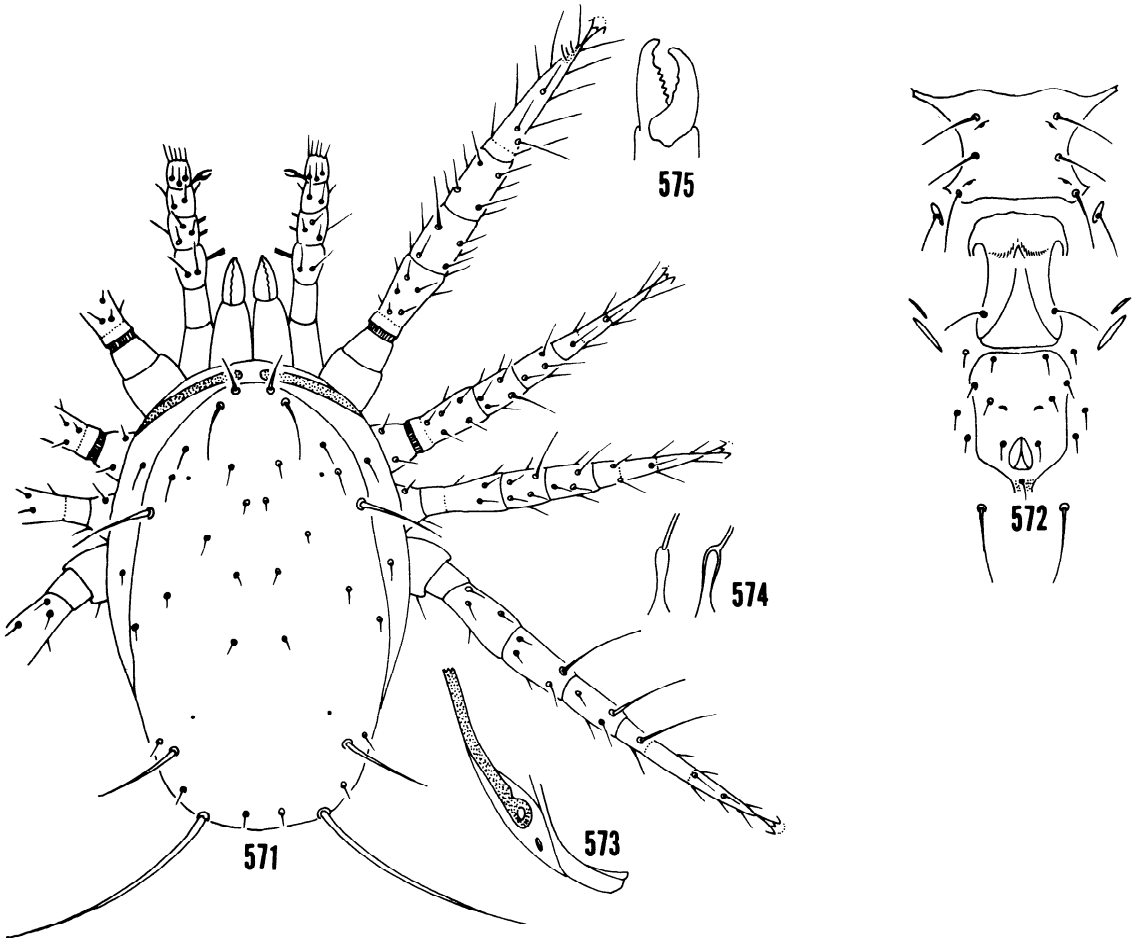
Fig. 571-575

Amblyseius monacus Wainstein, 1975: 918.

TYPE — Female holotype, U.S.S.R.: Bork (Necouzsky region, Jaroslavl district), 26 VII 1973, B.A. Wainstein, on *Tilia* sp., in Institute of Zoology, Academy of Science of the Ukrainian S.S.R., Kiev.

DIAGNOSIS — See *Amblyseius koreaensis* Denmark and Muma.

FEMALE — Length 345; width at L_4 188. Dorsal scutum smooth with 2-3 small pores and 17 pairs of setae. Measurements of setae: verticals 28; D_1 8, D_2 6, D_3 8, D_4 8; clunals 5; L_1 44, L_2 20, L_3 20, L_4 58, L_5 15, L_6 11, L_7 13, L_8 126; M_1 6, M_2 9, M_3 68; anterior sublaterals 20; posterior sublaterals 12. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum



Figs. 571-575. *Amblyseius monacus* Wainstein: 571. Dorsal and leg structure of female, 572. Ventral scuta and setation of female, 573. Posterior peritremal and stigmatal development of female, 574. Spermathecal structure of female, 575. Cheliceral structure of female.

smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 70, Sti IV 59, St IV 62. Genu II 2 - 2 - 2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with weakly vesicular cervix 22 and undifferentiated atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type specimen. Nothing is known about the biology of this species.

Amblyseius koreaensis Denmark and Muma n. sp.

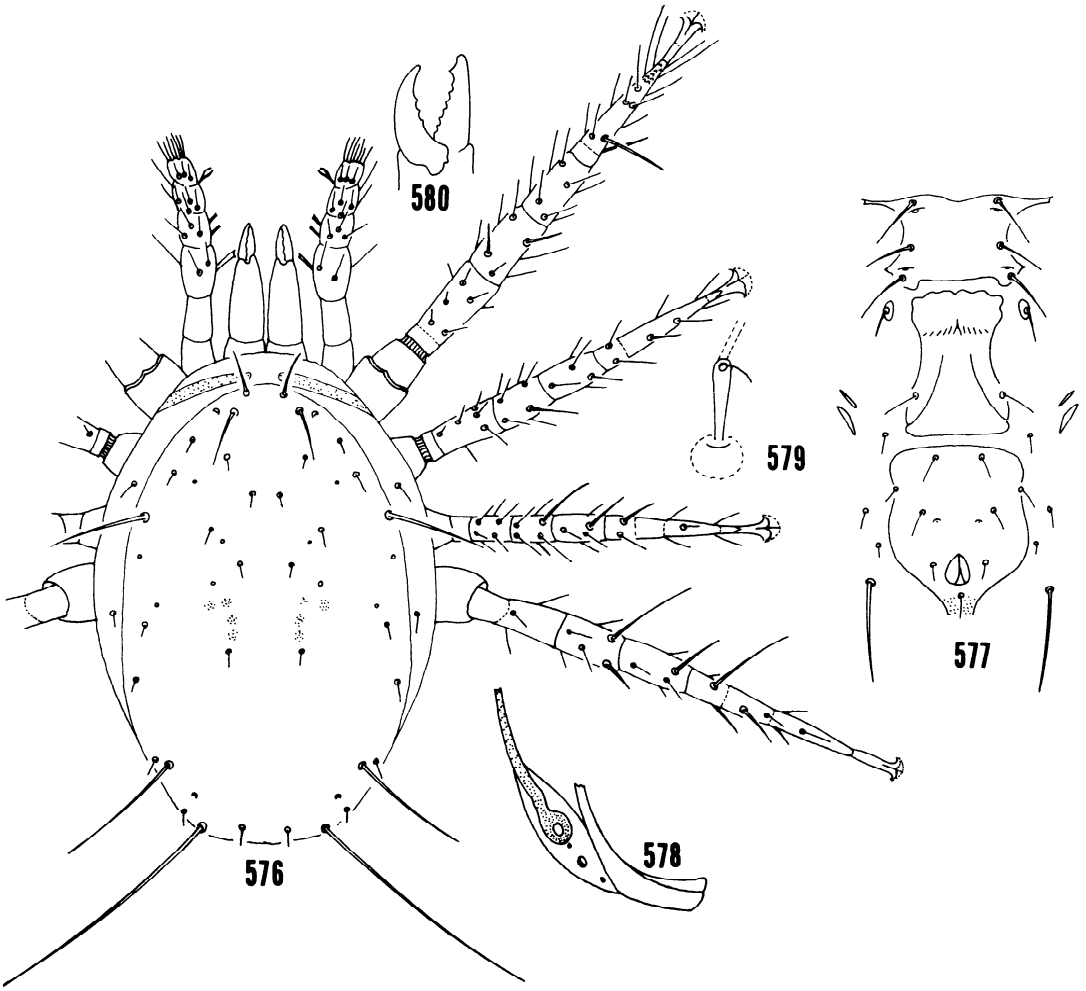
Fig. 576-580

TYPE — Female holotype, Korea: via Chicago, Illinois, 1 XII 1986, R.M. Keith, on medicinal plants (FSCA).

DIAGNOSIS — *Amblyseius koreaensis* is similar to *Amblyseius monacus* Wainstein but differs in having L_2 9, L_3 8, L_4 74, L_8 196 and M_3 93 as apposed to L_2 20, L_3 20, L_4 58, L_8 126, and M_3 63 in *monacus*.

FEMALE — Length 356; width at L_4 212. Dorsal scutum smooth with 7 small to medium sized pores, a few scattered muscle marks middorsally, and 17 pairs of setae. Measurements of setae: verticals 29; D_1 6, D_2 6, D_3 6, D_4 6; clunals 9; L_1 46, L_2 9, L_3 8, L_4 74, L_5 11, L_6 9, L_7 9, L_8 196; M_1 6, M_2 11, M_3 93; anterior sublaterals 14; posterior sublaterals 6. Sternal scutum smooth with 2 pairs of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 80, Sti IV 50, St IV 67. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with a weakly vesicular cervix 19 and undifferentiated atrium.

MALE — Unknown.



Figs. 576-580. *Amblyseius koreaensis* Denmark and Muma n. sp.: 576. Dorsal and leg structure of female, 577. Ventral scuta and setation of female, 578. Posterior peritremal and stigmatal development of female, 579. Spermathecal structure of female, 580. Cheliceral structure of female.

DISCUSSION — This species is known only from the type specimen. Nothing is known about the biology of this species.

IPOMOEAE GROUP

Three species are assigned to this group. They are *A. ipomoeae* Ghai and Menon, *A. guianensis* De Leon, and *A. morii* Ehara. The spermathecal atrium is nodular in all species but only slightly so in *morii,* and the cervix is vesicular.

Key to females in *ipomoeae* group

1. L_2 20 or longer ..... *ipomoeae* Ghai and Menon, p. 109
— L_2 shorter than 20 2
2. M_3 longer than 100 ..*guianensis* De Leon, p. 110
— M_3 shorter than 50 .....*morii* Ehara, p. 111

Amblyseius ipomoeae Ghai & Menon

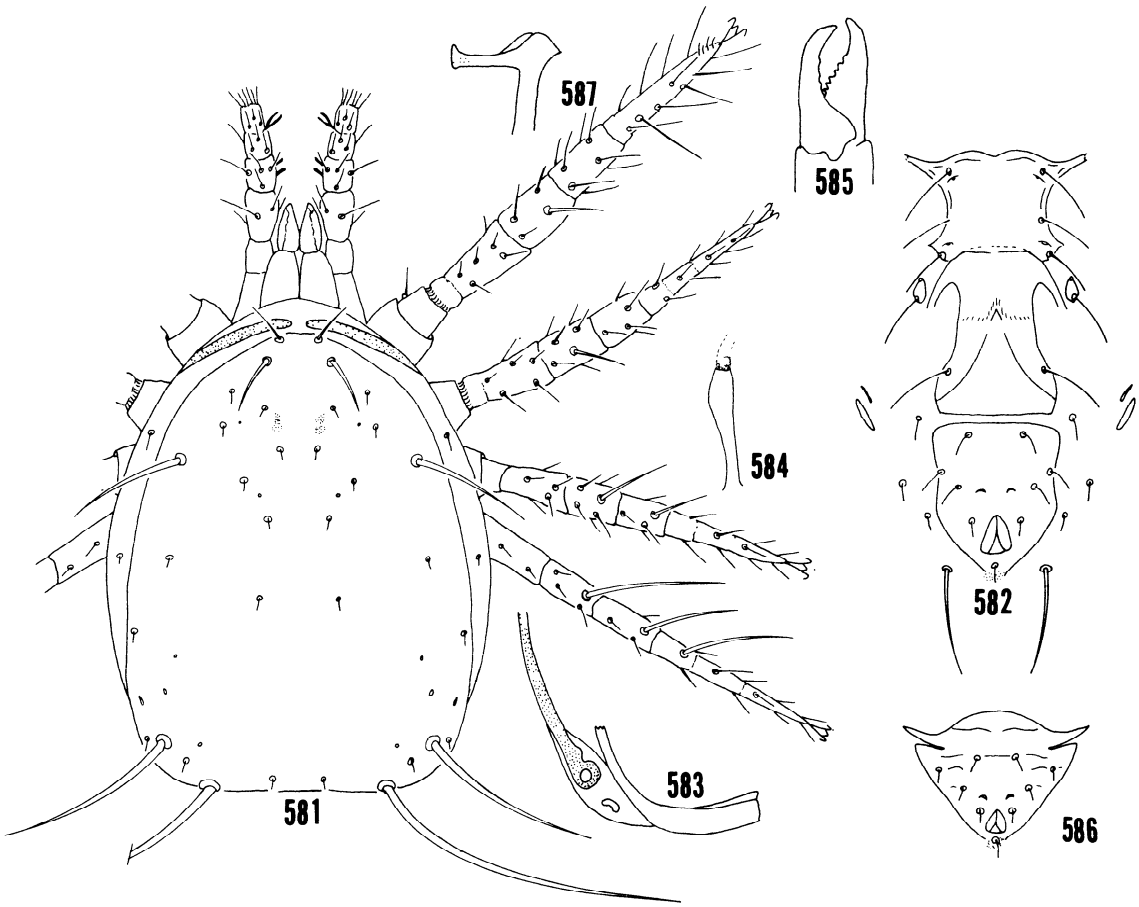
Fig. 581-587

Amblyseius impomoeae Ghai & Menon, 1967: 71.

TYPE — Female holotype, India: Bombay, ? III 1964, S. Ghai, on *Ipomoeae* sp. leaves, in National Pusa Collection, Indian Agricultural Research Institute, New Delhi.

DIAGNOSIS — *Amblyseius ipomoeae* is similar to *Amblyseius guianensis* De Leon and *Amblyseius morii* Ehara but differs in having L_1 52, L_2 6, L_4 98, L_8 178, M_3 110, Sge IV 102, Sti IV 73, St IV 82 as apposed to L_1 33, L_2 12, L_4 90, L_8 221, Sge IV 99, Sti IV 56, St IV 63 in *guianensis* and L_1 41, L_2 22, L_4 43, L_8 80, Sge IV 35, Sti IV 28, St IV 44 in *morii*.

FEMALE — Length 334-361; width at L_4 204. Dorsal scutum smooth with 5 to 6 small scattered pores and 17 pairs of setae. Measurements of setae: verticals 28-30; D_1 4, D_2 5, D_3 5, D_4 6; clunals 7; L_1 52, L_2 6, L_3 10, L_4 98, L_5 6, L_6 7, L_7 6, L_8 178; M_1 5, M_2 6, M_3 110;



Figs. 581-587. *Amblyseius ipomoeae* Ghai and Menon: 581. Dorsal and leg structure of female, 582. Ventral scuta and setation of female, 583. Posterior peritremal and stigmatal development of female, 584. Spermathecal structure of female, 585. Cheliceral structure of female, 586. Ventrianal scutum of male, 587. Spermatodactyl structure of male.

anterior sublaterals 8; posterior sublaterals 6. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of elliptical pores, smooth, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9-10 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 102, Sti IV 73, St IV 82. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with weakly vesicular cervix 20 and nodular atrium.

MALE — The male is similar to the female but smaller in size. The spermatodactyl has foot terminal, lateral process present, and toe enlarged. The ventrianal scutum lightly creased with a pair of elliptical pores and 3 pairs of preanal setae.

DISCUSSION — This species has been collected in Bombay, India on *Ipomoeae* leaves associated with an unidentified tetranychid mite.

Amblyseius guianensis De Leon

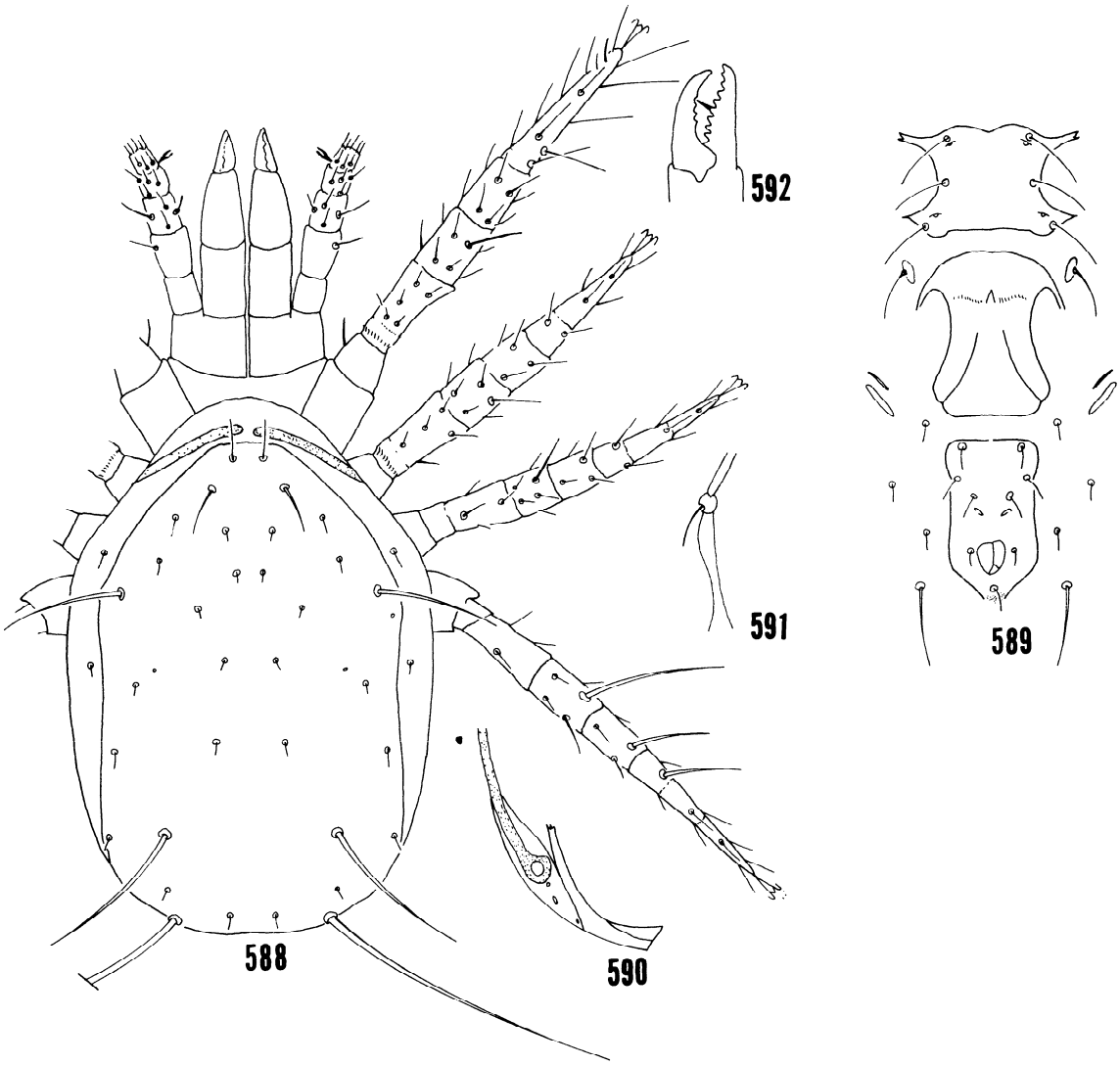
Fig. 588-592

Amblyseius guianensis De Leon, 1966: 93.

TYPE — Female holotype, British Guyana: 3 miles south of Bartica, 22 X 1963, D. De Leon, on *Anacardium occidentale* (MCZ).

DIAGNOSIS — See *Amblyseius ipomoeae* Ghai and Menon.

FEMALE — Length 337; width at L_4 205. Dorsal scutum smooth and 17 pairs of setae. Measurements of setae: verticals 28; D_1 7, D_2 5, D_3 7, D_4 8; clunals 8; L_1 33, L_2 12, L_3 8, L_4 90, L_5 11, L_6 10, L_7 9, L_8 221; M_1 7, M_2 9, M_3 111; anterior sublaterals 12; posterior sublaterals 9. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 4 denticules. Leg formula 4123.



Figs. 588-592. *Amblyseius guianensis* De Leon: 588. Dorsal and leg structure of female, 589. Ventral scuta and setation of female, 590. Posterior peritremal and stigmatal development of female, 591. Spermathecal structure of female, 592. Cheliceral structure of female.

Macrosetae Sge IV 99, Sti IV 56, St IV 63. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with weakly vesicular cervix 24 and nodular atrium.

MALE — Unknown.

DISCUSSION — This species has been taken only in British Guyana. Nothing is known about its biology.

Amblyseius morii Ehara

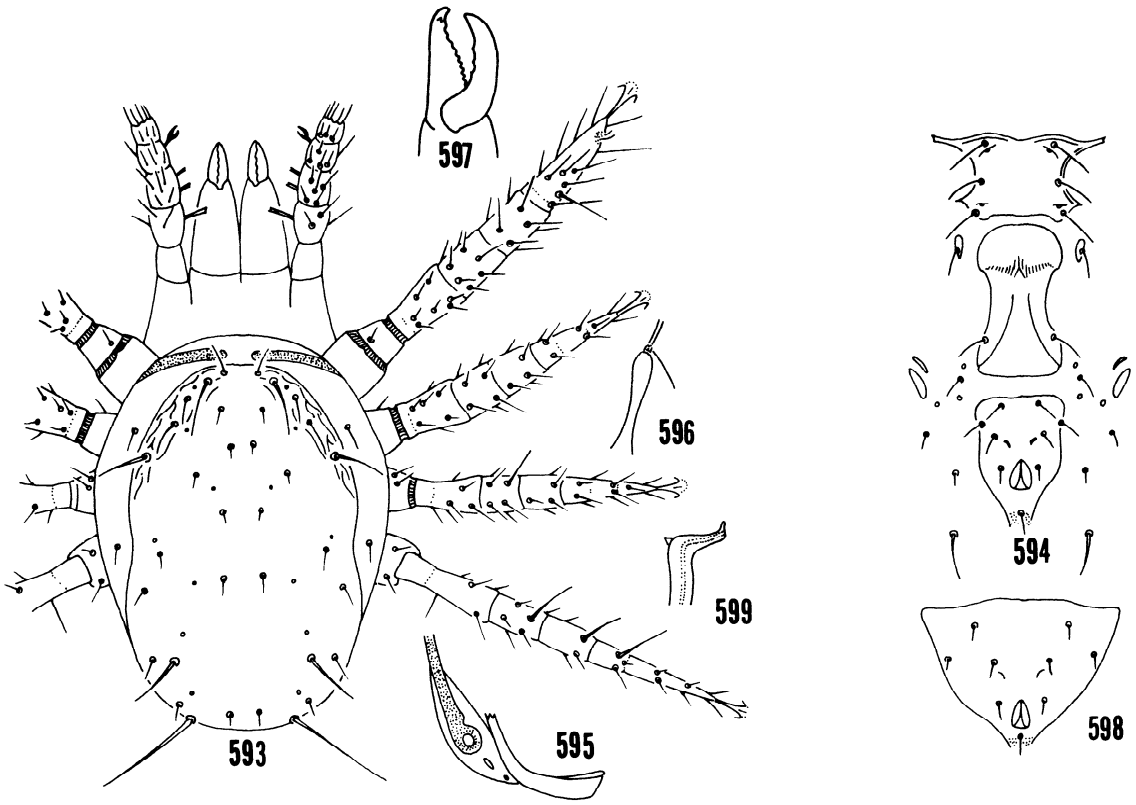
Fig. 593-599

Amblyseius morii Ehara, 1967: 219; Ehara, 1972: 156; Ehara, 1977: 36.

TYPE — Female holotype, Japan: Hokkaido, Toyotomi, Sarobetsu wasteland, 12-14 VII 1966, H. Mori, on *Salix hultenii* Floderus var. *angustifolia* Kitamura, in Zoological Institute, Faculty of Science, Hokkaido University.

DIAGNOSIS — See *Amblyseius ipomoeae* Ghai and Menon.

FEMALE — Length 282; width at L_4 173. Dorsal scutum smooth with 7 small pores, reticulated around the anterior edge of the dorsal scutum, and 17 pairs of setae. Measurements of setae: verticals 28; D_1 7, D_2 6, D_3 9, D_4 10; clunals 6; L_1 41, L_2 22, L_3 27, L_4 43, L_5 21, L_6 14, L_7 11, L_8 80; M_1 5, M_2 16, M_3 36; anterior sublaterals 17; posterior sublaterals 12. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal



Figs. 593-599. *Amblyseius morii* Ehara: 593. Dorsal and leg structure of female, 594. Ventral scuta and setation of female, 595. Posterior peritremal and stigmatal development of female, 596. Spermathecal structure of female, 597. Cheliceral structure of female, 598. Ventrianal scutum of male, 599. Spermatodactyl structure of male.

scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 9-10 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 35, Sti IV 28, St IV 44. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with weakly vesicular cervix 20 and slightly nodular atrium.

MALE — Similar to the female but smaller. Spermatodactyl with foot terminal and toe upturned. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae.

DISCUSSION — This species is known only from Japan: Hokkaido on *Salix hultenii* Floderus var. *angustifolia* Kimuro, *Kalopanax pictus*, and *Rhus ambigua;* Honshu on *Edgeworthia papyrifera*. Nothing is known about the biology of this species.

ITALICUS GROUP

Two species are assigned to this group. They are *A. italicus* Chant and *A. microorientalis* Wainstein and Begljarov. Both species have undifferentiated atria and weakly vesicular flared cervices. The tubular portion is short and the flared portion broad and nearly equal in length in *italicus*. The tubular portion is long and the flared portion slight and short in *microorientalis*.

Key to females in *italicus* group

1. M_3 110, and 2 pairs of preanal setae .... *italicus* Chant, p. 112
— M_3 72, and 3 pairs of preanal setae ..... .*microorientalis* Wainstein and Begljarov, p. 113

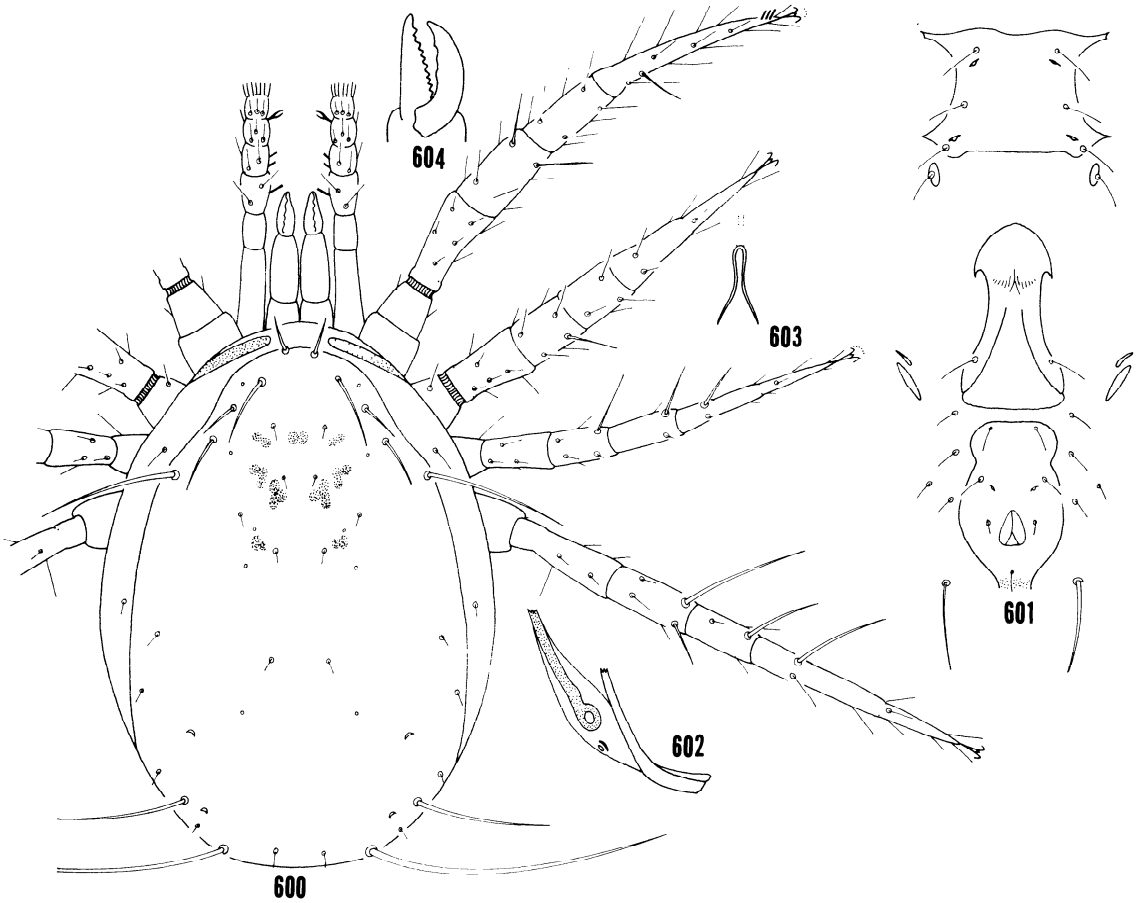
Amblyseius italicus Chant

Fig. 600-604

Amblyseius italicus Chant, 1959: 70; Athias-Henriot, 1966: 206; Wainstein, 1962: 14; Ivancich-Gambaro, 1975: 174; McMurtry, 1977: 21.

TYPE — Female holotype, Italy: intercepted at port in New York, 12 IX 1950, Hidalgo and Carlis, on beech leaves (USNMNH).

DIAGNOSIS — *Amblyseius italicus* is similar to *Amblyseius microorientalis* Wainstein and Begljarov but differs in having only 2 pairs of preanal setae and M_3 110 as apposed to 3 pairs of preanal setae and M_3 72 in *microorientalis*.



Figs. 600-604. *Amblyseius italicus* Chant: 600. Dorsal and leg structure of female, 601. Ventral scuta and setation of female, 602. Posterior peritremal and stigmatal development of female, 603. Spermathecal structure of female, 604. Cheliceral structure of female.

FEMALE — Length 445; width at L_4 251. Dorsal scutum smooth with muscle marks dorsocentrally, 6-7 small to medium sized pores scattered over the scutum, and 17 pairs of setae. Measurements of setae: verticals 41; D_1 10, D_2 6, D_3 6, D_4 6; clunals 11; L_1 63, L_2 35, L_3 50, L_4 128, L_5 14, L_6 12, L_7 9, L_8 280; M_1 6, M_2 11, M_3 110; anterior sublaterals 22; posterior sublaterals 16. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 2 pairs of preanal setae. Four pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 115, Sti IV 53, St IV 87. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with weakly vesicular flared cervix 22 and undifferentiated atrium.

MALE — Unknown.

DISCUSSION — This species is known from Italy on leaves of beech. It has been reported on peach trees in northern Italy by Ivancich-Gambaro (1975). McMurtry reported that specimens identified by Ivancich-Gambaro as *italicus* are *Amblyseius andersoni* (Chant) (1977). Nothing is known about the life cycle of this species.

Amblyseius microorientalis Wainstein and Begljarov

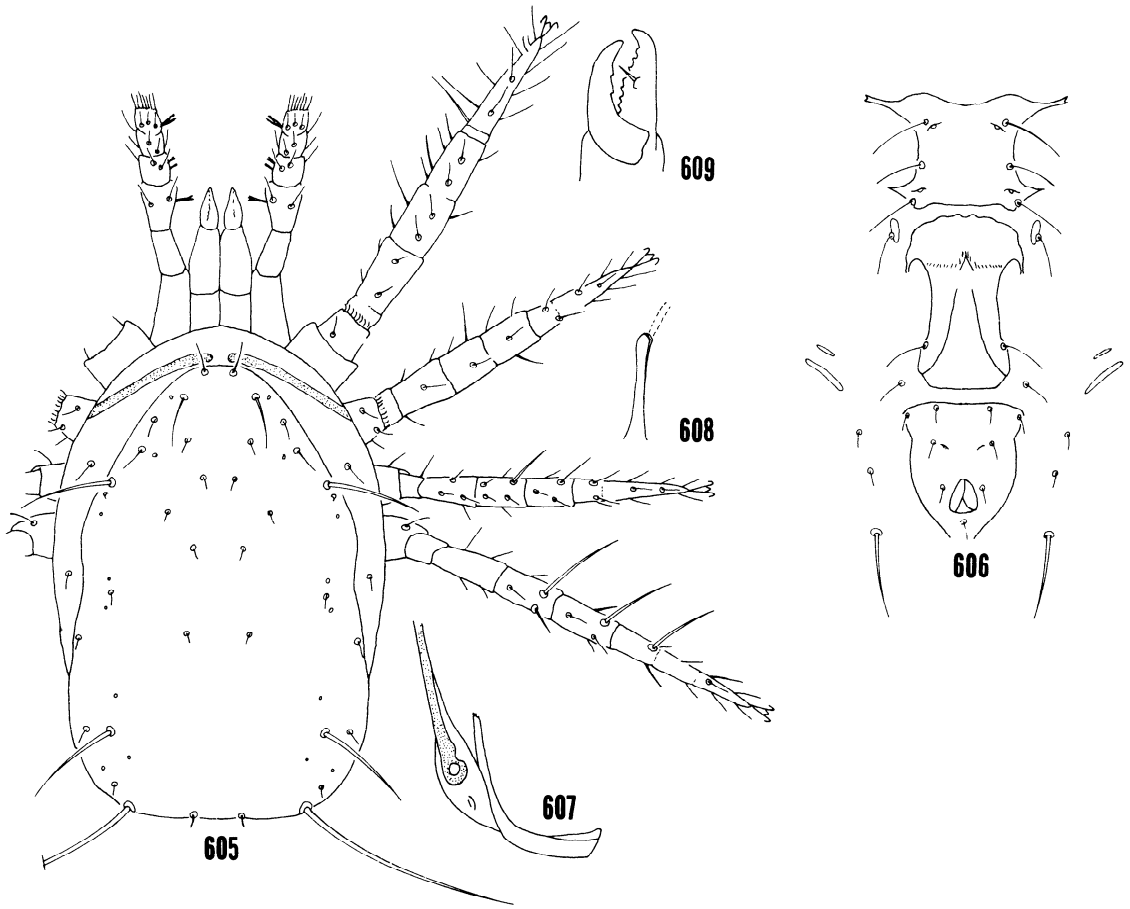
Fig. 605-609

Amblyseius microorientalis Wainstein and Begljarov, 1971: 1808; Wainstein, 1979: 141.

TYPE — Female holotype, U.S.S.R.: "Kedrovaya pad," Primorsky Territory, 1971, on *Actinidia* sp. in mixed forest, in Institute of Zoology, Academy of Science of the Ukrainnian S.S.R., Kiev.

DIAGNOSIS — See *Amblyseius italicus* Chant.

FEMALE — Length 336; width at L_4 188. Dorsal scutum smooth with 8 to 9 small to medium sized pores and 17 pairs of setae. Measurements of setae: verticals 27; D_1 5, D_2 5, D_3 5, D_4 5; clunals 7; L_1 45, L_2 17, L_3 21, L_4 69, L_5 13, L_6 12, L_7 11, L_8 160; M_1 5, M_2 8, M_3 72; anterior sublaterals 22; posterior sublaterals 11.



Figs. 605-609. *Amblyseius microorientalis* Wainstein and Begljarov: 605. Dorsal and leg structure of female, 606. Ventral scuta and setation of female, 607. Posterior peritremal and stigmatal development of female, 608. Spermathecal structure of female, 609. Cheliceral structure of female.

Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 2 denticules. Leg formula 4123. Macrosetae Sge IV 72, Sti IV 59, St IV 65. Genu II 2 - 2-2/1 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with weakly vesicular flared cervix 18 and undifferentiated atrium.

MALE — Unknown.

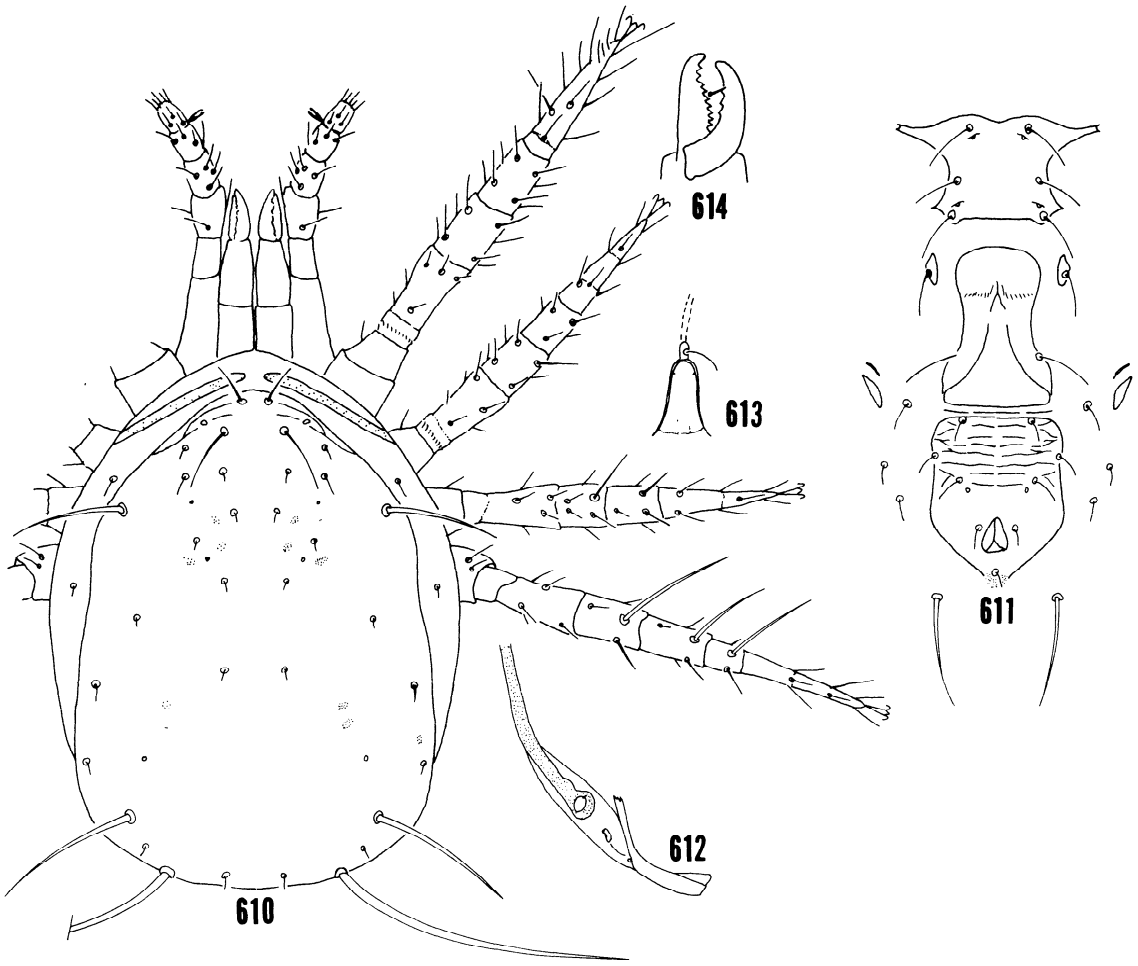
DISCUSSION — This species is known only from the U.S.S.R. Nothing is known about the biology.

BAYONICUS GROUP

Six species are assigned to this group. They are *A. bayonicus* Athias-Henriot, *A. salinellus* Athias-Henriot, *A. aricae* Karg, *A. franzellus* Athias-Henriot, *A. ovalitectus* Van der Merwe, and *A. valpoensis* Gonzales and Schuster. The first 3 species have relatively uniform spermathecal structures which vary mainly in lengths and widths of the nodular atria and saccular flared cervices. However, *ovalitectus* has a thickened, but not nodular, widely bifid atrium; *franzellus* and *valpoensis* have saccular flared cervices and small c-shaped atria.

Key to females in *bayonicus* group

1. Spermathecal atrium nodular 2
— Spermathecal atrium not nodular 4
2. L_4 shorter than 80, L_8 longer than 200, cervix approximately 20 ..... *salinellus* Athias-Henriot, p. 116
— L_4 80 or longer, L_8 200 or shorter, cervix less than 20 3
3. L_4 80, L_8 200, St IV shorter than Sge IV ..... *bayonicus* Athias-Henriot, p. 115
— L_4 90, L_8 shorter than 200, St IV and Sge IV approximately same length ..... *aricae* Karg, p. 117
4. Atrium bifid, cervix longer than 20 .....



Figs. 610-614. *Amblyseius bayonicus* Athias-Henriot: 610. Dorsal and leg structure of female, 611. Ventral scuta and setation of female, 612. Posterior peritremal and stigmatal development of female, 613. Spermathecal structure of female, 614. Cheliceral structure of female.

.....*ovalitectus* Van der Merwe, p. 118
— Atrium c-shaped, cervix shorter than 20 5
5. L_4 shorter than 50, M_3 shorter than 75, L_8 shorter than 150.....*franzellus* Athias-Henriot, p. 117
— L_4 longer than 50, M_3 longer than 75, L_8 longer than 150....*valpoensis* Gonzalez and Schuster, p. 119

Amblyseius bayonicus Athias-Henriot
Fig. 610-614

Amblyseius bayoncius Athias-Henriot, 1966: 203.

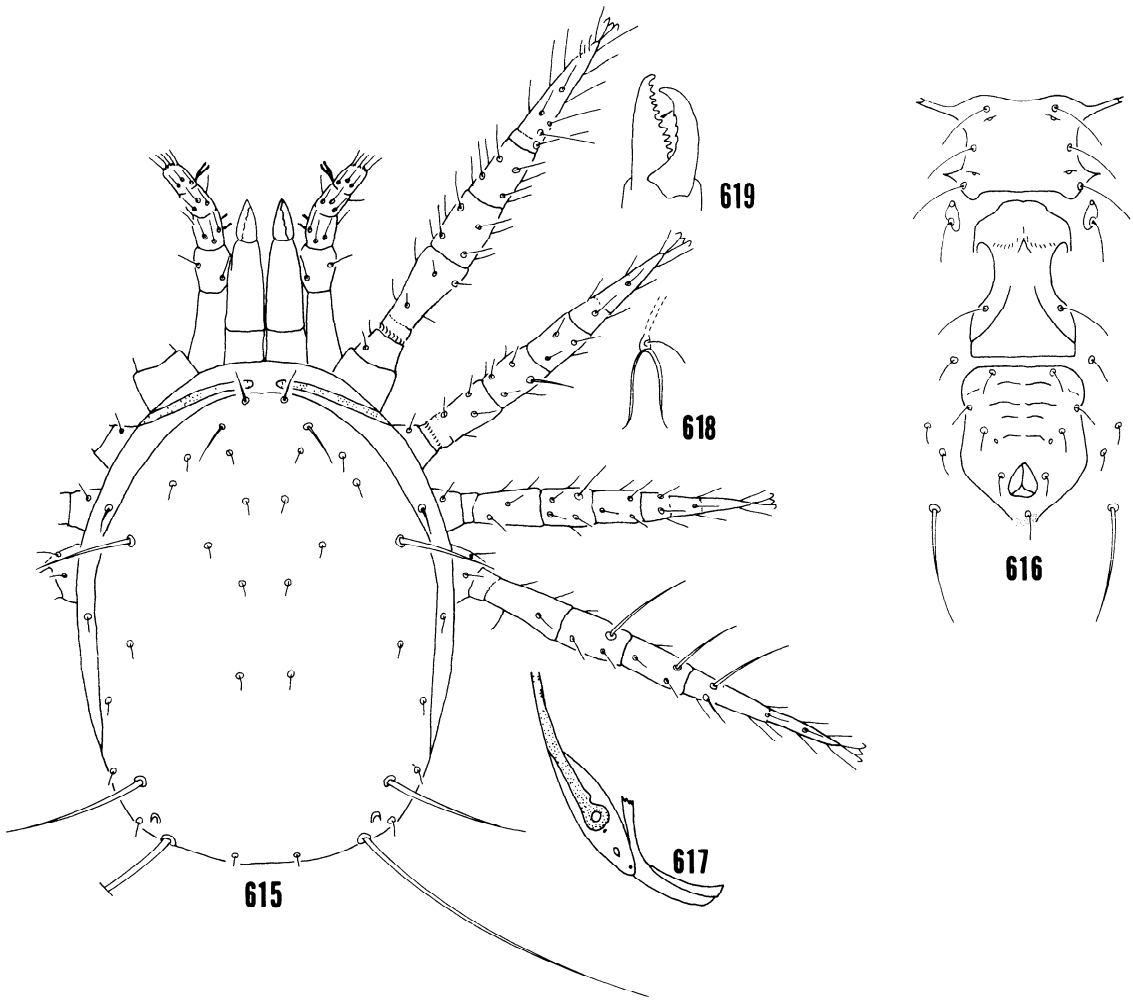
TYPE — Female holotype, Spain: Monte Ferreo, near Bayona, Orense, 1966, Athias-Henriot, from moor, in Museum of Natural History, Wien, Burging, Austria.

DIAGNOSIS — *Amblyseius bayonicus* is similar to *Amblyseius salinellus* Athias-Henriot and *Amblyseius aricae* Karg but differs by having L_4 82, L_8 204, M_2 111, and St IV 75 as apposed to L_4 71, L_8 219, M_3 99 and St IV 66 in *salinellus* and L_4 90, L_8 186, M_3 114, and St IV 98 in *aricae*.

FEMALE — Length 376; width at L_4 224. Dorsal scutum smooth with a few scattered muscle marks, 4-5 small pores, and 17 pairs of setae. Measurements of setae: verticals 27; D_1 6, D_2 6, D_3 6, D_4 6; clunals 11; L_1 49, L_2 6, L_3 10, L_4 82, L_5 11, L_6 9, L_7 9, L_8 204; M_1 6, M_2 6, M_3 111; anterior sublaterals 18; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum reticulated with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 86, Sti IV 68, St IV 75. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular flared cervix 19 and nodular atrium.

MALE — Unknown.

DISCUSSION — This species is known only from



Figs. 615-619. *Amblyseius salinellus* Athias-Henriot: 615. Dorsal and leg structure of female, 616. Ventral scuta and setation of female, 617. Posterior peritremal and stigmatal development of female, 618. Spermathecal structure of female, 619. Cheliceral structure of female.

the type collection. Nothing is known about the biology of this species.

Amblyseius salinellus Athias-Henriot
Fig. 615-619

Amblyseius salinellus Athias-Henriot, 1966: 203.

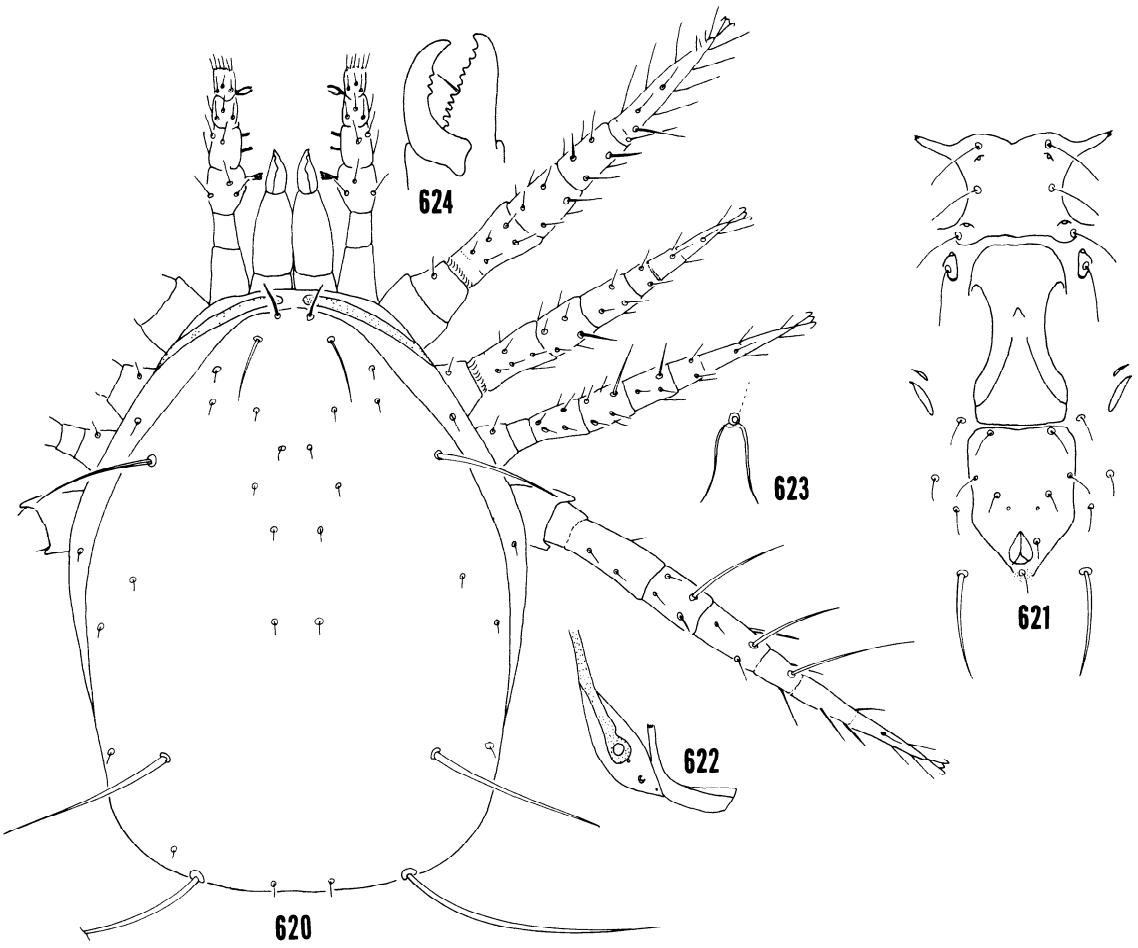
TYPE — Female holotype, Spain: Punta de la Estaca, La Coruna, 1966, C. Athias-Henriot, in litter of *Ulex* sp. and *Armeria maritima*, in Museum of Natural History, Wien, Burging, Austria.

DIAGNOSIS — See *Amblyseius bayonicus* Athias-Henriot.

FEMALE — Length 265; width at L_4 160. Dorsal scutum smooth with a large pore at base of L_8, and 17 pairs of setae. Measurements of setae: verticals broken; D_1 6, D_2 6, D_3 6, D_4 6; L_1 broken, L_2 11, L_3 12, L_4 71, L_5 6, L_6 6, L_7 6, L_8 219; clunals 12;M_1 6, M_2 8, M_3 99; anterior sublaterals 16; posterior sublaterals 9. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of small round pores, lightly creased, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 69, Sti IV 53, St IV 66. Genu II 2 - 2 - 2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular flared cervix 20 and nodular atrium.

MALE — Unknown.

DISCUSSION — *Amblyseius salinellus* is known only from the type specimen. Nothing is known of its food habits.



Figs. 620-624. *Amblyseius aricae* Karg: 620. Dorsal and leg structure of female, 621. Ventral scuta and setation of female, 622. Posterior peritremal and stigmatal development of female, 623. Spermathecal structure of female, 624. Cheliceral structure of female.

Amblyseius aricae Karg
Fig. 620-624

Amblyseius aricae Karg, 1976: 522.

TYPE — Female holotype, Chile: province of Tarapaca, 1965, W. Karg, in soil, in Budapest, Baross, in Institute for Plant Protection Research, Kleinmachnow, East Germany.

DIAGNOSIS — See *Amblyseius bayonicus* Athias-Henriot.

FEMALE — Length 395; width at L_4 252. Dorsal scutum smooth with 17 pairs of setae. Measurements of setae: verticals 25; D_1 6, D_2 6, D_3 6, D_4 8; clunals 9; L_1 36, L_2 8, L_3 8, L_4 90, L_5 8, L_6 8, L_7 7, L_8 186; M_1 6, M_2 6, M_3 114; anterior sublaterals 14; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 93, Sti IV 78, St IV 98. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with saccular flared cervix 11 and nodular atrium.

MALE — Unknown.

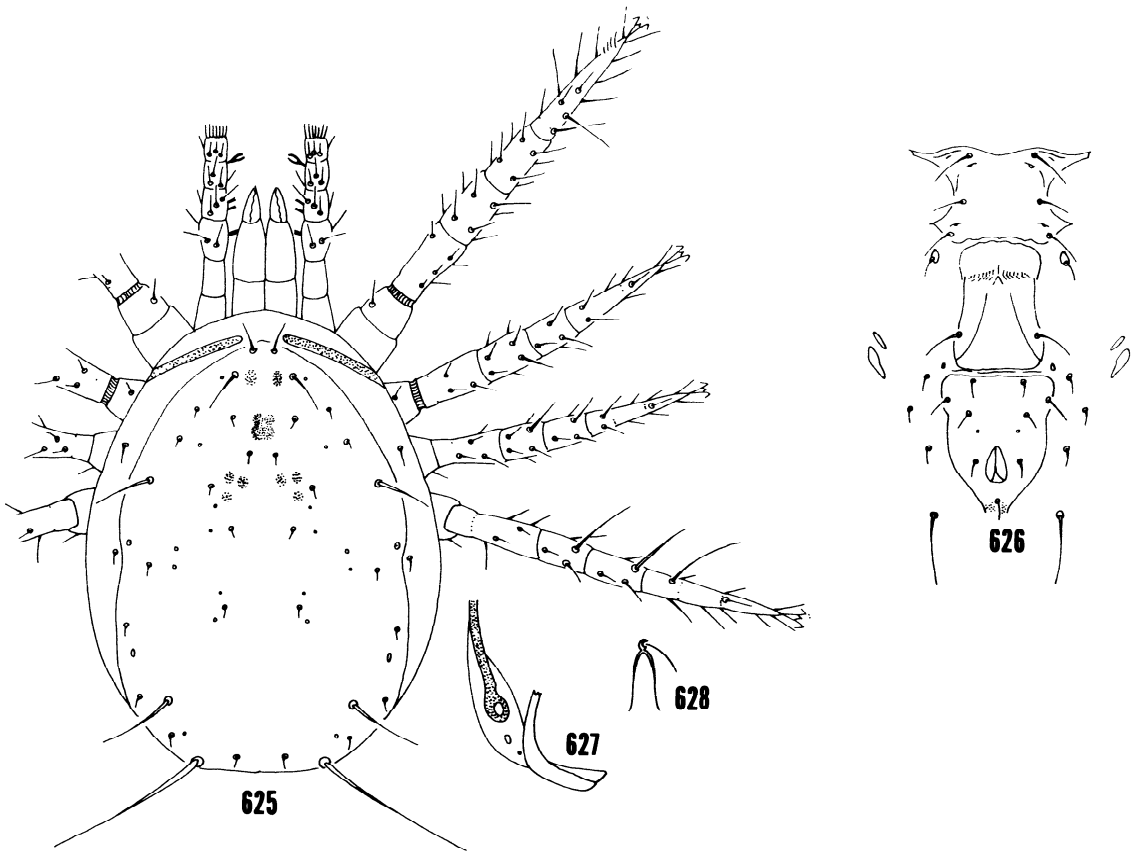
DISCUSSION — This species is known only from province of Tarapaca, Chile, (1965, 1966), W. Karg in soil.

Amblyseius franzellus Athias-Henriot
Fig. 625-628

Amblyseius franzellus Athias-Henriot, 1967: 535.

TYPE — Female holotype, Argentina: south of Buralovich, south of Bahia Blanca, 3 IX 1963, H. Franz, in litter, in Natural History Museum, Zoologische Abteilung, Vienna, Austria.

DIAGNOSIS — *Amblyseius franzellus* is similar to *Amblyseius valpoensis* Gonzalez and Schuster but differs in having L_4 shorter than 50, M_3 shorter than 75, L_8



Figs. 625-628. *Amblyseius franzellus* Athias-Henriot: 625. Dorsal and leg structure of female, 626. Ventral scuta and setation of female, 627. Posterior peritremal and stigmatal development of female, 628. Spermathecal structure of female.

shorter than 150 as apposed to L_4 longer than 50, M_1 longer than 75, and L_8 longer than 150 in *valpoensis*.

FEMALE — Length 345; width at L_4 204. Dorsal scutum smooth with scattered small to medium sized pores, scattered muscle marks dorsocentrally, and 17 pairs of setae. Measurements of setae: verticals 21; D_1 5, D_2 5, D_3 5, D_4 5; clunals 9; L_1 33, L_2 5, L_3 5, L_4 44, L_5 11, L_6 9, L_7 8, L_8 130; M_1 5, M_2 7, M_3 68; anterior sublaterals 16; posterior sublaterals 12. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger unclear. Leg formula 1423. Macrosetae Sge IV 58, Sti IV 53, St IV 65. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with saccular flared cervix 12 and c-shaped atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type specimen. Nothing is known about the biology of this species.

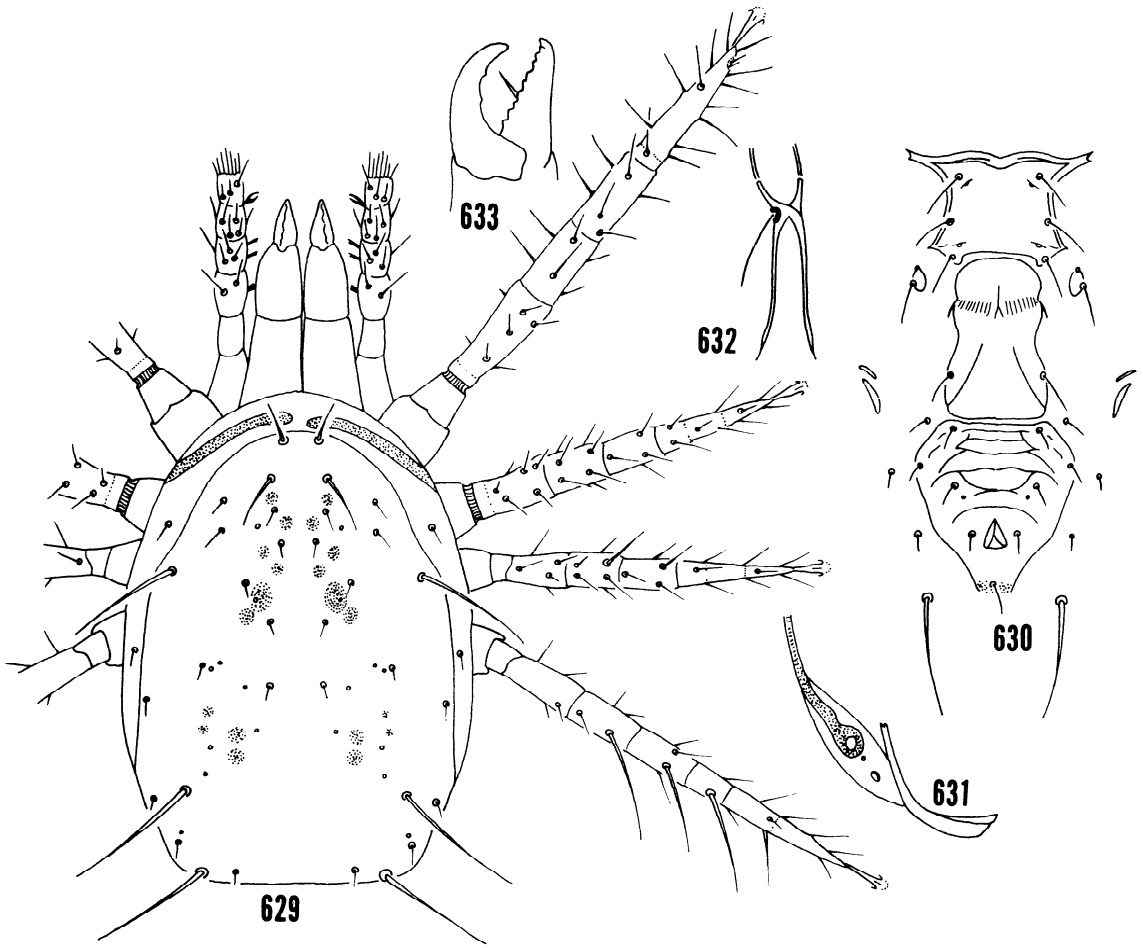
Amblyseius ovalitectus Van der Merwe
Fig. 629-633

Amblyseius ovalitectus Van der Merwe, 1968: 155.

TYPE — Female holotype, Republic of South Africa: Potchefstroom (Transvaal), ? X 1962, G.C. Loots, from soil, in National Collections of Insects, Pretoria, R.S.A.

DIAGNOSIS — *Amblyseius ovalitectus* is unique in this group by having a bifid atrium.

FEMALE — Length 329; width at L_4 204. Dorsal scutum smooth with scattered muscle marks dorsocentrally, 9 small pores, and 17 pairs of setae. Measurements of setae: verticals 27; D_1 6, D_2 6, D_3 6, D_4 6; clunals 8; L_1 35, L_2 6, L_3 11, L_4 82, L_5 6, L_6 6, L_7 8, L_8 84; M_1 6, M_2 6, M_3 97; anterior sublaterals 11; posterior sublaterals 8. Sternal scutum lightly creased anteriorly and laterally, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum reticulated with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 2 small denticules. Leg formula 1423. Macrosetae Sge



Figs. 629-633. *Amblyseius ovalitectus* Van der Merwe: 629. Dorsal and leg structure of female, 630. Ventral scuta and setation of female, 631. Posterior peritremal and stigmatal development of female, 632. Spermathecal structure of female, 633. Chelicerał structure of female.

IV 82, Sti IV 63, St IV 71. Genu II 2 - 2-2/0; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular flared cervix 28 and bifid atrium.

MALE — Unknown.

DISCUSSION — The species is known only from Potchefstroom, Republic of South Africa in soil. Nothing is known about the biology of this species.

Amblyseius valpoensis Gonzalez & Schuster
Fig. 634-638

Amblyseius valpoensis Gonzalez and Schuster, 1962: 16.

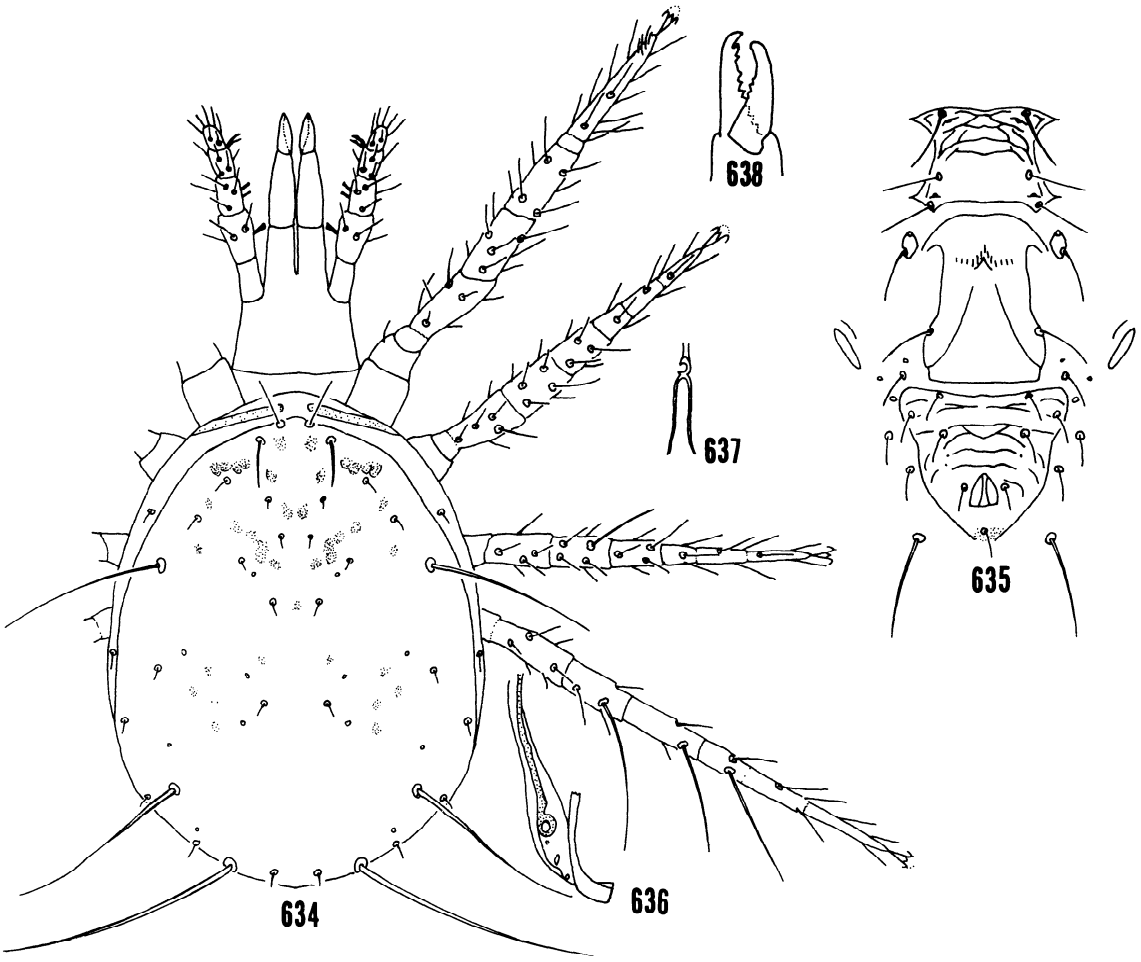
TYPE — Female holotype, Chile: Jardin, Botanico Nacional, Vina del Mar, 16 V 1961, L.M. Smith, in soil and humus (USNMNH).

DIAGNOSIS — See *Amblyseius franzellus* Athias-Henriot.

FEMALE — Length 345; width at L_4 243. Dorsal scutum smooth with scattered muscle marks, 5-6 small pores scattered over the dorsum, and 17 pairs of setae. Measurements of setae: verticals 33; D_1 5, D_2 5, D_3 6, D_4 7; clunals 9; L_1 35, L_2 5, L_3 5, L_4 125, L_5 9, L_6 9, L_7 11, L_8 173; M_1 5, M_2 8, M_3 141; anterior sublaterals 15; posterior sublaterals 10. Sternal scutum reticulated anteriorly, 2 pairs of pores and 3 pairs of setae. Ventrianal scutum reticulated with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 110, Sti IV 87, St IV 95. Genu II 2 - 2/1 - 2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular flared cervix 12 and c-shaped atrium.

MALE — Unknown.

DISCUSSION — Nothing is known about the biology of this species. It has been collected in Chile from the soil and humus.



Figs. 634-638. *Amblyseius valpoensis* Gonzalez and Schuster: 634. Dorsal and leg structure of female, 635. Ventral scuta and setation of female, 636. Posterior peritremal and stigmatal development of female, 637. Spermathecal structure of female, 638. Cheliceral structure of female.

FERNANDEZI GROUP

Two species are assigned to this group. They are *A. fernandezi* Chant and Baker and *A. martus* De Leon. Both species have an undifferentiated atrium and saccular cervix; however, *fernandezi* has the ectal end of the cervix darkened slightly, and *martus* has the same area of the cervix "pocular" in detail.

Key to females in *fernandezi* group

1. Spermathecal cervix shorter than 20 and Sge IV shorter than 100 ..... *fernandezi* Chant and Baker, p. 120
— Spermathecal cervix 20 or longer and Sge IV 100 ..... *martus* De Leon, p. 121

Amblyseius fernandezi Chant and Baker

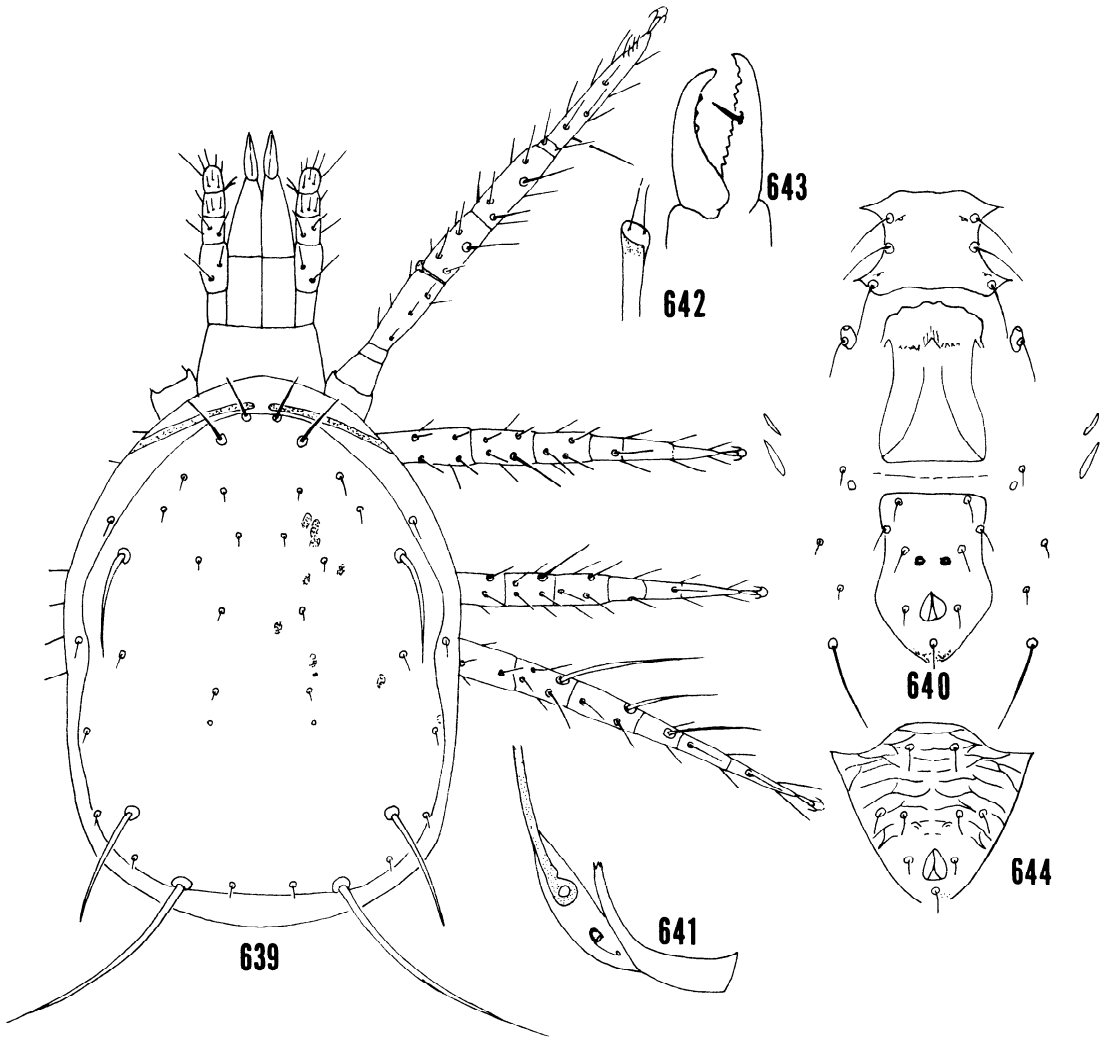
Fig. 639-644

Amblyseius fernandezi Chant and Baker, 1965: 19.

TYPE — Female holotype, Honduras: Lancetilla, 13 III 1959, J.G. Matthysse, on bamboo leaf (USNMNH).

DIAGNOSIS — *Amblyseius fernandezi* is similar to *Amblyseius martus* De Leon but differs in having L_2 shorter than 15, L_5 10 or longer, and Sge IV shorter than 100 as apposed to L_2 15 or longer, L_5 shorter than 10, and Sge IV 100 or longer in *martus*.

FEMALE — Length 345-361; width at L_4 236-242. Dorsal scutum smooth with or without scattered muscle marks, none to 3 small pores, and 17 pairs of setae. Measurements of setae: verticals 28; D_1 4-5, D_2 4-5, D_3 5-7, D_4 5-8; clunals 9; L_1 35-45, L_2 9-12, L_3 6-10, L_4 75-87, L_5 11-12, L_6 9-12, L_7 10, L_8 172-220; M_1 4-5, M_2 8-9, M_3 84-102; anterior sublaterals 12-16; posterior



Figs. 639-644. *Amblyseius fernandezi* Chant and Baker: 639. Dorsal and leg structure of female, 640. Ventral scuta and setation of female, 641. Posterior peritremal and stigmatal development of female, 642. Spermathecal structure of female, 643. Cheliceral structure of female, 644. Ventrianal scutum of male.

sublaterals 9-10. Sternal scutum smooth, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum smooth to lightly creased, a pair of elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 11-12 denticules, and movable finger with 3-4 denticules. Leg formula 1423 or 4123. Macrosetae Sge IV 79-90, Sti IV 59-65, St IV 67-79. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/0 - 1. Spermatheca with short saccular cervix 14-17 and lightly-stippled differentiated atrium.

MALE — The male is similar to the female but smaller in size. The spermatodactyl has foot terminal, lateral process present, and toe not enlarged. The ventrianal scutum creased with a pair of elliptical pores and 3 pairs of preanal setae.

DISCUSSION — This species has been collected in Honduras on bamboo leaves. Nothing is known about the life history of this species.

Amblyseius martus De Leon

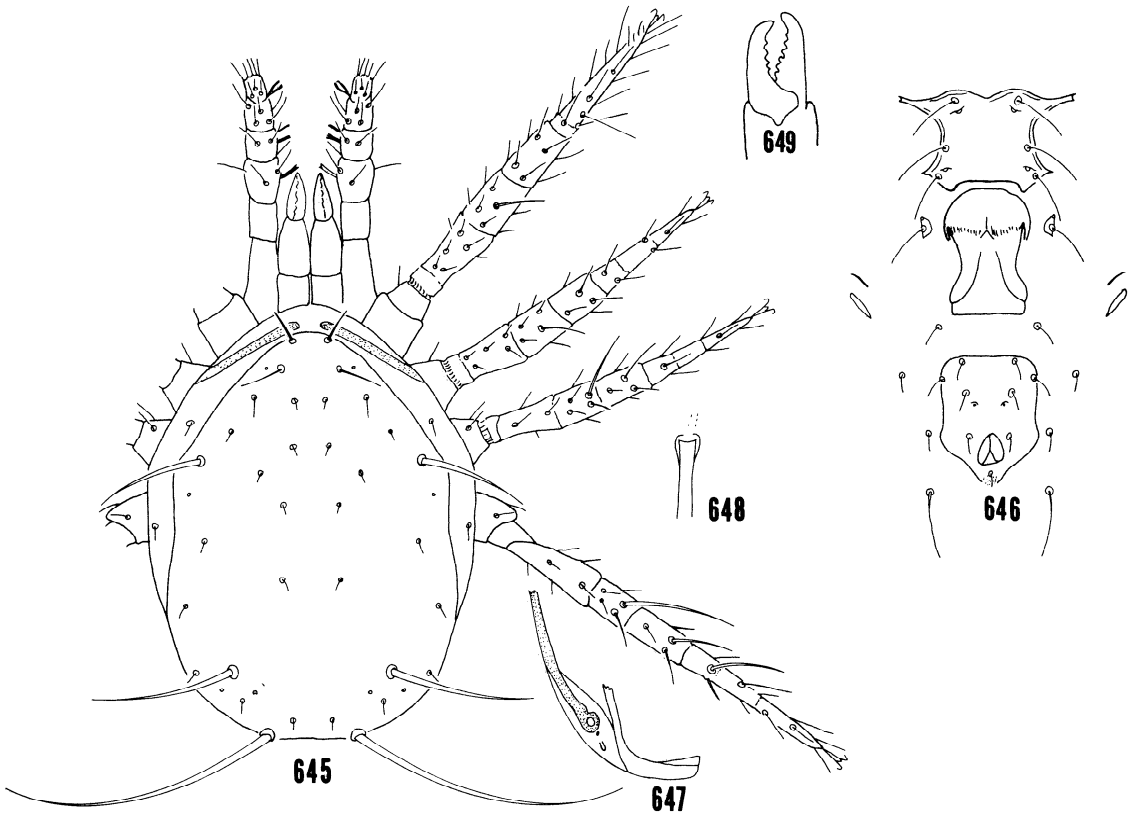
Fig. 645-649

Amblyseius martus De Leon, 1966: 92; Denmark and Muma, 1975: 286.

TYPE — Female holotype, British Guyana: Natural Reserve, Bartica, 28 X 1963, D. De Leon, on *Swartzia leiocalycina* (MCZ).

DIAGNOSIS — See *Amblyseius fernandezi* Chant and Baker.

FEMALE — Length 328; width at L_4 204. Dorsal scutum smooth with 3-5 small pores and 17 pairs of setae. Measurements of setae: verticals 27; D_1 6, D_2 7, D_3 8,



Figs. 645-649. *Amblyseius martus* De Leon: 645. Dorsal and leg structure of female, 646. Ventral scuta and setation of female, 647. Posterior peritremal and stigmatal development of female, 648. Spermathecal structure of female, 649. Cheliceral structure of female.

D_4 9; clunals 8; L_1 33, L_2 17, L_3 9, L_4 87, L_5 7, L_6 8, L_7 9, L_8 235; M_1 8, M_2 8, M_3 102; anterior sublaterals 11; posterior sublaterals 9. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 102, Sti IV 51, St IV 65. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular cervix 22 and undifferentiated atrium.

MALE — Unknown.

DISCUSSION — This species has been taken in British Guyana and Puerto Rico on *Swartzia leiocalycina, Anaxagorea dolichocarpa, Sclerobium micropetalum, Calophyllum brasiliense* var. *antillanum, Cissus* sp., *Citrus* sp., *Hibiscus* sp., *Lantana* sp., *Passiflora* sp., *Philodendron* sp., castor bean, rose apple, mango, taro, and turk's cap.

COFFEAE GROUP

Two species are assigned to this group. They are *A. coffeae* De Leon and *A. divisus* De Leon. Both species have undifferentiated atria, and the cervices fundibular at both ends, strongly so in *coffeae* and weakly so in *divisus.*

Key to female is *coffeae* group

1. L_8 230, L_4 65, and cervix 22 .... *coffeae* De Leon, p. 122
— L_8 99, L_4 46, and cervix 17 .... *divisus* De Leon, p. 123

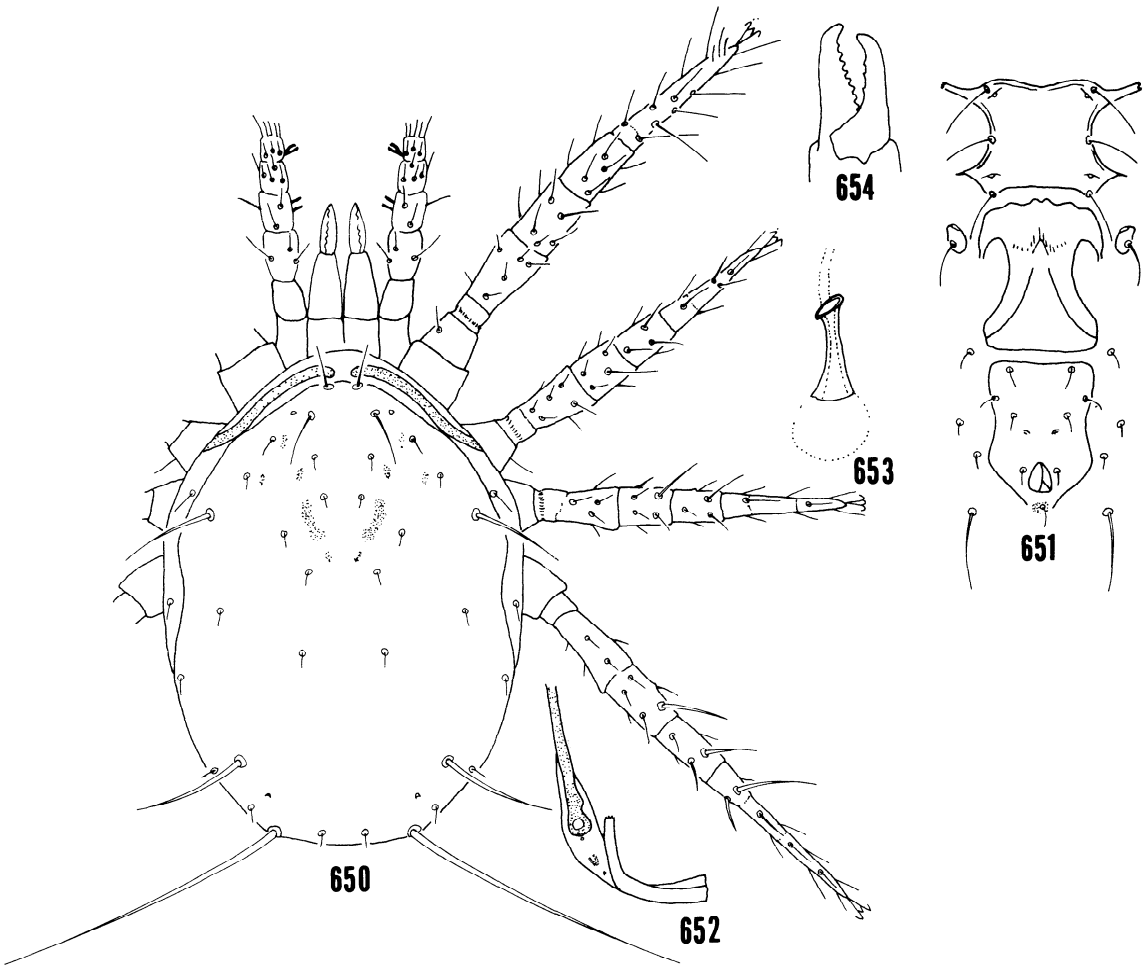
Amblyseius coffeae De Leon

Fig. 650-654

Amblyseius coffeae De Leon, 1961: 87.

TYPE — Female holotype, Mexico: Cordoba, Veracruz, 4 II 1957, D. De Leon, on *Citrus* sp. (MCZ).

DIAGNOSIS — *Amblyseius coffeae* is similar to *Amblyseius divisus* De Leon but differs in having L_4 65, L_8 230, and Sge IV 79 as apposed to L_4 46, L_8 99, and Sge IV 58 in *divisus.*



Figs. 650-654. *Amblyseius coffeae* De Leon: 650. Dorsal and leg structure of female, 651. Ventral scuta and setation of female, 652. Posterior peritremal and stigmatal development of female, 653. Spermathecal structure of female, 654. Checliceral structure of female.

FEMALE — Length 338; width at L_4 240. Dorsal scutum smooth with 1-3 small to medium sized pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 28; D_1 6, D_2 5, D_3 6, D_4 10; clunals 10; L_1 38, L_2 10, L_3 10, L_4 65, L_5 12, L_6 10, L_7 12, L_8 230; M_1 6, M_2 9, M_3 72; anterior sublaterals 17; posterior sublaterals 12. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 10-11 denticules, and movable finger with 2-3 denticules. Leg formula 4123. Macrosetae Sge IV 79, Sti IV 55, St IV 63. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with bifundibular cervix 22 and undifferentiated atrium.

MALE — Unknown.

DISCUSSION — Nothing is known about the biology of this species. It has been collected on citrus in Mexico.

Amblyseius divisus De Leon

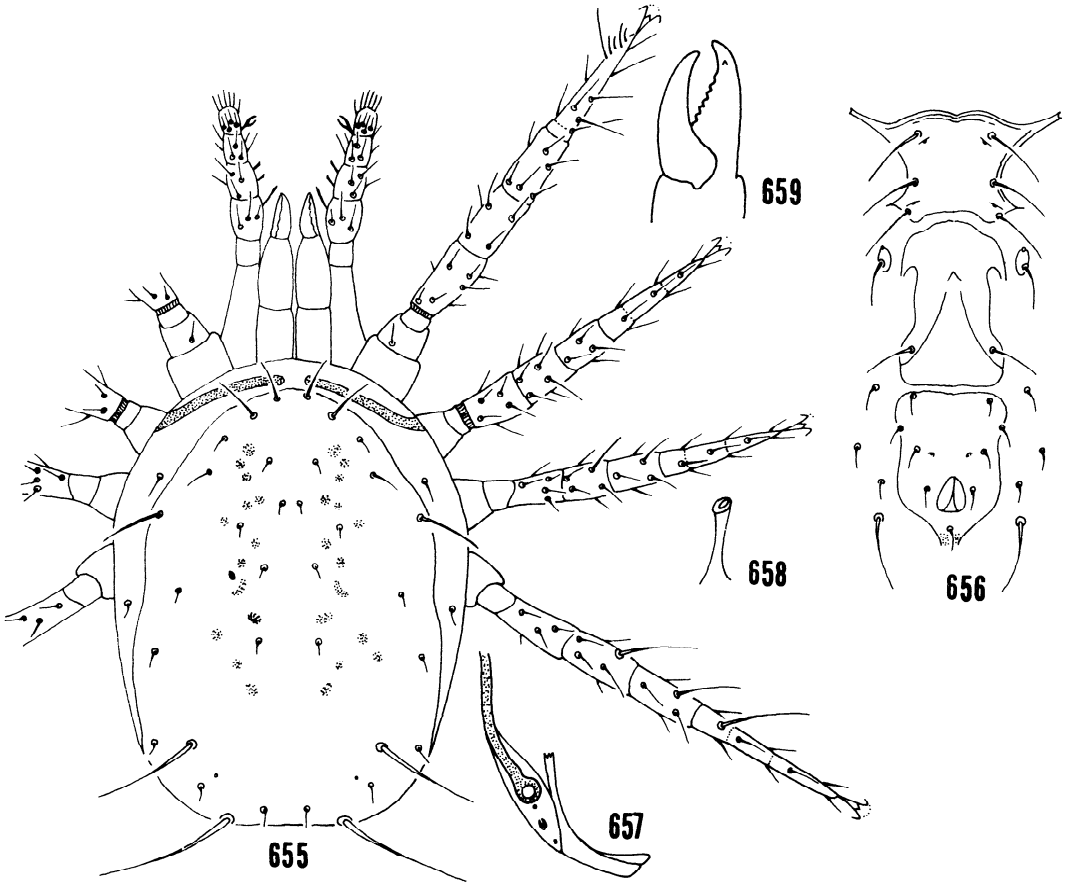
Fig. 655-659

Amblyseius divisus De Leon, 1961: 89; De Leon, 1962: 12.

TYPE — Female holotype, Mexico: Matias Romero, Oaxaca, 30 I 1957, D. De Leon, on *Acrocomia* sp. (MCZ).

DIAGNOSIS — See *Amblyseius coffeae* De Leon.

FEMALE — Length 320; width at L_4 204. Dorsal scutum smooth with scattered muscle marks, at least 1 pair of medium-sized pores, and 17 pairs of setae. Measurements of setae: verticals 25; D_1 6, D_2 6, D_3 6, D_4 6; clunals 10; L_1 31, L_2 8, L_3 20, L_4 46, L_5 11, L_6 8, L_7 8, L_8 99; M_1 6, M_2 6, M_3 75; anterior sublaterals 18; posterior sublaterals 9. Sternal scutum smooth with 2



Figs. 655-659. *Amblyseius divisus* De Leon: 655. Dorsal and leg structure of female, 656. Ventral scuta and setation of female, 657. Posterior peritremal and stigmatal development of female, 658. Spermathecal structure of female, 659. Cheliceral structure of female.

pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with no denticules. Leg formula 4123. Macrosetae Sge IV 58, Sti IV 39, St IV 64. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with bifundibular cervix 17 and undifferentiated atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type specimen. Nothing is known about the biology of this species.

OBTUSERELLUS GROUP

Two species are assigned to this group. They are *A. obtuserellus* Wainstein and Begljarov and *A. asperocervix* McMurtry. Both species have a saccular cervix with rough granular cervical walls.

Key to females in *obtuserellus* group

1. Verticals less than half as long as L_1, M_3 shorter than 100 ..... *asperocervix* McMurtry, p. 125
— Verticals more than half as long as L_1, M_3 longer than 100 ..... *obtuserellus* Wainstein and Begljarov, p. 124

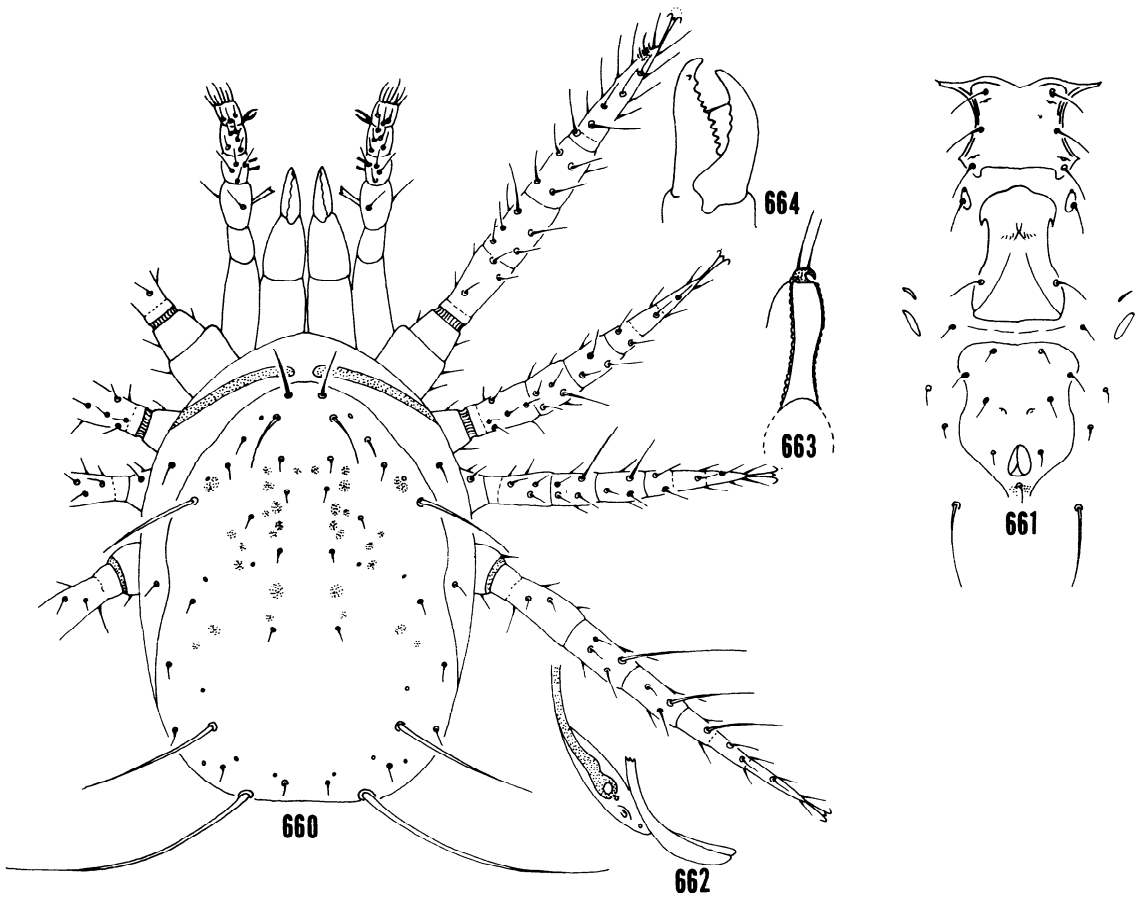
Amblyseius obtuserellus Wainstein & Begljarov

Fig. 660-664

Amblyseius obtuserellus Wainstein & Begljarov, 1971: 1806; Ehara and Yokogawa, 1977: 54; Wainstein, 1979: 14.

TYPE — Female holotype, U.S.S.R.: Kasen, Primorsky Territory on *Potentilla acerina* in Institute of Zoology, Academy of Science of the Ukrainian S.S.R., Kiev.

DIAGNOSIS — *Amblyseius obtuserellus* is similar to *Amblyseius asperocervix* McMurtry but differs in



Figs. 660-664. *Amblyseius obtuserellus* Wainstein and Begljarov: 660. Dorsal and leg structure of female, 661. Ventral scuta and setation of female, 662. Posterior peritremal and stigmatal development of female, 663. Spermathecal structure of female, 664. Cheliceral structure of female.

having verticals 30, L_8 194, and M_3 110 as apposed to vertical 17, L_8 160, M_3 97 in *asperocervix*.

FEMALE — Length 380; width at L_4 204. Dorsal scutum smooth with scattered muscle marks, 7-9 small pores, and 17 pairs of seate. Measurements of setae: verticals 30; D_1 9, D_2 5, D_3 6, D_4 6; clunals 9; L_1 41, L_2 11, L_3 11, L_4 80, L_5 11, L_6 11, L_7 11, L_8 194; M_1 5, M_2 9, M_3 110; anterior sublaterals 17; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 12 denticules, and movable finger with 3-4 denticules. Leg formula 1423. Macrosetae Sge IV 98-101, Sti IV 61-69, St IV 70-77. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 -, 1. Spermatheca with granular saccular cervix 24 and slightly nodular but well differentiated atrium.

MALE— Unknown.

DISCUSSION — This species has been collected on *Potentilla acerina* at Khasan, Primorsky Territory, U.S.S.R.; in Japan: on bamboo at Kyushozan, on *Zoysia* sp. at Kyuehozan, on sasa bamboo at Yasunaga, Tottori City, on *Anthriscus sylvestris* at Yachujo, Tottori City, on *Misanthus sinensis* at Yachujo-bashi. Nothing is known of the biology of this species.

Amblyseius asperocervix McMurtry and Moraes

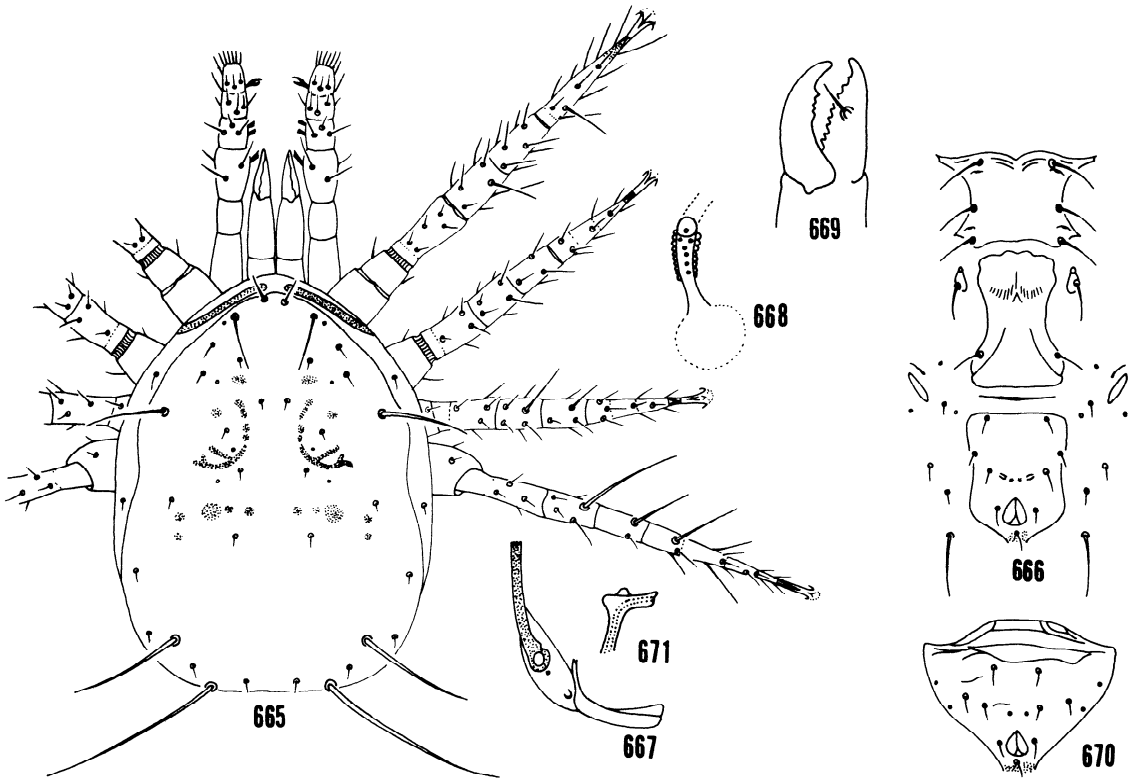
Fig. 665-671

Amblyseius asperocervix McMurtry and Moraes, 1985: 83.

TYPE — Female holotype, New Guinea: Mount Susu Reserve, near Bululo, Papua, 1 VI 1979, J.A. McMurtry, on *Araucaria* sp. (USNMNH).

DIAGNOSIS — See *Amblyseius obtuserellus*.

FEMALE — Length 333; width at L_4 218. Dorsal scutum smooth with scattered muscle marks, 4-5 small pores, and 17 pairs of setae. Measurements of setae: verticals 17; D_1 4, D_2 4, D_3 4, D_4 4; clunals 5; L_1 48, L_2 9, L_3 6, L_4 64, L_5 6, L_6 5, L_7 5, L_8 160; M_1 4, M_2 4, M_3 87; anterior sublaterals 12; posterior sublaterals 6. Sternal scutum smooth with 2 pairs of pores and 3 pairs



Figs. 665-671. *Amblyseius asperocervix* McMurtry and Moraes: 665. Dorsal and leg structure of female, 666. Ventral scuta and setation of female, 667. Posterior peritremal and stigmatal development of female, 668. Spermathecal structure of female, 669. Cheliceral structure of female, 670. Ventrianal scutum of male, 671. Spermatodactyl structure of male.

of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 11 denticules, and 4 denticules on movable finger. Leg formula 1423. Macrosetae Sge IV 82, Sti IV 47, St IV 63. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with granular saccular cervix 16 and undifferentiated atrium.

MALE — The male is similar to the female but smaller. The ventrianal scutum smooth to lightly creased with a pair of small round pores and 3 pairs of preanal setae. The spermatodactyl with foot terminal and slightly divided toe.

DISCUSSION — This species has been collected only from type locality. Nothing is known about its biology.

UNASSIGNED SPECIES GROUP

The following species are placed generically and subgenerically, but because of their unique spermathecal structures they cannot be related positively with other known species. They are retained here as unique species until species with similar spermathecae have been collected and described.

The unassigned species are:

A. anomalus Van der Merwe
A. deleonellus Athias-Henriot
A. paraaerialis Muma
A. reflexus Denmark and Knisley
A. segregans De Leon
A. sinuatus De Leon

Amblyseius segregans De Leon

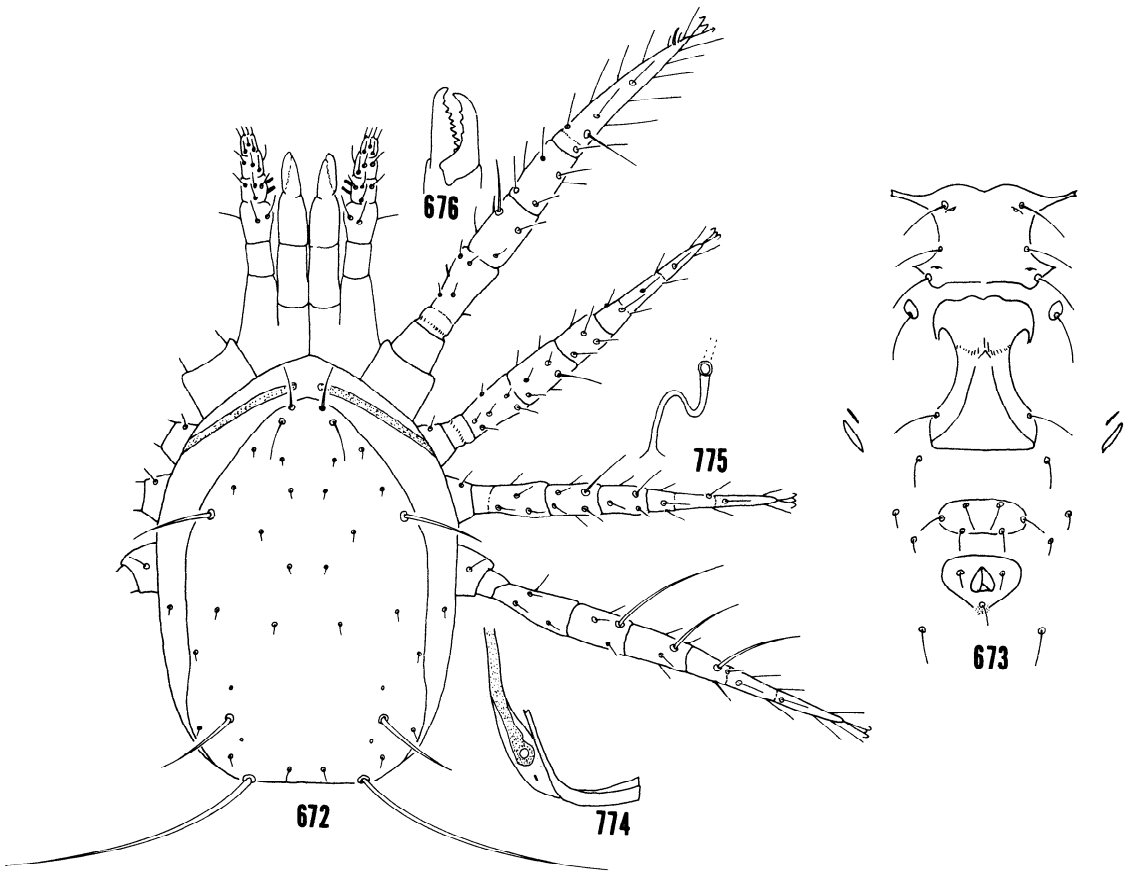
Fig. 672-676

Amblyseius segregans De Leon, 1966: 90.

TYPE — Female holotype, British Guyana: Natural Reserve, Bartica, 26 X 1963, D. De Leon, *Tapirira marchandii* Engl. (MCZ).

DIAGNOSIS — *Amblyseius segregans* is unique in having a long tubular flared cervix 33 long and a divided ventrianal scutum.

FEMALE — Length 320; width at L_4 204. Dorsal scutum smooth, 1 to 3 small pores, and 17 pairs of setae. Measurements of setae: verticals 30; D_1 5, D_2 5, D_3 8,



Figs. 672-676. *Amblyseius segregans* De Leon: 672. Dorsal and leg structure of female, 673. Ventral scuta and setation of female, 674. Posterior peritremal and stigmatal development of female, 675. Spermathecal structure of female, 676. Cheliceral structure of female.

D_4 8; clunals 7; L_1 32, L_2 5, L_3 5, L_4 65, L_5 8, L_6 8, L_7 7, L_8 219; M_1 5, M_2 6, M_3 65; anterior sublaterals 15; posterior sublaterals 14. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum divided and smooth with 3 pairs of preanal setae on the anterior part of the 2 parts. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 95, Sti IV 67, St IV 72. Genu II 2 - 2-2/0 - 1; genu III 2 - 2-2/1 - 1. Spermatheca with long tubular flared cervix 33 and darkly differentiated atrium.

MALE — Unknown.

DISCUSSION — Nothing is known about the biology of this species. It has been collected in British Guyana on *Tapirira marchandii.*

Amblyseius sinuatus De Leon

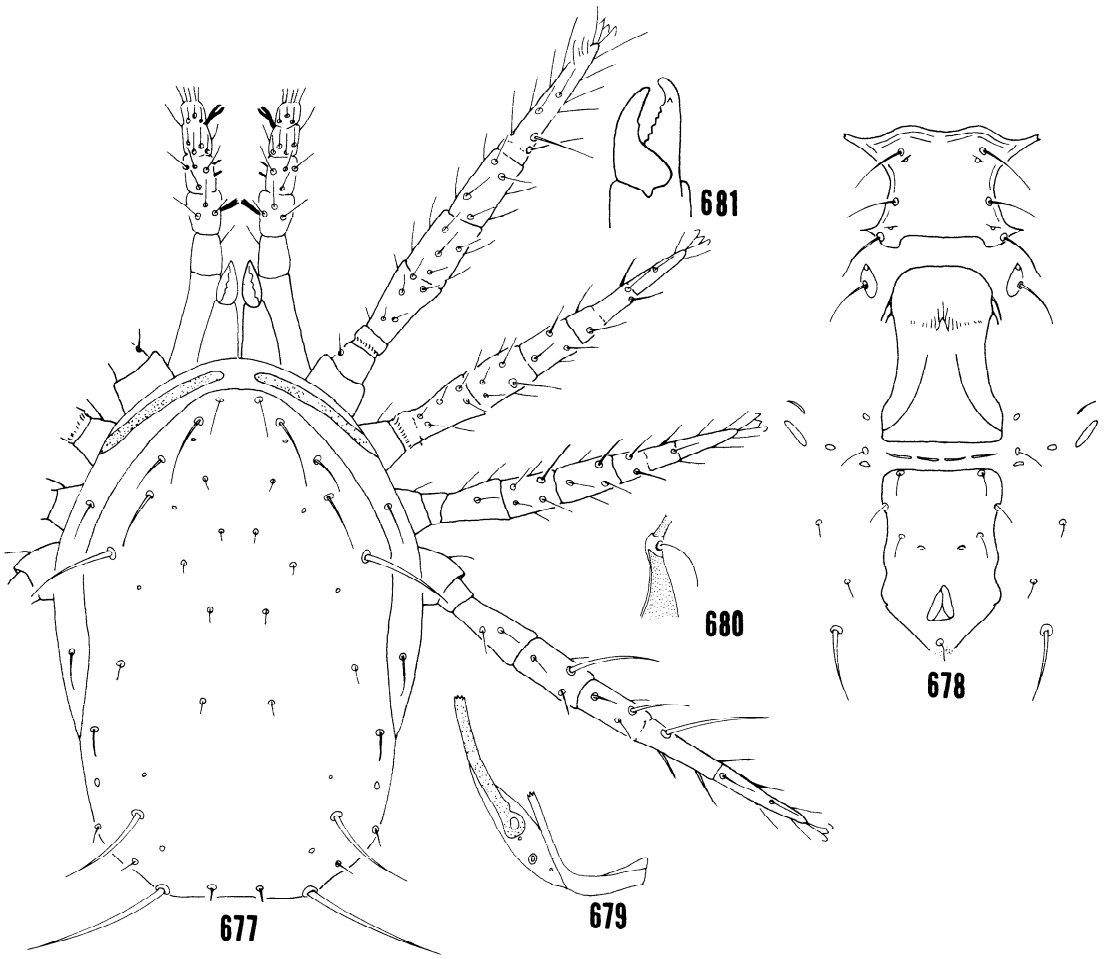
Fig. 677-681

Amblyseius sinuatus De Leon, 1961: 90-91; De Leon, 1962: 12; Karg, 1982: 200.

TYPE — Female holotype, Mexico: Santa Maria del Oro Nayarit, 24 III 1957, D. De Leon, from *Hedyosmum mexicanum* (MCZ).

DIAGNOSIS — *Amblyseius sinuatus* is unique in having L_2 27, L_3 44, L_4 64, L_8 105, M_3 68, and spermatheca with corniform darkened cervix 19 and slightly nodular atrium.

FEMALE — Length 384; width at L_4 220. Dorsal scutum smooth with 5-6 small to medium sized pores and 17 pairs of setae. Measurements of setae: verticals 33; D_1 6, D_2 5, D_3 9, D_4 10; clunals 11; L_1 53, L_2 27, L_3 44, L_4 65, L_5 20, L_6 14, L_7 11, L_8 105; M_1 5, M_2 11, M_3 68; anterior sublaterals 24; posterior sublaterals 17. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to



Figs. 677-681. *Amblyseius sinuatus* De Leon: 677. Dorsal and leg structure of female, 678. Ventral scuta and setation of female, 679. Posterior peritremal and stigmatal development of female, 680. Spermathecal structure of female, 681. Cheliceral structure of female.

the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 1 denticule. Leg formula 4123. Macrosetae Sge IV 63, Sti IV 47, St IV 82. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with corniform darkened cervix 19 and slightly nodular atrium.

MALE — Unknown.

DISCUSSION — This species known from Mexico, Santa Maria del Ora and Tepic, Nayarit on *Hedyosmum mexicanum* and *Baccharus trinervis*. Nothing is known about the biology of this species.

Amblyseius paraaerialis Muma

Fig. 682-686

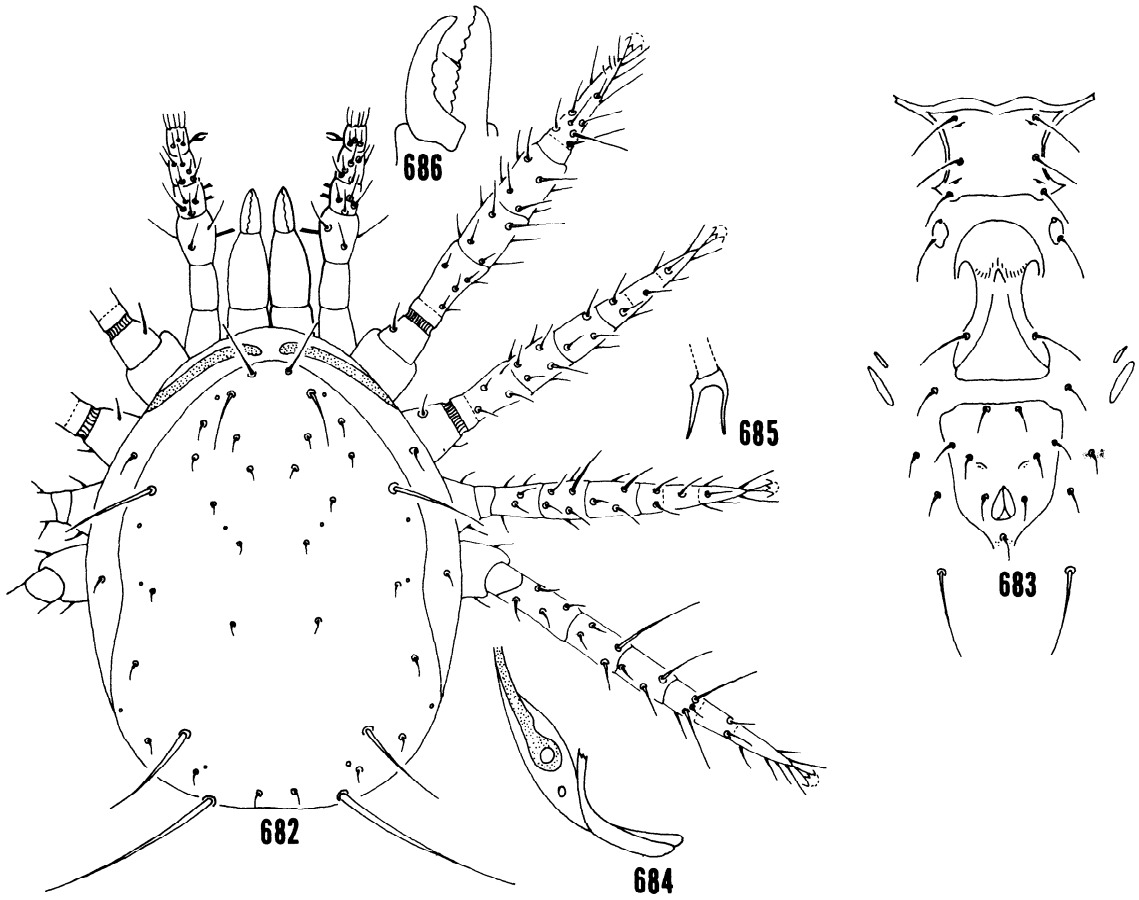
Amblyseius paraaerialis Muma, 1967: 270; Ehara and Bhandhufalch, 1977: 68-69.

TYPE — Female holotype, India: Burnihat, 26 VIII 1961, V.P. Rao, on citrus (FSCA).

DIAGNOSIS — *Amblyseius paraaerialis* is unique in having a short thick-walled saccular cervix 5 and undifferentiated atrium.

FEMALE — Length 340; width at L_4 204. Dorsal scutum smooth with 5-7 small pores and 17 pairs of setae. Measurements of setae: verticals 28; D_1 5, D_2 5, D_3 5, D_4 5; clunals 6; L_1 45, L_2 10, L_3 7, L_4 59, L_5 11, L_6 8, L_7 8, L_8 126; M_1 5, M_2 7, M_3 63; anterior sublaterals 17; posterior sublaterals 11. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Three pairs of setae surround the ventianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 65, Sti IV 42, St IV 52. Genu II 2 - 2/1 - 2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with short thick-walled saccular cervix 5 and undifferentiated atrium.

MALE — The male is similar to the female but



Figs. 682-686. *Amblyseius paraaerialis* Muma: 682. Dorsal and leg structure of female, 683. Ventral scuta and setation of female, 684. Posterior peritremal and stigmatal development of female, 685. Spermathecal structure of female, 686. Cheliceral structure of female.

smaller. The spermatodactyl with foot terminal and toe not enlarged. The ventrianal scutum smooth to lightly creased, a pair of elliptical pores, and 3 pairs of preanal setae. We have not seen a male. See Ehara and Bhandhufalch (1977: 68).

DISCUSSION — This species has been collected in India on *Citrus* sp. and in Thailand on *Citrus* sp., litchi, *Pinus kesiya* Gard., *Bridelia* sp., bamboo, *Urena labata* L., sugarcane, guava, persimmon, and *Eupatorium odoratum* L. Nothing is known about the biology of this species.

Amblyseius anomalus Van der Merwe

Fig. 687-693

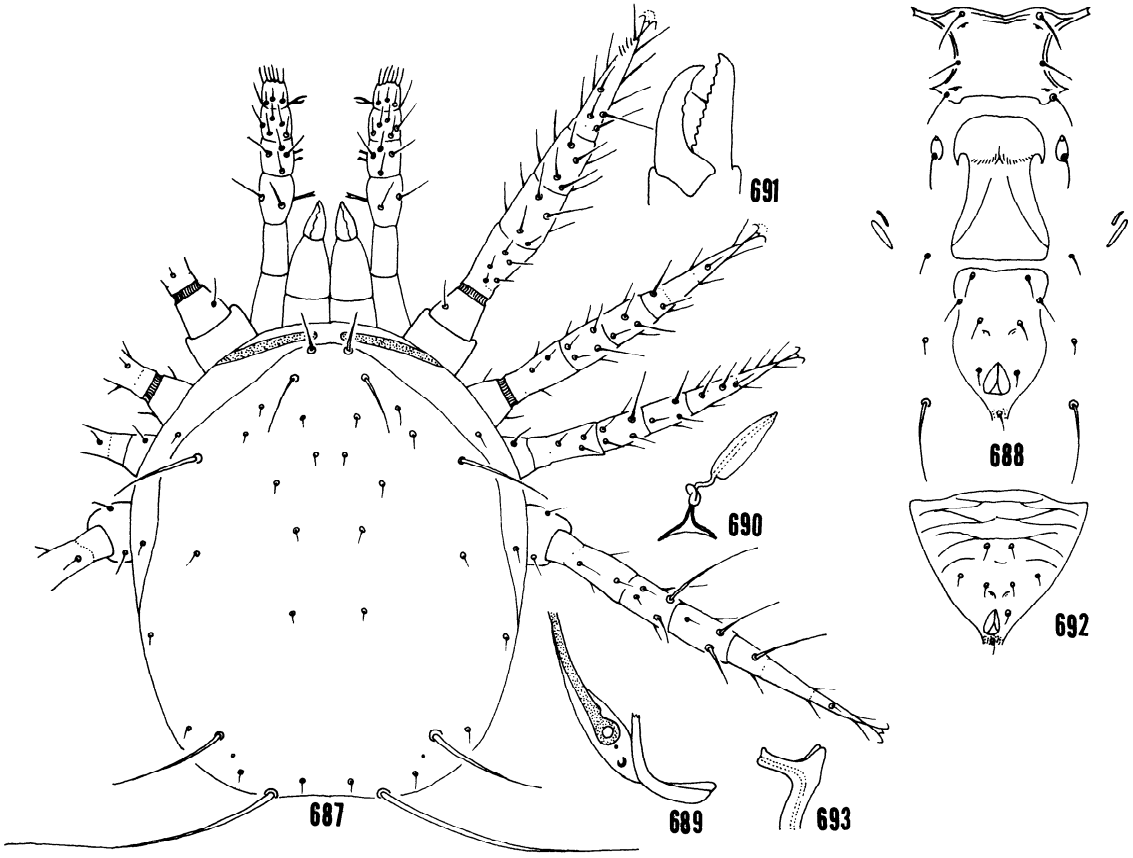
Amblyseius anomalus Van der Merwe, 1968: 157.

TYPE — Female holotype, South Africa: Munster (Natal), 19 IV 1955, M.K.P. Meyer, on *Monstera* sp., in Acarology Section, Plant Protection Research Institute, Pretoria.

DIAGNOSIS — *Amblyseius anomalus* is unique in having a spermatheca with tubular-flared cervix 9, nodular atrium, and vesicular major duct.

FEMALE — Length 376; width at L_4 235. Dorsal scutum smooth with none or 3-4 small pores and 17 pairs of setae. Measurements of setae: verticals 25; D_1 6, D_2 6, D_3 6, D_4 7; clunals 7; L_1 47, L_2 9, L_3 8, L_4 74, L_5 7, L_6 7, L_7 11, L_8 178; M_1 6, M_2 11, M_3 94; anterior sublaterals 9; posterior sublaterals 6. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of elliptical pores and 3 pairs of preanal setae. Two pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly beyond the verticals. Chelicerae normal in relation to body size, fixed finger with 10 denticules, and movable finger with 3 denticules. Leg formula 1423. Macrosetae Sge IV 89, Sti IV 47, St IV 56. Genu II 2 - 2-2/0 - 1; genu III 1 - 2-2/1 - 1. Spermatheca with tubular-flared cervix 9, nodular atrium, and vesicular major duct.

MALE — Similar to female but smaller in size. The ventrianal scutum creased with a pair of elliptical pores and 3 preanal setae. The spermatodactyl with foot and toe not enlarged.



Figs. 687-693. *Amblyseius anomalus* Van der Merwe: 687. Dorsal and leg structure of female, 688. Ventral scuta and setation of female, 689. Posterior peritremal and stigmatal development of female, 690. Spermathecal structure of female, 691. Cheliceral structure of female, 692. Ventrianal scutum of male, 693. Spermatodactyl structure of male.

DISCUSSION — This species has been taken at Munster (Natal) on *Monstera* sp. and grass; Tsitsikama Seacoast National Park (C.P.) on *Curtisia dentata,* at Knysna (C.P.) on unidentified plant. Nothing is known about the biology of this species.

Amblyseius deleonellus Athias-Henriot
Fig. 694-698

Amblyseius deleonellus Athias-Henriot, 1967: 532.

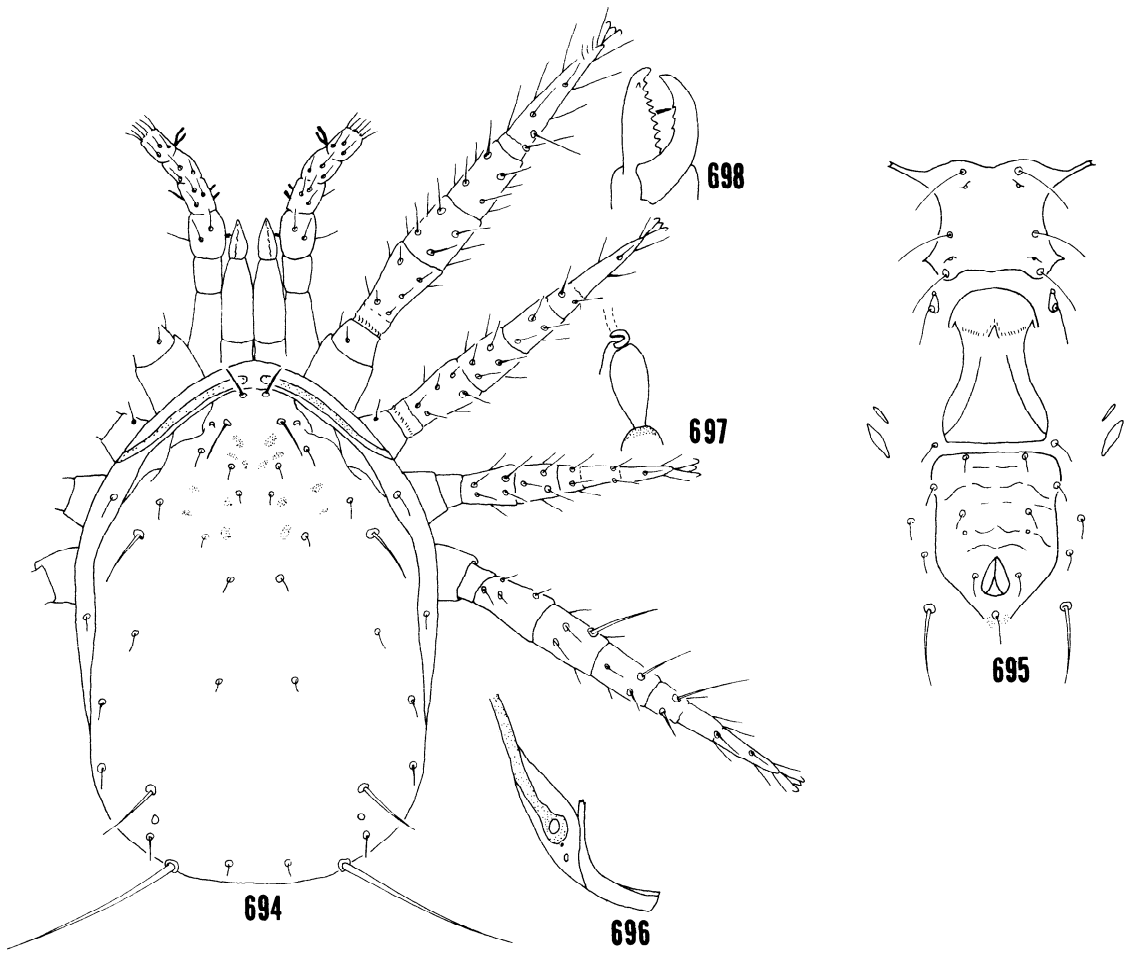
TYPE — Female holotype, Argentina: Arroyo Mache, Mitre, North of Cordoba, Santiago del Estero, 1966, on *Stipa* sp., in Museum of Natural History, Wien, Burgring, Austria.

DIAGNOSIS — *Amblyseius deleonellus* is unique in having a saccular-poculiform spermatheca with a c-shaped atrium.

FEMALE — Length 361; width at L_4 220. Dorsal scutum smooth with scattered muscle marks anteriorly, 2 medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 20; D_1 8, D_2 8, D_3 9, D_4 9; clunals 11; L_1 32, L_2 14, L_3 15, L_4 33, L_5 13, L_6 16, L_7 16, L_8 103; M_1 8, M_2 12, M_3 47; anterior sublaterals 14; posterior sublaterals 10. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum lightly creased, a pair of small round pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 49, Sti IV 43, St IV 57. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with saccular-pocular cervix 24 and c-shaped atrium.

MALE — Unknown.

DISCUSSION — *Amblyseius deleonellus* is known only from the type locality. Nothing is known about the biology of this species.



Figs. 694-698. *Amblyseius deleonellus* Athias-Henriot: 694. Dorsal and leg structure of female, 695. Ventral scuta and setation of female, 696. Posterior peritremal and stigmatal development of female, 697. Spermathecal structure of female, 698. Cheliceral structure of female.

Amblyseius reflexus Denmark and Knisley

Fig. 699-703

Amblyseius reflexus Denmark and Knisley, 1978: 8.

TYPE — Female holotype, U.S.A.: New Jersey, Morris County, Troy Hills, 26 VI 1975, C.B. Knisley, on *Acer saccharinum* (FSCA).

DIAGNOSIS — *Amblyseius reflexus* is unique in having a short pocular cervix with small nodular atrium.

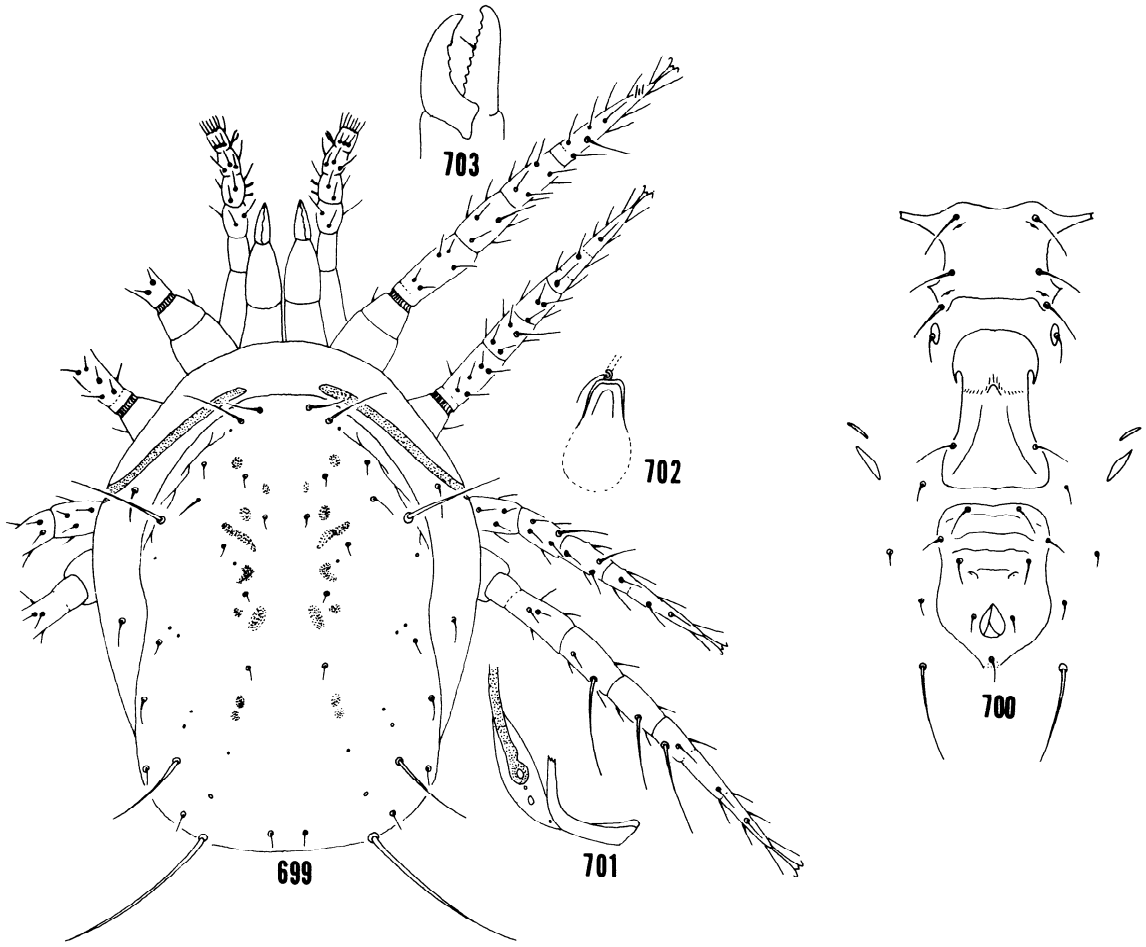
FEMALE — Length 361; width at L_4 188. Dorsal scutum smooth with scattered muscle marks dorsocentrally, 8-9 small to medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 29; D_1 5, D_2 5, D_3 8, D_4 8; clunals 6; L_1 55, L_2 13, L_3 18, L_4 79, L_5 19, L_6 11, L_7 11, L_8 133; M_1 6, M_2 8, M_3 72; anterior sublaterals 27; posterior sublaterals 16. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth to lightly creased, a pair of elliptical pores, and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 9 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 71, Sti IV 55, St IV 66. Genu II 2 - 2-2/0 - 1; genu III 1 - 2/1 - 2/0 - 1. Spermatheca with poculiform cervix 8 and small nodular atrium.

MALE — Unknown.

DISCUSSION — This species has been taken only in New Jersey on silver maple, *Acer saccharinum*. Nothing is known about the biology of this species.

AMBLYSEIUS (PAUCISEIUS) DENMARK AND MUMA N. SUBGEN.

TYPE SPECIES — *Amblyseius meridionalis* Berlese 1914 by present designation here. Females of this subgenus have Sge IV longer than, equal to, or shorter than Sti IV and St IV. Chelicerae with dentition on ff less than 8 (Usually 3-5) and 0-3 on mf. L_8 ranges from



Figs. 699-703. *Amblyseius reflexus* Denmark and Knisley: 699. Dorsal and leg structure of female, 700. Ventral scuta and setation of female, 701. Posterior peritremal and stigmatal development of female, 702. Spermathecal structure of female, 703. Cheliceral structure of female.

about 150 to 275, but usually less than 200. M_3 ranging from 65 to 140, but usually less than 100. Species in this subgenus are found on shrubs, ornamentals, lichens, and in soil.

The following species are placed in the subgenus *Pauciseius*:

MERIDIONALIS GROUP
A. meridionalis Berlese
A. oatmani Denmark
A. bidens Karg
A. proresinae Karg
A. stramenti Karg

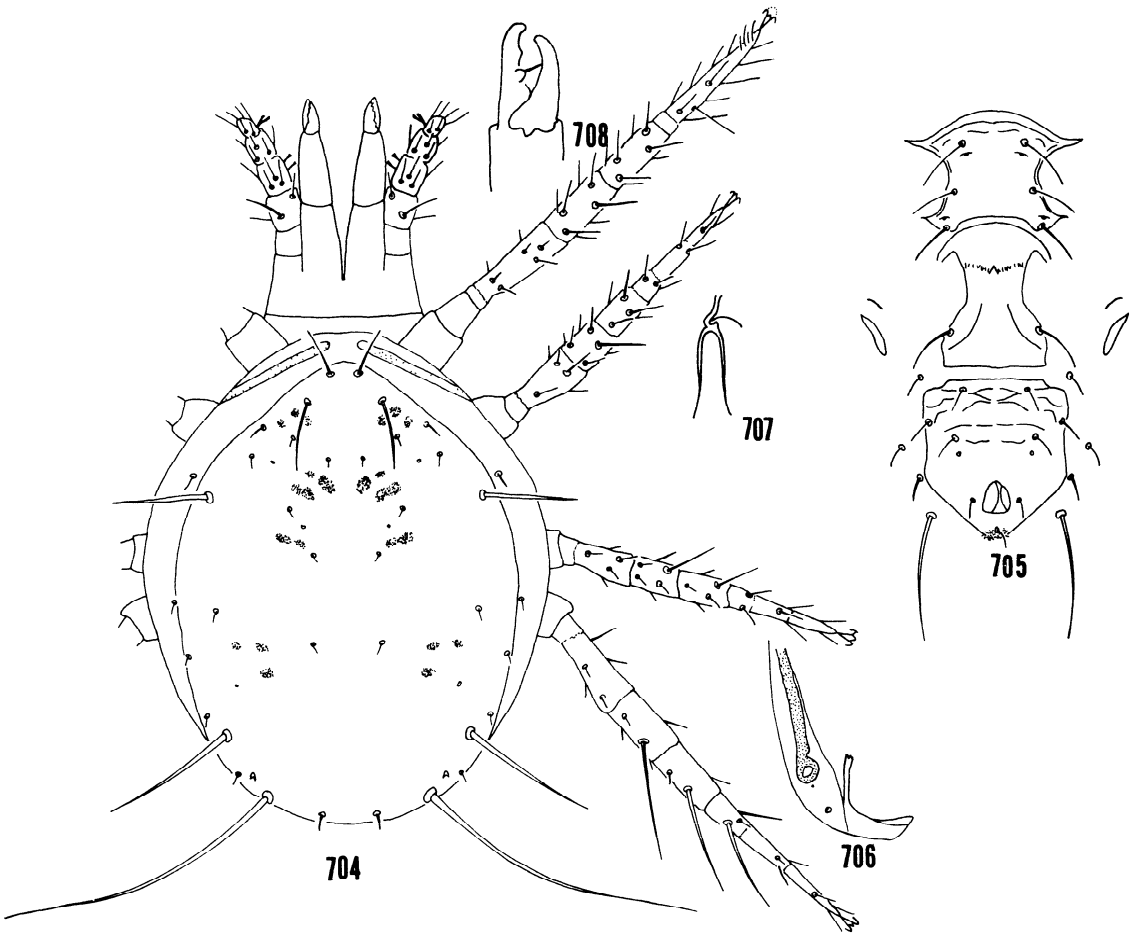
CHORITES GROUP
A. chorites Schuster and Pritchard
A. gruberi Denmark and Muma n. sp.

TUBAE GROUP
A. tubae Karg
A. nemorivagus Athias-Henriot

UNASSIGNED SPECIES GROUP
A. deductus Chaudhri
A. hexadens Karg
A. santoensis Schicha

Key to females in *Amblyseius (Pauciseius)* Denmark and Muma

1. S_1 and S_2 present, L_1 shorter or longer than 30, L_4 longer than 30 2
— S_1 and S_2 absent, L_1 and L_4 both shorter than 30 ..... *santoensis* Schicha, p. 144
2. Three pairs of ventrolateral setae (not including Cs beside the ventrianal scutum 3
— Two pairs of ventrolateral setae (not including Cs) beside the ventrianal scutum 5
3. Spermathecal cervix saccular (See Fig. 707) 4
— Spermathecal cervix not saccular 10
4. Spermatheca with c-shaped atrium (See Fig. 707) 6
— Spermatheca without distinct c-shaped atrium .. 9

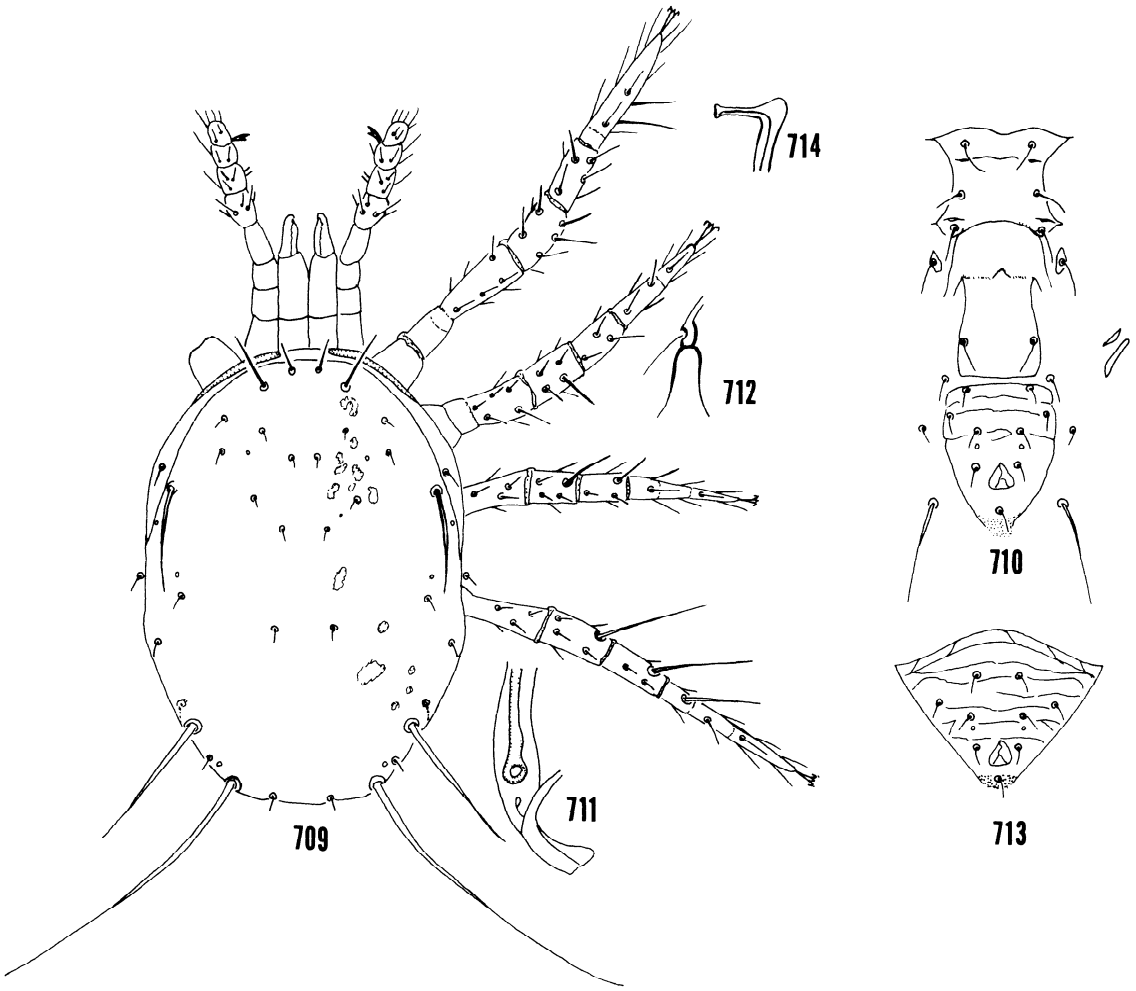


Figs. 704-708. *Amblyseius meridionalis* Berlese: 704. Dorsal and leg structure of female, 705. Ventral scuta and setation of female, 706. Posterior peritremal and stigmatal development of female, 707. Spermathecal structure of female, 708. Cheliceral structure of female.

5. Posterior ventrolateral setae beside the ventrianal scutum missing, L_4 approximately 80, L_8 longer than 200, and M_3 longer than 100 ..... *oatmani* Denmark, p. 135
— Posterior ventrolateral setae beside the ventrianal scutum present but middle pair missing, L_4 shorter than 80, L_8 shorter than 200, and M_3 shorter than 100 ..... *hexadens* Karg, p. 143
6. Sti IV shorter than St IV, L_8 shorter than 200... ..... *gruberi* Denmark and Muma n. sp., p. 139
— Sti IV as long as or longer than St IV, L_8 longer than 200 7
7. M_3 approximately 100 ..... *meridionalis* Berlese, p. 134
— M_3 shorter than 100 8
8. L_4 approximately 80, cervix shorter than 20 ..... *stramenti* Karg, p. 137
— L_4 approximately 50, cervix longer than 20..... *bidens* Karg, p. 135
9. L_1 60 and L_3 66 approximately the same length, L_5 longer than verticals ..... *chorites* Schuster and Pritchard, p. 138
— L_1 20 and L_3 18 approximately the same length but approximately ⅓ as long as in *chorites*, L_5 half as long as verticals ..... *proresinae* Karg, p. 136
10. Spermatheca cervix short tubular and pocular mesally, L_8 over 200 .. *deductus* Chaudhri, p. 142
— Spermatheca cervix not tubular, L_8 less than 200 11
11. Sti IV longer than St IV, L_1 approximately 5 times longer than L_3 ..... *tubae* Karg, p. 140
— Sti IV shorter than St IV, L_1 approximately the same length as L_3 . *nemorivagus* Athias-Henriot, p. 141

MERIDIONALIS GROUP

Five species are assigned to this group. They are *A. meridionalis* Berlese, *A. oatmani* Denmark, *A. bidens* Karg, *A. proresinae* Karg, and *A. stramenti* Karg. All species have a saccular flared cervix except *stramenti* which has a saccular cervix. The atria in *oatmani* and *proresinae* are nodular and c-shaped in the other species.



Figs. 709-714. *Amblyseius oatmani* Denmark: 709. Dorsal and leg structure of female, 710. Ventral scuta and setation of female, 711. Posterior peritremal and stigmatal development of female, 712. Spermathecal structure of female, 713. Ventrianal scutum of male, 714. Spermatodactyl structure of male.

Amblyseius meridionalis Berlese

Fig. 704-708

Amblyseius obtusus var. *meridionalis* Berlese, 1914: 144.
Typhlodromus obtusus var. *meridionalis* (Berlese), Chant 1957: 306; Chant, 1959: 85; Hirschmann, 1962: 23; Westerboer and Bernhard, 1963: 690.
Amblyseius meridionalis Berlese, Athias-Henriot, 1958: 32; Athias-Henriot, 1961: 424; Athias-Henriot, 1966: 203; Wainstein and Shcherbak, 1972: 35; Livshitz and Kuznetsov, 1972: 22; Chant and Shaul, 1978: 1062.
Amblyseius calicis Karg, 1960: 444-446.

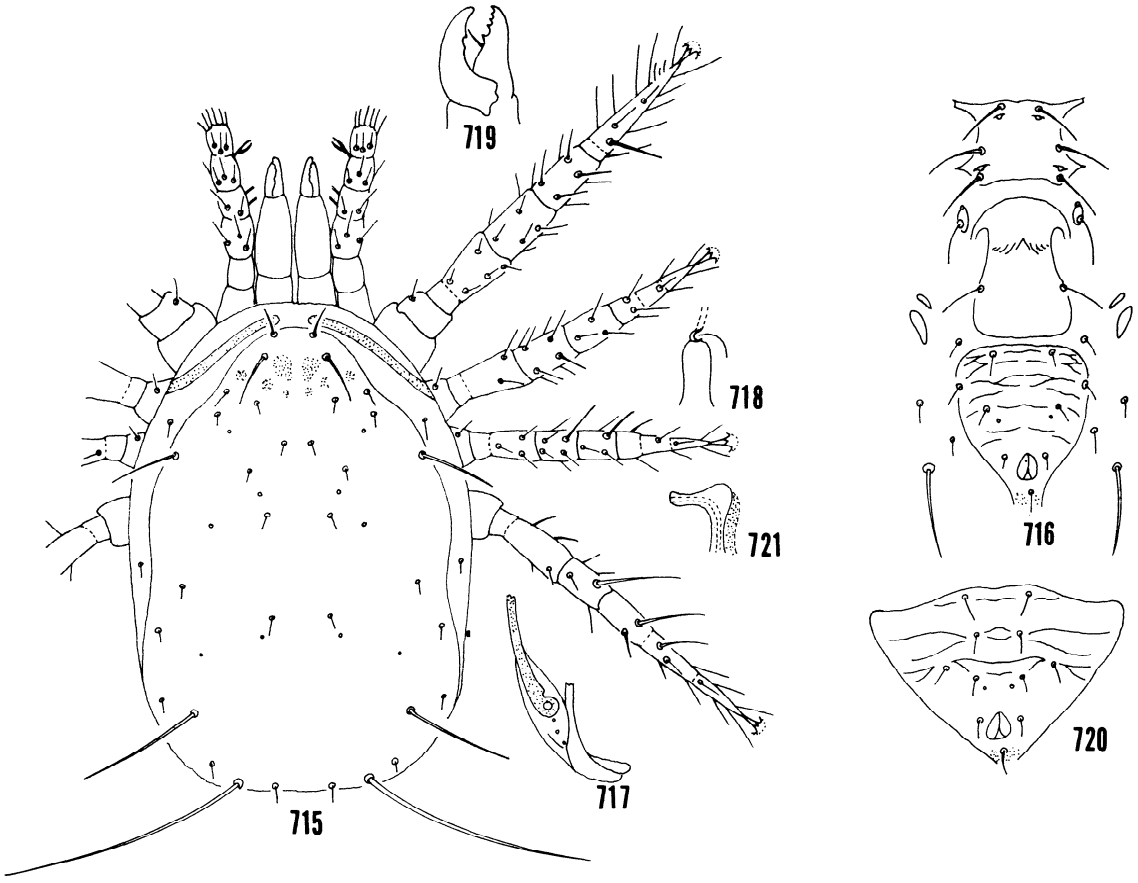
TYPE — Female holotype, Italy: Potenza, Basilicata, 1914, in humus, in Berlese Collection, Florence, Italy.

DIAGNOSIS — *Amblyseius meridionalis* is similar to *Amblyseius oatmani* Denmark but differs in having 3 pairs of ventrolateral setae on each side of the ventrianal scutum as apposed to 2 in *oatmani*.

FEMALE — Length 361; width at L_4 235. Dorsal scutum smooth with 4 to 5 medium sized pores, scattered muscle marks, and 17 pairs of setae. Measurements of setae: verticals 31; D_1 5, D_2 5, D_3 5, D_4 6; clunals 11; L_1 53, L_2 12, L_3 8, L_4 74, L_5 11, L_6 11, L_7 11, L_8 235, M_1 5, M_2 6, M_3 102; anterior sublaterals 12; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum with a pair of small round pores, lightly creased, and 3 pairs of preanal setae. Three pairs of setae located on each side of the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 1-2 denticules, and movable finger with no denticules. Leg formula 4123. Macrosetae Sge IV 89, Sti IV 81, St IV 67. Genu II 2 — 2-2/0 — 1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with saccular cervix 17 and c-shaped atrium.

MALE — Unknown.

DISCUSSION — This species is known from Italy, West Germany, Spain, Switzerland, Russia, Algeria, Morocco, Canada, and U.S.A. It has been taken in litter, humus, moss, soil, on cottonwood, and *Andropogon hirtus*. Nothing is known about the biology of this species.



Figs. 715-721. *Amblyseius bidens* Karg: 715. Dorsal and leg structure of female, 716. Ventral scuta and setation of female, 717. Posterior peritremal and stigmatal development of female, 718. Spermathecal structure of female, 719. Cheliceral structure of female, 720. Ventrianal scutum of male, 721. Spermatodactyl structure of male.

Amblyseius oatmani Denmark

Fig. 709-714

Amblyseius oatmani Denmark, 1974: 147.

TYPE — Female holotype, U.S.A.: Wisconsin, Door County, 13 VII 1962, E. Oatman, in soil duff under apple trees (FSCA). The allotype and 2 female paratypes were collected with the holotype.

DIAGNOSIS — *Amblyseius oatmani* is similar to *Amblyseius meridionalis* Berlese but differs in having only 2 pairs of ventrolateral setae beside the ventrianal scutum as apposed to 3 pairs in *meridionalis*.

FEMALE — Length 346; width at L_4 212. Dorsal scutum smooth with 4 medium sized pores and 17 pairs of setae. Measurements of setae: verticals 27; D_1 6, D_2 6, D_3 6, D_4 8; clunals 8; L_1 52, L_2 9, L_3 11, L_4 83, L_5 11, L_6 11, L_7 11, L_8 234; M_1 6, M_2 8, M_3 115; anterior sublaterals 13; posterior sublaterals 11. Sternal scutum smooth with 1 crease anteriorly, 2 pairs of pores, and 3 pairs of setae. Ventrianal scutum creased, a pair of small round pores, and 3 pairs of preanal setae. Two pairs of setae located on each side of the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 4 denticules, and movable finger with no denticules. Leg formula 4123. Macrosetae Sge IV 96, Sti IV 87, St IV 72. Genu II 2 — 2-2/1 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with saccular cervix 22 and nodular atrium.

MALE — The male is similar to the female but smaller. The ventrianal scutum is inbricate with a pair of small round pores and 3 pairs of preanal setae. The spermatodactyl has foot terminal with enlarged toe and lateral process not evident.

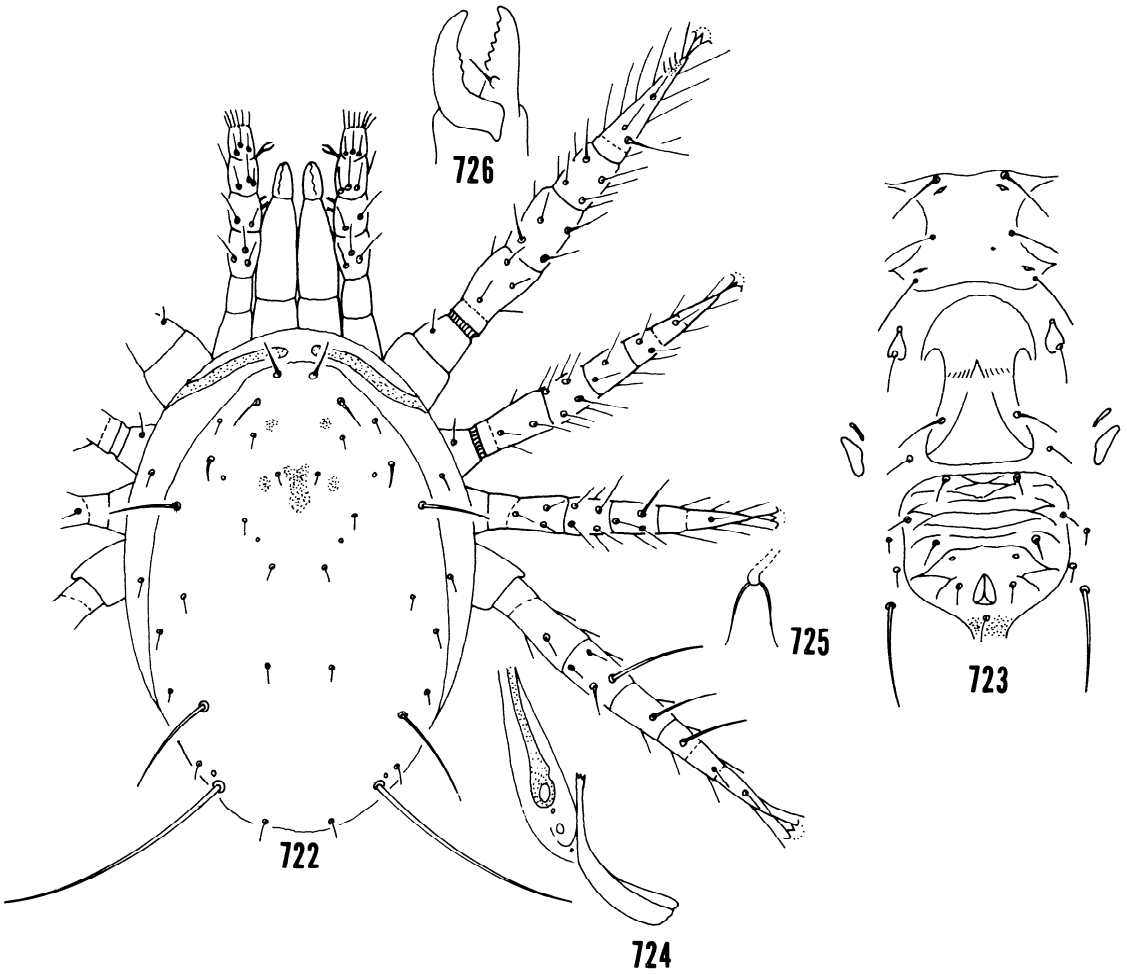
DISCUSSION — In addition to the type specimens, collections were made at the same location as follows: 2 paratype males 10 VIII 1962, 2 paratype females 7 IX 1962, and 2 paratype females 27 VIII 1962. Nothing is known about its biology.

Amblyseius bidens Karg

Fig. 715-721

Amblyseius bidens Karg, 1970: 293.

TYPE — Female holotype, East Germany: Elsterhang, near Rattis (Vogtland), Karl Marx Stadt, 26 IX 1967, W. Karg, on oak leaf litter, in Institute for Plant Protection Research, Kleinmachnow, East Germany.



Figs. 722-726. *Amblyseius proresinae* Karg: 722. Dorsal and leg structure of female, 723. Ventral scuta and setation of female, 724. Posterior peritremal and stigmatal development of female, 725. Spermathecal structure of female, 726. Cheliceral structure of female.

DIAGNOSIS — *Amblyseius bidens* is similar to *Amblyseius stramenti* Karg and *Amblyseius proresinae* Karg but differs in having L_1 42, L_4 49, L_8 157, M_3 86, cervix 27 as apposed to L_1 36, L_4 79, L_8 199, M_3 74, and cervix 16 in *stramenti* and L_1 20, L_4 45, L_8 170, M_3 65, and cervix 16 in *proresinae*.

FEMALE — Length 394; width at L_4 224. Dorsal scutum smooth with muscle marks anteriorly, 5-6 small pores, and 17 pairs of setae. Measurements of setae: verticals 23; D_1 6, D_2 6, D_3 6, D_4 6; clunals 12; L_1 42, L_2 11, L_3 11, L_4 49, L_5 6, L_6 6, L_7 8, L_8 157; M_1 4, M_2 5, M_3 86; anterior sublaterals 14; posterior sublaterals 7. Sternal scutum smooth with a pair of pores and 3 pairs of setae. Ventrianal scutum lightly reticulated with a pair of small round pores and 3 pairs of setae on the preanal scutum. Three pairs of setae located on each side of the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 3 denticules, and movable finger with 2 denticules. Leg formula 1423. Macrosetae Sge IV 68, Sti IV 57, St IV 57. Genu II 2 — 2-2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with saccular cervix 27 and small c-shaped atrium.

MALE — The male is similar to the female, but smaller in size. The spermatodactyl has foot terminal, toe slightly enlarged, and lateral process indistinct. The ventrianal scutum lightly creased with a pair of small round pores and 4 pairs of preanal setae.

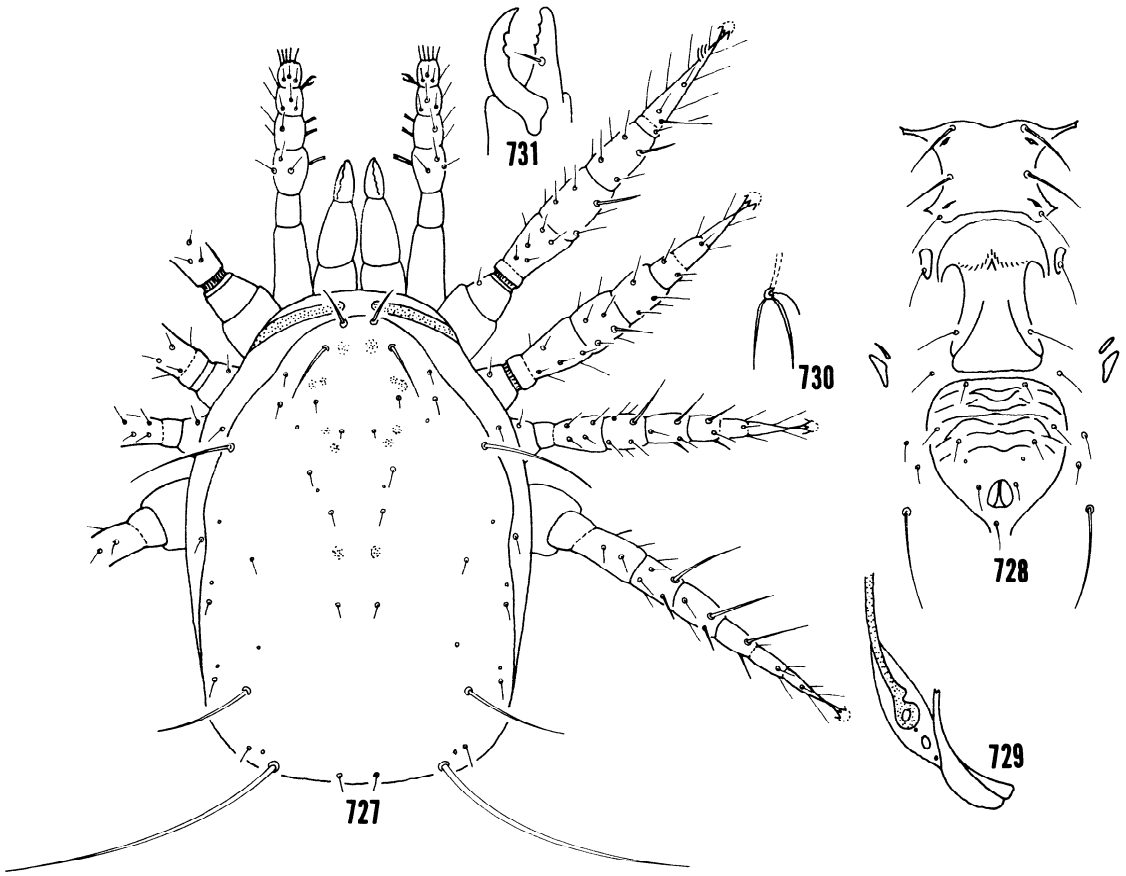
DISCUSSION — This species is known only from the type collection. Nothing is known about its biology.

Amblyseius proresinae Karg

Fig. 722-726

Amblyseius proresinae Karg, 1970: 294.

TYPE — Female holotype, East Germany: Hoppelberg, Halbersladt, Magdeburg, 10 X 1967, W. Karg, in litter, in Institute for Plant Protection Research,



Figs. 727-731. *Amblyseius stramenti* Karg: 727. Dorsal and leg structure of female, 728. Ventral scuta and setation of female, 729. Posterior peritremal and stigmatal development of female, 730. Spermathecal structure of female, 731. Cheliceral structure of female.

Kleinmachnow, East Germany.

DIAGNOSIS — See *Amblyseius bidens* Karg.

FEMALE — Length 338; width at L_4 206. Dorsal scutum smooth with several muscle marks anteriorly to M_1, 3-4 small to medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 16; D_1 8, D_2 8, D_3 8, D_4 8; clunals 9; L_1 20, L_2 11, L_3 18, L_4 45, L_5 8, L_6 10, L_7 10, L_8 170; M_1 7, M_2 8, M_3 65; anterior sublaterals 12; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum reticulated with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae surround the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 5 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 52, Sti IV 38, St IV 54. Genu II 2 — 2-2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with saccular flared cervix 16 and differentiated atrium.

MALE — Unknown.

DISCUSSION: This species is known only from the type collection. Nothing is known about its biology.

Amblyseius stramenti Karg

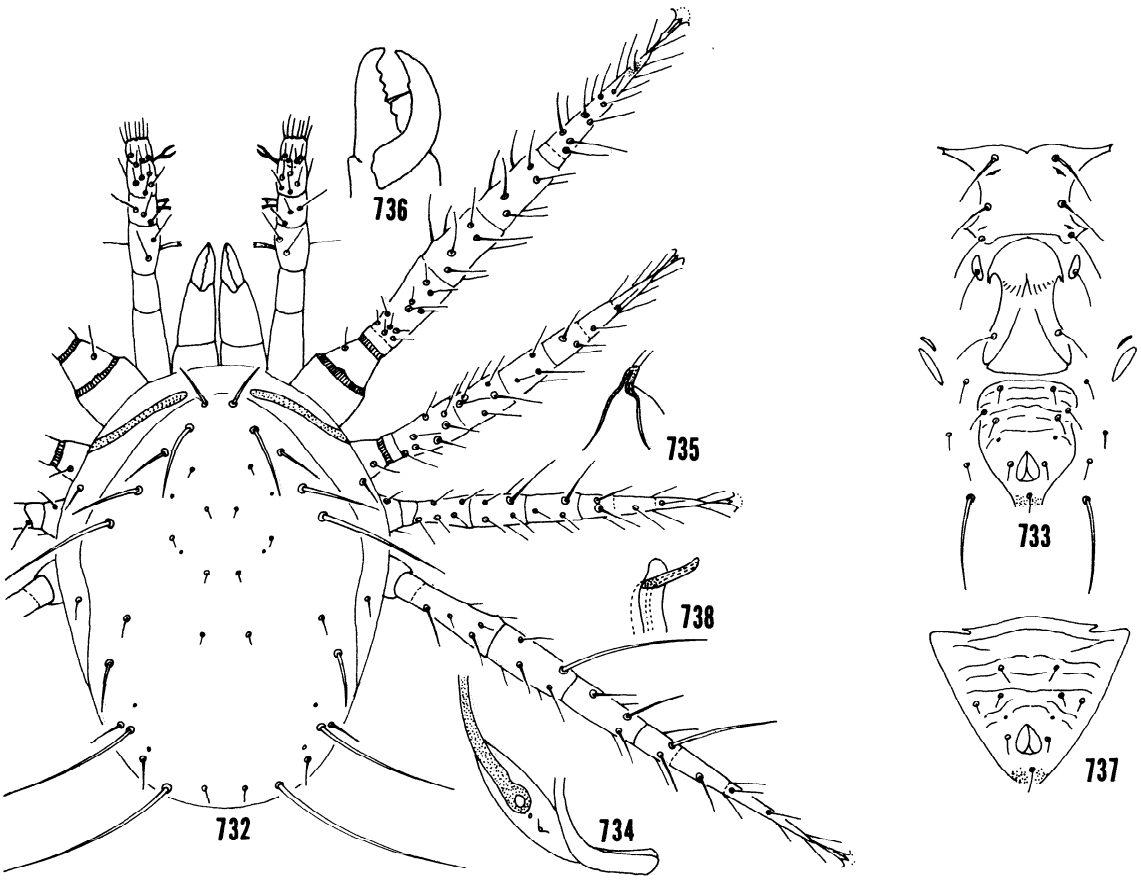
Fig. 727-731

Amblyseius stramenti Karg, 1965: 281; Athias-Henriot,

TYPE — Female holotype, East Germany: Jagen, 24 VI 1973, W. Karg, in litter of beech, in Institute for Plant Protection Research, Kleinmachnow, East Germany.

DIAGNOSIS — See *Amblyseius bidens* Karg.

FEMALE — Length 361; width at L_4 204. Dorsal scutum smooth with scattered muscle marks, 6-7 small to medium sized pores, and 17 pairs of setae. Measurements of setae: verticals 24; D_1 6, D_2 5, D_3 7, D_4 7; clunals 14; L_1 36, L_2 11, L_3 14, L_4 79, L_5 10, L_6 9, L_7 11, L_8 199; M_1 5, M_2 9, M_3 74; anterior sublaterals 12; posterior sublaterals 9. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum lightly creased with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae located on each side of the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 3 denticules, and movable finger with



Figs. 732-738. *Amblyseius chorites* Schuster and Pritchard: 732. Dorsal and leg structure of female, 733. Ventral scuta and setation of female, 734. Posterior peritremal and stigmatal development of female, 735. Spermathecal structure of female, 736. Cheliceral structure of female, 737. Ventrianal scutum of male, 738. Spermatodactyl structure of male.

3 denticules. Leg formula 1423. Macrosetae Sge IV 68, Sti IV 57, St IV 57. Genu II 2 — 2-2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with saccular cervix 16 and small c-shaped atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type collection. Nothing is known about its biology.

CHORITES GROUP

Two species are assigned to this group. They are *A. chorites* Schuster and Pritchard and *A. gruberi* Denmark and Muma. Both species have a pocular cervix, but *chorites* has an elongate differentiated atrium, and *gruberi* has a nodular atrium.

Amblyseius chorites Schuster & Pritchard

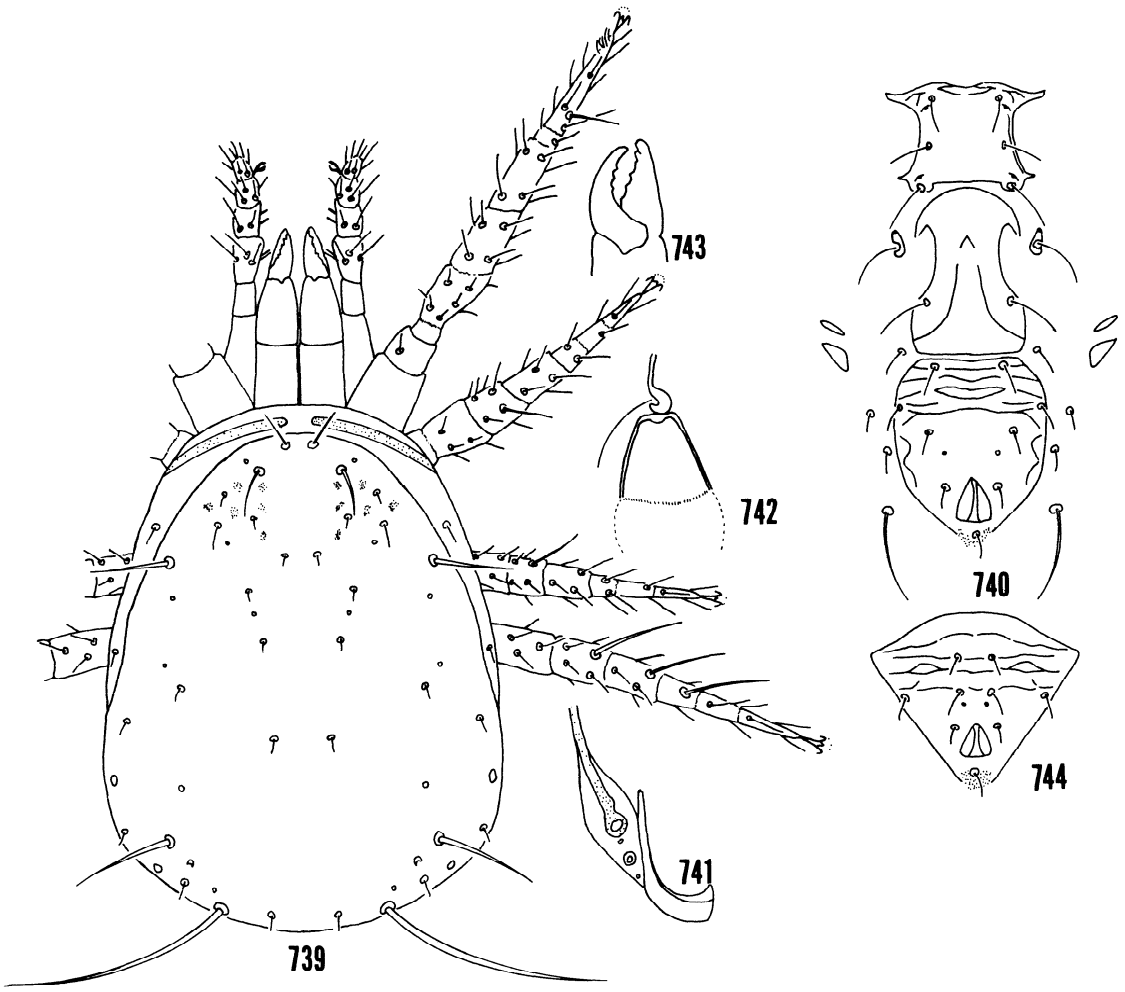
Fig. 732-738

Amblyseius chorites Schuster and Pritchard, 1963: 240.

TYPE — Female holotype, U.S.A.: California, Rumsey, Yolo County, 29 VII 1959, L. M. Smith, in litter (USNMNH).

DIAGNOSIS — *Amblyseius chorites* is similar to *Amblyseius gruberi* Denmark and Muma but differs in having L_1 59, L_2 33, L_3 66, L_4 120, Sge IV 100, Sti IV 69, and St IV 85 as apposed to L_1 42, L_2 8, L_3 20, L_4 52, Sge IV 60, Sti IV 52-60, and St IV 60-70 in *gruberi*.

FEMALE — Length 345; width at L_4 204. Dorsal scutum smooth with 4-5 small pores and 17 pairs of setae. Measurements of setae: verticals 35; D_1 5, D_2 5, D_3 5, D_4 6; clunals 11; L_1 59, L_2 33, L_3 66, L_4 120, L_5 45, L_6 25, L_7 19, L_8 160; M_1 5, M_2 12, M_3 126; anterior sublaterals 25; posterior sublaterals 19. Sternal scutum smooth with a pair of pores and 3 pairs of setae. Ventrianal scutum imbricate with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae located on each side of the ventrianal scutum. Peritreme exten-



Figs. 739-744. *Amblyseius gruberi* Denmark and Muma n. sp.: 739. Dorsal and leg structure of female, 740. Ventral scuta and setation of female, 741. Posterior peritremal and stigmatal development of female, 742. Spermathecal structure of female, 743. Cheliceral structure of female, 744. Ventrianal scutum of male.

ding anteriorly to the verticals. Chelicerae normal in relation to the body size, fixed finger with 6 denticules, and movable finger with a small denticule. Leg formula 4123. Macrosetae Sge IV 100, Sti IV 69, St IV 85. Genu II 2 — 2-2/0 — 1; genu III 2 — 2/0 — 2/1 — 1. Spermatheca with saccular cervix 15 and elongate differentiated atrium.

MALE — The male is similar to but smaller than the female. The ventrianal scutum is imbricate with 3 pairs of preanal setae and a pair of small round pores. The spermatodactyl has foot terminal and toe slightly increased in size.

DISCUSSION — This species has been taken in California in Yolo, Marin, Plumas, San Joaquin, and Solando Counties under bark of grape, litter, and soil. Nothing is known about the biology of this mite.

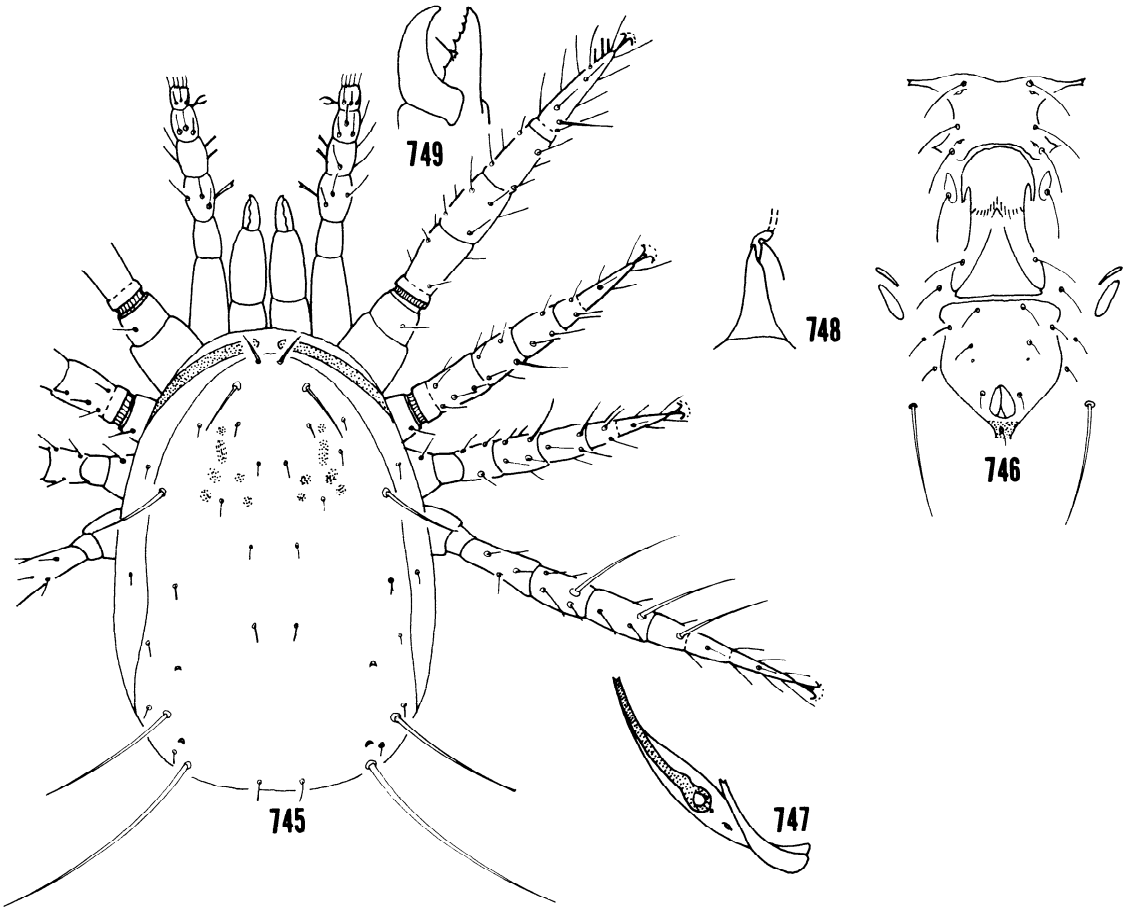
Amblyseius gruberi Denmark and Muma n. sp.

Fig. 739-744

TYPE — Female holotype, Spain: Sierra de Gerez, Orense, 1956, C. Athias-Henriot, in litter, in Natural History Museum, Wien, Austria.

DIAGNOSIS — *Amblyseius gruberi* is similar to *Amblyseius chorites* Schuster and Pritchard but differs in having L_2 8, L_3 20, L_6 8, L_7 11, M_3 65-75 and Sge IV 60 as apposed to L_2 33, L_3 66, L_6 25, L_7 19, M_3 126, and Sge IV 100 in *chorites*.

FEMALE — Length 364; width at L_4 235. Dorsal scutum smooth with a few scattered muscle marks anteriorly, 9-10 medium to large sized pores, and 17 pairs of setae. Measurements of setae: verticals 27; D_1 6, D_2 5, D_3 5, D_4 6; clunals 12; L_1 42, L_2 8, L_3 20, L_4 52, L_5 11, L_6 8, L_7 11, L_8 150-160; M_1 5, M_2 6, M_3 102; anterior sublaterals 12; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae.



Figs. 745-749. *Amblyseius tubae* Karg: 745. Dorsal and leg structure of female, 746. Ventral scuta and setation of female, 747. Posterior peritremal and stigmatal development of female, 748. Spermathecal structure of female, 749. Cheliceral structure of female.

Ventrianal scutum with a pair of small round pores, lightly creased, and 3 pairs of preanal setae. Three pairs of setae located on each side of the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 5 denticules, and movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 60, Sti IV 52-60, St IV 60-70. Genu II 2 — 2-2/0 — 1; genu III 1 — 2/0 - 2/1 — 1. Spermatheca with pocular cervix 16 and nodular atrium.

MALE — Similar to female but smaller in size. Ventrianal scutum reticulated, a pair of small round pores, and 3 pairs of preanal setae.

DISCUSSION — This species has been taken in Spain in litter with *Amblyseius madorellus* Athias-Henriot. *A. madorellus* belongs to the genus *Typhlodromips*, but *A. gruberi* belongs to *Amblyseius* and is named after Professor Dr. J. Gruber, Director of the Natural History Museum, Wien, Austria, who was most helpful in loaning slides for this study.

TUBAE GROUP

Two species are assigned to this group. They are *A. tubae* Karg and *A. nemorivagus* Athias-Henriot. Both species have a broadly fundibular cervix, but *tubae* has an elongate differentiated atrium, and *nemorivagus* has a c-shaped atrium.

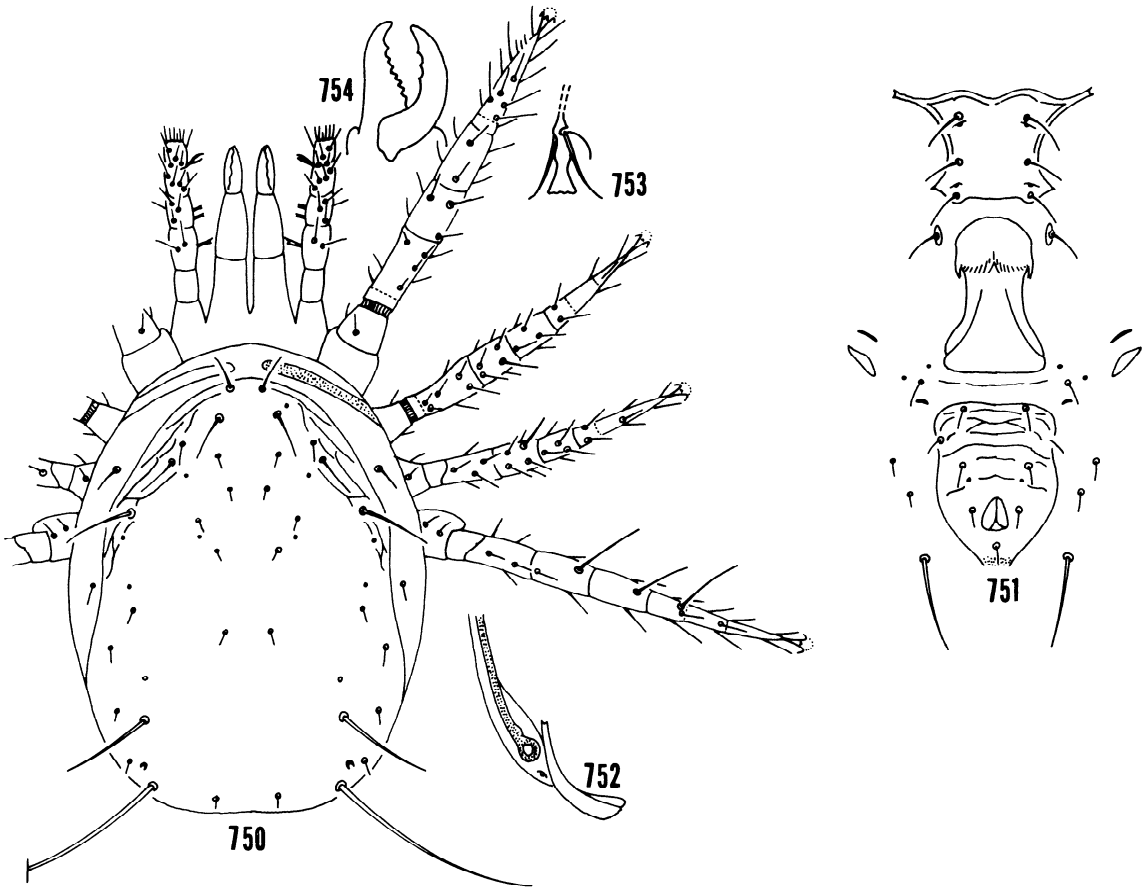
Amblyseius tubae Karg

Fig. 745-749

Amblyseius tubae Karg, 1970: 292.

TYPE — Female holotype, East Germany: Kemmtzal, Plaven, Chemnitz, 26 IX 1967, W. Karg, in humus, in Institute for Plant Protection Research Kleinmachnow, East Germany.

DIAGNOSIS — *Amblyseius tubae* is similar to *Amblyseius nemorivagus* Athias-Henriot but differs in having L_1 46, L_4 72, and M_3 105 as apposed to L_1 34, L_4 47, and M_3 71 in *nemorivagus*.



Figs. 750-754. *Amblyseius nemorivagus* Athias-Henriot: 750. Dorsal and leg structure of female, 751. Ventral scuta and setation of female, 752. Posterior peritremal and stigmatal development of female, 753. Spermathecal structure of female, 754. Cheliceral structure of female.

FEMALE — Length 330; width at L_4 188. Dorsal scutum smooth with scattered muscle marks, 2 pairs of medium sized pores posteriorly, and 17 pairs of setae. Measurements of setae: verticals 24; D_1 5, D_2 5, D_3 5, D_4 6; clunals 11; L_1 46, L_2 6, L_3 8, L_4 72, L_5 6, L_7 6, L_8 181; M_1 5, M_2 6, M_3 105; anterior sublaterals 12; posterior sublaterals 6. Sternal scutum smooth with 2 pair of pores and 3 pairs of setae. Vertrianal scutum smooth with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae located on each side of the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 5 denticules, movable finger with no denticules. Leg formula 4123. Macrosetae Sge IV 80, Sti IV 63, St IV 59. Genu II 2 — 2-2/1 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with fundibular cervix 23 and elongate differentiated atrium.

MALE — Unknown.

DISCUSSION — This species has only been collected in East Germany on herbs, shrubs, grass, lichens, and humus. Nothing is known about its biology.

Amblyseius nemorivagus Athias-Henriot

Fig. 750-754

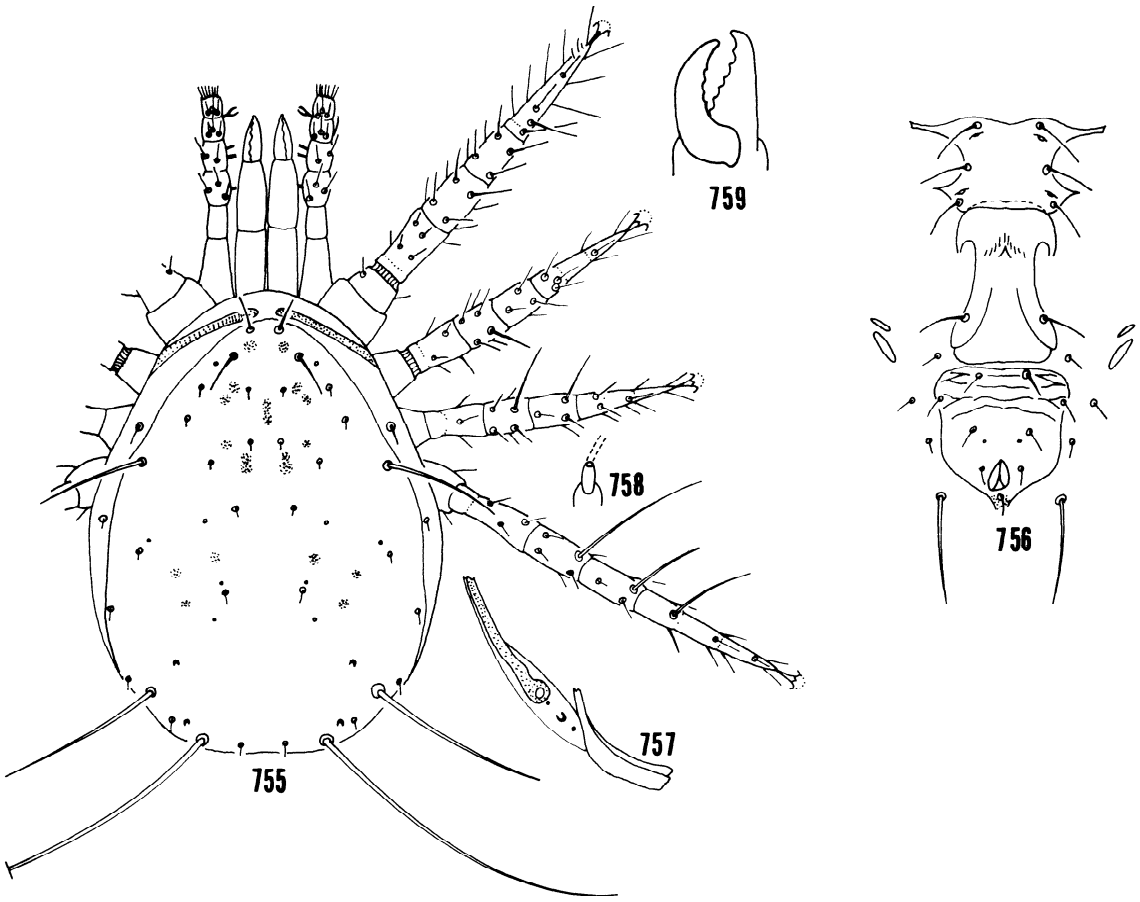
Amblyseius nemorivagus Athias-Henriot, 1961: 424, 426; Athias-Henriot 1966: 197; Livshitz and Kuznetsov, 1972:23; Kolodochka, 1978: 30; Kolodochka, 1980: 45.

Amblyseius hispanensis Westerboer, 1963: 696. NEW SYNONYM.

TYPE — Female holotype, Algeria: Alger, 1961, H. Franz, in litter, in Natural History Museum, Zoologische Abteilung, Vienna, Austria.

DIAGNOSIS — See *Amblyseius tubae* Karg.

FEMALE — Length 346; width at L_4 214. Dorsal scutum smooth with 7 small to medium sized pores, creased anteriorly, and 17 pairs of setae. Measurements of setae: verticals 25; D_1 10, D_2 5, D_3 6, D_4 8; clunals 11; L_1 34, L_2 14, L_3 30, L_4 47, L_5 12, L_6 9, L_7 11, L_8 165; M_1 5, M_2 8, M_3 71; anterior sublaterals 18; posterior sublaterals 16. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum lightly creased with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae located on each side



Figs. 755-759. *Amblyseius deductus* Chaudhri: 755. Dorsal and leg structure of female, 756. Ventral scuta and setation of female, 757. Posterior peritremal and stigmatal development of female, 758. Spermathecal structure of female, 759. Cheliceral structure of female.

of the ventrianal scutum. Peritreme extening anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 7 denticules, movable finger with 3 denticules. Leg formula 4123. Macrosetae Sge IV 57, Sti IV 41, St IV 57. Genu II 2 — 2/0 — 2/1 — 1; genu III 1 — 2/1 — 2/0 — 1. Spermatheca with fundibular cervix 16 and c-shaped atrium.

MALE — Unknown.

DISCUSSION — This species has been taken in Algeria in litter; Spain in leaf litter under *Quercus toza*; U.S.S.R., Crimea: *Achilles* sp., *Aesculus* sp., *Ballota nigra*, *Mentha* sp., and *Tamarix* sp.; Moldavia on *Plantago* sp., and *Viola* sp. Nothing is known about the biology of this species.

UNASSIGNED SPECIES GROUP

The following species are placed generically and subgenerically, but because of their unique spermathecal structures they cannot be related positively with other known species. They are retained here as unassigned species until species with similar spermathecae have been collected and described.

The unassigned species are:

A. deductus Chaudhri
A. hexadens Karg
A. santoensis Schicha

Amblyseius deductus Chaudhri

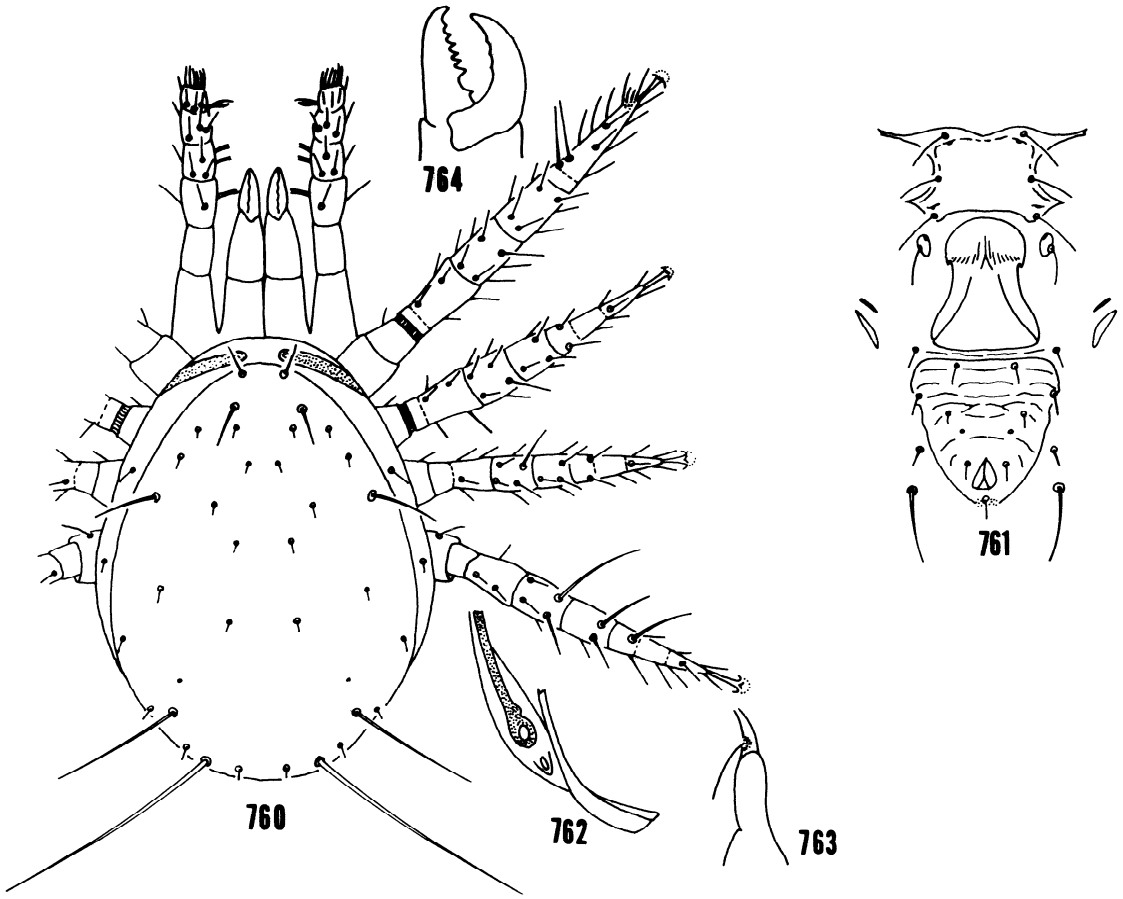
Fig. 755-759

Amblyseius deductus Chaudhri, 1979:73.

TYPE — Female holotype, Pakistan: 2 miles N. Charrapani, 3500′ (Murree Hills), Punjab, 11 V 1973, W.M. Chaudhri, on *Peristrophe* sp., in Department of Entomology, University of Agriculture, Faisalabad.

DIAGNOSIS — *Amblyseius deductus* is distinct in having a short tubular cervix with a pocular base and Sge IV longer than 100.

FEMALE — Length 354; width at L_4 234. Dorsal scutum smooth with scattered muscle marks, 6 to 8 small to medium sized pores, and 17 pairs of setae.



Figs. 760-764. *Amblyseius hexadens* Karg: 760. Dorsal and leg structure of female, 761. Ventral scuta and setation of female, 762. Posterior peritremal and stigmatal development of female, 763. Spermathecal structure of female, 764. Cheliceral structure of female.

Measurements of setae: verticals 27; D_1 4, D_2 4, D_3 4, D_4 8; clunals 8; L_1 34, L_2 4, L_3 4, L_4 88, L_5 18, L_6 10, L_7 10, L_8 276; M_1 4, M_2 8, M_3 141; anterior sublaterals 10; posterior sublaterals 8. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum lightly creased anteriorly with a pair of small round pores and 3 pairs of preanal setae. Three pairs of setae located each side of the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 6 denticules, and movable finger with 4 denticules. Leg formula 4123. Macrosetae Sge IV 122, Sti IV 63, St IV 69. Genu II 2 — 2-2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with short tubular-pocular cervix 10 and undifferentiated atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type specimen. Nothing is known about its biology.

Amblyseius hexadens Karg

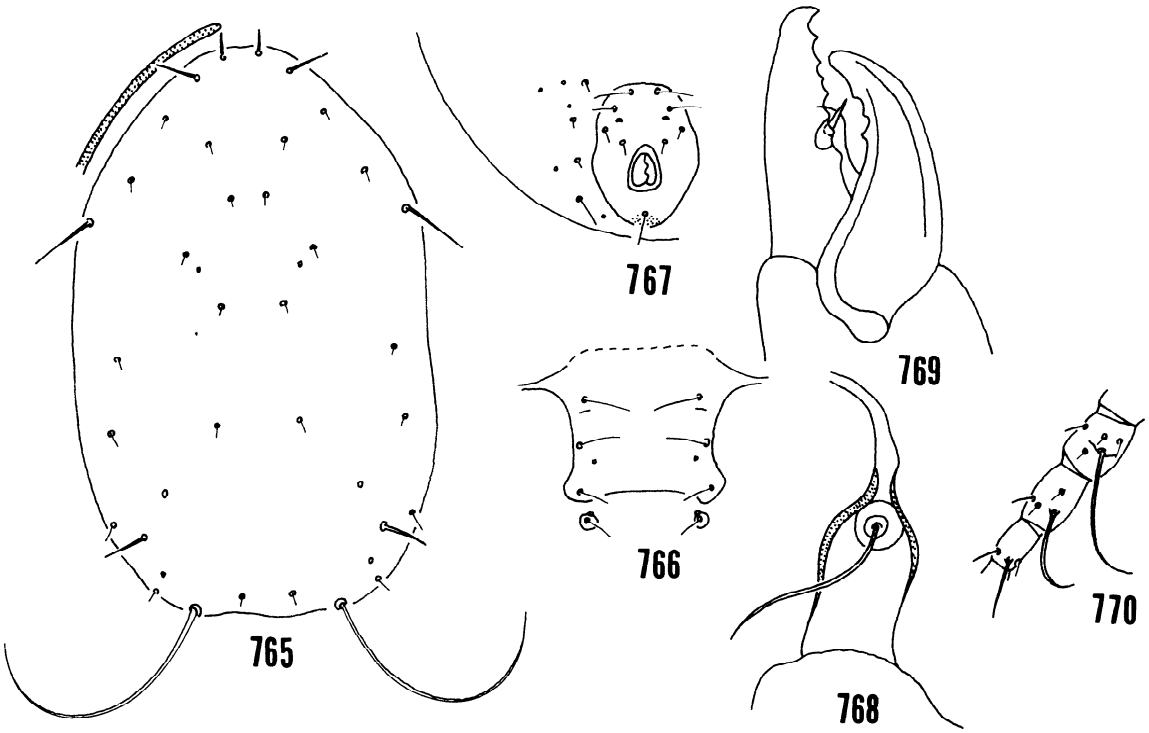
Fig. 760-764

Amblyseius hexadens Karg 1983: 316.

TYPE — Female holotype, Brazil: 5 IX 1971, K. Lenko, in humus, in Institute for Plant Protection Research, Kleinmachnow, East Germany.

DIAGNOSIS — *Amblyseius hexadens* is unique in having only 2 pairs of ventrolateral setae beside the ventrianal scutum.

FEMALE — Length 314; width at L_4 204. Dorsal scutum smooth with 1-2 small pores and 17 pairs of setae. Measurements of setae: verticals 16; D_1 6, D_2 6, D_3 6, D_4 6; clunals 6; L_1 27, L_2 6, L_3 6, L_4 40, L_5 7, L_6 7, L_7 7, L_8 150; M_1 6, M_2 7, M_3 90; anterior sublaterals 11; posterior sublaterals 6. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum lightly creased with a pair of small round pores and 3 pairs of preanal setae. Two pairs of setae located on each side of the ventrianal scutum. Peritreme extending anteriorly to the verticals. Chelicerae normal in relation to body size, fixed finger with 7 denticules, and movable finger with



Figs. 765-770. *Amblyseius santoensis* Schicha: 765. Dorsal and leg structure of female, 766. Ventral scuta and setation of female, 767. Posterior peritremal and stigmatal development of female, 768. Spermathecal structure of female, 769. Cheliceral structure of female, 770. Leg IV setation of female (after Schicha).

3 denticules. Leg formula 1423. Macrosetae Sge IV 68, Sti IV 36, St IV 48. Genu II 2 — 2-2/0 — 1; genu III 1 — 2-2/1 — 1. Spermatheca with fundibular cervix 18 and elongate differentiated atrium.

MALE — Unknown.

DISCUSSION — This species is known only from the type collection. Nothing is known about its biology.

Amblyseius santoensis Schicha

Fig. 765-770

Amblyseius santoensis Schicha, 1981: 42-43.

TYPE — Female holotype, New Hebrides: Sarraoutou (Espiritu Santo), 18 IV 1977, J. Gutienez, on *Cocos nucifera* (BCRI).

DIAGNOSIS — *Amblyseius santoensis* is unique in having no S_1 and S_2 and short L_4 and M_3.

FEMALE — Length 324; width at L_4 178. Dorsal scutum smooth with 2 pairs of medium sized pores, 4 pairs of small pores, and 17 pairs of setae. Measurements of setae: verticals 5-8; L_1 24, L_2 8, L_3 6, L_4 38, L_5 5-7, L_6 5-7, L_8 157; M_1 6, M_2 6, $M_3$27; anterior sublaterals missing; posteriors also missing. Sternal scutum smooth with 2 pairs of pores and 3 pairs of setae. Ventrianal scutum smooth with a pair of oval pores and 3 pairs of preanal setae. Three setae located on each side of the ventrianal scutum. Peritreme extending anteriorly to verticals. Chelicerae normal in relation to body size, fixed finger with 7 denticules, and movable finger with 3 denticules. Macrosetae Sge IV 76, Sti IV 48, St IV 27. Spermatheca with saccular cervix 19 and undifferentiated atrium.

MALE — Unknown.

Discussion — This is not a typical *Amblyseius* according to the description and drawings prepared by Schicha (1981). (We were unable to see this species). We do not know whether this species has a typical leg I. The sublateral setae are missing and the ventrianal scutum differs in shape from most *Amblyseius*. It is known only from the type collection. Nothing is known about the biology of this species. The above information is from the original data of Schicha (1981) but put into the form used in describing other species in this publication.

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