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Venezuelan macronyssidae (Acarina:mesostigmata)

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VENEZUELAN MACRONYSSIDAE

(Acarina: Mesostigmata)

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VENEZUELAN MACRONYSSIDAE (ACARINA: MESOSTIGMATA)[1]

by Robert C. Saunders[2]

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INTRODUCTION

There has been no previous comprehensive study of the macronyssid mites in Venezuela. The work reported on in this paper is based on extensive samples of ectoparasitic mites collected as part of the Smithsonian Venezuelan Project, which was supported by Department of the Army contract DA-49-193-MO-2788 (Ecology and distribution of mammalian ectoparasites, arboviruses, and their hosts in Venezuela). Collecting was conducted by field teams under the direction of Norman E. Peterson, M. D. Tuttle and A. L. Tuttle during the period from July 1965 through September 1968. Hosts were taken from throughout Venezuela sampling as many different habitats as possible. Many hosts, but not all, were sampled for intranasal mites using the nasal washing technique outlined by Yunker (1961).

More than 5000 macronyssid mites were collected. The majority of these specimens will be deposited in the U.S. National Museum, Washington, D.C. with representatives of all taxa deposited at the Universidad Central de Venezuela, Caracas.

Mites of the family Macronyssidae are primarily ectoparasites of rodents, marsupials, bats, and birds. Some species are of medical importance because they attack man in the absence of their natural hosts. Some are known to harbor or transmit causative agents of several zoonotic diseases such as murine typhus (Worth and Rickard, 1951), rickettsial pox (Philip and Hughes, 1948; and Strandtmann and Wharton, 1958), eastern encephalitis (Clark, Lutz and Fadness, 1966), and coxsackie virus disease (Schwab, Allen and Sulkin, 1952). Not

only are some mite species involved directly in the transmisssion of disease agents to man but they may also play an important role in maintenance cycles of arthropod-borne zoonoses. One species is a proven vector of the virus, Ornithosis bedsoniae (Eddie, Meyer, Lembrecht and Furman, 1962) and the filarial worm, Litomosoides carinii (Williams and Brown, 1946). Yunker (1964 and 1973) reviewed the importance of parasitic mites associated with laboratory animals and indicated the species which are potentially dangerous to man, some of which are macronyssid mites. Epidemiological studies of arthropod-borne zoonoses rely heavily on taxonomy, host-parasite relationships and distribution. Although macronyssid mites are known transmitters of some disease causing agents, previous works have been restricted primarily to discussions on the generic level (Till and Evans, 1964) or specific host groups (Radovsky, 1967). This is a taxonomic study of mites of the family Macronyssidae in Venezuela with some notes on ecology, and host-parasite relationships.

For every advantage gained by a parasite in its relationship with a host there is a corresponding surrender of independence. Modifications in morphology and life cycles may be advantageous in one situation, e.g. on a particular host, but may be disadvantageous in another situation. The morphology of a host, its mode of life, e.g. whether it is sedentary or wide ranging, solitary or colonial, nomadic or tends to return to the same place to build a nest, are factors which affect the kinds of parasites a host will harbor. Other characteristics which affect host-parasite relationships are the hosts' ecological tolerance and whether it burrows in the ground or has no direct contact with the earth. In addition, the morphology of the

parasite, the number of offspring, whether eggs or living young are produced, whether all stages are obligate parasites or some stages are free-living, its vagility and ecological tolerance are all influenced by host-parasite relationships. Ambient conditions may also modify host-parasite relationships.

Those macronyssid mites which live on bats are obligatory, host-specific parasites. Among the Macronyssidae it appears that species of the subfamily Macronyssinae have had the longest association with bats and it is within this group that the earliest radiation took place. The earliest members of the subfamily Ornithonyssinae were probably parasites of bats with some species acquiring non-chiropteran hosts secondarily as a result of early radiation (Radovsky, 1969). It is probable that species which have been associated with their hosts for the longest period of time exhibit the greatest degree of host specificity, while those macronyssid species which have acquired non-chiropteran hosts in more recent times have broader host tolerances and include species with low host specificity.

It is thought that parasitism developed as a result of continued close association of predatory mites with potential vertebrate hosts. The abundance of necessary elements for survival afforded by a vertebrate host, i.e. food and shelter, gradually replaced the less dependable survival elements associated with a predatory mode of life. With an increase in host specificity and development of intimate host-parasite relationships, increased morphological changes occurred in parasitic mites. If one considers nest-dwelling predatory mites as generalized forms, there has been a gradual change from this state to forms more specialized for a parasit-

ic existence. This transition can be observed by examining the existing mite faunas within various groups of parasitic mites. Free-living or predatory mites are characterized by being heavily sclerotized and possessing massive chelae. The closely related nest-dwelling facultative parasites, which are one step removed from free-living forms, generally have a less heavily sclerotized idiosoma and the chelae are somewhat smaller as seen in many of the laelapid mites of the subfamily Laelapinae. At this juncture in the evolutionary process true host specificity had not developed and a more appropriate term would be "nest specificity" as proposed by Wharton (1957). The host-parasite relationship at this point may be said to be generalized. As host-parasite relationships become more intimate and specificity increases, changes in the morphology of parasitic mites occur which allow them to benefit from specific characteristics of the host. The first and more conspicuous changes often involve reduction in sclerotization of the idiosoma and a decrease in the number of setae. Also, as the parasites become more specialized, the mouthparts become better fitted for piercing and sucking, thus aiding in the blood-feeding process; they may also be modified for attachment to prevent removal when the host moves or preens. There are changes in body structure which aid the mite in either adhering to its host or moving rapidly through the pelage or plumage, i.e. a flattening of the body, unidirectional orientation of the setae, development of caudally directed spines and spurs on the coxae and large tarsal claws. In some instances, parasites with very intimate host-parasite relationships have developed morphological characteristics which almost entirely limit their existence to one host or a closely

related group of hosts. Such characteristics as size and strength of tarsal claws, number and size of setae and relative lengths of legs may all change as dependence on the host increases. These adaptive features become apparent when families of parasitic mesostigmatic mites are compared. As mentioned earlier, the more generalized parasites have heavy sclerotization and generally a full compliment of setae as seen in most of the Laelapinae. The more specialized forms, for example the Macronyssidae, tend to have less heavily sclerotized bodies and a general reduction in setation.

The Macronyssidae apparently are derived from the Laelapidae. The macronyssid genera retaining the most charactistics indicating a laelapine origin are Ichoronyssus, Bewsiella and Synasponyssus, all of which are found on bats (Radovsky and Furman, 1969) and are similar to the bat parasitizing laelapid genera Neolaelaps and Notolaelaps. This group of genera apparently forms the stem from which the remainder of the family Macronyssidae evolved. One important fact that gives credence to this hypothesis is that the laelapid bat parasites are restricted to the primitive suborder Megachiroptera while the Macronyssidae are restricted to the more recent Michrochiroptera, this has led to the conclusion that the family first evolved and radiated on bats and secondarily acquired other hosts (Radovsky, 1969). This statement is further supported by the host relationships of the two subfamilies of Macronyssidae. The more primitive Macronyssinae are found almost exclusively on bats; they also exhibit the greatest degree of host specificity, an indication of long time association with a host, and the greatest morphological diversity. The Ornithonyssinae on the other hand have a low degree of host specificity and many

species of this subfamily have non-chiropteran hosts. They are more uniform morphologically, and probably biologically, and there are more species.

The family Macronyssidae is cosmopolitan in distribution. It appears to have gone through several phases of adaptive radiation, some of which have taken place largely or entirely in the neotropics. The neotropics are particularly rich in the number of macronyssid species as demonstrated by the species diversity found in Venezuela. One phase involved macronyssines evolving on bats, apparently beginning at an early stage in the history of the neotropical chiropteran fauna. Several endemic genera arose, including Parichoronyssus, Radfordiella, and Macronyssoides, particularly on bats of the superfamily Phyllostomatoidea. Even though phyllostomatoid bats were apparently the hosts during early radiation, there has been considerable movement to other bat host group. Radfordiella and Macronyssoides are still essentially restricted to phyllostomatoid hosts, Parichoronyssus has become widespread within the Phyllostomatoidea and some species even occur on emballonuroid bats. A second phase of radiation involved the ornithonyssines which were perhaps late arrivals from the North (Radovsky, 1974). This phase produced the genus Ornithonyssus and such relatives as Pellonyssus and Draconyssus which are not associated with bats, as well as bat parasites including Chiroptonyssus which is endemic to the New World. While there is strong evidence that Ornithonyssus was restricted to the New World in pre-Columbian times, three species of this genus have become extremely widespread, essentially cosmopolitan, O. bacoti on rodents and O. bursa and O. sylviarum on birds. The spread of these species

apparently was facilitated by their adaptability to domiciliated rodents (O. bacoti) and domestic fowl (O. bursa and O. sylviarum) that were disseminated as a result of man's movement from one area to another. After this dissemination, the mites became permanently established in other regions of the world through transfer to native species of rodents and birds. Thus a particularly low level of host specificity, in combination with human activity, has enabled these mites to achieve a remarkably wide geographic distribution. Other parasitic mites, such as Laelaps nuttalli, associated with domiciliated rodents are less adaptable to establishment on native hosts, possibly due to competition with other mite species or more restrictive requirements regarding ambient conditions, thus they have narrower geographic distributions than O. bacoti.

"Mesostigmatic parasites have evolved principally towards simplification of the life cycle: that is, the number of separated stages and the number of active stages may each be reduced." (Radovsky, 1969:468). The tendency toward simplification is influenced by the trophic advantages of parasitism. Also the chance that mites in inactive stages may be lost from the host results in increased pressure toward intrauterine development of early stages. Such is the case in the Spinturnicidae which are host-specific and spend their entire life cycle on the host. In the Macronyssidae, the larval and deutonymphal stages are quiescent and nonfeeding and generally are found on a substrate off the host. This adaptive modus contrasts with the permanently parasitic Spinturnicidae, but is nonetheless associated with a high level of specialization for successful parasitism. The short duration of the larval and deutonymphal

stages of Macronyssidae compensates for their relative defenselessness. Typically, but with a number of exceptions, unembryonated eggs are produced and deposited on surfaces of the roost or nest of the host animal. The protonymph, unlike the larva, is active and searches out a host. After feeding to repletion, the protonymph molts to a deutonymph which is able to molt to the adult without further feeding. The need for only a single feeding period prior to adulthood, with resulting greater chance of reaching maturity, relates to a morphological and functional divergence between protonymphs and adults in the Macronyssidae. The protonymph remains attached and feeding for a period of days, developing new cuticle that greatly increases its capacity for engorgement, while the adults are rapid feeders. The factor of attachment may also enhance dissemination of this group of mites as the protonymphs may be carried considerable distances by the host to a secondary nesting or roosting site before the protonymph completes engorgement and drops off the host. This may account for some of the atypical hosts seen in the Venezuela records, particularly among bat hosts which frequently roost in colonies with several different species represented. Since the adult mite must seek out a blood meal at the new location, the host it finds may not be the same host species that the protonymph had fed on. It would appear that the life cycles of macronyssid mites have been greatly affected by their host-parasite relationships. The prototype mite of the family Macronyssidae was probably a bat parasite, as most of the species of the family are now bat parasites and their life histories are consistent with that which would be expected from a long association of parasites with a highly vagile group of hosts. Bats which live in

colonies afford greater security, as far as availability of a blood meal is concerned, than if potential hosts occurred singly. Even though development of some stages of the parasite occurs off the host, the problems of host finding are minimized when hosts occur in large colonies.

FAMILY MACRONYSSIDAE

The concept of the family Macronyssidae followed in this paper is essentially the same as that proposed by Radovsky (1967) in his monograph on laelapid and macronyssid mites parasitic on bats and further expanded in relation to other parasitic Mesostigmata by Radovsky (1969). He recognized two subfamilies: Macronyssinae, primarily on bats and Ornithonyssinae, on bats, rodents, marsupials, birds, and reptiles. The genera included in the Macronyssinae are: Acanthonyssus, Argitis, Bewsiella, Chiroecetes, Ichoronyssus, Liponysella, Macronyssus, Macronyssoides, Megistonyssus, Nycteronyssus, Parichoronyssus, Radfordiella, and Synasponyssus. The genera included in the Ornithonyssinae are: Chiroptonyssus, Cryptonyssus, Draconyssus, Lepidodorsum, Lepronyssoides, Ornithonyssus, Pellonyssus, and Steatonyssus. Fourteen of the above genera have been identified from Venezuelan material collected by personnel associated with the Smithsonian Venezuelan Project.

KEY TO THE GENERA OF VENEZUELAN MACRONYSSIDAE

(FEMALES)

1. Chelicerae with second segment elongate stylet-like; parasitic on reptiles . . . . . *Draconyssus belgicae*

   Chelicerae with second segment normal, not elongate; parasitic on birds or mammals 2

2. Dorsal plate divided; palpal trochanter usually with blade-like ventral process 3

   Dorsal plate entire; process of palpal trochanter variable. . 4

3. Sternal plate about twice as wide as long, with a strongly sclerotized posterior margin; sternal seta I about as large as sternal seta II . . . . . *Steatonyssus*

   Sternal plate very narrow, arched, lacks sclerotized posterior margin; sternal seta I much smaller than sternal seta II . . . . . .*Pellonyssus*

4. Coxae I-III all with one or two heavy ventral spurs some of which may be setigerous; proximally recurved ventral spurs present on genua and tibae II-IV 5

   Coxae I-III variable (coxae II-III may have nonsetigerous spurs); genua and tibae II-IV without ventral spurs 6

5. Dorsal plate with clusters of punctae at bases of setae giving grape like appearance; peritreme short and stout; ex *Oryzomys* spp. . . . . *Argitis oryzomys*

   Dorsal plate not as above; peritreme long and slender; ex *Proechimys* spp. . . . . .*Acanthonyssus*

6. Some idiosomal setae (especially caudal ones) barbed. 7

   All setae bare. 9

7. Sternal plate normally with 3 pairs of setae; parasitic on various mammals and birds 8

   Sternal plate with only 2 pairs of setae; ex *Oryzomys albigularis* . . . . . *Lepidodorsum tiptoni*

8. Spur on palpal trochanter small or absent; caudal setae peg-like with multiple barbs; parasitic on bats . Chiroptonyssus

   Spur on palpal trochanter blade-like; all setae slender generally with only 1 barb; parasitic on birds and mammals . . . . . .Ornithonyssus

9. All dorsal setae minute; coxae II-III with ventral spurs. . . . . Chiroecetes lonchophylla

   Dorsal setae not minute; coxae generally without ventral spurs, may have ridges 10

10. Third pair of sternal pores on posterior margin of sternal plate; all legs stout laelapoid in appearance . . . . . .Parichoronyssus

    Third pair of sternal pores on unarmed integument; legs generally slender, not stout. 11

11. Leg I stouter than II-IV, claws arising directly from the tarsus (no pretarsus); coxa II and III with small inapparent ridges. . . . . Nycteronyssus desmodus

    Leg I similar to II-IV, claws arising from pretarsus; coxa II and III frequently with definite ventral ridges. 12

12. Linear sculpturing entirely absent from ventral armature; anterior margin of coxa II with 2 small separate spurs or single spur with bifid tip. . . . . Radfordiella

    Linear sculpturing present on one or more ventral plates; anterior margin of coxa II with single spur, rarely with a bifid tip 13

13. Last pair sternal setae on narrow extension of sternal plate; numerous setae on ventral surface. . . . .n. gen. "N"

    Last pair of sternal setae on posterior portion of plate, no narrow extension of plate; ventral surface with few setae 14

14. Sternal glands present; fixed chela with 2 hook-like ventral hyaline processes . . . . . .Macronyssus

    Sternal glands absent; fixed chela not as above 15

15. Ventral ridges usually present on coxae II-IV; epigynial plate with narrow membranous projection of anterior margin extending beyond posterior margin of sternal plate; dorsal plate not strongly tapered, covers most of dorsum . . . . . Macronyssoides

Ventral ridges absent from coxae; epigynial plate with anterior margin inapparent or short, broad and inconspicuous; dorsal plate strongly tapered leaving much of dorsum uncovered . . . . . Cryptonyssus

SUBFAMILY MACRONYSSINAE

This subfamily is found primarily on bats. The female chelicerae are of uniform diameter throughout their length, and the chelae are obvious. Both digits of the chelae are present and subequal. The male holoventral plate may be entire or divided; the male spermatodactyl is about twice the size of the moveable digit. The fixed digit of the male chelae is always present and generally as long as the moveable digit. The Macronyssinae represent a very diverse group both in form and host-parasite relationships.

Genus Acanthonyssus Yunker and Radovsky

Acanthonyssus Yunker and Radovsky, 1966:92.--Yunker and Saunders, 1973:371 [Redefined].

Type Species: Ichoronyssus dentipes Strandtmann and Eads, 1947.

Small mites (adult less than 500 μ long); idiosomal setae relatively short, bare except for M_{11} of nymphs; adult dorsal plate entire, broadly rounded posteriorly. All coxae (active stages) with 1 or 2 stout ventral spurs, some bifid and setigerous; coxa II with large, sharp anterodorsal spur; telofemora III and IV, genua and tibiae II-IV with strong proximally recurved ventral spurs; tarsi II-IV each with pair of small setigerous spurs; palpal apotele two-tined; chelicerae slender, elongate.

Acanthonyssus proechimys Yunker and Saunders

Acanthonyssus proechimys Yunker and Saunders, 1973:371.

VENEZUELAN RECORDS (447 females, 234 males, and 46 nymphs):

Four hundred ten females, 210 males, and 39 nymphs ex 110 Proechimys semispinosus were collected in the following states, listed in order from greatest to least number of collections: Zulia, Apure, Barinas, Carabobo, T.F. Amazonas, Sucre, Lara, Falcon, and Trujillo; 12 females, 11 males, and 4 nymphs ex 10 P. guyannensis, from T.F. Amazonas and Bolivar; 16 females, 12 males, and 1 nymph ex 8 Proechimys sp. from Apure, Zulia, Lara, Barinas, and Carabobo. There were also 9 females, 1 male, and 2 nymphs off Heteromys anomalus, Sigmodon hispidus, Zygodontomys brevicauda, a squirrel, 2 marsupials, and a bat. Some of these hosts particularly the non-rodent hosts are presumed to be accidental. Infested hosts were found at elevations from 24-1355 m but the majority were collected at low elevations.

REMARKS:

A. proechimys is similar to A. dentipes (Strandtmann and Eads) but can be distinguished on the basis of the length-width ratio of the sternal plate (sternal plate is longer in A. proechimys, first pair of sternal setae do not reach the posterior margin of plate), length of anal plate (shorter in A. proechimys) and the length of the peritreme extends only to middle of coxa I in A. proechimys) (Yunker and Saunders, 1973). In addition to morphological differences, there is

a definite difference in host preference. A. proechimys is associated primarily with species of Proechimys while A. dentipes is most frequently associated with Sigmodon hispidus.

Variations in the dimensions of the dorsal plate of the female and idiosomal chaetotaxy of the male were noted in the material examined. In some females the dorsal plate was considerably shorter than that of the holotype while in others the plate was narrower but just as long as that of the holotype. Major variations in the male were in the number of setae on the dorsal plate (24-26 pairs) and on the holoventral plate. The latter variation is due to asymmetrical erosion of the plate.

Genus Argitis Yunker and Saunders

Argitis Yunker and Saunders, 1973:378.

Type Species: Argitis oryzomys Yunker and Saunders, 1973.

Small mites (adults less than 500 μ long) adult dorsal plate entire, ornamented with large punctae which form grape-like clusters of cells at setal bases and near anterolateral margins; idiosomal setae short, bare; peritreme wide, short, terminating at level of coxae III. All coxae with short ventral spurs, some setigerous, bifid or truncated. Genua and tibiae II-IV each bear long, robust, proximally recurved ventral spurs. Tarsi II-IV each with pair of small recurved setigerous spurs.

Argitis oryzomys Yunker and Saunders

Argitis oryzomys Yunker and Saunders, 1973:379.

VENEZUELAN RECORDS (9 females and 3 males):

Nine females and 2 males ex Oryzomys concolor; (SVP 12750), Bolivar, 12 km S, 43 km E Caicara (Hato La Florida), 43 m elev., 15.IV.67 and 1 male ex O. bicolor; (SVP 13451), Sucre, 7 km N, 4 km W Guiria, 4 m elev., 14.VI.67.

REMARKS:

Argitis shares many macronyssid characters with and is similar to Acanthonyssus. It can be distinguished from Acanthonyssus by the grape-like clusters of cells on the dorsal plate.

This genus represents one of the least commonly collected mites in Venezuela. Careful examination of Oryzomys in other areas may result in extension of the known distribution of this species. The above collections (only known specimens of this species) were taken at widely distant locations.

Genus Macronyssoides Radovsky

Macronyssoides Radovsky, 1966:96.--Radovsky, 1967:166.

Type Species: Ichoronyssus kochi Fonseca, 1948.

Macronyssoides resembles the genus Macronyssus but can be distinguished by the absence of sternal glands in the female, by the presence of a blade-like process on the palpal trochanter, and by a strongly tapering, pointed epigynial plate. Protonymphs of the two genera differ in that Macronyssoides has 11 setal pairs on the podosomal plate (10 in Macronyssus), four setal pairs on the pygidial plate (5-7 pairs in Macronyssus), and the process on the palpal trochanter is blade-like as in the female (ridge-like in Macronyssus).

Males lack the palpal process. The male of only one species, M. kochi, has been described.

Macronyssoides conciliatus Radovsky

Macronyssoides conciliatus Radovsky, 1967:169.

VENEZUELAN RECORDS (20 females and 114 protonymphs):

Eight females and 57 protonymphs ex 16 Vampyrops umbratas; 7 females and 37 protonymphs ex 7 V. aurarius. The remaining specimens were collected from different bat species, 2 birds, a shrew, and a rat. Mites collected from hosts other than bats probably represent contamination and mites associated with bats other than species of Vampyrops may be the result of several bat species sharing the same roosting areas and are considered accidental.

REMARKS:

The type series for this species was collected in Panama off Vampyrops vittatus. The above Venezuela collections represent the only other published records of M. conciliatus. Species of Vampyrops appear to be the natural hosts. Most specimens were collected at elevations over 1000 meters. States or districts in which collections were made, in order of diminishing number of collections are: Dto. Federal, Bolivar, Miranda, Barinas, Merida, and the border between Yaracuy and Carabobo.

Macronyssoides kochi (Fonseca)

Ichoronyssus kochi Fonseca, 1948:278.

Macronyssoides kochi Radovsky, 1966:94.--Radovsky, 1967:167.--
Dusbábek, 1969:321.

VENEZUELAN RECORDS (105 females, 1 male, and 316 protonymphs):

Twelve females, 1 male, and 252 protonymphs ex 80 Artibeus jamaicensis; 57 females, and 13 protonymphs ex 8 Artibeus lituratus; 19 females, and 10 protonymphs ex 9 Vampyrops helleri; 7 protonymphs ex 6 Carollia perspicillata and 1 female and 13 protonymphs ex Desmodus rotundus. The remaining 37 specimens were collected from various species of bats in the families Emballonuridae, Mormoopidae, Phyllostomatidae, and Desmodontidae and from a marsupial. The latter record is considered to be an error and most of the miscellaneous bat hosts are considered accidental host-parasite associations.

REMARKS:

M. kochi was collected throughout Venezuela, however, most of the collections came from the northwest areas of Venezuela, particularly the states of Zulia and Trujillo but with numerous collections from Bolivar and T.F. Amazonas. Some collections were made at an elevation of 1810 m but the majority of specimens came from 100-200 meters elevation.

The only male collected in Venezuela differs somewhat from the description given by Radovsky (1967:168) while the females and protonymphs from the same collection fit the description. For this reason, I have tentatively assigned this specimen to M. kochi awaiting additional material or further study.

Genus Nycteronyssus Saunders and Yunker

Nycteronyssus Saunders and Yunker, 1973:381.

Type Species: Nycteronyssus desmodus Saunders and Yunker, 1973:382.

Large mites (adult over 600 μ long) dorsal plate entire but rather small; with 20 pairs of setae, F_1 pair very small, remainder robust, bare, spiniform. Peritremal plate long, connecting with dorsal plate anteriorly; peritreme short, wide, terminating over coxa III. Sternal plate wider than long, lateral margins slightly concave, with three pairs of setae. Epigynial plate well removed from sternal plate, short, narrow, linguiform and with single pair of setae. Leg I short and robust, its claws massive and arising directly from tarsus; legs II-IV normal.

REMARKS:

This species is represented by a single female off a vampire bat, Desmodus youngi, collected in the Orinoco drainage of northeastern Amazonas Territory. It is a very unique species having characteristics of both ecto- and endoparasitic forms. Due to its host association and the majority of characteristics being typically macronyssid this species was assigned to the family Macronyssidae, subfamily Macronyssinae.

Genus Radfordiella Fonseca

Radfordiella Fonseca, 1948:270.

Type Species: Radfordiella oudemansi Fonseca, 1948.

Small mites with moderately long and thick legs. Female dorsal plate abruptly narrowed posterior to setal pair M8; setal pair

Mll subterminal; with 22-26 pairs of setae; setae S8 absent. Ventral plates without sculpturing, sternal glands absent. Coxae without ventral ridges or with weak ridges on coxae II and III or II-IV. Coxa II with bifid anterior spur or two separate anterior spurs. Palpal trochanter of female with blade-like process; that of male with weak ridge or lacking process. Protonymph with 3 or 4 pairs of setae on pygidial plate.

REMARKS:

In lieu of a separate discussion for each of the three species of this genus found in Venezuela the following comments and discussion contributed by Dr. Frank J. Radovsky, the authority on this genus, are being used.

"The genus Radfordiella is an important element among the mites parasitic on Neotropical bats, yet only one species was named prior to 1967. That the extensiveness of this faunal element is only now beginning to be appreciated relates to the limited amount of work on acarine parasites in the Neotropics and to the relatively small size of these compared to other macronyssids. Nonetheless, it is difficult to account for the late discovery of Radfordiella desmodi, a regular and abundant parasite of the common vampire bat, Desmodus rotundus.

"Radovsky et al. (1971) recognized 6 species of Radfordiella, in reviewing that genus in relation to describing 3 new species with protonymphs parasitic in the mouths of glossophagine bats (only the protonymphs of these 3 species are known). All species appear to have Phyllostomatoidea as maintaining hosts.

"The analysis of the Venezuelan Radfordiella collections is still in progress, but the findings can be summarized. Most of the collections are of the 3 species previously known from adults as well as protonymphs: R. oudemansi Fonseca, 1948; R. desmodi Radovsky, 1967; and R. carolliae Radovsky, 1967. The greatest number of collections were R. desmodi, involving approximately 100 individual hosts of which more than 85% were Desmodus rotundus. The other hosts recorded for R. desmodi were largely phyllostomatid bats in most cases with only a single specimen of the mite recovered. Two records from birds, coincident with collections from D. rotundus, need to be verified. The resulting picture is one of a high degree of species specificity, bearing out previous observations on this mite, especially where numerous collections have been made in Panama and Trinidad. The closely related species R. carolliae appears to be specific at the generic level, i.e., on bats of the genus Carollia. These results also tend to confirm the specific distinctness of this mite from R. desmodi. R. oudemansi was found on at least 7 genera of phyllostomatoid bats, confirming earlier observations that suggested a lower level of specificity for this mite.

"In addition to the known species noted above, at least 2 undescribed species of Radfordiella have been distinguished thus far in the Venezuelan collections. These are from phyllostomatid bat genera Micronycteris and Lionycteris, and both are related to the desmodi-carolliae species group. Other mites represented by single or a few specimens are possibly new but require further study; they are from such phyllostomatid hosts as Tonatia, Sturnira, Phylloderma, and Lonchorhina. Each of these mites of questionable specific status is

obviously related either to the desmodi-carolliae group or to the oudemansi group.

"In summary, the Venezuelan collections of Radfordiella support this as being a genus of major importance and of which only a relatively small fraction of the existing species are probably known at present. The genus apparently originated as parasites of Phyllostomatoidea and has evolved to some extent with this host group; therefore, the genus may prove to be useful in analyzing the phylogenetic relationships of their hosts. There is a wide range of levels of specificity in the genus, from host species to host superfamily. The host-parasite relationships are scarcely studied, with most information relating to the occurrence of protonymphs of certain species in specific loci in the mouths of long-nosed, nectar- and pollen-feeding bats, and offer an intriguing area for future investigation."

Genus Chiroecetes Herrin and Radovsky

Chiroecetes Herrin and Radovsky, 1947:347.

Type Species: Chiroecetes lonchophylla Herrin and Radovsky, 1974.

Idiosomal armature reduced and lacking sculpturing; dorsal plate with prominent anterolateral shoulders then narrowing medially, and ending in bluntly pointed tip; with 21 pairs of minute setae; peritreme with posterior portion near stigma septate; peritremal plate not connected to any other plates. Sternal plate about as long as wide with irregular anterior and emarginate lateral margins; with only

2 pairs of setae and 1 pair of pores. Epigynial plate long and narrow with bluntly pointed posterior tip; genital setae marginal. Opisthosomal setae slender not barbed, those of venter near anal plate acuminate with inflated base. Legs of moderate length; claws stout and subequal; some hypotrichy. Anteromarginal spur of coxa II absent; coxa II and III each bearing a well developed, blunt, ventral spur. Palpal trochanter with small spur-like process; apotele two tined. Chelicerae rather short and stout.

Chiroecetes lonchophylla Herrin and Radovsky

Chiroecetes lonchophylla Herrin and Radovsky, 1974:348.

Female dorsal plate relatively small with prominent anterolateral shoulders, constricted laterally between setae S3 and S4, expanding between S4 and S7, then narrowing to a bluntly pointed tip; with 21 pairs of simple minute setae. Sternal plate approximately rectangular, anterior margin with median hump; only 2 pairs of setae, St3 just off posterolateral corners; sternal setae small and slender. Epigynial plate small, narrow, with weak striations. Anal plate narrowly pyriform. Unarmed venter with 28-33 pairs of simple setae, posterior ones slender, longer than anterior pairs, some with inflated bases.

REMARKS:

This genus and species is known from only a single specimen off Lonchophylla robusta, a long-tongued bat, from the state of Zulia. This species appears closest to the Radfordiella, Parichoronyssus and Macronyssoides group of the Macronyssinae (Herrin and Radovsky, 1974). It has most features in common with Radfordiella.

SUBFAMILY ORNITHONYSSINAE

These mites represent the most successful outgrowth of earlier radiation in the Macronyssidae. All are haematophagus with a considerable capacity for engorgement. They are more uniform morphologically and probably biologically than the Macronyssinae, but they are also more numerous and are found on a greater variety of hosts, representatives being found on reptiles, birds, and mammals other than bats as well as bats. Adult females lack sternal glands and frequently setal pair D7 is lacking on adult dorsal armature. The epigynial plate generally is narrowly rounded or pointed. The female palpal trochanter has a blade-like process and the dorsal setae generally are slender and barbed.

Genus Ornithonyssus Sambon

Ornithonyssus Sambon, 1928:105.--Strandtmann and Wharton, 1958:81.--Furman and Radovsky, 1963:90 [Rediagnosis].

Type Species: Dermanyssus sylviarum Canestrini and Fanzago, 1877.

All setae slender, many, particularly posterior ones, barbed (single barb usually). Dorsal plate generally entire, frequently leaving large area of idiosoma exposed. Legs of moderate length, slender. Coxae without prominent ridges or spurs, anteromarginal spur of coxa II small.

This genus was the most prevalent of the macronyssid mites collected in Venezuela due primarily to the large numbers of Ornithonyssus bacoti.

Ornithonyssus bacoti (Hirst)

Leiognathus bacoti Hirst, 1913:122.

Ornithonyssus bacoti Bregetova, 1956:165.--Strandtmann and Wharton, 1958:83.--Strandtmann, 1956:137.--Baker et al., 1956:22.

VENEZUELAN RECORDS (218 females, 222 males, 1243 protonymphs and 1 larva):

Thirty-four females, 24 males and 429 protonymphs ex 116 Zygodontomys brevicauda; 43 females, 53 males and 224 protonymphs ex 97 Sigmodon hispidus; 1 female, 25 males and 34 protonymphs ex 13 Proechimys guyannensis; 50 females, 72 males and 22 protonymphs ex 94 Proechimys semispinosus; 18 females, 5 males and 95 protonymphs ex 19 Rattus rattus. Other hosts from which O. bacoti was collected include 9 Holochilus brasiliensis, 5 Marmosa robinsoni and 5 Monodelphis brevicaudata. Seven species of mammals were found infested with this species 3 or 4 times. These were Didelphus marsupialis, Echimys semivillosus, Rhipidomys macconnelli, Nectomys squamipes, Oryzomys fulvescens, Sigmodon sp. and Akodon urichi. The remaining 33 species of rodents, bats, marsupials, and birds from which specimens were taken are considered to be errors or work table contaminations.

REMARKS:

The specimens of O. bacoti taken in Venezuela agree well with descriptions of the species. Yunker and Radovsky (1966) found Sigmodon hispidus to be a more common host of O. bacoti than Zygodontomys sp. in Panama, while the reverse was true in Venezuela, though both were common hosts.

The tropical rat mite is one of the most cosmopolitan of all parasitic mesostigmatid mites. It was first described from Egypt but has since been found world wide in association with man and his domiciliated animals, particularly rodents. O. bacoti is found primarily on domestic rats but is common on many species of rodents and can attack birds and many mammals other than rodents, including man.

Strandtmann and Wharton (1958) expressed the view that O. bacoti originated in the New World as a parasite of Sigmodon hispidus and secondarily became associated with Rattus species on which it has spread throughout the world. Yunker and Radovsky (1966) found S. hispidus to be one of the most common hosts of O. bacoti in Panama and the material from Venezuela further supports the theory that O. bacoti was originally a parasite of S. hispidus.

Ornithonyssus bursa (Berlese)

Leiognathus bursa Berlese, 1888:208.

Ornithonyssus bursa Sambon, 1928:107.--Strandtmann and Wharton, 1958:86.

VENEZUELAN RECORDS (12 females, 1 male, and 6 protonymphs):

Eleven females, 1 male, and 6 protonymphs ex 2 "birds"; 1 female ex "bat". The latter record is probably the result of accidental work table contamination.

REMARKS:

This species was taken only three times in Venezuela during the present study. This probably is not indicative of its being very

rare there but rather is the result of very few avian specimens being collected and sampled.

Ornithonyssus wernecki (Fonseca)

Liponyssus wernecki Fonseca, 1935:70.

Ornithonyssus wernecki Furman and Radovsky, 1963:91.

VENEZUELAN RECORDS (39 females, 20 males, and 16 nymphs):

Thirty eight females, 20 males, and 7 nymphs ex 9 Didelphis marsupialis, 1 female, and 9 numphs ex 2 Lutreolina crassicaudata.

REMARKS:

As noted by Strandtmann and Wharton (1958) O. wernecki is most commonly found on marsupial hosts. In the Venezuelan material, all collections were off marsupials. O. wernecki can be separated from O. bacoti, by the presence of a spur-like elevation on coxa I from which the proximal seta arises, and by its host associations. O. bacoti is found primarily on rodent hosts while O. wernecki is found on marsupials.

Lepidodorsum Saunders and Yunker

Lepidodorsum Saunders and Yunker, 1974.

Type Species: Lepidodorsum tiptoni Saunders and Yunker, 1974.

Macronyssid mites of moderate to small size (adult 500-600 μ long). Dorsal plate entire, elongate-ovate, ornamented with scale-like pattern forming small cells over most of plate, each cell containing many small punctae except those of plate margins.

Idiosomal setae of moderate length, some piliform, most barbed. Peritreme long, narrow, terminating over coxa II. Peritremal plate fused with dorsal plate anteriorly. All coxae with definite sculpturing but lacking ventral spurs or ridges. Legs normal without any striking modifications. Chelicerae slender, rather long; chelae simple, endendate, without setae. Palpal trochanter without ventral spur.

Female: Dorsal plate with 15-17 pairs barbed setae, unarmed integument hypertrichous. Sternal plate short with only two pairs of sternal setae, St3 absent. Epigynial plate long, narrow with membranous anterior flap extending over sternal plate to base of tritosternum.

Male: Unknown.

Protonymph: Unknown.

REMARKS:

This genus is similar to Ornithonyssus but differs from it in the following important aspects: (1) sternal setae 3 absent, (2) palpal trochanter without ventral spur, (3) enlarged anal plate, (4) epigynial plate with prolonged anterior projection, and (5) peritremal plate fused anteriorly with dorsal plate.

Lepidodorsum tiptoni Saunders and Yunker

Lepidodorsum tiptoni Saunders and Yunker, 1974.

A small species, female idiosomal length about 500 μ. Dorsal plate entire, tapering posteriorly, covered with reticulated pattern over most of the plate; with 15-17 pairs of barbed setae. Unarmed dorsum with 50 or more moderately heavy barbed setae. Peritremal

plate connected anteriorly with dorsal plate. Peritreme ventrolateral, ending at posterior margin of coxa II and narrow. Tritosternum bipartate, vested, with lateral membranous fringe on basal third. Sternal plate very short, much wider than long; with 2 pairs of setae, St1 on anterior margin and St2 near posterior margin; lacking ornamentation; sternal pores slit like, located near setal bases. Epigynial plate elongate, narrow, pointed posteriorly, with anterior membranous flap extending over sternal plate covering central portion and extending to base of tritosternum; with distinct sculpturing; epigynial setae present and similar to sternal setae. Anal plate relatively large; adanal setae posterior to midline of anal field; postanal seta similar to adanals. Unarmed venter with 26-28 medial pairs nude setae, lateral and caudal pairs longer, robust, blunt, and multiply branched. Metapodal plates elongate, resembling paragenitals. Deutosternal grove with 10 teeth arranged in single file. Legs not unusually modified, coxae without spurs, spines or ridges. Antero-marginal spur of coxa II lacking.

VENEZUELAN RECORDS (23 females):

Of the 23 females collected 22 were off Oryzomys albigularis, the type host. The single remaining specimen was one in poor condition off Zygodontomys brevicauda.

REMARKS:

See remarks section under the genus. The specific name for this species is in honor of Dr. Vernon J. Tipton, who served as co-director of the Venezuelan Project and also as major professor of the author during his work at Brigham Young University.

Genus Chiroptonyssus Augustson

Chiroptonyssus Augustson, 1945:46.--Radovsky, 1967:176.

Type Species: Chiroptonyssus texensis Augustson, 1945= (Liponyssus robustipes Ewing, 1925).

Caudal setae short, stout with 2 rows of barbs. Dorsal plate entire with 30-36 pairs of setae. Palpal trochanter with spur-like ridge. Leg II stouter than leg I; coxa II with anterior marginal spur. Sternal plate rectangular, with or without posterior lateral extensions. Epigynial plate faintly sculptured, tapering to narrow point.

For a more detailed description and notes on synonomy of this genus see the excellent review of macronyssid and laelapid parasites of bats by Radovsky (1967:176).

Chiroptonyssus haematophagus (Fonseca)

Liponissus [sic] haematophagus Fonseca, 1935:25.
Chiroptonyssus haematophagus Radovsky, 1966:94.--Radovsky, 1967:181.--Dusbábek, 1969:323.

Female dorsal plate tapering to blunt point, with 32 pairs of setae. Slight constriction between main part of sternal plate and posterior sternal setae, not as distinct as in C. venezolanus. Male with stout curved spur on trochanter IV, spur lacking in C. robustipes and on femur IV of venezolanus. Protonymph with 5 pairs of setae on unarmed venter. C. robustipes protonymphs have 7 pairs of setae on unarmed venter, both robustipes and haematophagus protonymphs lack blunt lateral spur on coxa I found in venezolanus.

VENEZUELAN RECORDS (12 females, 1 male and 381 protonymphs):

Nine females and 68 protonymphs ex 16 Molossus pretiosus; 112 protonymphs ex 13 M. ater; 38 protonymphs ex 5 M. bondae; 1 female, 1 male and 113 protonymphs ex 11 M. molossus; and 10 protonymphs ex 3 M. obscurus. The remainder of the specimens occurred in groups of from 1 to 10 specimens on 1 or 2 individuals of a variety of bats, rodents, and a marsupial. The latter two hosts are considered erroneous records or work table contaminations as this species is strictly a bat parasite.

REMARKS:

Previously known only from the type collection from Brazil and the following countries: Cuba, Mexico, Trinidad, and Panama (Dusbábek, 1969), Chiroptonyssus haematophagus is recorded for the first time from Venezuela. The specimens collected agree with the description given by Radovsky (1967) in his review of macronyssid and laelapid parasites of bats. The known host range of C. haematophagus is expanded with the addition of the following new hosts: Molossus obscurus, M. bondae, and M. pretiosus.

Chiroptonyssus robustipes (Ewing)

Liponyssus robustipes Ewing, 1925:20.
Chiroptonyssus texensis Augustson, 1945:46.
Chiroptonyssus robustipes Fonseca, 1948:248.

Chiroptonyssus robustipes is very similar to C. haematophagus but can be distinguished by the characteristics given under the latter species. C. robustipes was encountered infrequently in Venezuela;

there were only 16 protonymphs taken from 3 positive hosts. Two of the hosts were Tadarida brasiliensis while the third was Sturnira ludovici. This latter record may be in error or due to contamination as C. robustipes has previously been recorded from molossid bats only and primarily species of Tadarida (Radovsky, 1967).

Chiroptonyssus venezolanus (Vitzthum)

Liponissus [sic] venezolanus Vitzthum, 1932:9.
Chiroptonyssus venezolanus Radovsky, 1966:94.--Radovsky, 1967:182.--Dusbabek, 1969:323.

The main diagnostic characteristics for this species are discussed in the diagnosis for C. haematophagus. The constrictions of the posterolateral margins of the sternal plate of the female are such that it may appear as if the third pair of sternal setae are off the plate.

VENEZUELAN RECORDS (13 females and 209 protonymphs):

Thirteen females and 129 protonymphs ex 36 Tadarida gracilis; 74 protonymphs ex 12 Tadarida europs. The remaining specimens were from 1 collection each from a variety of bat species and a rodent and may represent contaminations. The above records represent an extension of the host range for this species. Radovsky (1967) pointed out that the greatest variation between type specimens and other specimens he examined was noted among specimens from Tadarida femorosacca in Arizona. The specimens from Venezuelan Tadarida spp. agree well with the published descriptions of C. venezolanus and do not appear to represent any new or different taxa.

All but 13 of the specimens of C. venezolanus were collected in the southern portions of the states of T.F. Amazonas and Apure at relatively low elevations ranging from 76-470 m with the majority from around 200 m.

UNASSIGNED MATERIAL:

Two specimens, a female ex T. europs and a protonymph ex T. brasiliensis could not be placed with confidence in any existing taxon of Chiroptonyssus. These specimens may be aberrant individuals or could represent new species. In the absence of an adequate series of specimens in which females are represented it is inadvisable to describe new taxa at this time or assign these specimens to a known taxon.

Draconyssus Yunker and Radovsky

Draconyssus Yunker and Radovsky, 1966:93.

Draconyssus possesses morphological features which relate it to both the Dermanyssidae and the Macronyssidae; it has the long second cheliceral segment characteristic of dermanyssid mites but the chelae are strong as in the macronyssid mites rather than minute as in dermanyssid mites. Yunker and Radovsky (1966) remarked "At this point we are unable to assign Draconyssus to a subfamily within the Dermanyssidae. We suspect it to be a macronyssid and to have affinities with Ophionyssus and Sauronyssus." Therefore, I have included this genus in this paper.

Draconyssus belgicae Yunker and Radovsky

Draconyssus belgicae Yunker and Radovsky, 1966:93.

Female with two dorsal plates, pygidial plate small; podosomal shield longer than wide, with six pairs of setae. Sternal plate with two pairs of setae; third setal pair off posterior margin of sternal plate. Epigynial plate narrow, void of setae. Chelicerae with second segment greatly elongate, not attenuate.

VENEZUELAN RECORDS (3 females):

Two ex "lizards" and 1 ex Zygodontomys brevicauda the latter record obviously erroneous as this is a reptile parasite found in the intranasal passages of lizards. Two of the 3 specimens were collected in the state of Trujillo (90 m elev.). The other specimen was collected in the state of Falcon (90 m elev.).

REMARKS:

Venezuelan specimens closely agree with the type material from Panama. Yunker and Radovsky (1966) reported considerable variation in features of the dorsal and ventral plates in the type material from Panama, but inasmuch as only 3 specimens were collected in Venezuela, there was no opportunity to study variation in Venezuelan specimens. Had more attention been given to the collection of intranasal mites of lizards, it is probable that more specimens of D. beligicae could have been made available for study.

HOST-PARASITE LIST*

Class Reptilia

I. Order Squamata

1. "Lizard"

a. Draconyssus belgicae 2**

Class Aves

1. "Bird"

a. Ornithonyssus bursa 2

Class Mammalia

II. Order Marsupialia

A. Family Didelphidae

1. Monodelphis brevicaudata

a. Ornithonyssus bacoti 1
b. Acanthonyssus proechimys 1

2. Marmosa cineria

a. Ornithonyssus bacoti 1

3. Marmosa robinsoni

a. Ornithonyssus bacoti 3

* An attempt has been made to eliminate those collections considered erroneous or accidental associations.

** Numbers in this column indicate the number of collections of the species from the particular host.

4. *Didelphis marsupialis*

a.	*Ornithonyssus bacoti*	3
b.	*Ornithonyssus wernecki*	10

5. *Lutreolina crassicaudata*

a.	*Ornithonyssus bacoti*	2
b.	*Ornithonyssus wernecki*	2

III. Order Chiroptera

B. Family Emballonuridae

1. *Saccopteryx bilineata*

a.	*Parichoronyssus cryptosternum*	1

2. *Peropteryx kappleri*

a.	*Radfordiella* sp. nr. *carolliae*	2
b.	*Radfordiella* sp.	1

3. *Peropteryx macrotis*

a.	*Radfordiella* sp. nr. *carolliae*	4

C. Family Noctilionidae

1. *Noctilio labialis*

a.	*Macronyssus crosbyi*	1
b.	*Parichoronyssus euthysternum*	1
c.	*Radfordiella oudemansi*	1
d.	*Steatonyssus* sp.	1
e.	New Genus "N" n. sp. #1	2
f.	New Genus "N" n. sp. #2	2

D. Family Phyllostamatidae

1. *Lonchorhina aurita*

a.	*Radfordiella oudemansi*	1
b.	*Radfordiella* sp.	1

2. *Tonatia minuta*

a.	*Radfordiella* sp.	1

3. Phyllostomus hastatus

a.	Radfordiella oudemansi	2
b.	Parichoronyssus sp.	1
c.	Parichoronyssus n. sp. (not sclerus)	3
d.	Parichoronyssus n. sp. #1	6

4. Phylloderma stenops

a.	Macronyssus meridionalis	1
b.	Radfordiella oudemansi	2
c.	Radfordiella n. sp. nr. oudemansi	1

5. Trachops cirrhosus

a.	Macronyssus meridionalis	1

6. Glossophaga longirostris

a.	Macronyssoides conciliatus	1

7. Glossophaga soricina

a.	Macronyssoides kochi	1

8. Lionycteris spurrelli

a.	Parichoronyssus n. sp. (not sclerus)	2
b.	Radfordiella n. sp.	6

9. Anoura geoffroyi

a.	Parichoronyssus sp.	1

10. Cheoroniscus godmani

a.	Macronyssus sp.	1

11. Carollia perspicillata

a.	Chiroptonyssus haematophagus	6
b.	Macronyssoides kochi	5
c.	Parichoronyssus crassipes	1
d.	Parichoronyssus n. sp. (not sclerus)	1
e.	Radfordiella carolliae	4
f.	Radfordiella desmodi	2

12. Carollia subrufa

a.	Parichoronyssus euthysternum	1
b.	Radfordiella carolliae	2

13. Carollia sp.

a.	Parichoronyssus euthysternum	1
b.	Parichoronyssus sp. nr. euthysternum	1
c.	Radfordiella carolliae	5
d.	Radfordiella sp.	4

14. Sturnira erythromos

a.	Macronyssoides sp.	3
b.	Macronyssus sp.	1

15. Sturnira lilium

a.	Chiroptonyssus haematophagus	1
b.	Macronyssus n. sp. #1	1
c.	Parichoronyssus euthysternum	4
d.	Parichoronyssus sp. nr. euthysternum	3
e.	Radfordiella sp.	1

16. Sturnira ludovici

a.	Chiroptonyssus robustipes	1
b.	Macronyssoides conciliatus	2
c.	Parichoronyssus euthysternum	1
d.	Parichoronyssus sp.	2

17. Uroderma bilobatum

a.	Macronyssoides conciliatus	2
b.	Macronyssoides kochi	1

18. Vampyrops helleri

a.	Macronyssoides kochi	8
b.	Macronyssoides sp.	1
c.	Parichoronyssus n. sp. #2	1
d.	Radfordiella oudemansi	1

19. Vampyrops umbratus

a.	Macronyssoides conciliatus	16
b.	Macronyssoides kochi	1
c.	Parichoronyssus sp. nr. euthysternum	1

20. Vampyrops aurasius

a.	Macronyssoides conciliatus	7
b.	Macronyssus sp. nr. (but not unidens)	1

21. Artibeus cinereus

a.	Macronyssoides kochi	2

22. *Artibeus concolor*

a.	*Parichoronyssus* (near) n. sp. #2	1

23. *Artibeus fuliginosis*

a.	*Macronyssoides kochi*	1

24. *Artibeus jamaicensis*

a.	*Macronyssoides kochi*	80
b.	*Radfordiella desmodi*	3
c.	*Chiroptonyssus venezolanus*	1

25. *Artibeus lituratus*

a.	*Macronyssoides kochi*	8
b.	*Radfordiella desmodi*	1

E. Family Desmodontidae

1. *Desmodus rotundus*

a.	*Chiroptonyssus venezolanus*	1
b.	*Macronyssoides conciliatus*	1
c.	*Macronyssoides kochi*	1
d.	*Macronyssus* n. sp. #1	5
e.	*Parichoronyssus* n. sp. #1	1
f.	*Parichoronyssus* n. sp. (not *sclerus*)	1
g.	*Radfordiella carolliae*	1
h.	*Radfordiella desmodi*	76
i.	*Radfordiella* sp.	1

2. *Desmodus* sp.

a.	*Radfordiella desmodi*	1

3. *Desmodus youngi*

a.	*Radfordiella desmodi*	1
b.	*Radfordiella oudemansi*	6
c.	*Nycteronyssus desmodus*	1

F. Family Vespertilionidae

1. *Myotis nigricans*

a.	*Chiroptonyssus venezolanus*	1
b.	*Macronyssus conciliatus*	1
c.	*Macronyssus meridionalis*	9
d.	*Macronyssus* sp. nr. *crosbyi*	1

2. *Myotis albescens*

a.	*Macronyssus crosbyi*	2
b.	*Macronyssus* sp.	2
c.	*Steatonyssus joaquimi*	1

3. *Myotis* sp.

a.	*Macronyssus* sp. nr. *crosbyi*	1

4. *Eptesicus brasiliensis*

a.	*Macronyssus* nr. (but not *sclerus*)	13
b.	*Macronyssus* sp. nr. *crosbyi*	1
c.	*Macronyssus* sp. nr. *longisetosus*	1
d.	*Macronyssus* sp.	4
e.	*Steatonyssus* sp.	3

5. *Eptesicus fuscus*

a.	*Steatonyssus occidentalis*	1

6. *Eptesicus* sp.

a.	*Macronyssus* sp. nr. (but not *unidens*)	1
b.	*Radfordiella desmodi*	1
c.	*Steatonyssus occidentalis*	1
d.	*Steatonyssus* sp.	3

7. *Histiotus montanus*

a.	*Cryptonyssus* sp.	1

8. *Lasiurus ega*

a.	*Steatonyssus radovskyi*	1

G. Family Molossidae

1. *Molossops planirostris*

a.	*Chiroptonyssus venezolanus*	1

2. *Molossus ater*

a.	*Chiroptonyssus haematophagus*	13
b.	*Parichoronyssus* n. sp. #1	1
c.	New Genus "N" n. sp. #2	15

3. *Molossus bondae*

a.	*Chiroptonyssus haematophagus*	5
b.	New Genus "N" n. sp. #2	3

4. *Molossus molossus*

a.	*Chiroptonyssus haematophagus*	11
b.	New Genus "N" n. sp. #2	1

5. *Molossus obscurus*

a.	*Chiroptonyssus haematophagus*	2

6. *Molossus pretiosus*

a.	*Chiroptonyssus haematophagus*	12

7. *Molossus trinitatus*

a.	*Chiroptonyssus haematophagus*	1

8. *Molossus* sp.

a.	*Chiroptonyssus haematophagus*	1

9. *Promops* sp.

a.	*Chiroptonyssus haematophagus*	1

10. *Tadarida brasiliensis*

a.	*Chiroptonyssus robustipes*	2
b.	*Chiroptonyssus* sp. (not *robustipes*)	1

11. *Tadarida europs*

a.	*Chiroptonyssus haematophagus*	1
b.	*Chiroptonyssus venezolanus*	49
c.	*Chiroptonyssus* sp.	1
d.	*Radfordiella desmodi*	1

12. *Tadarida* sp.

a.	*Chiroptonyssus venezolanus*	5

IV. Order Rodentia

A. Family Sciuridae

1. *Sciurus granatensis*

a.	*Acanthonyssus proechimys*	1
b.	*Ornithonyssus bacoti*	1

B. Family Heteromyidae

1. *Heteromys anomalus*

a. *Acanthonyssus proechimys* 1

2. *Heteromys* sp.

a. *Ornithonyssus bacoti* 1

C. Family Cricetidae

1. *Oryzomys albigularis*

a. *Ornithonyssus bacoti* 1
b. *Lepidodorsum tiptoni* 6

2. *Oryzomys concolor*

a. *Ornithonyssus* n. sp. 1
b. *Ornithonyssus* sp. nr. *bacoti* 1

3. *Oryzomys fulvescens*

a. *Ornithonyssus* sp. 1
b. *Ornithonyssus bacoti* 2
c. *Ornithonyssus* n. sp. 3

4. *Oryzomys minutus*

a. *Ornithonyssus* n. sp. 27

5. *Nectomys squamipes*

a. *Ornithonyssus bacoti* 3

6. *Rhipidomys goodfellowi*

a. *Ornithonyssus bacoti* 1

7. *Rhipidomys macconnelli*

a. *Ornithonyssus bacoti* 3

8. *Rhipidomys venezuelae*

a. *Ornithonyssus bacoti* 2

9. *Rhipidomys couesi*

a. *Ornithonyssus bacoti* 1

10. *Thomasomys laniger*

a.	*Ornithonyssus bacoti*	1
b.	*Ornithonyssus* n. sp.	1

11. *Akodon bogatensis*

a.	*Ornithonyssus* n. sp.	1

12. *Akodon urichi*

a.	*Ornithonyssus* sp. nr. *bacoti*	1
b.	*Ornithonyssus bacoti*	3

13. *Zygodontomys brevicauda*

a.	*Ornithonyssus bacoti*	111
b.	*Ornithonyssus* sp.	2

14. *Holochilus brasiliensis*

a.	*Ornithonyssus bacoti*	3

15. *Sigmodon hispidus*

a.	*Ornithonyssus bacoti*	97
b.	*Ornithonyssus* sp. nr. *bacoti*	1
c.	*Acanthonyssus proechimys*	1

16. *Sigmomys alstoni*

a.	*Ornithonyssus bacoti*	23

H. Family Muridae

1. *Rattus rattus*

a.	*Acanthonyssus proechimys*	1
b.	*Ornithonyssus bacoti*	19
c.	*Ornithonyssus* sp. nr. *bacoti*	1

I. Family Dasyproctidae

1. *Agouti paca*

a.	*Ornithonyssus bacoti*	1
b.	*Ornithonyssus* sp. nr. *bacoti*	2

2. *Dasyprocta agouti*

a.	*Ornithonyssus bacoti*	1

J. Family Echymidae

1. Proechimys conicollis

    a. Ornithonyssus bacoti 1

2. Proechimys guyannensis

    a. Acanthonyssus proechimys 10
    b. Ornithonyssus bacoti 16

3. Proechimys semispinosus

    a. Acanthonyssus proechimys 110
    b. Ornithonyssus bacoti 9

4. Echimys semivillosus

    a. Ornithonyssus bacoti 1

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VITA

VENEZUELAN MACRONYSSIDAE

IV. A NEW GENUS AND SPECIES OF RODENT-PARASITIZING ORNITHONYSSINAE (ACARINA, MACRONYSSIDAE)[1]

By Robert C. Saunders[2] and Conrad E. Yunker[3]

[1]This work was supported in part by Department of the Army Contract DA-49-193-MD-2788 with the Smithsonian Institution (Ecology and distribution of mammalian ectoparasites, arboviruses, and their hosts in Venezuela).

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Abstract: Lepidodorsum tiptoni, n. gen., n. sp., is described from Oryzomys albigularis in Merida, Venezuela. Additional specimens were seen from the same host in Trujillo and Tachira and from Zygodontomys brevicauda in Miranda.

The subfamily Ornithonyssinae Lange, 1958 contains 11 macronyssid genera (Radovsky 1969), of which the nominal genus, Ornithonyssus Sambon, 1928, has recently been redefined in the interest of phyletic affinity (Furman & Radovsky 1963). Restrictions of the new definition exclude the species described here from that genus, to which it is most closely related. Hence, a new genus, Lepidodorsum, is proposed for this parasite of Venezuelan rodents.

Cohort GAMASINA Leach, 1815

Superfamily DERMANYSSOIDEA Kolenati, 1859

Family MACRONYSSIDAE Oudemans, 1936

Subfamily ORNITHONYSSINAE Lange, 1958

Genus LEPIDODORSUM, n. gen.

Diagnosis (♀): Medium-sized mites (450-600 μ long); body elongate-ovate. Dorsal plate entire, tapering posteriorly and exposing broad areas of unarmed integument; fused with peritremal plate anteriorly; ornamented with pronounced scale-like pattern and coarse puncta; with 17 pairs of short to moderately long and barbed setae. ET_1 intimately associated with peritremal plate. Unarmed dorsal integument hypertrichous; setae moderately long, thick and barbed. Sternal plate short, without reticulations, glands, or sclerotized band; with 2 pairs of setae. Third sternal setae absent; metapodal setae present. Epigynial plate long, narrow and pointed posteriorly, broad anteriorly and with prolonged medial flap that overlaps sternal plate and base of tritosternum; with a single pair

of piliform setae and lacking reticulate sculpturing. Anal plate large, ellipsoidal; paranal setae piliform, postanal seta barbed. Legs not unusually modified; claws subequal, coxae lacking spurs, spines, pedicels or ridges, but with reticulate sculpturing; many leg setae short, robust and barbed, others short to moderately long, fine and piliform. Deutosternal groove with 10 teeth in single file; palpal trochanter without spur or keel; hypostomal processes and tectum elongate, reaching to base of palpal tarsus; tectum pointed anteriorly, apically fimbriate; chelicerae elongate, slender; chelae edentate.

Type-species: Lepidodorsum tiptoni, n. sp.

Remarks: This genus and Ornithonyssus Sambon, 1928 (type-species Dermanyssus sylviarum) share many of the characters given above. However, the former differs in the following: absence of setae St3, sternal plate lacking reticulate sculpturing, epigynial plate with prolonged anterior projection, enlarged anal plate, fusion of dorsal and peritremal plates, and absence of a spur or keel on palpal trochanter. Additional characters Lepidodorsum possesses that may be atypical of Ornithonyssus are short, blunt, dorsal-plate setae and pronounced coxal sculpturing, but we are unable to confirm that these are lacking in all species of Ornithonyssus.

LEPIDODORSUM TIPTONI, N. SP.

Type-data: Holotype ♀ and 1 paratype ♀, Fig. 1-5, ex Oryzomys albigularis (RML 63698) (SVP 4586), Mérida, 1 km N and 2 km W Mérida (Santa Rosa), 2010 m elev., 26.V.1966, N. E. Peterson. Additional paratypes as follows: 7 ♀♀, ex Oryzomys albigularis (SVP 4546), Mérida

1 km N and 2 km W Mérida (Santa Rosa), 1970 m elev., 14.V.1966, N. E. Peterson; 3 ♀♀, ex O. albigularis (SVP 4573), same data except 2000 m elev. and 24.V.1966; 6 ♂♂, ex O. albigularis (SVP 4587), same data except 2020 m elev. and 27.V.1966; 2 ♀♀, ex O. albigularis (SVP 4569), same data except 1970 m elev. and 21.V.1966; 1 ♀, ex O. albigularis (SVP 3820), Trujillo, Misisi, 15 km E Trujillo (Hda. Misisi), 2360 m elev., 19.I.1966; 1 ♀, ex O. albigularis (SVP 21937), Tachira, 35 km S and 22 km W San Cristobal (Buena Vista), 2396 m elev., 17.III.1968, N. E. Peterson et al.

Holotype and 3 paratypes in the collection of the Rocky Mountain Laboratory, Hamilton, Montana; remaining paratypes to be distributed among the collections of the U.S. Museum of Natural History, Washington, D.C., Universidad Central de Venezuela, Caracas, Bernice P. Bishop Museum, Honolulu, and British Museum (Natural History), London.

A single ♀, in poor condition, was also seen ex Zygodontomys brevicauda (SVP 11542), Miranda, 6 km S Rio Chico (Hda. La Guapa), 1 m elev., 10.XII.1966. N. E. Peterson et al.

Dorsum (Fig. 1, 5): Body relatively elongate and narrow in unengorged specimens. Dorsal plate entire, elongate-ovate, widest over podosoma, narrowest posteriorly, ending bluntly, with pronounced scale-like or reticulate sculpturing overall, of which each cell accentuated by numerous coarse puncta; with 15-17 pairs of short to moderately long, sparsely barbed setae. Unarmed dorsum with 50 or more pairs of moderately long, barbed setae. ET_1 intimately associated with, possibly arising from, peritremal plate (Fig. 5). A pair of ovate pores on unarmed dorsum at or near level of setae Sc.

Venter (Fig. 2, 3): Tritosternum bipartite, laciniae barbed, a lateral membranous fringe on basal 1/3. Sternal plate a short, wide band, with gently arched anterior margin and bulging posterior margin, longest near midline, lacking ornamentation other than a few scattered, fine puncta; with 2 pairs of short, fine, piliform nude setae (St1 and 2) and 2 pairs of pores; third sternal setae absent. Third sternal pores and metasternal setae on unarmed integument in endopodal area between coxae II and III. Epigynial plate elongate, narrow and pointed posteriorly, wide anteriorly and with a prolonged membranous flap that overlaps median portion of sternal plate and base of tritosternum; this flap with serrate anterior margin; sclerotized portion of plate without ornamentation other than a few weakly produced, longitudinal lines, with a single pair of epigynial setae similar to sternals; membranous anterior portion invested with pronounced ribs and folds. Anal plate large, ellipsoidal, rounded anteriorly, slightly reflected posteriorly, with well-developed sculpturing; paired adanal setae at midlevel of anal opening, similar in form to sternals and epigynials, single postanal seta slightly thicker and barbed; cribrum composed of numerous, coarse, close-set, anteriorly directed denticles. Unarmed venter with 26-28 pairs of setae, those medial short, slender, piliform and nude, resembling sternals and epigynials, those lateral and caudal longer, robust, blunt and multiply barbed. Endopodal platelets between coxae II and III small, those between III and IV well-developed, fused with genital apodemes and parapodal plates. Peritreme ventrolateral, not sinuous, originating in small circular stigma lateral to anterior margin of coxa IV, terminating above middle of coxa II. Peritremal plate

posteriorly contiguous with subintegumental parapodal plate, emerging on surface in exopodal area IV, narrowing anterior of stigma, becoming dorsolateral over coxa II, anteriorly fused with dorsal plate. A pair of long, narrow paragenital platelets flanking the posterior portion of epigynial plate, posterolateral to these a pair of subintegumental apodemes of similar shape; metapodal plates elongate, resembling paragenitals.

Legs (Fig. 1, 2): Not unusually modified, each terminating in paired, subequal claws and pulvilli. Anteromarginal spur of coxa II lacking; coxae without spurs, spines, pedicels or ridges, but with pronounced sculpturing; setae of coxae I and IV fine and nude, those of II and III thicker and with 1 or 2 barbs. Excluding tarsi, most dorsal leg setae short, robust and barbed, ventral setae mostly short, fine and nude; tarsal setae usually longer, piliform and nude. Chaetotaxy as in TABLE 1. Femora I & II and genu II with one less, and genua III & IV and tibia III with one more, seta than normally found in most free-living dermanyssoid adults.

Gnathosoma (Fig. 3, 4): Deutosternal groove with 10 teeth arranged in a single file; these occasionally bicuspidate. Gnathosomal setae fine, attenuate, piliform; inner proximal hypostomals similar to but much longer than gnathosomals or outer hypostomals; outer and distal hypostomals subequal. Hypostomal processes elongate, terminating at anterior level of palpal tibiae; tectum equally long, fimbriate apically. Palpal trochanter without spur or keel. Palpal setation: 2-5-6-12/13-13/14; tarsal apotele 2-tined. Chelicerae chelate, basal segment short, 2nd segment 7 times as long; fixed digit slender, edentate, lacking pilus dentilis; movable digit edentate, scaphiform, slightly shorter than fixed digit.

Measurements (in microns): (Holotype followed, in parentheses, by range and mean of 9 paratypes.) Idiosoma, L. 484 (490-575, 512), greatest W. 265 (255-320, 276); dorsal plate, L. 473 (473-503, 481); W. over coxae II 197 (187-208, 198); sternal plate, greatest L. 28 (25-35, 31); W. at setae St2, 95 (88-101, 94); anal plate, L. 106 (95-107, 101); W. at midlevel of anal pore, 74 (72-79, 77); movable chela, L. 34 (34-39, 36); distal segment of chelicera (including fixed digit), L. 156 (149-170, 159); basal segment of chelicera, L. 23 (19-26, 22); seta F_1, L. 9 (7-9, 9); seta F_3, L. 18 (18-23, 20); seta T, L. 23 (20-27, 22); seta D_3, L. 16 (14-16, 15); seta M_{11}, L. 19 (19-25, 23).

Remarks: Morphological variation in L. tiptoni is most obvious in the dorsal chaetotaxy. Typically, 17 pairs of setae are on the dorsal plate, but 12 paratype specimens have an extra seta or setal pair on the margin of the plate lateral to S_3 or S_4. In 1 paratype, an extra seta is on the posterolateral margin of the plate just anterior to M_{11}. Setal pair S_6, usually found on the plate, is located on the unarmed integument in the holotype and in 1 paratype; only 1 member of this pair is so displaced in 3 other paratypes and, in an additional paratype, 1 seta S_6 is missing altogether. Two specimens, including the holotype, lack a single member of pair I, and each of 3 paratypes lack 1 seta of pair F_1, D_4, or D_5. In 1 paratype a single seta of pair M_{11} (typically on the plate) is located in an emarginate area of the plate (Fig. 5). In the exception, the holotype, no trace can be found of 1 member of pair ET_1.

This species is named for Dr. Vernon J. Tipton, Brigham Young University. Dr. Frank J. Radovsky, Bishop Museum, Honolulu, kindly

aided us in providing observations of and designations for certain of the dorsal setae.

Table 1. Leg chaetotaxy of Lepidodorsum tiptoni, n. sp.

	I	II	III	IV
Coxa	2	2	2	1
Trochanter	6	5	5	5
Femur	12	10	6	6
Genu	13	10	10	10
Tibia	13	10	9	10
Tarsus	--	18	18	18

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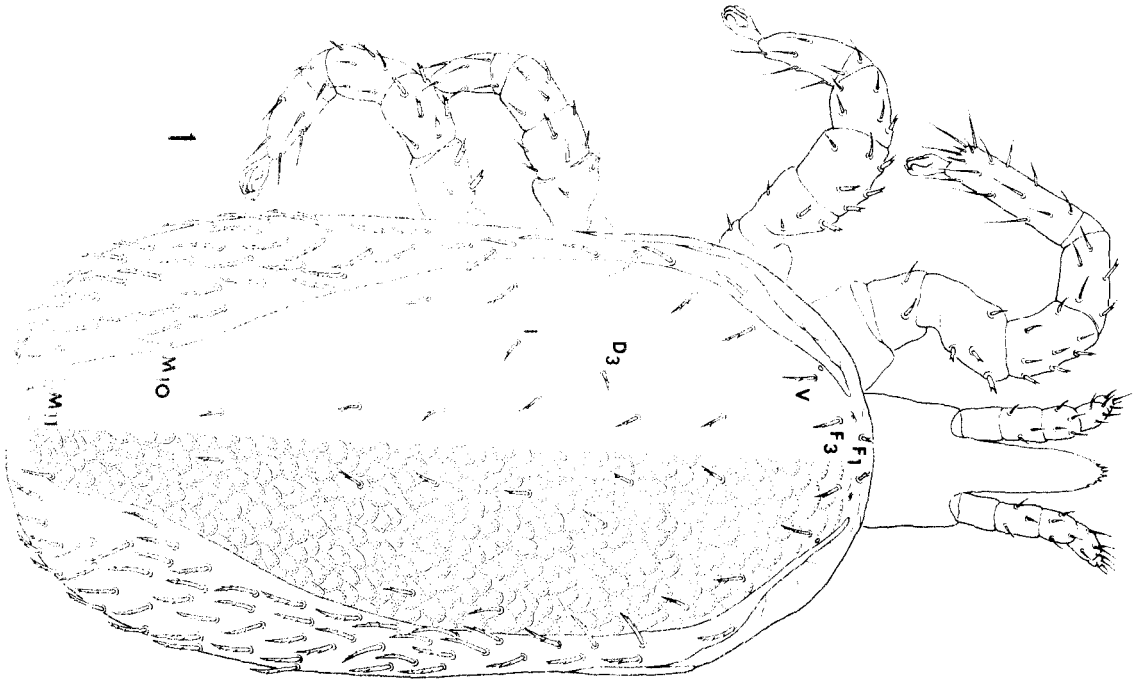
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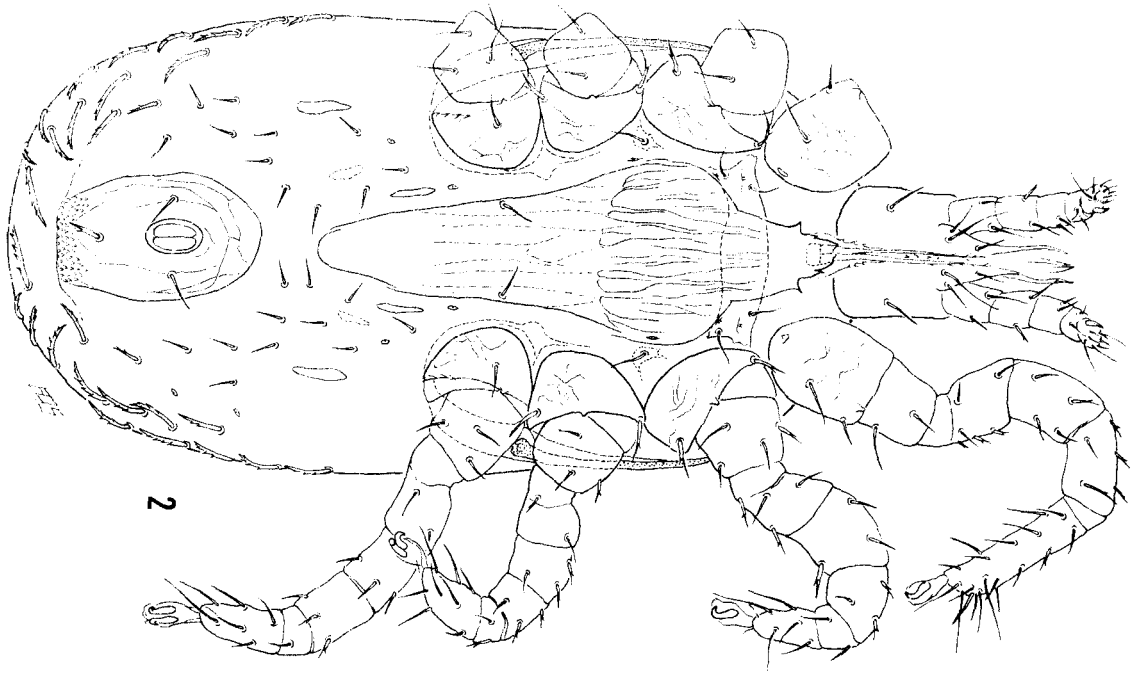
M11
D3
V
F3
F1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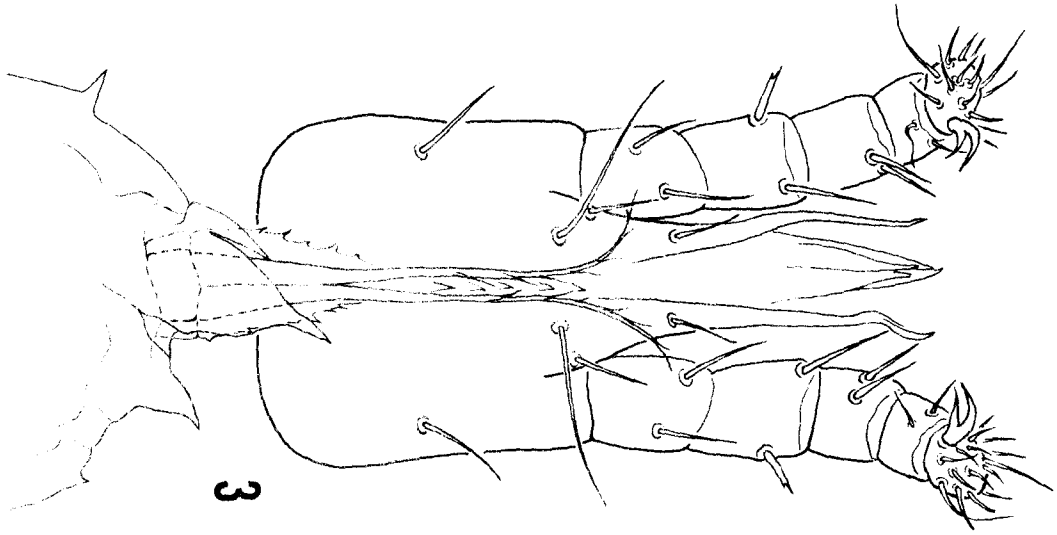

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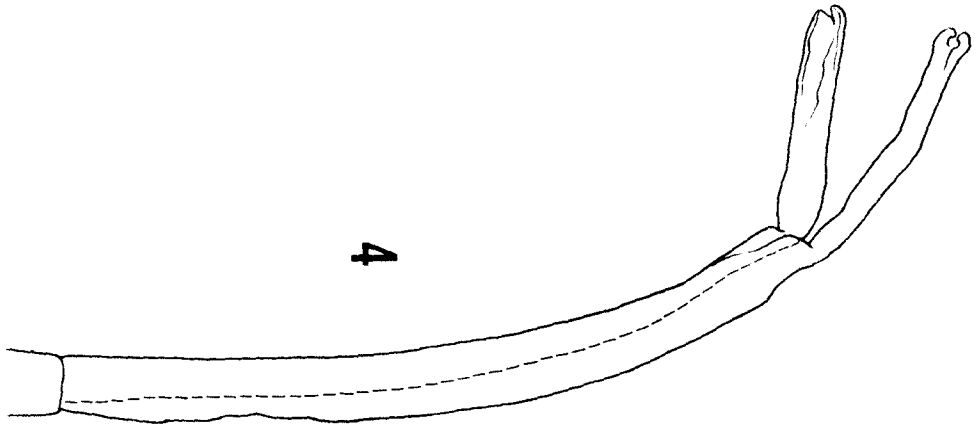

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VENEZUELAN MACRONYSSIDAE

I. The genera *Acanthonyssus* Yunker & Radovsky, and *Argitis*, n. gen.[1]

By **Conrad E. Yunker[2] and Robert C. Saunders[3]**

Abstract: The genus *Acanthonyssus* is redefined. Described from the female, male, deutonymph and protonymph is a 2nd species of *Acanthonyssus*, *A. proechimys*, n. sp., off *Proechimys semispinosus* (type-host) and *P. guyannensis*. Other infrequent records include *Heteromys anomalus*, *Sigmodon hispidus* and *Zygodontomys brevicauda*. A new genus, *Argitis* (monotypic for *A. oryzomys*, n. sp.), is erected for an *Acanthonyssus*-like form off *Oryzomys concolor* (type-host) and *O. bicolor*.

The genus *Acanthonyssus* Yunker & Radovsky, 1966 was proposed for *Ichoronyssus dentipes* Strandtmann & Eads, 1947, a parasite of the cotton rat, *Sigmodon hispidus*, in southern U.S.A. and Central America. At the time *Acanthonyssus* was erected the existence of a species complex among *A. dentipes*-like forms on the cotton rat and the echimyid rodent, *Proechimys semispinosus*, was suggested. Recent extensive collections of *Acanthonyssus* from Venezuelan *Proechimys* spp. have enabled us to separate a 2nd species and compare it with the type-species. Description of the new species and a redefinition of the genus follow. Also included are descriptions of a new genus and species related to *Acanthonyssus*.

Measurements, in microns, are means and ranges; the number (n) of specimens measured was 10 unless otherwise noted. Terminology, abbreviations and the system of dorsal setal nomenclature used follow Radovsky 1967 (exceptions noted).

Genus **ACANTHONYSSUS** Yunker & Radovsky, 1966

Diagnosis: Macronyssidae of small size (adult less than 500 long). Idiosomal setae relatively short, all smooth except M_{11} of nymphs. Adult dorsal plate entire, broadly rounded posteriorly, without unusual ornamentation. Peritremes moderately wide, elongate, sinuate. Tectum entire, tip aculeate. Active stages with all coxae bearing 1 or 2 stout ventral spurs of which some are bifid and setigerous, I and II with transverse ridges which may be lobiform, II with a large, sharp anterodorsal spur; telofemora III and IV, and genua and tibiae II–IV with a strong, proximally recurved ventral spur; tarsi II–IV each with a pair of small, recurved, setigerous spurs; claws of subequal size from leg to leg; palpal apotele 2-tined; chelicerae elongate, slender.

♀: With 23 pairs of setae on dorsal plate. Sternal setae II much closer to III than to I. Metasternal setae present. Epigynial plate sagittate, with large imbricate-scale pattern on anterior portion. Anal plate normal, ovate. Metapodal plates absent. Peritremes terminating over coxae I. Chelae simple, edentate, without setae. Palpal trochanter with a spurlike apicoventral process.

♂: With 25 pairs of setae on dorsal plate. Ventral armature entire; plate not greatly widened in ventrianal region. Peritremes terminating over coxae II.

Protonymph: Motile, with functional mouthparts. Total idiosomal setal pairs 38 + postanal: 11 pairs on propodosomal plate, 4 on pygidial plate, 3 on sternal plate 1 + postanal on anal plate, 13 on unarmed dorsum and 6 on unarmed venter. Idiosomal plates normal, neither immoderately large nor unusually shaped; each with well-developed reticulate sculpturing. Peritreme lacking poststigmal portion. Palpal trochanter without ventral process.

Deutonymph: Nonfeeding; with reduced sclerotization, appendages and mouthparts; sexually heteromorphic.

Type-species: *Ichoronyssus dentipes* Strandtmann & Eads, 1947.

Acanthonyssus proechimys, n. sp.

♀ *Dorsum* (FIG. 1, 7): Dorsal plate entire, slightly biconcave laterally, broadly rounded posteriorly, with a short posterior projection between setae M_{11}, reticulate sculpturing restricted to extreme anterior and anterolateral areas, otherwise unadorned, with 17 pairs of mostly circular pores plus a prominent pair of dual openings with thickened rims connected to subintegumental taenidiform ducts, the latter openings located near posterolateral plate margin, with 23 pairs of short bare setae, F_1 minute, F_3 longest, those remaining intermediate. Unarmed dorsum with 19–22 pairs of short bare setae. Peritremal plate not connected with dorsal plate, dorsal for most of its length but poststigmal portion ventral and apparently fused with parapodal plate. Peritreme almost entirely dorsal, commencing at laterally located stigma and terminating over mid-region of coxa I, sharply curved over intercoxal spaces I–II and II–III, moderately broad at origin, somewhat attenuate thereafter.

Venter (FIG. 2, 3, 9, 11): Tritosternum with 2 vested laciniae and a lateral membranous fringe extending from base anteriad to level of lacinial division. Sternal plate (FIG. 3, 9) subrectangular, wider than long, with convex anterior and concave posterior margin; anterior 2/3 punctate and with reticulations merging insensibly with unarmed integument anterior to plate; with 3 pairs of setae, the 2nd much closer to the 3rd than to the 1st, and 2 pairs of pores. Third sternal pores and metasternal setae on unarmed integument posterior and lateral of plate. Epigynial plate sagittate, with broadly curved membranous anterior margin only slightly or not overlapping sternal plate; anterior 1/2 with large imbricate cells that increase in size posteriorly and finally become transverse striae; with 1 pair of setae, the epigynials, and corresponding pores; posterolateral margins encroaching on bases of 2 additional pairs of

[1]This work was supported in part by Department of the Army Contract DA-49-193-MD-2788 with the Smithsonian Institution (Ecology and distribution of mammalian ectoparasites, arboviruses, and their hosts in Venezuela).

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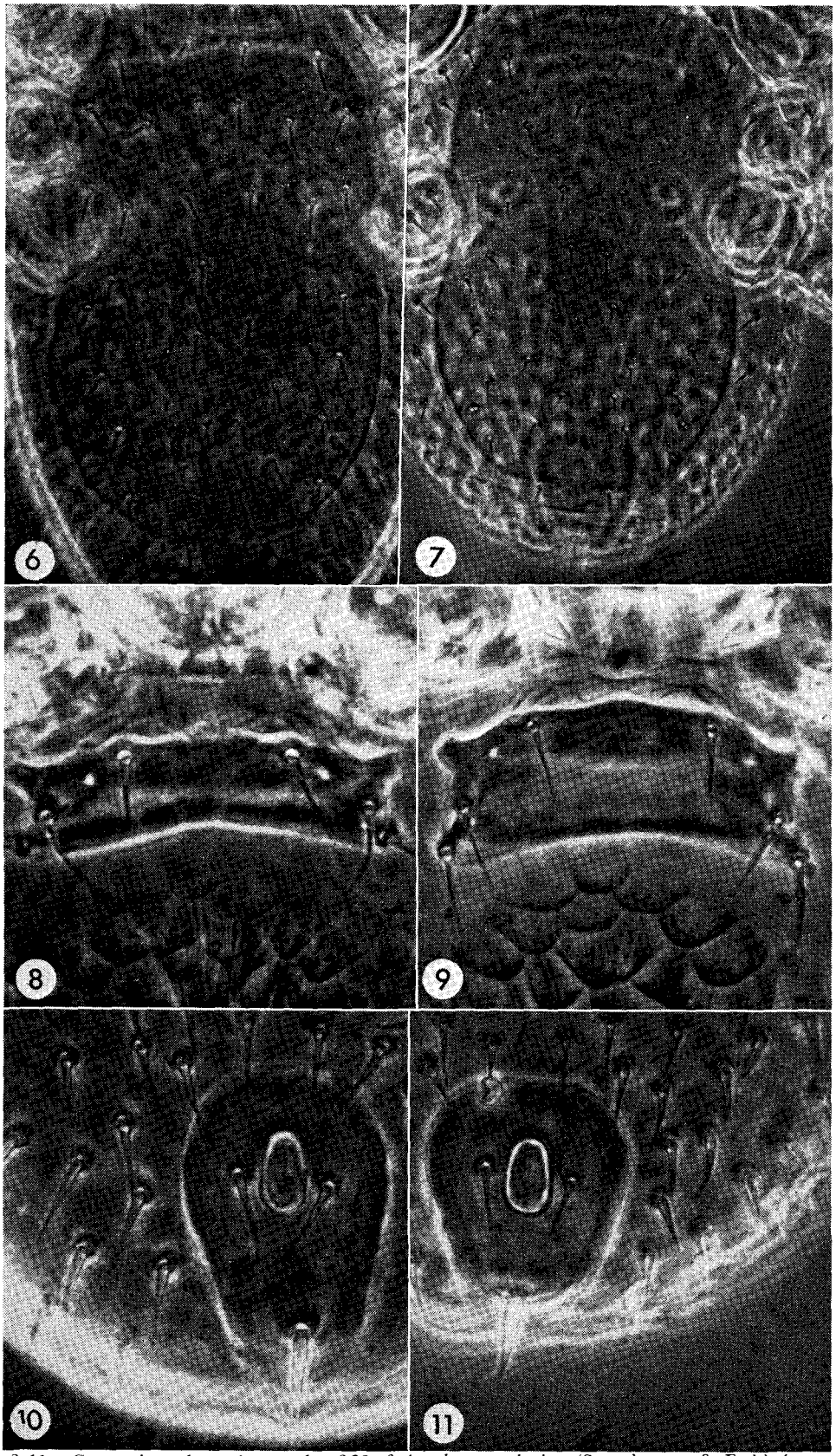

FIG. 6–11. Comparison photomicrographs of ♀♀ of *Acanthonyssus dentipes* (Strandtmann & Eads) (cotype) and *A. proechimys*, n. sp. (holotype). (6) Dorsum of *A. dentipes*. (7) same, *A. proechimys*. (8) Sternal plate, *A. dentipes*. (9) same, *A. proechimys*. (10) Anal plate, *A. dentipes*. (11) same, *A. proechimys*. Scale: FIG. 6 & 7, 250×; 8–11, 520×.

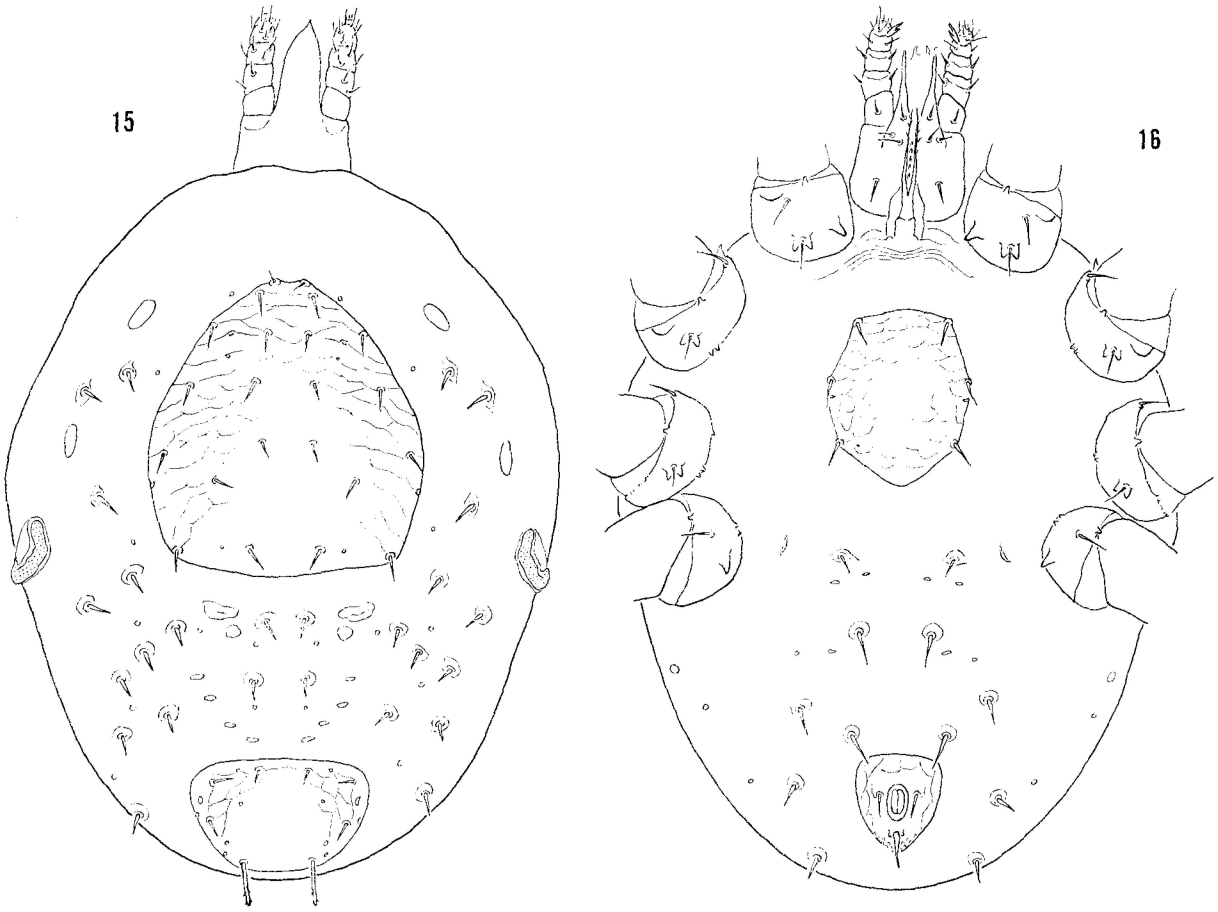

FIG. 15–16. *Acanthonyssus proechimys*, n. sp., protonymph. (15) Dorsum. (16) Venter. Scale: 375×.

of ♀ as follows: Tectum not surpassing palps, trochanter without ventral bladelike process, lateral seta of femur thick, arising from a distinct protuberance, moveable chela with spermatodactyl as illustrated (FIG. 14).

Measurements: Idiosomal L., 307 (293–317); dorsal plate L., 299 (285–309); dorsal plate W., 154 (148–163); holoventral plate L. to postanal seta, 253 (245–258); holoventral plate, greatest W. in sternal area, 95 (89–100); F_1, 6 (5–8); F_3, 22 (19–23); V, 19 (14–21); D_8, 17 (15–18); M_{11}, 12 (10–16); sternal seta 1, 26 (25–26); sternal seta 2, 27 (26–29); sternal seta 3, 27 (26–29); metasternal seta, 27 (23–29); genital seta, 28 (26–33); adanal seta, 15 (14–16); postanal seta, 19 (15–22).

Protonymph dorsum (FIG. 15): Propodosomal plate pyriform and small, ornamented as in ♀, with 4 pairs of pores and 11 pairs of nude setae; F_1 small, others longer and subequal. Pygidial plate semicircular, strongly sculptured and punctate, with 7 pairs of well-defined pores and 4 pairs of setae: M_{11} long and barbed; others shorter, subequal and nude. Unarmed dorsum with 13 pairs of nude setae. A pair of small, lenticular, punctate platelets on dorsum over coxae II and a similar pair over coxae III. Four pairs of minute and 2 pairs of larger (mesonotal) platelets on integument between main dorsal plates; most pore openings and many setal bases on unarmed dorsum moderately sclerotized. Stigma lateral; peritremalia short, restricted to region of dorsum over trochanter IV, lacking a poststigmal segment.

Venter (FIG. 16): Sternal plate with margins regular, lacking intercoxal projections, weakly reticulate, with 3 pairs of subequal setae and 2 pairs of pores. Anal plate ovate with truncate anterior margin; strongly reticulate; adanal setae short, slender and attenuate, arising at anterior level of anus, postanal seta same length but robust; cribrum as in adults. Unarmed venter with 4 setal pairs between plates, the 1st (genital) 1/2 the size of the succeeding ones, and 2 pairs posterolateral of anal plate; all setal bases moderately sclerotized.

Legs: I and IV longest, subequal; II and III subequal, each terminating in similar paired claws and a well-developed pulvillus. Chaetotaxy as in TABLE 1. Coxae I and II as in ♂, coxa III with a single, bifid, setigerous spur and coxa IV with a single nonsetigerous spur. Free segments with spurs same as in adults, except less strongly developed.

Gnathosoma: Except for dimensions, palpal chaetotaxy and chelae, essentially same as that of ♂. Trochanter with one, femur with 4 and genu with 5, and tibia and tarsus with an indeterminate number of setae. Chelicerae functional, similar to that of ♀.

Measurements: 278 (260–336); F_1, 7 (6–8); F_3, 14 (12–15); V, 13 (11–14); D_8, 8 (6–10); M_{11}, 14 (11–16); sternal seta 1, 18 (18–19); genital seta, 10 (10–11), adanal seta, 14 (12–15); postanal seta 15 (12–18).

Deutonymph (FIG. 17–20): Of the nonfeeding type, with reduced sclerotization, poorly developed appendages and tritosternum, and rudimentary mouthparts. Dorsal plate entire; M_{11} long, not tapered, blunt and barbed. Except for bifid setigerous spur of coxa I, excrescences seen on coxae, femora, genua and tibiae of active stages greatly reduced or entirely

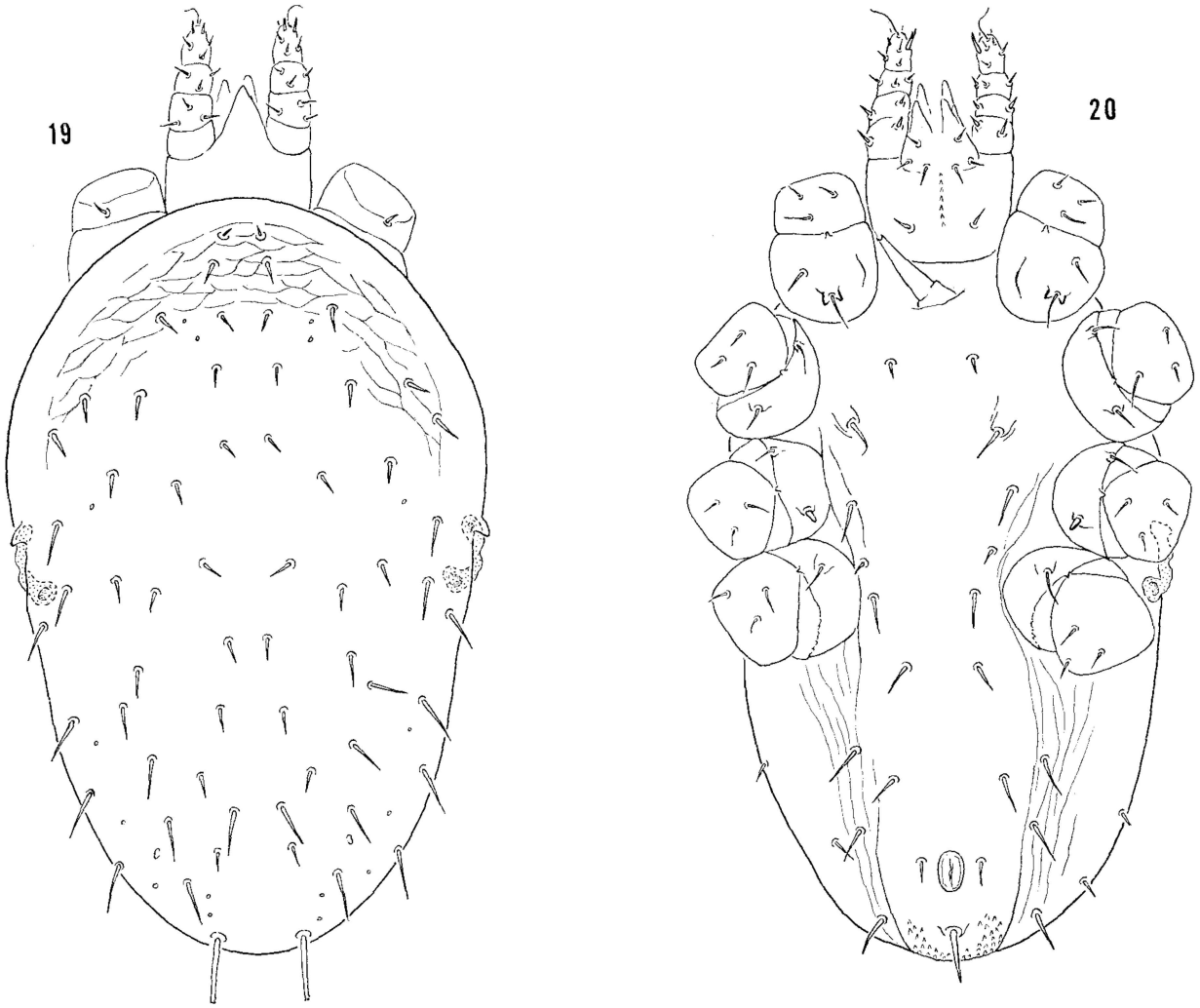

FIG. 19–20. *Acanthonyssus proechimys*, n. sp., ♂ deutonymph. (19) Dorsum. (20) Venter. Scale: 315×.

off 105 *Proechimys semispinosus*, 27 off 12 *P. guyannensis* and 43 off 10 undetermined *Proechimys* sp. Other occasional collections were made from *Heteromys anomalus*, *Sigmodon hispidus*, *Zygodontomys brevicauda*, a squirrel, 2 marsupials and a bat. Some of these hosts, particularly the non-rodents, are presumed to be accidental. Infested hosts were found at altitudes from 24–1335 m.

Remarks: Variations were noted in dorsal plate dimensions of the female and idiosomal chaetotaxy of the male. The dorsal plate of 1 paratype female, while equally wide as that of the holotype (193) is considerably shorter (336 vs 360). The same plate of another paratype female is narrow (181), but of intermediate length (353). The male dorsal plate may have 24–26 pairs of setae, this variation arising from loss or gain of 1 or 2 pairs of the M series at the posterolateral margin. In addition, asymmetrical erosion in the ventrianal region of the male holoventral plate results in variation in number of plate setae among individuals.

Females of *A. proechimys* may be distinguished from those of *A. dentipes* by the following characteristics (FIG. 6–11): sternal plate long, 1st pair of sternal setae not reaching posterior margin of shield (in *A. dentipes* these setae surpass the plate's posterior margin); anal plate as wide as, but noticeably shorter than, that of *A. dentipes;* dorsal setae short; peritreme not extending beyond mid-level of coxa I, relatively narrow (the wider peritreme of *A. dentipes* extends to the anterior level of coxa I); lateral setae of ventral opisthosoma noticeably more robust than corresponding ones of *A. dentipes*. TABLE 2 shows comparative measurements for certain characteristics among type specimens of *A. proechimys* and *A. dentipes* and a Panamanian representative of the latter.

Like the intradermal chigger *Intercutestrix mondolfii*

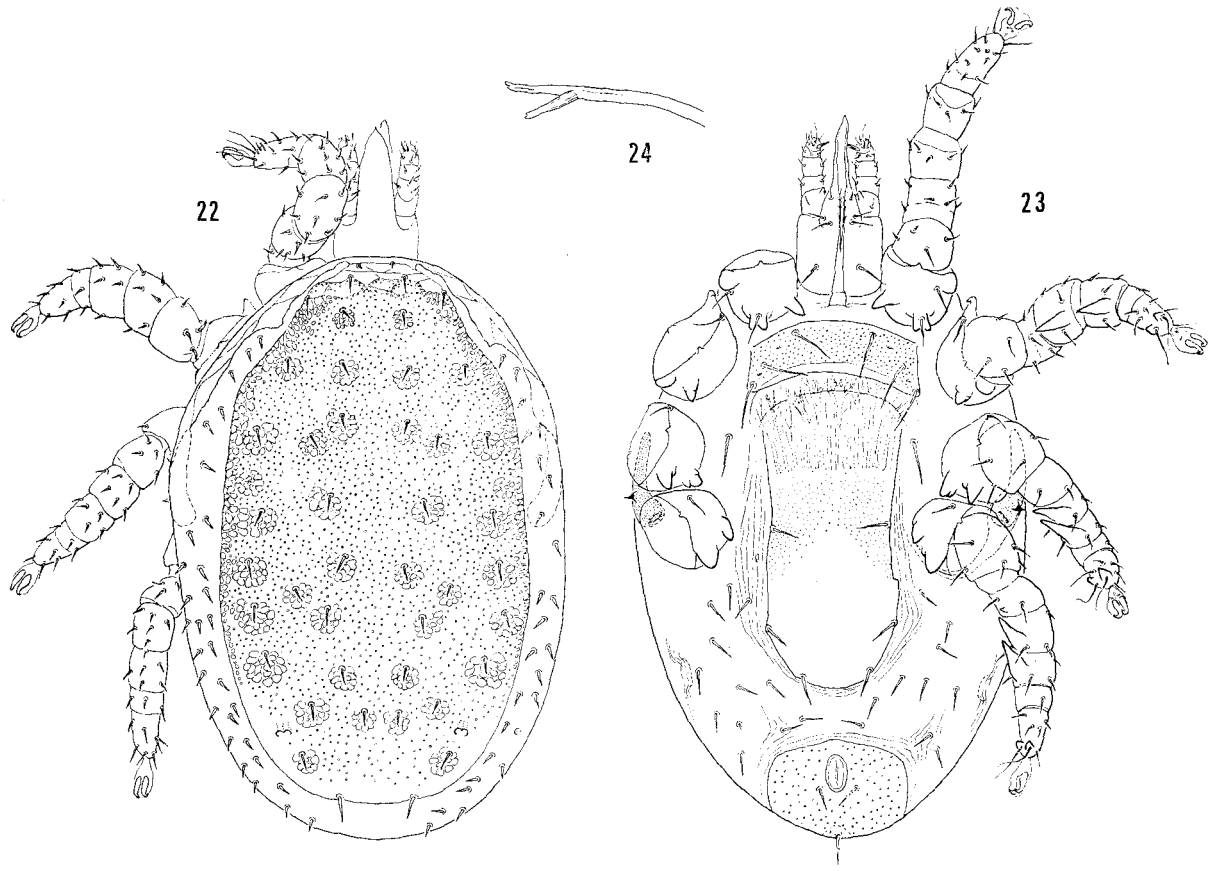

FIG. 22–24. *Argitis oryzomys*, n. gen., n. sp., ♀. (22) Dorsum. (23) Venter. (24) Chela. Scale: FIG. 22 & 23, 215×; 24, 685×.

be considered a member of the Macronyssidae. Macronyssid characters possessed by the new genus include reduced dorsal plate setation, deutosternal teeth in a single file, presence of an apical process on palpal trochanter and elongate chelicerae with chelae lacking teeth or a pilus dentilis. Characters *Argitis* possesses which are atypical of the Macronyssidae are the short wide peritremes, highly ornate dorsal shield and unique anal plate. Future detailed study of the sensory field of tarsus I and availability of information concerning nymphal stages will aid in resolving placement of this form.

The name, Latin (fem.) for "a vine bearing clusters of grapes," refers to the distinctive ornamentation of the dorsal plate.

Argitis oryzomys, n. sp.

♀ *Dorsum* (FIG. 22): Dorsal plate entire, elliptic, evenly convex except for shallow concavities at shoulders; reticulate sculpturing restricted to extreme anterior portion; surface invested with large, discrete puncta which enlarge, cohere and become racemose clusters of cells at anterolateral plate margins and posterior of each plate seta except M_{11}; true pores indistinguishable from the numerous puncta, except a distinctive pair of large, dual openings located near posterolateral plate margins; with 22 pairs of bare, mostly short setae; F_1 minute, M_{11} longest. Unarmed dorsum with 32 pairs of short, bare setae. Peritremal plate mostly lateral, extending to region above coxa I; fusion with dorsal plate not determinable in material examined; poststigmal portion connected ventrally with parapodal plate. Peritreme dorsolateral, very wide and short, commencing at stigma and terminating over mid-region of coxa III; bearing a sharp, thornlike projection anterior of stigma.

Venter (FIG. 23). Tritosternum with 2 elongate vested laciniae; a lateral membranous fringe extending from base anteriad to level of lacinial division. Sternal plate subrectangular, wider than long, bandlike, with concave posterior margin paralleling convex anterior one; with 3 pairs of setae, the 2nd much closer to the 3rd than to the 1st, and 2 pairs of pores; sculpturing absent, ornamentation of plate restricted to minute puncta covering all of surface except posteromedial portion. Third sternal pores and metasternal setae on unarmed integument posterior of plate. Epigynial plate linguiform, sides parallel, bluntly rounded posteriorly, membranous anterior margin slightly overlapping sternal plate; beneath this membrane a transverse arc extending across vaginal wall; ornamentation restricted to dendritic flutes on membranous anterior 1/3 and close-set minute puncta over all; with 3 pairs of setae of subequal size. Anal plate subcircular, enlarged, wide as or wider than long; surface ornamented with large, wide-spaced puncta; anal opening situated near anterior margin; cribrum, composed of small denticles, extending nearly to dorsum; paired adanal setae situated at level of posterior of

setigerous. Free segments with spurs same as in ♀ but slightly less robust.

Gnathosoma: Differing structurally from that of ♀ in: chelicerae broader, shorter (basal segment L., 82; distal segment L., 113), moveable chela with spermatodactyl, apparently similar to that of *Acanthonyssus*.

Measurements (n = 3 unless otherwise noted): Idiosomal L., 283 (278–288); dorsal plate L., 270 (267–273); dorsal plate W. 155 (147–160); holoventral plate L. to postanal seta, 241 (237–247); holoventral plate W. at ventrianal region, 94 (92–96); F_1 (n = 2), 5 (4–5); F_3, 10 (8–11); V, 9 (7–10); D_8, 9 (8–10); M_{11}, 14 (11–15); sternal seta 1 (n = 2), 20 (19 21); sternal seta 2 (n = 2), 20 (20–20); sternal seta 3 (n = 2), 25 (25–26); metasternal seta (n = 2), 21 (18–23); genital seta, 13 (12–15); adanal seta, 10 (10–11); postanal seta, 6 (5–7).

Type-material: Holotype ♀, allotype ♂, 8 paratype ♀♀ and 1 paratype ♂ ex *Oryzomys concolor;* Bolivar, 12 km S, 43 km E Caicara (Hato La Florida); elev. 43 m; 15.IV.67 (RML 55655). One paratype ♂ ex *O. bicolor;* Sucré, 7 km N, 5 km E Güiria (Ensenada Cauranta); elev. 4 m; 14.VI.67 (RML 60289).

Holotype, allotype and 1 paratype ♀ in the Rocky Mountain Laboratory. Remaining paratypes to be distributed among the U.S. National Museum, Universidad Central de Venezuela, Bernice P. Bishop Museum, Field Museum of Natural History and British Museum (Natural History).

Remarks: Variations include division of the normally sharply pointed tectum into 2 or 3 thorn-like projections, and flexion and recurvature of 1 or both anterodorsal spurs of coxae II. Setal counts of the unarmed venter of females ranged from 11–14 pairs, but the exact number may have been obscured by excessive wrinkling of the idiosoma of the specimens studied.

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VENEZUELAN MACRONYSSIDAE
II. *Nycteronyssus desmodus*, n. gen., n. sp., off a vampire bat[1]

By **Robert C. Saunders[2] and Conrad E. Yunker[3]**

Abstract: A new genus and species of Macronyssidae, *Nycteronyssus desmodus*, is described and illustrated from a single female collected off *Desmodus youngi* Jentink (Desmodontidae), T. F. Amazonas, Venezuela.

The single female specimen on which this description is based was taken off a vampire bat, *Desmodus youngi* Jentink, 1893, collected in the Orinoco drainage of northeastern Amazonas Territory. The only other macronyssid reported for this host is *Radfordiella oudemansi* Fonseca, 1948 (Radovsky 1967).

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Cohort **GAMASINA** Leach, 1815
Superfamily DERMANYSSOIDEA Kolenati, 1859
Family MACRONYSSIDAE Oudemans, 1936
Genus **NYCTERONYSSUS, n. gen.**

Diagnosis: Tritosternum well-developed, bipartite. Idiosomal setae piliform, short, thick, bare. Dorsal plate reduced, with 20 pairs of setae. Peritreme short and wide, extending only to mid-level of coxa III. Sternal plate rectangular, with 3 pairs of setae. Epigynial plate short and narrow, with a single pair of setae. Anal plate pyriform, with 3 setae. Legs II–IV normal; I short and robust, with massive sessile tarsal claws; some segments of I with setal deficiencies. Coxae I–III with slight ventral ridges and/or setiferous bosses; II with an-

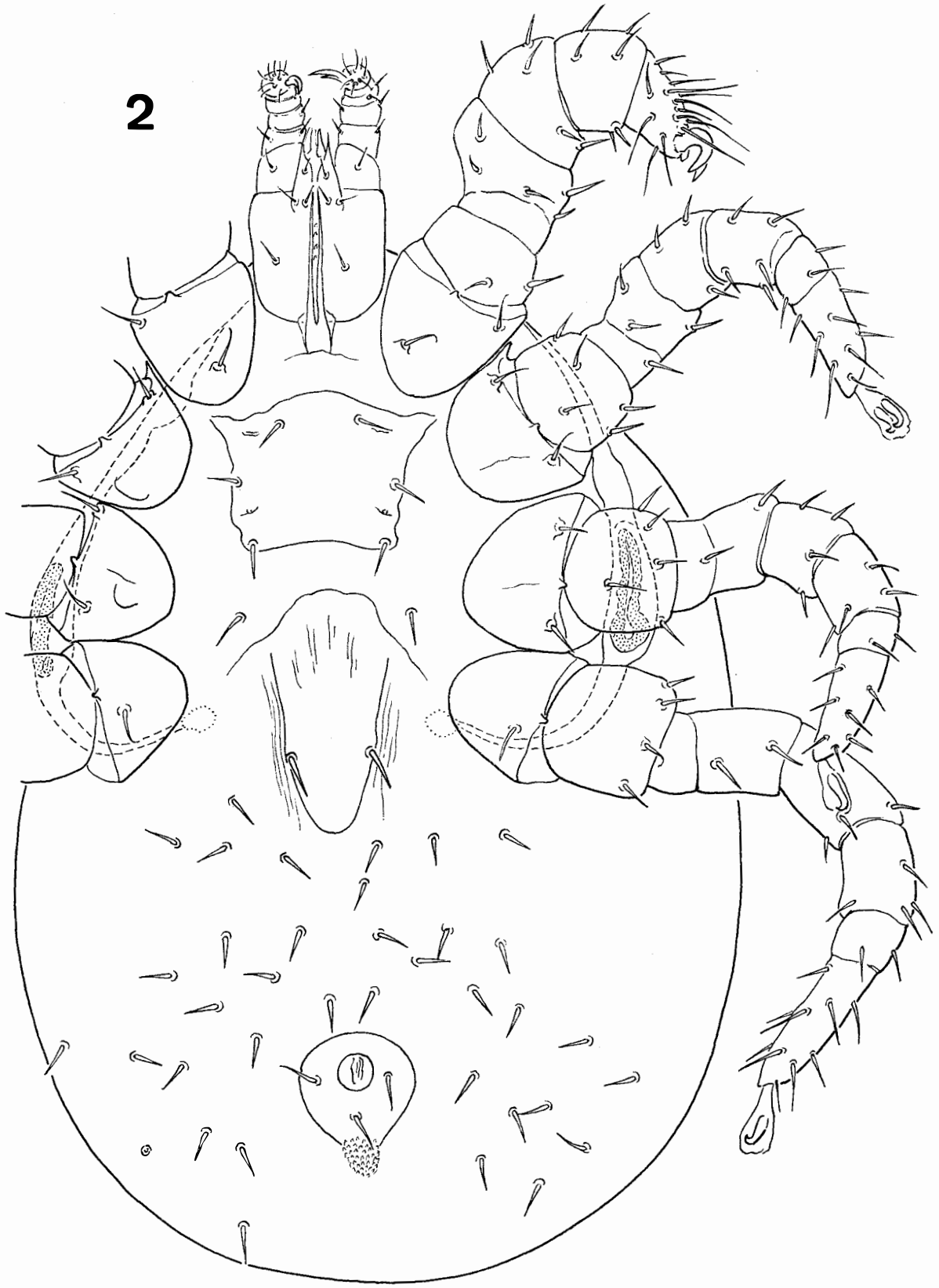

FIG. 2. *Nycteronyssus desmodus*, n. sp. ♀. Ventral view. 250×.

VENEZUELAN MACRONYSSIDAE

(Acarina: Mesostigmata)

Robert C. Saunders

Department of Zoology

Ph. D. Degree, April 1974

ABSTRACT

A total of over 5000 mite specimens representing 49 species was studied and evaluated. The most frequently encountered species was Ornithonyssus bacoti. Based on these specimens, a brief review of the family Macronyssidae in Venezuela is presented. Included are brief notes as to medical importance and host relationships; also a key to the genera of Venezuelan Macronyssidae and a host-parasite list are included.

Reprints of two papers and the manuscript of a third are included as part of the dissertation requirements. Contained in these are descriptions of three new genera (Argitis, Lepidodorsum, and Nycteronyssus) and four new species (Acanthonyssus proechimys, Argitis oryzomys, Lepidodorsum tiptoni, and Nycteronyssus desmodus.), all made from Venezuelan material.

COMMITTEE APPROVAL: