FLOWER MITES OF THE FAMILY ASCIDAE PHORETIC IN NASAL CAVITIES OF BIRDS (ACARINA: *MESOSTIGMATA*)

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INTRODUCTION

Baker and Yunker (1964) were the first to draw attention to the curious biology of certain mesostigmatic mites which normally live in flowers and utilize hummingbirds as phoretic hosts. These authors described two new genera (*Rhinoseius* and *Tropicoseius*) and eleven new species which they placed in the family Blattisociidae. Six of their species were found associated only with avian hosts of the family Trochilidae, three with plants only, and the other two were collected from both plants and hummingbirds. The countries of origin included Venezuela, Colombia, Brazil, Panama and Mexico.

In a revision of the family Ascidae by Lindquist and Evans (1965) the genus *Tropicoseius* was synonymized with *Rhinoseius* and the latter was placed in the subfamily Ascinae, tribe Melicharini. *Rhinoseius bakeri* was described by Dusbabek and Cerny (1970) from Cuba where it was taken in association with the trochilid, *Chlorostilbon ricordii ricordii*.

Hunter (1972) described two new species from Costa Rican birds and flowers. He observed that the immature stages of these mites are much more numerous in flowers than on or in hummingbirds. He confirmed the opinion of Baker and Yunker that these mites are not truly parasitic on the birds but mainly phoretic, utilizing ostensibly the birds for transfer from flower to flower. Because of the weak structure of the chelicerae Lindquist and Evans (1965) believed that these mites were pollen feeding rather than predaceous.

Similar phoretic associations have been reported in the literature. These have come from other parts of the world and involve other mites and other families of birds. *Proctolaelaps vandenbergi* (Rycke) is very common in several species of South African *Protea* flowers and Rycke (1964) believed that these mites were transported from flower to flower by both insects and honey birds. Domrow (1966) noted the presence of «blattisociine» mites «on the pollen strewn beaks and bare facial skin of several noisy friar-birds (Meliphagidae) feeding in flowering *Eucalyptus* in S.E. Queensland». He described a new species, *Hattena panopla*, from the nares of a brown honeyeater, *Gliciphila indistincta* (Meliphagidae, Passeriformes), in Australia. This species was close to another species of the same genus, *Hattena erosa* Domrow (1963), from Borneo. Other authors cited by Colwell (1973) have reported similar associations.

The mite-bird-flower associations of *Rh. richardsoni* and *Rh. colwelli* have been studied in detail by Colwell (1973). He found the two species to be completely separated in the flowers of their specific plant species; in fact, he never collected mites from any flowers in the presence of the other species. On the other hand he

found both species of mites on the same bird, but the distribution was what was expected, based on the feeding habits of the particular bird. When mites are introduced into the flowers of the wrong host species they will be killed by the resident mites, according to Colwell.

Colwell was not able to demonstrate pollen feeding by the mites but by using vital dyes in a sugar solution he was able to demonstrate their ability to imbibe nectar. Martin and Musy (1959) emphasized the importance of arthropods in addition to nectar in the diet of various trochilids. Van Bocxstaele and Vercruysse (1975) at the Antwerp Zoo have pointed out the necessity of including *Drosophila* in the diet of captive hummingbirds.

The present paper is devoted to a study of the mites of the family Ascidae collected almost exclusively from the nasal cavities of trochilid hosts taken in Trinidad (West Indies), Brazil, Panama and Venezuela. One of us (T. Aitken) collected in Trinidad from 1954 to 1966, and in Northern Brazil (Belém, Para) between 1967 and 1970. Data relative to these collections have been mentioned in the earlier papers of Fain and Aitken (1967, 1968, 1969). Another collection, that of Dr. P. Kirmse, University of Guelph, Ontario, Canada, made in Panama and Venezuela during 1967-68 was kindly sent to one of us (A.F.) for study. Hosts from the latter collection are from three different localities: Cerro Punta, Chiriqui Prov., Western Panama (1800 m.); Almirante, Boccas del Torro Prov., Western Panama, Atlantic Coast; Birongo, NE Caracas, Venezuela, near Atlantic Coast (60 m. alt.).

The total number of species of the Ascidae encountered in this study is fifteen of which twelve are new. They belong to three genera, namely *Lasioseius* (one species), *Proctolaelaps* (four species), and *Rhinoseius* (ten species). All these species have been briefly described in a preliminary note (Fain, Hyland & Aitken, 1977).

To our knowledge no representatives of the genera *Lasioseius* and *Proctolaelaps* have been reported previously from the nasal cavities of birds. Moreover our observations confirm the findings of other authors (*op.cit.*) that the Ascidae are found in hosts other than hummingbirds (Trochilidae), namely nectar-and pollen-feeding birds. One possible exception, however, concerns a collection from a finch.

Types of all new species are deposited in the United States Museum of Natural History (USNM), Washington, D.C. Paratypes when available are in the Instituto Biologico, Sao Paulo, Brazil and in the author's collections at the Institut de Médecine Tropicale Prince Léopold, Antwerpen, Belgium, and the Department of Zoology, University of Rhode Island, Kingston, R.I., U.S.A.

Abbreviations have been used throughout to refer to the various collectors as follows: T.A.= T.H.G. Aitken; A. & L. = T.H.G. Aitken and T.E. Lovejoy; P.K. = Peter Kirmse.

REMARKS ON SOME ORGANS IN THE ASCIDAE

1. Inseminating apparatus in the female

Michael (1892), working with *Haemogamasus horridus* was the first to observe a specialized and complex inseminating structure in the Mesostigmata. This organ consists of a series of tubules or sacs forming a continuous canal: « Thus it will be seen that this series of organs or parts — the cornu sacculi, the sacculus foemineus, the rami sacculi and the tubuli annulati, all of which are strictly confined to the female, form an unbroken connection, varying enormously in size and capacity, but absolutely continuous, between the sperm-chamber in the ovary and the acetabulum of the third leg on each side » (Michael, 1892, p. 302). Studying another species, *Haemogamasus hirsutus,* this author observed that the sacculus foemineus contains spermatocytes (immature spermatozoa) and he concludes: « It may, I think, therefore safely be said that the contents of the sacculus are the products of the male genital organs » (p. 306). Michael thought that probably these « spermatocytes » travel through the small trumpet-like organs called tubuli annulati, and then into the other canals, finally arriving in the ovary.

The existence of these inseminating organs has been confirmed by several authors and for other groups of Mesostigmata. Oudemans found them in the Phytoseiidae (1928) and in the Halarachnidae (1935); Vitzthum (1931) in the Halarachnidae; Fain in the Halarachnidae (1952, 1955, 1958, 1962a), the Entonyssidae (1961), the Ixodorhynchidae (1962a) and the Rhinonyssidae (1962b and 1963). Dosse (1958), Athias-Henriot (1960), De Leon (1962) and others have studied these organs in the Phytoseiidae. More recently a detailed study of these organs in laelapoid mites was made by Athias-Henriot (1968).

Fain (1963) has shown that in the Halarachnidae and in some Rhinonyssidae the inseminating apparatus consists of 4 main organs:

Adductor canal (fig. 1): this paired organ opens through a small orifice at the posterior border of each coxa III. It is generally narrow and variable in length. Proximally it ends in a large median pouch (maturation pouch). In some species the canal is surrounded by one or two sphincter-like organs located at the distal or proximal opening or at both openings.

Maturation pouch (fig. 1-2): a broad slightly sclerotized median pouch. This pouch is the sac where the young, large spermatocytes maturate and transform into very thin and smaller spermatozoa. We appropriately have called this organ the « maturation pouch ». This variously shaped pouch is connected laterally with the two adductor canals and posteriorly with a very thin and smaller canal, the spermiduct.

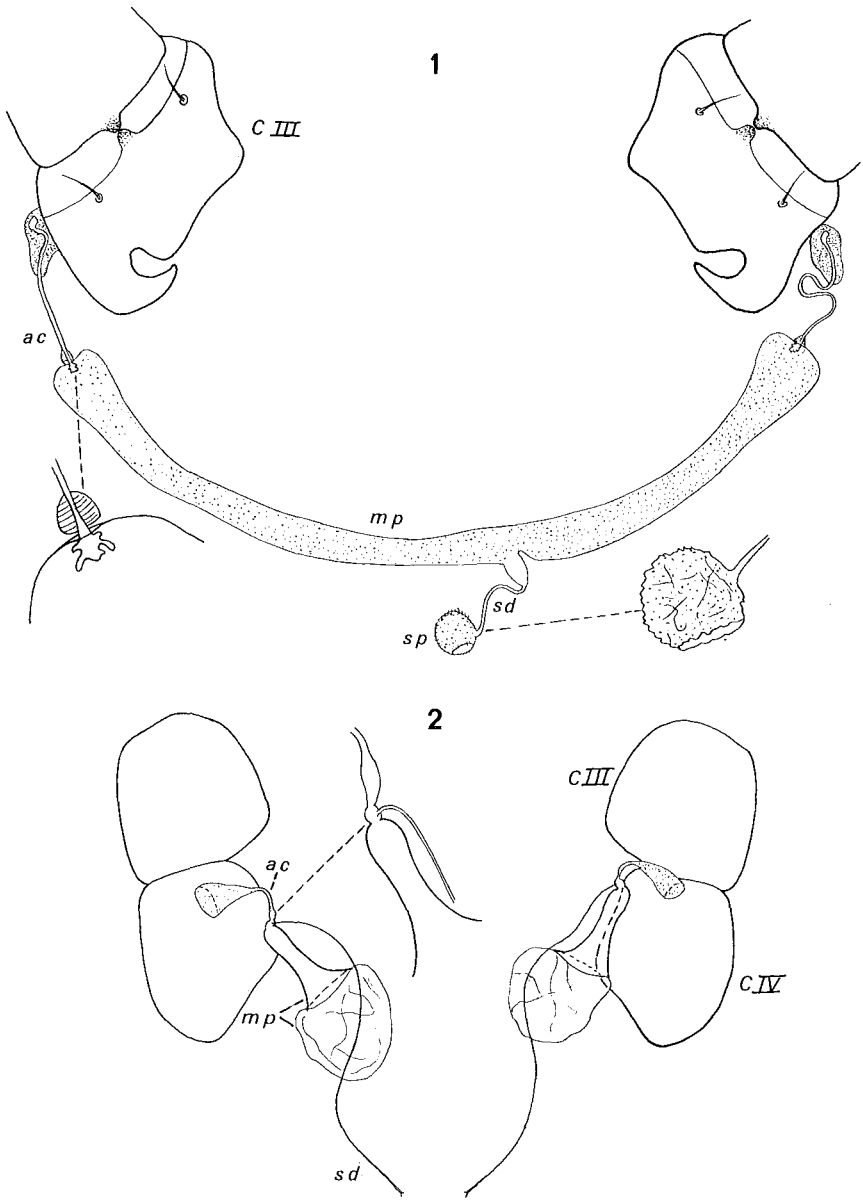


Fig. 1 - 2 — Inseminating apparatus:
Fig. 1 - In *Rhinophaga pongoicola* Fain (Halarachnidae)
Fig. 2 - In *Amblyseius* sp. (Phytoseiidae).
(Abbreviations: ac = adductor canal; mp = maturation pouch; sd = spermiduct; sp = spermatheca) (after Fain, 1963).

Spermiduct (fig. 1): a very thin, sclerotized median tubule connecting the maturation pouch with the more deeply located spermatheca. We surmize that after maturation and reduction in size, the spermatozoa are able to pass through the very fine spermiduct into the spermatheca where they accumulate.

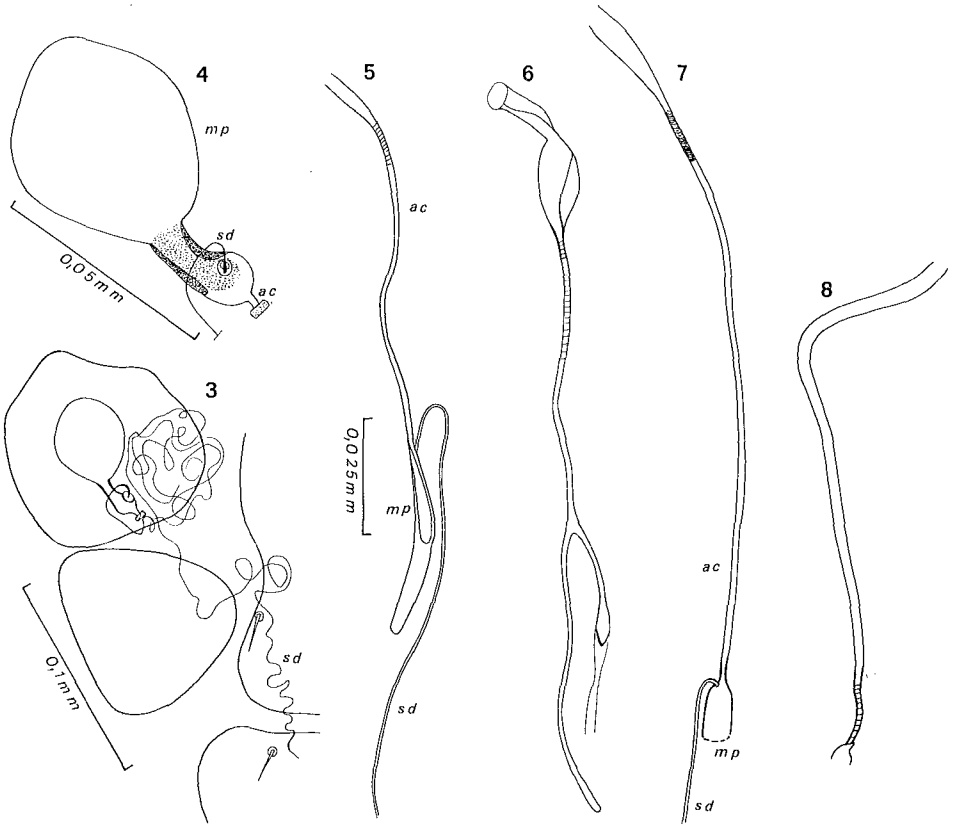


Fig 3 - 8 — Inseminating apparatus in the genera *Lasioseius* and *Proctolaelaps* (Ascidae):
Fig. 3 - Region of coxa III and IV in *Lasioseius elegans* sp.n. showing the entire apparatus.
Fig. 4 - Enlarged distal portion of the above apparatus.
Fig. 5 - Entire apparatus in *Proctolaelaps glaucis* Fain et al.
Fig. 6 - The same in *P. hunteri* Fain at al.
Fig. 7 - The same in *P. kirmsei* Fain et al.
Fig. 8 - The same in *P. belemensis* Fain et al.
(Abbreviations: ac = adductor canal; mp = maturation pouch; sd = spermiduct; sp = spermatheca).

Spermatheca (fig. 1): median organ, generally cup-shaped and with sclerotized walls. On one side it is connected with the spermiduct by a very small opening and on the other side with the ovary by a larger orifice.

In the Phytoseiidae and Ascidae the inseminating apparatus is paired and consists of two separate complexes of tubes but no spermatheca has been reported. The structure of these tubes varies according to the genus or species. In the Phytoseiidae and in some genera of Ascidae (*Lasioseius*, etc.) the following organs are found on both sides: a short adductor canal, a large more or less sclerotized maturation pouch and a very thin and often very long spermiduct (fig. 2-4). We think that the spermatheca is actually present but is not visible because it is not suf-

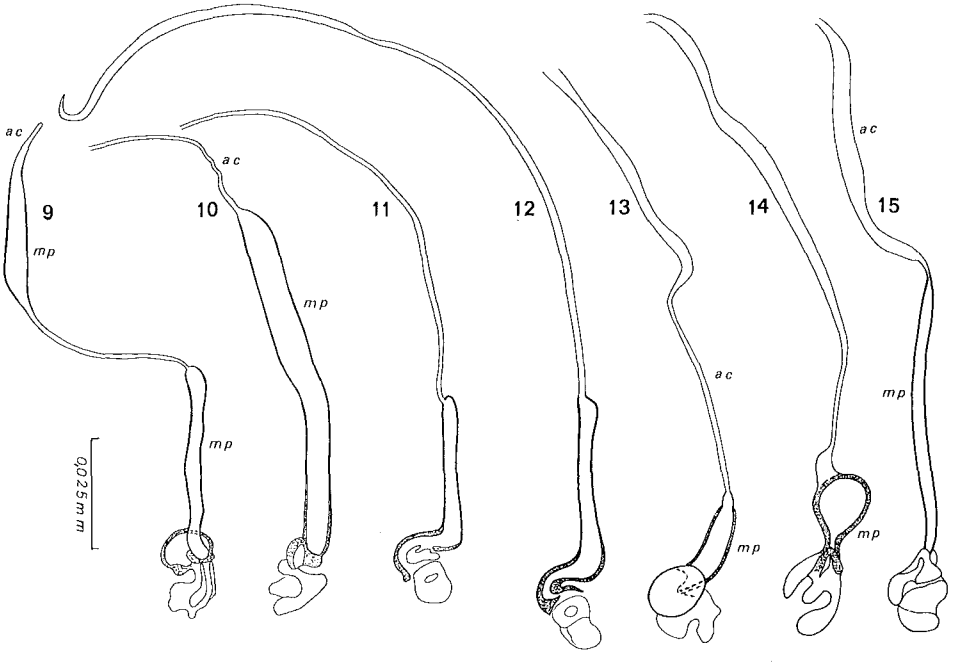


Fig. 9 - 15 — Inseminating apparatus in *Rhinoseius* spp. showing a distinct sclerotized maturation pouch.
Fig. 9 - *Rh. bisacculatus* Fain et al.
Fig. 10 - *Rh. venezuelensis* (B. & Y.).
Fig. 11 - *R. phaethornis* Fain et al.
Fig. 12 - *Rh. heliconiae* (B. & Y.).
Fig. 13 - *Rh. chlorestes* Fain et al.
Fig. 14 - *Rh. wetmorei* (B. & Y.).
Fig. 15 - *Rh. eisenmanni* (B. & Y.)
Abbreviations: ac = adductor canal; mp = maturation pouch).

ficiently sclerotized. The spermiduct originates generally from the distal part of the maturation pouch, not far from the junction of the adductor canal. In some species of *Proctolaelaps* (Ascidae) the adductor canal is long and thin, the maturation pouch is small and poorly sclerotized and the spermiduct is very thin and long (fig. 5-7). In the genus *Rhinoseius* (Ascidae) the inseminating canal is either very long, thin and completely membranous, and without a distinct sclerotized maturation pouch (fig. 20-26), or moderately long and with one, or more rarely two, sclerotized

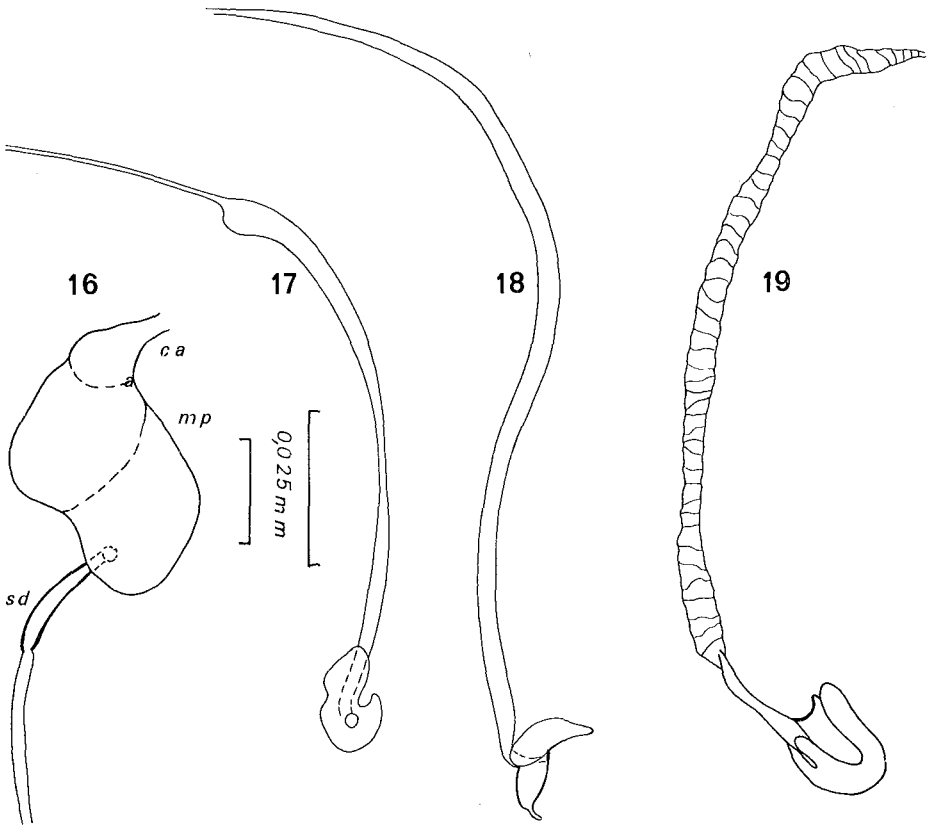


Fig. 16 - 19 — Inseminating apparatus in *Rhinoseius* ssp.
Fig. 16 - *Rh. richardsoni* Hunter.
Fig. 17 - *Rh. fairchildi* (B. & Y.).
Fig. 18 - *Rh. uniformis* Fain et al.
Fig. 19 - *Rh. bakeri* (Dusbabek & Cerny).

maturation pouches (fig. 9-15). The spermiduct is lacking, but we surmize that the complex structure situated at the proximal end of the inseminating apparatus has the same function as a spermiduct. As a matter of fact, at the juncture of the two canals there is often a definite constriction which probably plays the same role as the spermiduct in preventing the unripe spermatozoa from passing into the spermatheca (fig. 14, 24). In one species of *Proctolaelaps (P. belemensis)* the inseminating apparatus is completely membranous and without a distinct pouch (fig. 8), as in some *Rhinoseius* species.

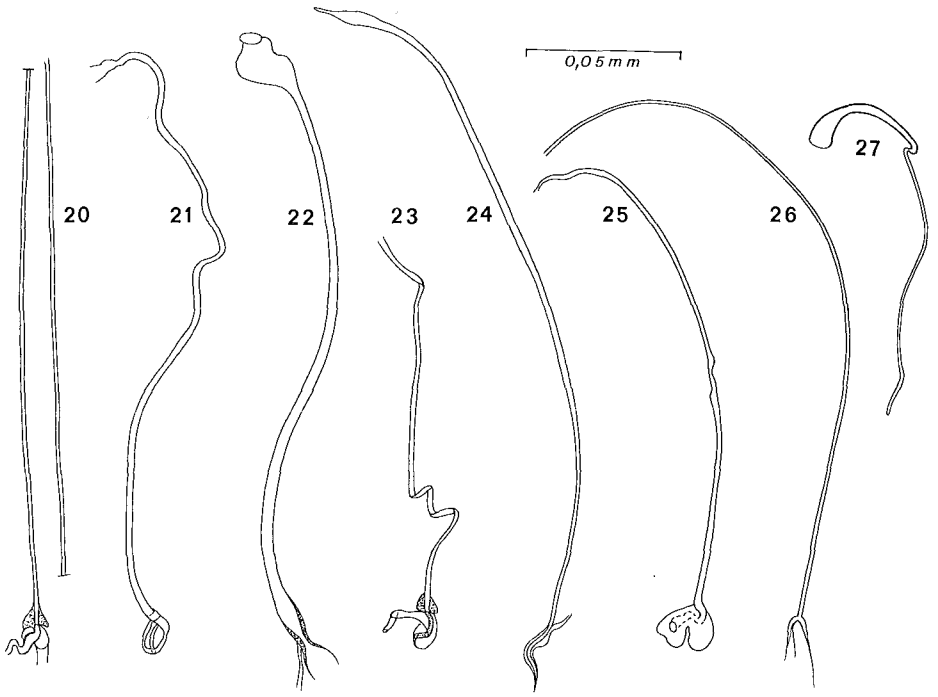


Fig. 20 - 27 — Inseminating apparatus in *Rhinoseius* spp. lacking a distinct maturation pouch.
Fig. 20 - *Rh. peregrinator* (B. & Y.).
Fig. 21 - *Rh. braziliensis* (B. & Y.).
Fig. 22 - *Rh. phoreticus* Fain et al.
Fig. 23 - *Rh. chiriquensis* (B. & Y.).
Fig. 24 - *Rh. colwelli* Hunter.
Fig. 25 - *Rh. erro* (B. & Y.).
Fig. 26 - *Rh. changensis* (B. & Y.).
Fig. 27 - *Rh. tiptoni* (B. & Y.).

2. *Denticles on coxa I*

One or several rows of fine denticles are present on coxa I in the following species of the genus *Rhinoseius: Rh. tiptoni, Rh. changensis, Rh. chiriquensis, Rh. peregrinator, Rh. colwelli, Rh. richardsoni* and *Rh. panamensis*, These denticles are absent in the other species of *Rhinoseius*, as well as in the species of *Proctolaelaps* and *Lasioseius* studied here.

In addition all the species of *Rhinoseius* with these denticles have a rounded and often short tectum, while the species without coxal denticles have an extended tectum tapering to a long point. On the basis of these two characters one might recognize two groups in the genus *Rhinoseius*: the first, with denticles, corresponds to the true *Rhinoseius* (type species: *Rh. tiptoni*), the second group without denticles corresponds to the genus *Tropicoseius* Baker and Yunker (type species: *Rh. wetmorei*). That these two groups represent distinct genera or not is a matter of opinion.

3. *Modified chaetotaxy in legs II or IV in the males of PROCTOLAELAPS and RHINOSEIUS*

The chaetotaxy of legs II and IV in the males may contribute in separating the genera *Proctalaelaps* and *Rhinoseius* represented in the nasal cavities of birds.

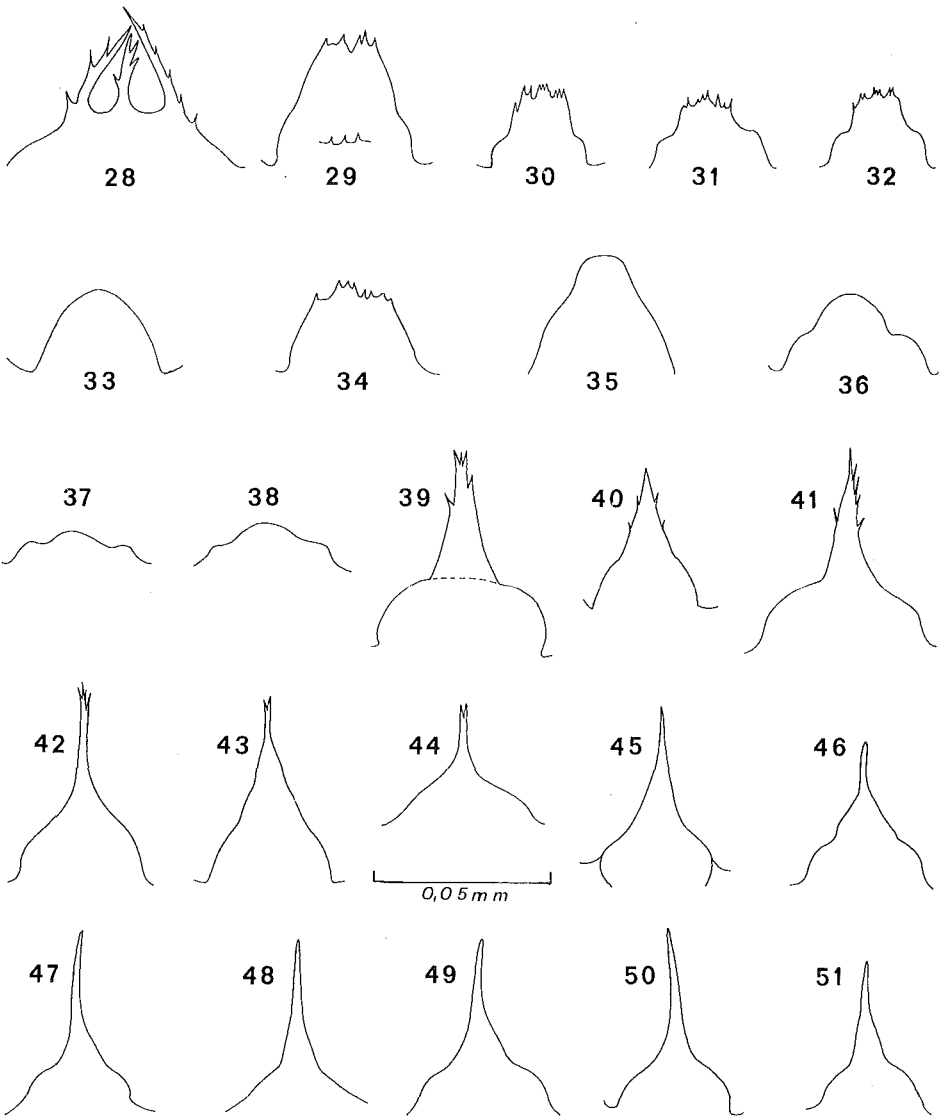
In the males of *Proctolaelaps*, the femur IV bears a very strong ventral spine almost completely fused with the tegument (fig. 81, 87, 91, 98). The leg II is variable: in *P. belemensis* all the setae are thin and short (fig. 100) while in *P. hunteri, P. kirmsei* and *P. glaucis* the tarsus, tibia, genu and femur bear ventrally small but distinct conical spines (fig. 83 and 89).

In the males of *Rhinoseius,* the femur IV lacks this big ventral spine, but the spines of leg II are more conspicuous than in *Proctolaelaps*, and they are generally sclerotized, thick and rounded apically. Their number is variable. In *Rh. tiptoni* and *Rh. richardsoni* the tarsus II bears 2 spines, the genu and femur each one, the tibia none. In most of the other species these tarsi bear 4 spines and the three other segments one spine each (fig. 114 and 116).

4. *Length of the peritremes in the genera PROCTOLAELAPS and RHINOSEIUS*

In the 4 species of *Proctolaelaps* that we have studied the peritremes are long and terminate close to the *z 1* setae.

In the genus *Rhinoseius* the length of the peritremes in both sexes is variable. In *Rh. richardsoni* these peritremes reach approximately the middle of coxa II. In *Rh.*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tiptoni they reach to the middle of coxa I, which is approximately the level of the *s 1* seta. In all the other species of *Rhinoseius* the peritreme goes far beyond the *s 1* setae and generally close to the *z 1* setae (fig. 52-74).

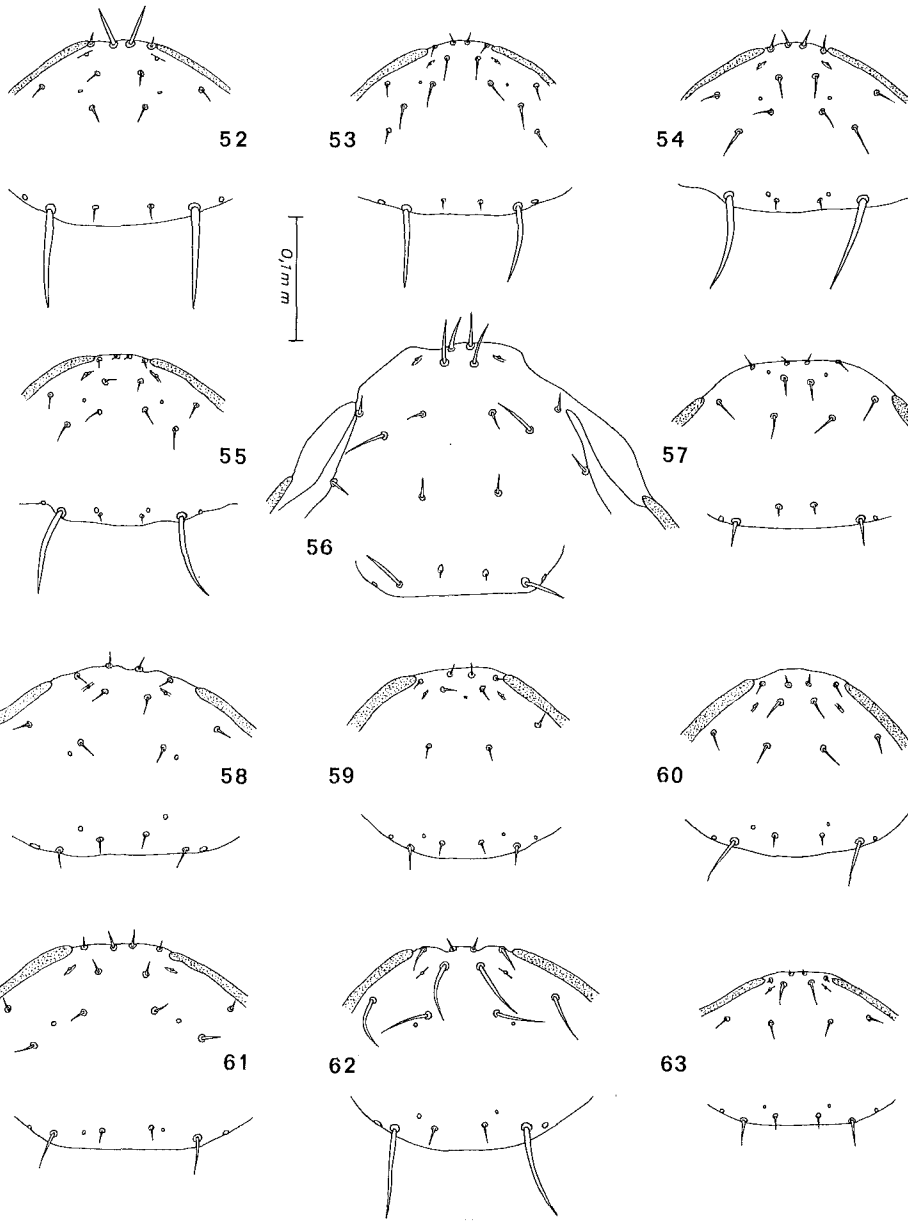
5. *Dorsal plate (or shield) in the females of genera PROCTOLAELAPS and RHINOSEIUS*

In *Proctolaelaps*, at least in the species studied herein, the dorsal plate is entire and lacks lateral incisions. This plate is wider than in *Rhinoseius* and it includes several *r* setae.

In *Rhinoseius* the dorsal plate possesses two lateral incisions which are sometimes connected by a transverse suture; it is narrower than in *Proctolaelaps* and never bears *r* setae.

The *z 3* setae are absent in females of the genus *Rhinoseius* they are present in all the species of *Proctolaelaps* studied here except in *P. hunteri.*

Fig. 28 - 51 — Tectum in the females of the genera *Lasioseius, Proctolaelaps* and *Rhinoseius.*
Fig. 28 - *Lasioseius elegans.*
Fig. 29 - *Proctolaelaps belemensis.*
Fig. 30 - *P. hunteri.*
Fig. 31 - *P. glaucis.*
Fig. 32 - *P. kirmsei.*
Fig. 33 - *Rhinoseius tiptoni.*
Fig. 34 - *Rh. richardsoni.*
Fig. 35 - *Rh. changensis.*
Fig. 36 - *Rh. colwelli.*
Fig. 37 - *Rh. peregrinator.*
Fig. 38 - *Rh. chiriquensis.*
Fig. 39 - *Rh. braziliensis.*
Fig. 40 - *Rh. fairchildi.*
Fig. 41 - *Rh. phoreticus*
Fig. 42 - *Rh. bisacculatus.*
Fig. 43 - *Rh. wetmorei.*
Fig. 44 - *Rh. uniformis.*
Fig. 45 - *Rh. eisenmanni.*
Fig. 46 - *Rh. bakeri.*
Fig. 47 - *Rh. phaethornis.*
Fig. 48 - *Rh. chlorestes.*
Fig. 49 - *Rh. erro.*
Fig. 50 - *Rh. heliconiae.*
Fig. 51 - *Rh. venezuelensis.*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6. Barbed setae on the legs and palps in the females of RHINOSEIUS

In three species of *Rhinoseius,* some segments of both palps and legs bear one or several barbed setae on their dorsal surface.

In *Rh. braziliensis* and in *Rh. phoreticus* these barbed setae are present on femora I to IV, on trochanters I, III and IV and on the palpfemora.

In *Rh. uniformis* barbed setae are present on femora I to IV, trochanter I and on the palpfemora.

These barbed setae are absent in all other species of *Rhinoseius.*

KEY TO THE NEOTROPICAL ASCIDAE ASSOCIATED WITH FLOWERS OR THE NASAL PASSAGES OF BIRDS

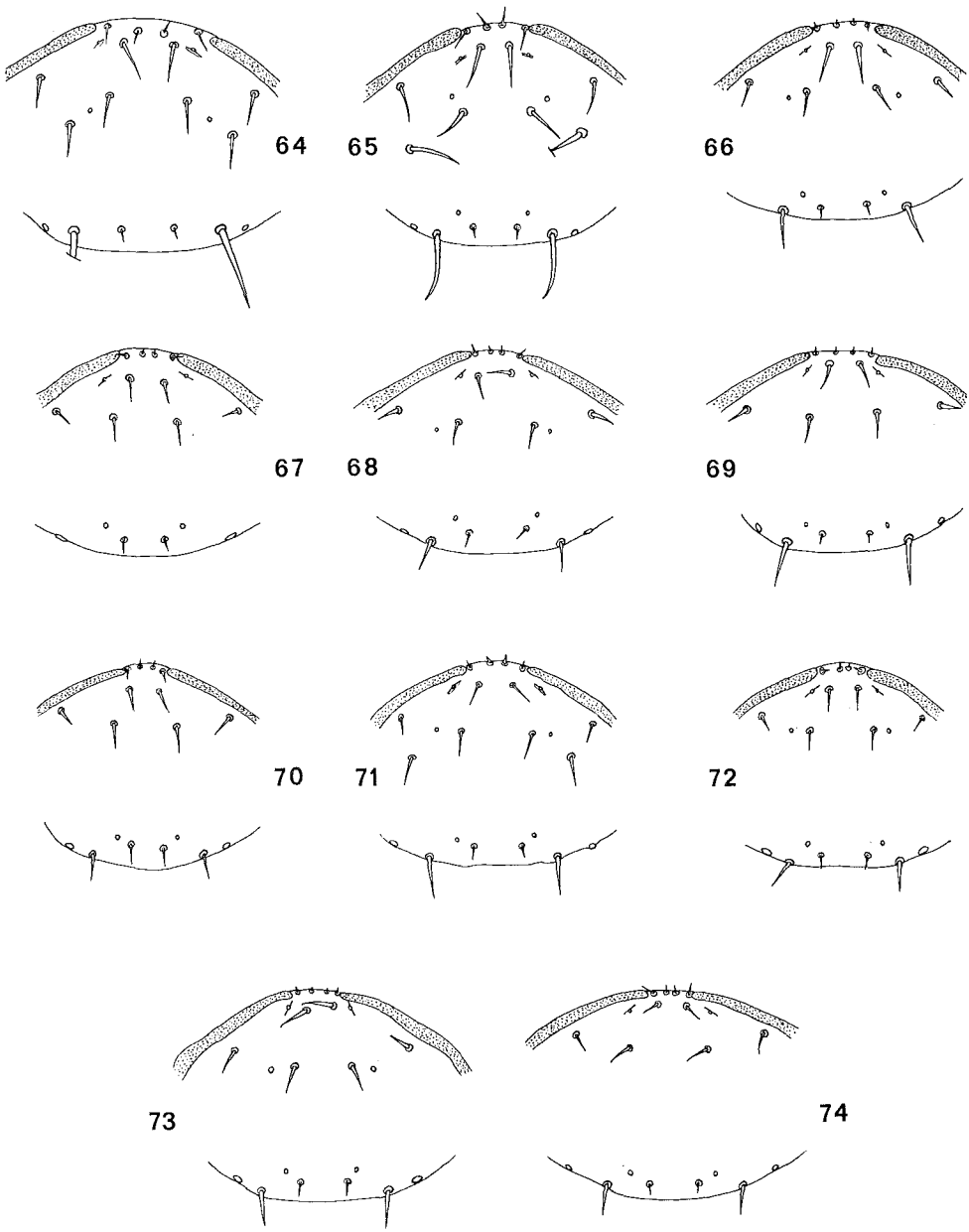
Females

(The female of *Rh. panamensis* is unknown)

1. Dorsum covered with a large plate which lacks a lateral incision. Anterior part of this plate with one or more *r* setae. Seta *Z 5* very heavy, 60 to 90 μ long. Tectum either with three tines which branch, or, lacking tines, with a continuous rounded and denticulate border, never with a pronounced singel anterior prolongation 2

Fig. 52 - 63 — Anterior and posterior borders of the dorsal plates in the genera *Proctolaelaps* and *Rhinoseius:*

Fig. 52 - *Proctolaelaps belemensis.*
Fig. 53 - *P. glaucis.*
Fig. 54 - *P. hunteri.*
Fig. 55 - *P. kirmsei.*
Fig. 56 - *Rhinoseius richardsoni.*
Fig. 57 - *Rh. tiptoni.*
Fig. 58 - *Rh. changensis.*
Fig. 59 - *Rh. chiriquensis.*
Fig. 60 - *Rh. peregrinator.*
Fig. 61 - *Rh. colwelli.*
Fig. 62 - *Rh. braziliensis.*
Fig. 63 - *Rh. fairchildi.*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Dorsum covered with a large plate which has a definite lateral incision. Setae of *r* series never on the plate but always on soft cuticle. Setae *Z 5* generally much finer and shorter than above. Tectum usually terminates in a single long anterior projection, more rarely rounded, with or without denticles	genus *Rhinoseius* Baker and Yunker, 1964 (6)
2. Ventrianal plate very large and bears the 3 anal setae plus 4 pairs of opisthogaster setae. Tectum with 3 separate tines which branch. Fixed digit of chelicerae with 13-14 small teeth and with a very short, cylindrical *pilus dentilis;* moveable digit with 3, possibly 4 teeth ..	genus *Lasioseius* Berlese, 1916 *L. elegans* Fain et al. 1977
Anal plate smaller and bears only the 3 anal setae. Tectum with a rounded border which is denticulate. Fixed digit of chelicerae bears only 2 or 3 teeth and the *pilus dentilis* is replaced by a rounded membrane; moveable digit with 2, 1 or no teeth	genus *Proctolaelaps* Berlese, 1923 (3)

Fig. 64 - 74 — Anterior and posterior borders of the dorsal shields in the genus *Rhinoseius*.
Fig. 64 - *Rh. phoreticus.*
Fig. 65 - *Rh. uniformis.*
Fig. 66 - *Rh. wetmorei.*
Fig. 67 - *Rh. heliconiae.*
Fig. 68 - *Rh. erro.*
Fig. 69 - *Rh. venezuelensis.*
Fig. 70 - *Rh. chlorestes.*
Fig. 71 - *Rh. bisacculatus.*
Fig. 72 - *Rh. phaethornis.*
Fig. 73 - *Rh. eisenmanni.*
Fig. 74 - *Rh. bakeri.*

3. Seta *j 1* spinous, 33 μ long. Deutosternal teeth arranged as follows: the 4 anterior rows and the 7th are narrow and straight; rows 5 and 6 wider, the 5th being concave in front and the 6th convex. Seta *z 3* present. Inseminating apparatus in the female consists of a narrow membranous tube, with distal half slightly wider and more sclerotized ..... *P. belemensis* Fain et al. 1977

   Seta *j 1* very fine and short, maximum length 12 μ. Inseminating apparatus dilated medially forming a short membranous blind sac (maturation pouch); from the base of the sac or from the canal itself a thin and long tube (the spermiduct) connects 4

4. Seta *z 3* absent; seta *j 6* approximately 2 times as long (30 μ) as the *j 2* (15-17 μ). Opisthogaster setae 35 to 42 μ long. Anterior pair of sternal setae 27 μ apart. Posterior setae of coxa II, 30 μ long. Anal plate longer (90 μ) than wide (75 μ) ..... *P. hunteri* Fain et al. 1977

   Seta *z 3* present. Opisthogaster setae short (16 to 33 μ). Other characters variable 5

5. Anal plate longer (80 μ) than wide (69 μ). Distance between anterior pair of sternal setae 21 μ. Posterior seta on coxa II 29 μ long. Seta *j 2* very thin and short (6 μ) and *j 6* strong and long (22 μ) ..... *P. kirmsei* Fain et al. 1977

   Anal plate wider (69 μ) than long (66 μ). Anterior pair of sternal setae 32 to 34 μ apart. Posterior seta on coxa II fine and long (18 μ). Setae *j 2* and *j 6* subequal (19-21 μ) *P. glaucis* Fain et al. 1977

6. Tectum rounded. Ventral surface of coxa I with one or more rows of denticles. Anterior ends of the peritremes more or less widely separated 7

Tectum tapering to a long and narrow point. Ventral surface of coxa I without denticles. Anterior ends of the peritremes generally very close together.	12
7. Anterior ends of the peritremes not extending beyond the level of seta *s l*. Tectum short or very short. Five pairs of *s* setae present. Posterior part of dorsal plate with 13 pairs of setae. Inseminating apparatus variable	8
Anterior ends of peritremes extending nearly to the level of setae *z l*. Tectum variable. Six pairs of *s* setae present. Posterior part of dorsal plate with 15 pairs of setae (in holotypes of *Rh. changensis* and *Rh. chiriquensis* there are 14 on one side and 15 on the other). Inseminating apparatus long and narrow and lacking a sclerotized maturation pouch	9
8. Coxa IV with a prominent triangular prolongation on its ventral surface. Inseminating apparatus with a voluminous bilobed maturation pouch. Seta *z l* wanting	*Rh. richardsoni* Hunter, 1972
Coxa IV without such prolongation. Inseminating apparatus very narrow and without sclerotized maturation pouch. Seta *z l* present	*Rh. tiptoni* Baker and Yunker, 1964
9. Tectum long. Inseminating apparatus lacks sphincter in its proximal extremity	10
Tectum very short. Inseminating apparatus with a small sphincter in its proximal extremity	11
10. Anal shield much longer (165 μ) than wide (92 μ). Posterior portion of genital plate progressively narrowed	*Rh. changensis* (Baker and Yunker, 1964)

	Anal shield slightly longer than wide. Genital plate widened posteriorly	*Rh. colwelli* Hunter, 1972
11.	Seta *Z 5* is 36 μ long. Anterior region of the sternal plate less sclerotized than remainder of plate and prolonged into two lobes	*Rh. peregrinator* (Baker and Yunker, 1964)
	Seta *Z 5* only half as long (18 μ). Sternal plate uniformely sclerotized and with an anterior border which is incised medially but which lacks true lobes	*Rh. chiriquensis* (Baker and Yunker, 1964)
12.	Anal shield subcircular (120 μ long by 117 μ wide). Maturation pouch of the inseminating apparatus only slightly sclerotized and situated toward the middle of the tube. Postanal seta thin and short and only slightly longer (15 μ) than paraanal setae.	*Rh. fairchildi* (Baker and Yunker, 1964)
	Anal shield definitely longer than wide. Inseminating apparatus different. Postanal seta thick and at least two times longer than the paraanals.	13
13.	Seta *Z 5* absent	*Rh. heliconiae* (Baker and Yunker, 1964)
	Seta *Z 5* present	14
14.	Inseminating apparatus narrow, membranous and without distinct maturation pouch	15
	Inseminating apparatus with either one enlarged proximal sclerotized maturation pouch or with two separated, sclerotized pouches.	18

15. All femoral and trochanteral setae of legs are bare. *Z 5* seta is 20 μ long; *j 2* is 18 μ long ..... *Rh. erro* (Baker and Yunker, 1964)

Some setae of trochanters I, III and IV and of all femora barbed 16

16. Setae *j 2* and *Z 5* respectively 51 and 87 μ long. Idiosoma 733 μ long. ..... *Rh. braziliensis* (Baker and Yunker, 1964)

Seta *j 2* not longer than 30 μ. Seta *Z 5* not longer than 60 μ. Idiosoma not longer than 675 μ 17

17. Anterior region of dorsal plate with numerous convex and parallel striations. Anal shield 110 μ long, 78 μ wide ..... *Rh. uniformis* Fain et al. 1977

Anterior region of dorsal plate without these striations. Anal shield 150 μ long, 102 μ wide ..... *Rh. phoreticus* Fain et al. 1977

18. Inseminating apparatus with two cylindrical sclerotized maturation pouches separated by a straight membranous part. The proximal pouch has an ovoid sclerotized dilation. Coxa II possesses a conical spine which is 18 μ long on the posterior border ..... *Rh. bisacculatus* Fain et al. 1977

Inseminating apparatus with a single sclerotized pouch which is sometimes bilobed 19

19. Inseminating apparatus broadly cylindrical, 75 μ long. Posterior seta on coxa II a conical spine 16 μ long. Seta *Z 5* measures 30 μ; *j 2* is 21 μ long. Ventral setae et base of gnathosoma extremely short (6 μ) ..... *Rh. venezuelensis* (Baker and Yunker, 1964)

Inseminating apparatus differs from above. Other characters variable	20
20. Sclerotized maturation pouch cylindrical, very thin and not sinuous at base, 60 μ long. Setae *j 2* and *Z 5* subequal (respective lengths: 24 and 27 μ). Anterior lobes of sternal plate with 3 to 4 transverse striations. Anal plate 150 μ long by 90 μ wide	*Rh. eisenmanni* (Baker and Yunker, 1964)
Sclerotized maturation pouch differs from above. Other characters variable	21
21. Sclerotized maturation pouch cylindrical, «L»-shaped, with a longitudinal portion 25 to 50 μ long, and «S»-shaped at base	22
Sclerotized maturation pouch with a different form ..	23
22. Sclerotized maturation pouch 25-34 μ long. Posterior spine on coxa II conical, 13-15 μ long. Anal plate 120 μ long, 70 μ wide. Anterior lobes of sternal plate with 3 to 4 transverse striations	*Rh. phaethornis* Fain et al. 1977
Sclerotized maturation pouch 45-50 μ long. Coxa II with a thick posterior seta 26 μ long. Anal plate 140 μ long by 105 μ wide. Anterior lobes of sternal plate without transverse striations	*Rh. trinitatis* Fain et al. 1977
23. Sclerotized maturation pouch almost as wide (12 μ) as long (13 μ). Setae *j 2* nearly one and one-half times longer (31 μ) than *j 3* (21 to 23 μ)	*Rh. wetmorei* (Baker and Yunker, 1964)
Sclerotized maturation pouch with a different form. Setae *j 2* slightly shorter (18 to 22 μ) than the *j 3* (20 to 23 μ)	24

24. Sclerotized maturation pouch bilobed, consisting of a smaller subglobular proximal portion (diameter 11-13 μ) and a larger crooked cylindrical portion, 18-20 μ long and 4,5 μ wide. Ratio of length to width of anal plate 1,75 ..... *Rh. chlorestes* Fain et al. 1977

Maturation pouch only slightly sclerotized, cylindrical and narrow and 20 μ long. Pouch continues distally as a wide striated sac with weak walls, 105-110 μ long by 3 μ to 6 μ wide. Ratio of length to width of anal plate 1,30 *Rh. bakeri* (Dusbabek and Cerny, 1970)

Males

(Males of *Rh. fairchildi* and *Rh. wetmorei* have not been seen. Males of the following are unknown: *L. elegans, P. belemensis cyanocompsae, Rh. braziliensis, Rh. changensis, Rh. chiriquensis, Rh. bakeri, Rh. bisacculatus, Rh. chlorestes, Rh. uniformis, Rh. phoreticus* and *Rh. trinitatis*)

1. Femur IV with a strong sclerotized spine on ventral face, in part fused to the integument ..... genus *Proctolaelaps* Berlese, 1923 (2)

Femur IV without such spine ..... genus *Rhinoseius* Baker en Yunker, 1964 (5)

2. Seta *j 1* a strong spine, 40 μ long ..... *P. belemensis* Fain et al. 1977

Seta *j 1* short and weak 3

3. Setae *S 3* and *S 4* much heavier and longer (75 and 64 μ respectively) than *S 2* and *S 1* (30 and 27 μ) ..... *P. glaucis* Fain et al. 1977

Setae *S 2* to *S 5* either very short (8 μ) and weak, or setae *S 1* to *S 4* strong, subequal and from 55 to 60 μ long	4
4. Setae *S 2* to *S 5* very short (8 μ) and weak	*P. kirmsei* Fain et al. 1977
Setae *S 2* to *S 4* strong, subequal (55 to 60 μ long)	*P. hunteri* Fain et al. 1977
5. Two pairs of very heavy paramedian cylindroconical spines (70 μ long) on posterior third of dorsal plate. Ventrianal plate carrying 3 anal setae plus 6 to 8 pairs of ventral opisthosomal setae.	6
Heavy spines lacking on the posterior third of the dorsal plate	7
6. Setae *j 1* and *j 2* are 45 μ long, *j 3* to *j 6* are 30-33 μ long. Setae *s 1* to *s 5* subequal (45-55 μ long). *Z 5* very heavy (9 μ thick) and with a spiral pattern	*Rh. panamensis* Fain et al. 1977
Setae *j 1* and *j 2* are 27 μ long, *j 3* to *j 6* are 15 μ long. Setae *s 1* much shorter (10 μ) than *s 5* (50 μ). *Z 5* thinner (3 to 4 μ thick) and without pattern	*Rh. richardsoni* Hunter, 1972
7. Coxa I with one or several rows of denticles	8
Coxa I without denticles	10
8. Anal plate small, carries only 3 setae. Tarsus II with a sclerotized conical spine	*Rh. tiptoni* Baker and Yunker, 1964
Ventrianal plate with 3 anal setae plus 3 or 4 pairs of ventral opisthosomal setae. Tarsus II with 4 strongly sclerotized spines, of which one is very strong and almost fused with the integument	9

9. Setae *z 4, s 3* to *s 6* much stronger and about five to six times longer than the *j 5*. The *J 4* much smaller than *Z 4*	*Rh. colwelli* Hunter, 1972
The *z 4, s 3* to *s 6* only slightly stronger and equal or at most twice as long as *j 5* setae. The *J 4* and *Z 4* equal or subequal	*Rh. peregrinator* (Baker and Yunker, 1964)
10. Seta *Z 5* absent	*Rh. heliconiae* (Baker and Yunker, 1964)
Seta *Z 5* present	11
11. Setae *S 1* to *S 5* strong, 90-100 μ long. Seta *Z 5* very heavy, 135 μ long	*Rh. erro* (Baker and Yunker, 1964)
Setae *S 1* to *S 5* weaker never more than 60 μ long. Maximum length of *Z 5* is 100 μ	12
12. All setae on dorsal shield, except *Z 5*, weak, subequal and never longer than 30 μ. Seta *Z 5* measures 90 μ ...	*Rh. phaethornis* Fain et al. 1977
Setae *S* and *R* and certain *s* and *r* are 50 to 60 μ long and strikingly stronger and longer than *J*, *Z* and *z* respectively (except *Z 5*)	13
13. Some setae of tibia III and IV longer than their respective segments	*Rh. venezuelensis* (Baker and Yunker, 1964)
Setae of tibia III and IV are never longer than those segments	*Rh. eisenmanni* (Baker and Yunker, 1964)

STUDY OF THE SPECIES

Genus *Lasioseius* Berlese, 1916

Only one species of this genus is represented in our collection. It is represented by 3 females which correspond closely to the definition of this genus given by Lindquist and Evans (1935).

Lasioseius elegans Fain, Hyland and Aitken, 1977

Female (fig. 3-4, 28, 75-78): Idiosoma 615 μ long, and 385 μ maximum width (holotype). *Dorsum:* dorsal shield without lateral incisions. It bears 21 pairs of setae *(j 1 - j 6, z 1 - z 6, s 1 - s 6* and *r 2, r 3* and *r 4)* on its anterior part and 15 pairs on its posterior part. The *J 2* and *Z 1* are present.The setae *r 3* and *Z 5* are tricarinate.The *j 1* are tricarinate and 36 μ long. Distance between the anterior ends of peritremes 84 μ. *Venter:* Sternal plate with two anterior well developed lobes, distinctly striated. Third pair of sternal setae situated on the plate, 4th pair off the plate. Genital plate truncate posteriorly; anterior lip short. Ventrianal plate broad with 4 pairs of ventral setae in addition to the 3 anal setae. Inseminating apparatus on each side consists of a short adductor canal, a large maturation pouch with a sclerotized distal portion and a very thin and very long spermiduct (fig. 3-4). Gnathosoma: tectum triramous and denticulate (fig. 28). Deutosternum with 7 rows of 8 to 20 denticles each. Chelicerae: fixed digit with 13-14 teeth, movable digit with 3-4 teeth. *Pilus dentilis* short. Legs: coxa I lacking denticles. Chaetotaxy (legs I-IV): Trochanters 6-5-5-5. Femora 12-11-6-6. Genua 14-11-9-9. Tibiae 13-10-8-10.

Hosts and localities:

Holotype and one paratype female from the nasal cavities of the green hermit, *Phaethornis guy,* Ravine Sable Trace, Vega de Oropouche, Trinidad West Indies, 20.IX.1960 (Host n° 4948) (Coll. T.A.).

An additional female paratype from the rufous-breasted hermit, *Glaucis hirsuta,* Cumuto, Trinidad, 19.IV.1960 (Host n° 4286) (All collected by T.A.).

Genus *Proctolaelaps* Berlese, 1923

Until now this genus had not been recorded from the nasal cavities of birds.

Our specimens correspond to the generic definition provided by Lindquist and Evans (1965) except for some characters in both the female and the male.

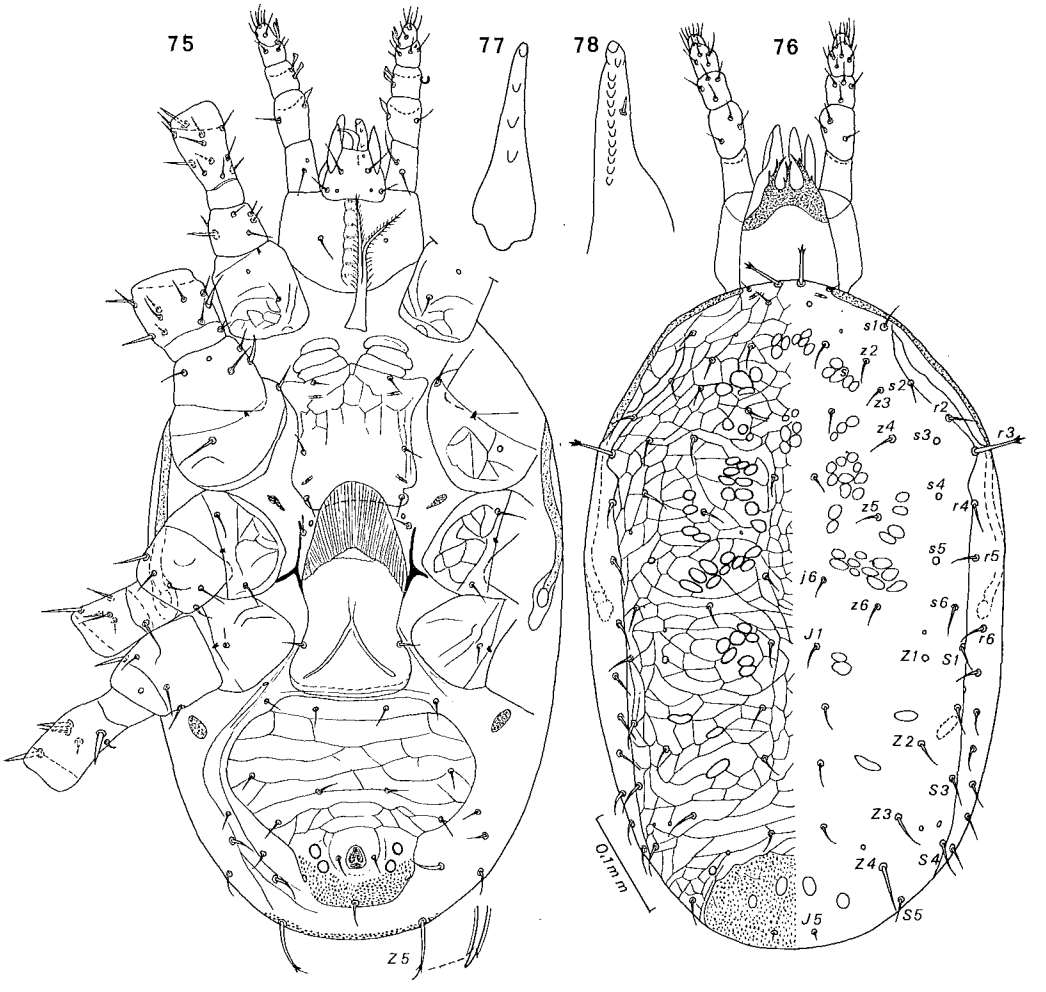

Fig. 75 - 78 — *Lasioseius elegans* Fain et al. Female holotype:
Fig. 75 and 76 - Ventral and dorsal view.
Fig. 77 and 78 - Movable and fixes digits of chelicerae.

In the females the *pilus dentilis* is replaced by a membranous lobe as in *Rhinoseius*. The fixed digit bears only 3-4 small teeth, and is not multidentate as it is generally the case in this genus. The movable digit bears 2 poorly teeth. The dorsal plate is entire, without lateral incisions. The *z 3* is present in all the species except in *P. hunteri*. Coxa I is without denticles. There are moderately wide rows of deutosternal teeth.

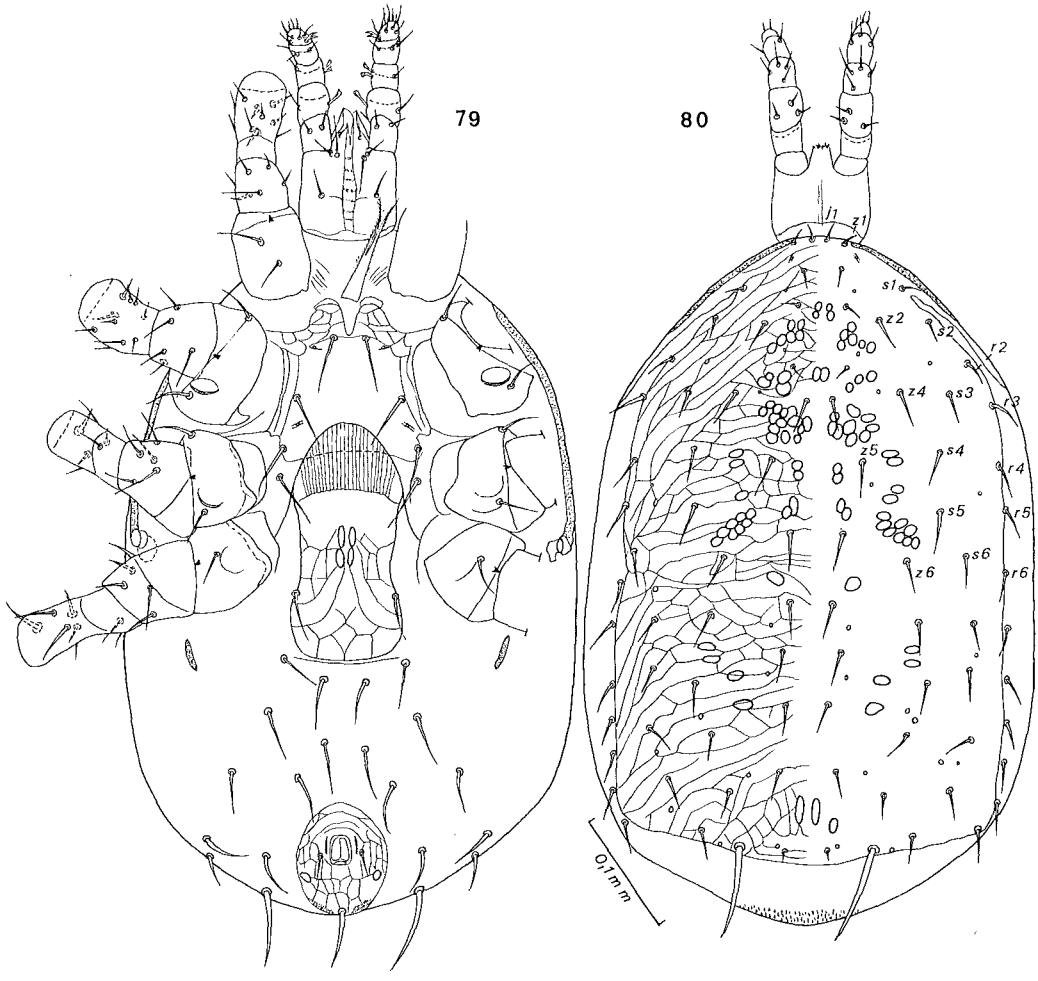

Fig. 79 - 80 — *Proctolaelaps hunteri* Fain et al.: Holotype female in ventral and dorsal view.

The males do not agree exactly with the definition of Lindquist and Evans in two important aspects. The first is the sexual dimorphism in leg IV. In all our species the femur IV bears a very large ventral spine slightly recurved apically, and partly fused with the integument. A second character is the size of the ventrianal plate which in all our species, except one *(P. belemensis),* is relatively small and resembles that of the *Rhinoseius* spp. The only exception is *P. belemensis* whose plate is larger and impinges upon the metapodal plates.

We have placed all these species in the genus *Proctolaelaps* but it is quite possible that some or all belong to another perhaps undescribed genus intermediate between *Rhinoseius* and *Proctolaelaps.* Before erecting additional genera it is imperative in our estimation that the males of the various genera of the Ascidae, especially the subfamily Ascinae, be restudied.

Proctolaelaps hunteri Fain, Hyland and Aitken, 1977

This species is distinguished from all others of the genus by the absence of the *z 3* setae and the greater length of the opisthogaster setae.

Female (fig. 6, 30, 79-80): Holotype 525 μ long and 333 μ maximum width (idiosoma). *Dorsum:* anterior part of dorsal plate with 6 pairs of *j,* 5 pairs of *z* (the *z 3* are lacking), 6 pairs of *s* and 5 pairs of *r* (total 22 pairs of setae); posterior part with 21 pairs of setae. All *r* setae are situated on or close to the borders of the shield. The dorsal setae are rather unequal, the *j 4* being much thinner and shorter (11 μ) than *j 5* (27 μ) or *j 6* (30 μ). The *j 6* are twice as long as the *j 2*. The *Z 5* seta is strong and 75 μ long. Distance between the ends of peritremes 45 μ. *Venter:* sternal plate with several lateral longitudinal lines; it is prolonged anteriorly by two patterned lobes relatively well developed. Anterior pair of sternal setae separated by 27 μ. Genital plate slightly expanded posteriorly. Anal shield small, 90 μ long and 75 μ wide, with the anus placed in its anterior half. Ventral setae rather long. Inseminating apparatus: adductor canal long, enlarged at its distal extremity. There is a small very poorly sclerotized maturation pouch and a rather short spermiduct. Gnathosoma: tectum rounded, denticulate. Legs: posterior seta of coxa II relatively narrow and long (30 μ).

Male (fig. 81-84): Allotype 426 μ long and 305 μ wide (idiosoma). *Dorsum:* shield not incised laterally. The seta *j 1* is 12 μ long; the *j 3, j 4, J 2, J 3, J 4* and *J 5* are very thin and short (maximum 9 μ long); the other *j* or *J* are much stronger and longer (36 to 50 μ). Most of the *z, Z, s* and *S* and the marginals are long and strong. *Z 5* is a thick spine, 60-65 μ long. *Venter:* sternal plate not fused with ventrianal plate, the latter bears 5 pairs of ventral setae plus the 3 anal setae. Gnathosoma: sper-

matodactyl 87 μ long, slightly sinuous. Legs: leg II with short conical spines on tibia, genu and femur. Femur IV with a very strong ventral spine partly fused with integument.

This species is named for our colleague, Preston E. Hunter, Department of Entomology, University of Georgia, Athens, Georgia, U.S.A.

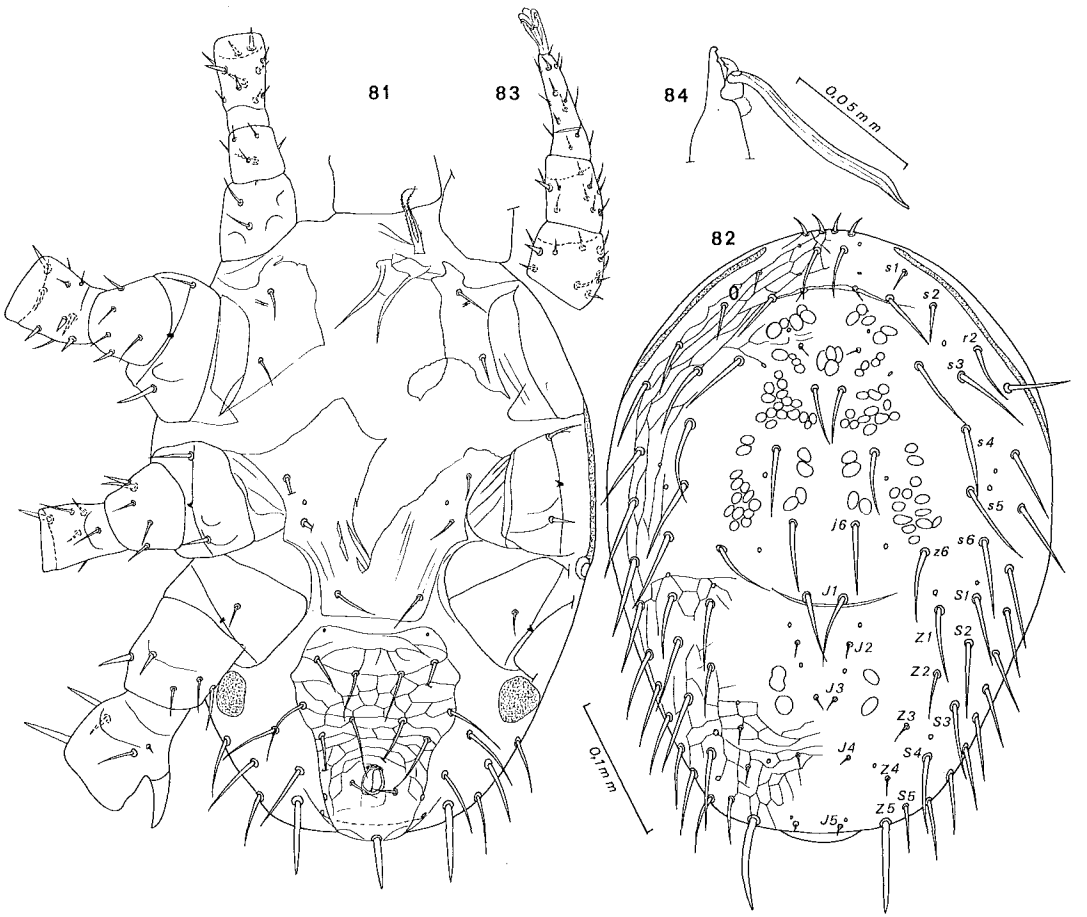

Fig. 81 - 84 — *Proctolaelaps hunteri* Fain et al.
Fig. 81-82 - Allotype male in ventral and dorsal view.
Fig. 83 - Tarsus, tibia and genu II.
Fig. 84 - Spermatodactyl.

Hosts and localities :

Holotype and 4 paratype females from the nasal cavities of *Glaucis hirsuta,* Ananindeua, Pará, Brazil, 29.X.1970 (Host n° 55570).

Allotype male and one paratype female from the long-tailed hermit. *Phaethornis superciliosus,* Ananindeua, Pará, Brazil. 25.VIII.1970 (Host no° 55286 and 55287) (All collected by A. & L.).

Two other paratype females from the blue-chinned sapphire. *Chlorestes notatus,* APEG Forest, Station A, (IPEAN), Belém, Pará, Brazil, 8.XII.1969 (Host n° 53011).

Proctolaelaps glaucis Fain, Hyland and Aitken, 1977

This species is distinguished from *P. hunteri* in the female by the presence of *z 3* setae, the smaller size of the dorsal and ventral setae, the greater distance between the anterior pair of sternal setae, the shape of the anal plate (wider than long) and the different shape of the inseminating apparatus. The male differs by the shape of the spermatodactyl which is strongly curved apically, the presence of *z 3,* the smaller size of most dorsal setae (see key) and greater length of *Z 5.*

Female (fig. 5, 31, 85-86): Idiosoma 435 μ long, 277 μ wide (holotype). *Dorsum :* the *j 2* and *j 6* subequal (19-21 μ), the *j 4* is smaller (10 μ). The *z 3* is present but is smaller than *z 2* and *z 4*. Anterior part of the plate with 23 pairs of setae (the r being on the margins), posterior part with 19 pairs of setae. Distance between anterior ends of peritremes 48 μ. The *Z 5* is strong, 60 μ long. *Venter :* sternal plate as in *P. hunteri* but the lateral pattern is indistinct. Anterior pair of sternal setae separated by 32-34 μ. Anal plate 66 μ long and 69 μ wide. Inseminating apparatus: adductor canal only slightly enlarged distally, the spermiduct starts from the distal part of the membranous maturation pouch. Gnathosoma: tectum as in *P. hunteri* but wider at its base. Legs: posterior seta of coxa II thin and 18 μ long.

Male (fig. 87-90): Idiosoma 351 μ long and 250 μ wide. *Dorsum :* as in *P. hunteri* but most of the setae are distinctly smaller except *Z 5* which is longer (75-78 μ). The *S 3* and *S 4* are much heavier and longer (75 and 64 μ respectively) than *S 2* (30 μ). Distance in straight line between anterior ends of peritremes 90 μ. *Venter* as in *P. hunteri.* Spermatodactyl 75 μ long, strongly curved apically. Short conical setae on leg II poorly developed. Femur IV with large, broad ventral spine.

Hosts and localities :

The holotype and 37 female paratypes, 5 males (allotype and paratypes) have been found in the nasal cavities of 3 *Glaucis hirsuta,* Ravine Sable Trace, Vega de Oropouche, Trinidad, 8.XII.1959 (Host n° 3735 (holotype), 3728, 3729).

Other paratypes from the same host but in other localities close to the type locality: Esperanza Estate, 15.XII.1959 (Host n° 3741 and 3746) (7 female paratype) and 19.11.1960 (Host n° 3904) (6 females, 1 nymph); and Corneillac Estate, 22.XII.1959 (Host n° 3816) (2 female paratypes). Also from Fort Read, Trinidad, 22.III.1959 (Host n° 4212) (1 paratype female). All collected by T.A.

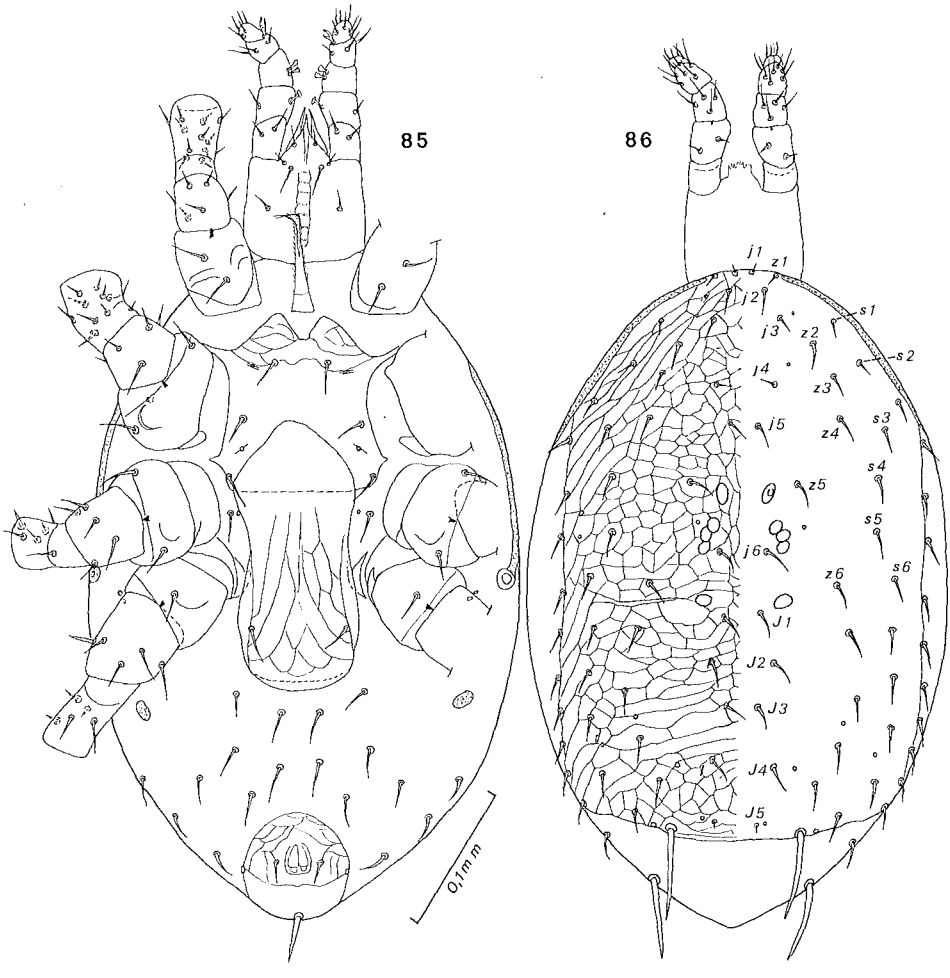

Fig. 85 - 86 — *Proctolaelaps glaucis* Fain et al.: Holotype female in ventral and dorsal view.

Proctolaelaps kirmsei Fain, Hyland and Aitken, 1977

This species is distinguished from *P. hunteri* and *P. glaucis* in the female by the position of the anterior pair of sternal setae which are much closer together, the very small size of the *j 2* setae, the presence of the *z 3* setae (which are absent in *P. hunteri),* and the different shape of the inseminating apparatus. The male differs by the very small size of the *S 2* to *S 5* setae.

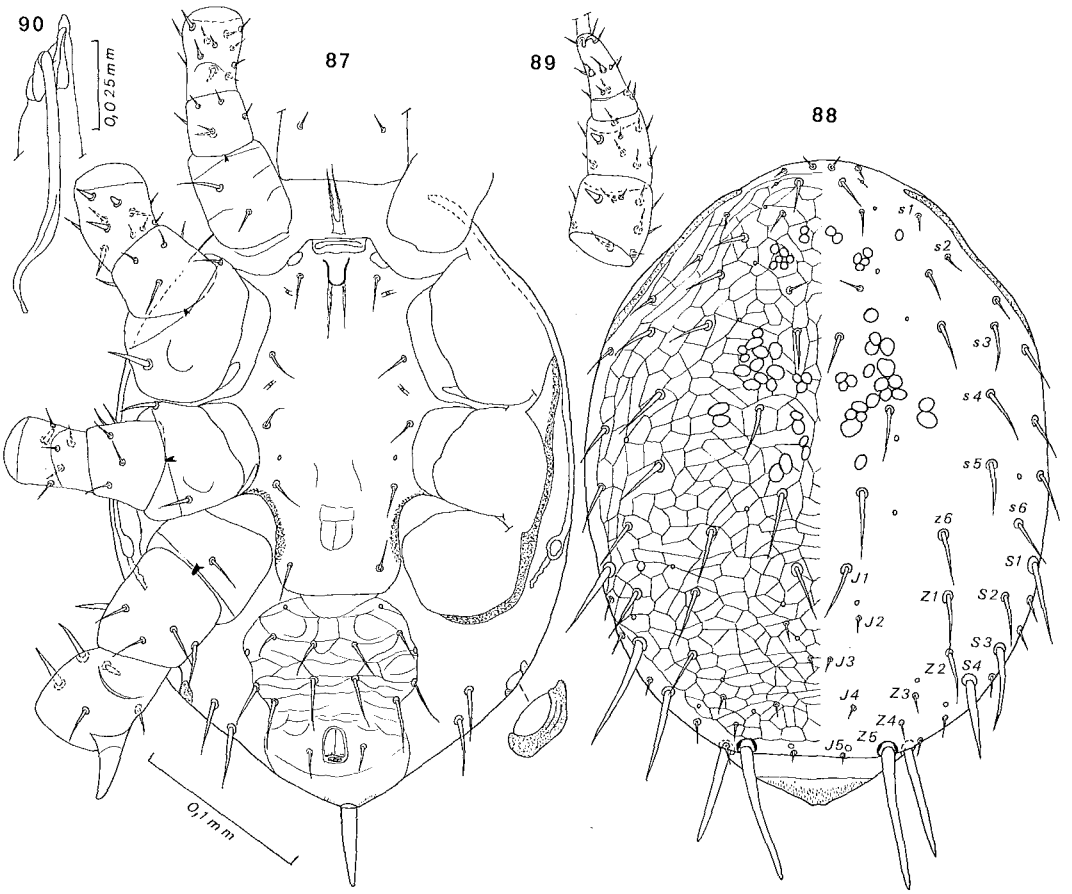

Fig. 87 - 90 — *Proctolaelaps glaucis* Fain et al.
Fig. 87 - 88 - Allotype male in ventral and dorsal view.
Fig. 89 - Tarsus, tibia and genu II.
Fig. 90 - Spermatodactyl.

Male (fig. 91-93): Idiosoma of holotype is 420 μ long and 270 μ wide. *Dorsum:* dorsal plate without lateral incisions and bearing very unequal setae. The *j 1* to *j 4*, the *z 1* and *z 3*, *s 1* to *s 3* are less than 15 μ long. In the posterior part of the plate the *J 2* to *J 5*, the *Z 2* to*Z 4* and the *S 2* to *S 5* are also small. The other setae are much stronger and longer (e.g. the *j 6* is 50 μ long, the *z 5* and *s 5* are 45 μ long). Anterior

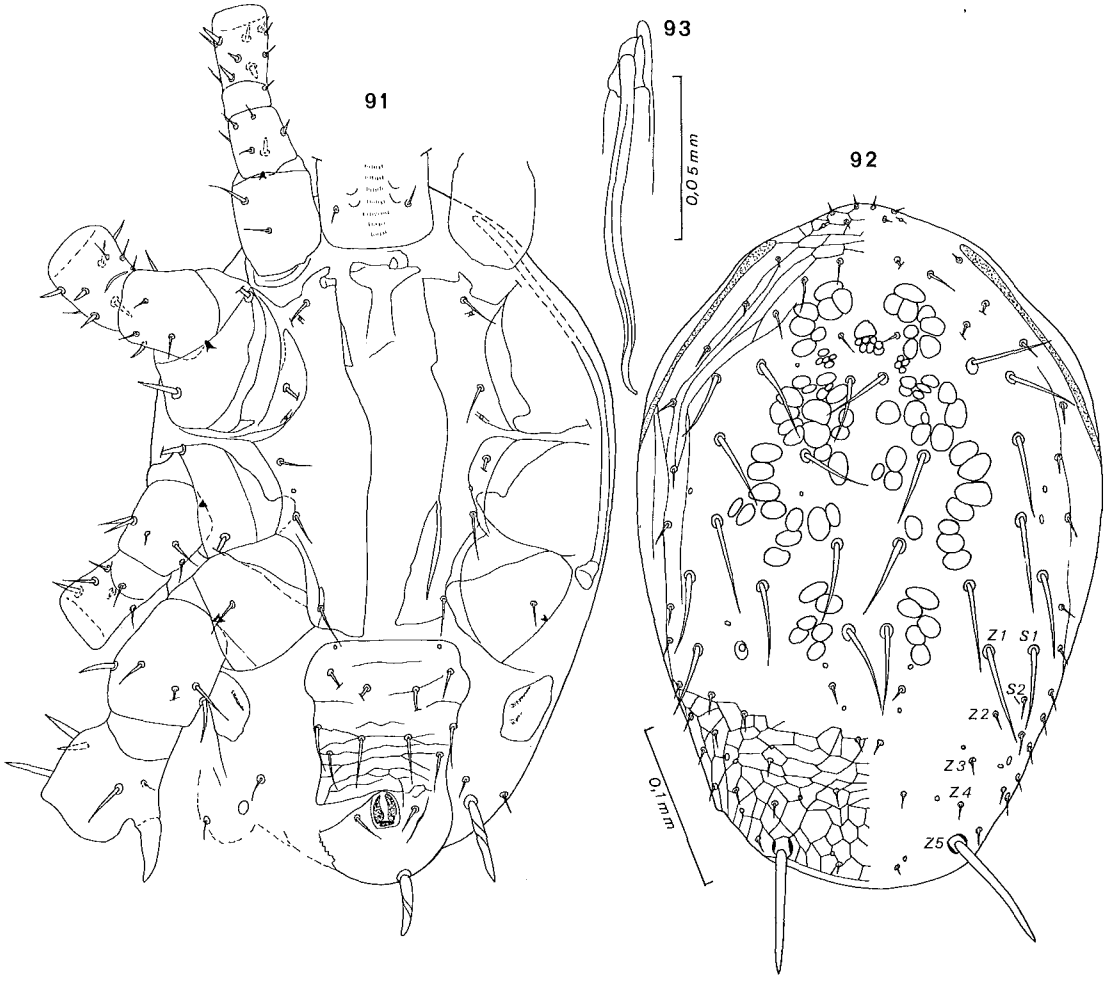

Fig. 91 - 93 — *Proctolaelaps kirmsei* Fain et al.
Fig. 91 - 92 - Holotype male in ventral and dorsal view.
Fig. 93 - Spermatodactyl.

ends of peritremes separated by 108 μ (in straight line). *Venter:* ventrianal plate with 5 pairs of ventral setae plus the 3 anal setae. Spermatodactyl 100 μ long, sinuous apically. Legs: spines on leg II relatively strong.

Female (fig. 7, 32): All our specimens are in rather bad condition and measurements of the idiosoma cannot be given. *Dorsum:* plate not incised; bears in its anterior part 23 pairs of setae, the longest (*j 6* and *s 5*) being 22 μ long; posterior part with 20 pairs of subequal setae (12-15 μ), with *J 1* a little longer (21 μ) and *Z 5* very strong and long (60 μ). Anterior ends of peritremes separated by 75 μ. Inseminating apparatus as in the two previously described species of the genus but the membranous maturation pouch is very short. *Venter:* distance between first pair of sternal setae 21 μ. Anal plate longer (80 μ) than wide (69 μ).

This species is named for our colleague, Peter Kirmse, University of Guelp, Ontario, Canada.

Host and locality:

Holotype and 2 paratype males, allotype and 6 paratype females, from the nasal cavities of the sooty-capped hermit. *Phaethornis augusti,* Birongo, Venezuela, 2.1.1968 (Host n° WV 1068) (Coll. P.K.)

Proctolaelaps belemensis Fain, Hyland and Aitken, 1977

This species differs markedly from the three other species described above by the following characters:

1. In both sexes the *j 1* setae are long and strong and the deutosternal teeth are much more developed, especially the 5the and 6th rows.
2. In the female the inseminating apparatus is not of the *Proctolaelaps* type but resembles more that encountered in the genus *Rhinoseius*. Moreover the anterior lip of genital plate is strongly tapered and is narrowly tonguelike. The two anterior prolongations of the sternal plate are very poorly developed.
3. The spermatodactyl of the male is thinner and not twisted. The ventrianal plate is much broader and bears more setae. Leg II is devoid of spines and the dorsal plate bears only small subequal setae, except for the *j 1* and the *Z 5* which are strong. The sternal plate has a well-marked network.

Female (fig. 8, 29, 94-97): Idiosoma of holotype 570 μ long and 375 μ wide. *Dorsum:* dorsal plate not incised. Setae *j 1* spinous, much stronger and longer (33 μ) than the other dorsal setae except *Z 5* which is still stronger and longer (90 μ). The *z 3* seta is present. Distance between anterior ends of peritremes 57 μ. *Venter:* Sternal plate well sclerotized and with a network of lines, mainly in its lateral parts, and prolonged anteriorly into two very poorly sclerotized, striated lobes. Anterior lip of

vulva long and tapering anteriorly. Anal plate 105 μ long and 76 μ wide with a large anus in its anterior half. Inseminating apparatus a narrow tube with distal half wider and more sclerotized.

Male (fig. 98-101): Idiosoma 460 μ long, 330 μ wide. *Dorsum:* seta *j 1* is spinous, 40 μ long; seta *Z 5* strong and 70 μ long; other setae of dorsal plate much shorter. *Venter:* sternigenital plate with a pattern of lines specially well developed in lateral and posterior regions. Ventrianal plate large bearing 6 pairs of setae plus the 3 anal setae. Gnathosoma: spermatodactyl 140 μ long, almost straight. Legs II without conical spines.

Hosts and localities:

Holotype female plus 6 paratype females and a paratype male taken from the paletailed barbthroat *Threnetes leucurus* in APEG Forest, Belém, Pará, Brazil, 29.I.1968 (Host n° B 10) (Coll. A. & L.). Allotype male plus 14 paratype females and a paratype male from *T. leucurus,* Mucambo Forest, Belém, Brazil, 15.IV.1968 (Host n° B 29) (Coll. A. & L.). An additional 32 paratype females and a male from the same host, locality and collector but with following dates: 20.II.1968, 5.III.1968, 16.IV.1968, 11.VII.1968, 10.VI.1970. Two additional paratype females from the gray-breasted sabrewing *Campylopterus largipennis,* Pará, Brazil, 27.VI.1968 and 11.VII.1970 (Coll. A. & L.); 2 paratypes females from *Phaethornis superciliosus,* one from Marituba, Pará, Brazil, 15.XI.1968 (Host n° 43733) (Coll. A. & L.), the other from Almirante, Panama, 10.X.1967 (Host n° WP 16167) (Coll. P.K.); 3 paratype females and a male from *Glaucis hirsuta,* the male and a female from Birongo, Venezuela, 23.I.1968 (Host n° WV 14.68) (Coll. P.K.), one female from Cumuto, Trinidad, 19.IV.1960 (Host n° 4287) (Coll. T.A.); and one female from Ravine Sable Trace, Vega de Oropouche, Trinidad, 8.XII.1959 (Host n° 3734) (Coll. T.A.)

Proctolaelaps belemensis ssp. *cyanocompsae* ssp. n.

This subspecies is known only from one female specimen. It can be distinguished from the typical species by the following characters: larger size of the body, longer and more attenuated shape of the anterior lobe of genital lip, different shape of the two anterior lobes of the sternal plate, and the relatively longer opisthogaster setae.

Holotype female: 630 μ long and 402 μ wide (idiosoma) (fig. 102, 103). Male is unknown.

Host and locality:

Holotype female found in the nasal cavities of the blue-black grosbeak, *Cyanocompsa cyanoides* (Mosqueiro Ferry, Marituba, Pará, Brazil, 7.II.1969 (Host n° 46562) (Coll. A & L.).

Genus *Rhinoseius* Baker and Yunker, 1964

Our species agree with the definition of this genus given by Lindquist and Evans (1965) except for the inseminating apparatus which may vary strongly is structure (see above).

According to the shape of the tectum, the presence or absence of denticles on coxa I and several other characters it is possible to distinguish two groups in the genus *Rhinoseius*:

Group A: The tectum is short or moderately elongate but always rounded. The coxa I bears one or several rows of fine denticles. The inseminating apparatus is a long

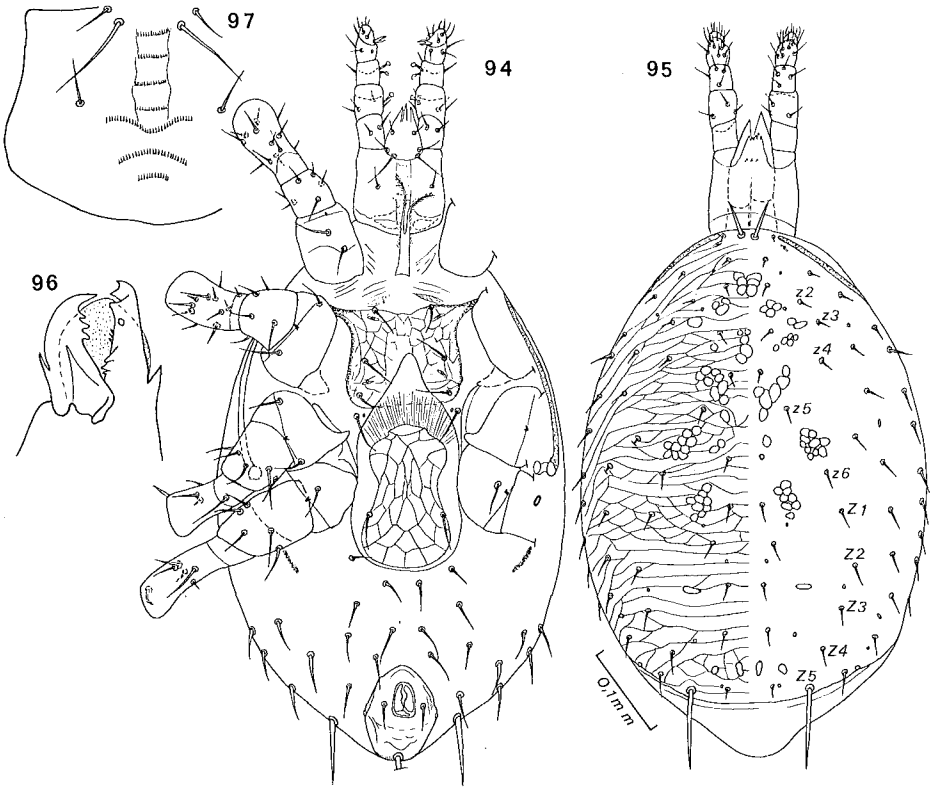

Fig. 94 - 97 — *Proctolaelaps belemensis* Fain et al. Holotype female.
Fig. 94-95 - Ventral and dorsal view.
Fig. 96 - Digits of chelicera.
Fig. 97 - Deutosternal teeth.

membranous tube without a dilated and sclerotized maturation pouch (except in one species *Rh. richardsoni* which possesses a large sclerotized maturation pouch). The anterior border of the sternal plate is incised medially and does not form two distinct lobes.

This group includes the following species: *Rh. tiptoni* (type of the genus *Rhinoseius) Rh. peregrinator, Rh. chiriquensis, Rh. changensis, Rh. colwelli, Rh. richardsoni* and *Rh. panamensis*. These species have been described from Panama, Mexico or Costa Rica.

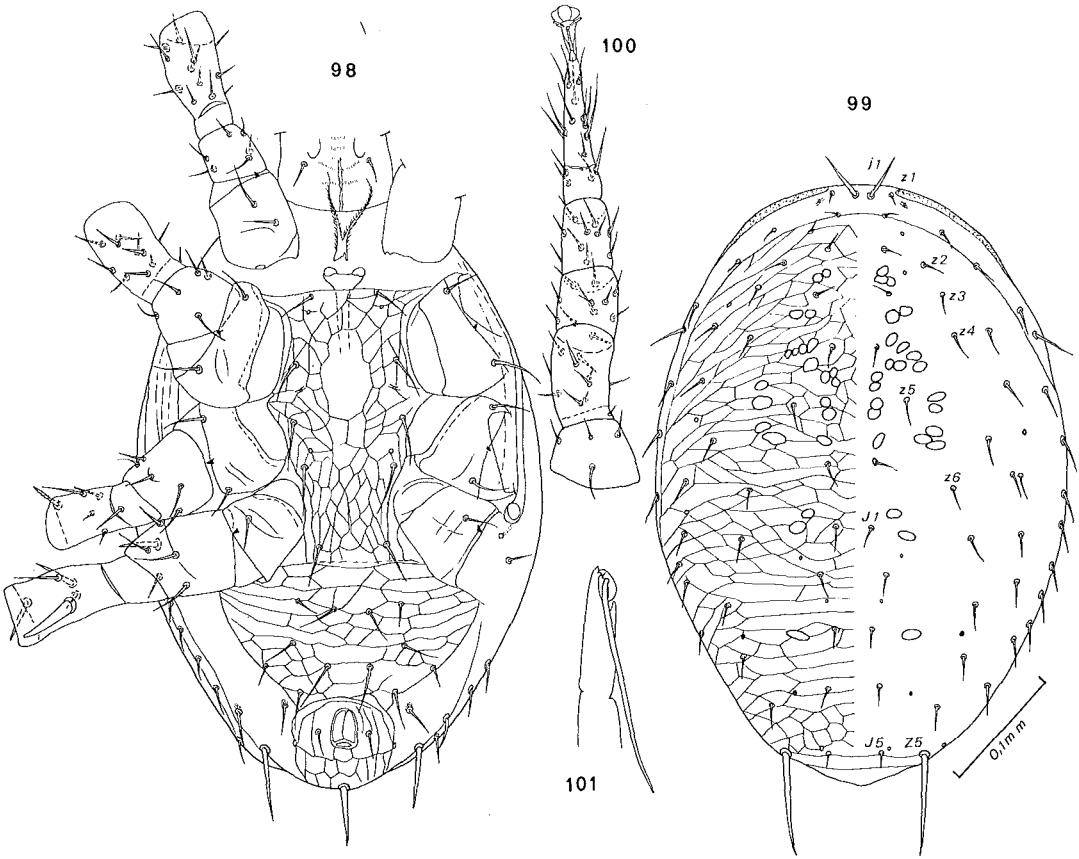

Fig. 98 - 101 — *Proctolaelaps belemensis* Fain et al. Allotype male.
Fig. 98 - 99 - Ventral and dorsal view.
Fig. 100 - Leg II.
Fig. 101 - Spermatodactyl.

Group B : The tectum is long, tapering to an acute point. Coxa I without denticles. Inseminating apparatus variable, but most of the species have a long sclerotized cylindrical maturation pouch. Anterior part of sternal plate prolonged anteriorly as a bilobed punctate area separated from sternal plate by a constriction.

This group includes the following species: *Rh. braziliensis, Rh. venezuelensis, Rh. heliconiae, Rh. erro, Rh. wetmorei* (= type of genus *Tropicoseius*), *Rh. fairchildi, Rh. bakeri, Rh. bilobatus, Rh. uniformis, Rh. phoreticus, Rh. phaethornis, Rh. trinitatis, Rh.*

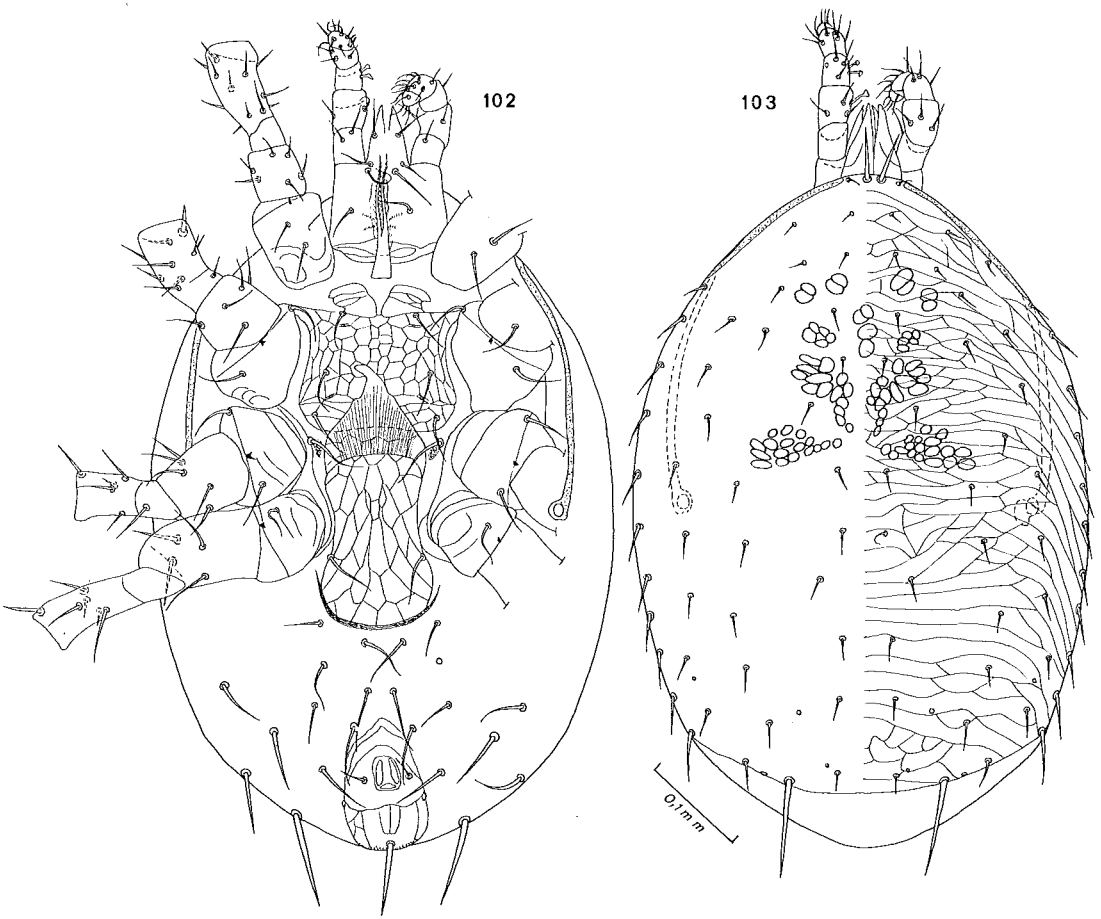

Fig. 102 - 103 — *Proctolaelaps belemensis* ssp. *cyanocompsae* ssp. n. Holotype female in ventral and dorsal view.

chlorestes. These mites have been described from Brazil (5 species), Panama (4 species), Trinidad (2 species), and one each from Cuba, Mexico, Venezuela and Colombia.

Rhinoseius venezuelensis Baker and Yunker, 1964

The holotype was described from a *Heliconia* floral bract taken at New York quarantine but originating in Venezuela (fig. 10,51). Paratypes were collected from *Heliconia* flowers but from Fort Clayton, Panama, Canal Zone. Additional material is recorded from the nasal cavities of *Phaethornis superciliosus* taken in a cacao plantation, Gamboa, Canal Zone.

Hosts and localities

We have found numerous specimens of this species in nasal cavities of the following hosts:

— *Glaucis hirsuta,* APEG Forest, Belém, Pará, Brazil, 28.V.1968 (Host n° 38840) (20 females and 4 males) (Coll. A. & L.). From the same host but in Trinidad: Cumuto Road, 26.IV.1960 (Host n° 3740) (3 females); Fort Read, 16.XI.1960 (Host n° 3735) (2 females) (Coll. T.A.).
— *Phaethornis superciliosus,* APEG Forest, Belém, Brazil, 11.VI.1968 (Host n° 39112) (4 females) (Coll. A. & L.).
— *Phaethornis guy*, Mayaro, Trinidad, 23.VII.1968 (Host n° 14163) (1 female) (Coll. T.A.).
— *Amazilia chionopectus* (white-chested emerald), Ravine Sable Trace, Vega de Oropouche, Trinidad, 13.IX.1960, bird n° 4938 (1 female) (Coll. T.A.).
— *Coereba flaveola* (bananaguit, Coerebidae), Mayaro, Trinidad, 25.VI.1968 (Host n° 19036) (1 female) (Coll. T.A.).

Rhinoseius bisacculatus Fain, Hyland and Aitken, 1977

This species is represented by female specimens only. It is characterized by differences in the inseminating apparatus in which there are two cylindrical, sclerotized maturation pouches separated by a rather long and narrow membranous tubule.

Female (fig. 9, 42, 104-105): Idiosoma of holotype is 525 μ long and 320 μ maximum width. *Dorsum:* plate with deep lateral incisions. Dorsal setae not exceeding 24 μ in length. The *j 1* and *z 1* are very short. Seta *z 3* is lacking. Anterior ends of peritremes separated by a distance of 39 μ. Anterior part of dorsal plate with 17

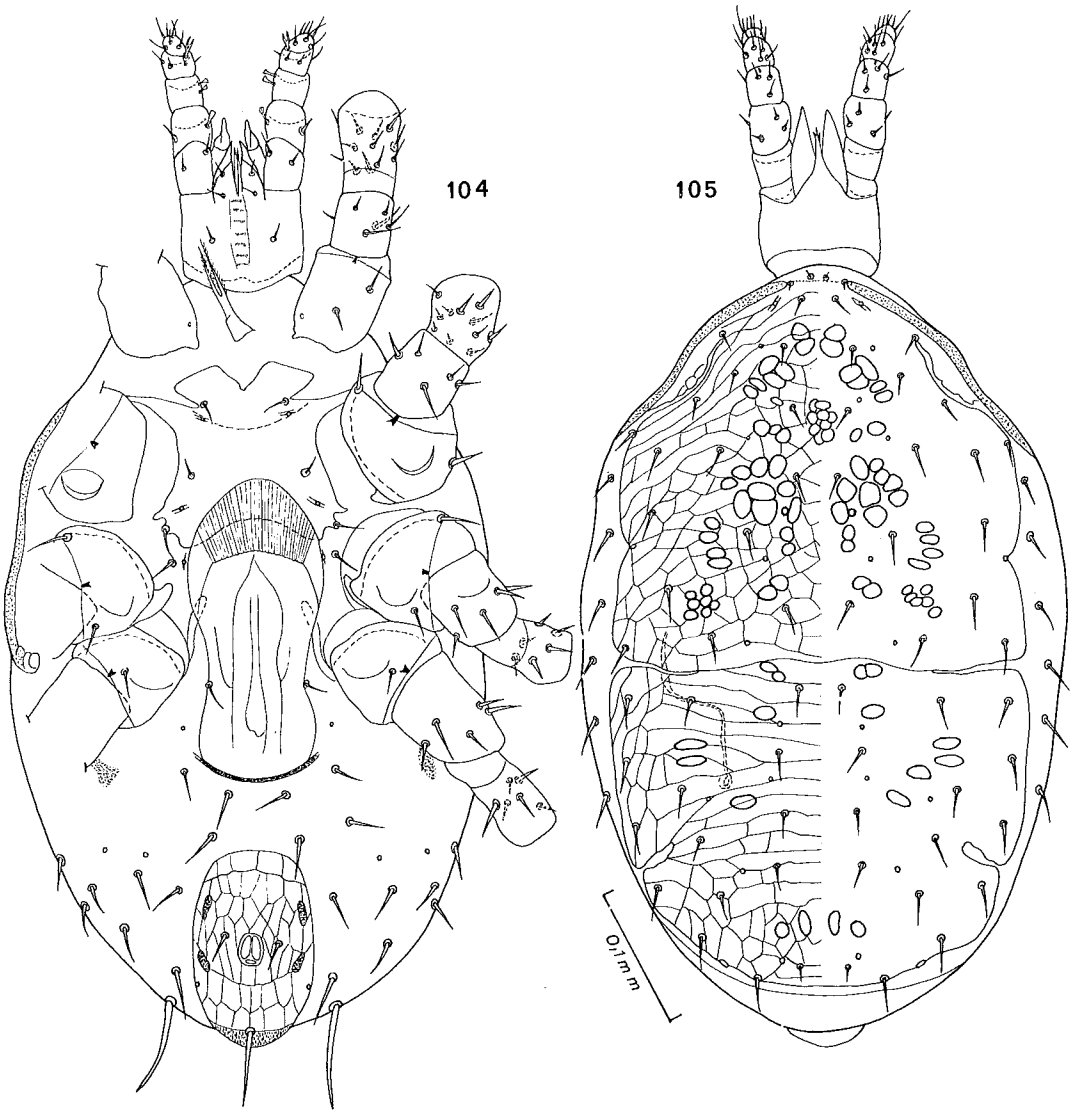

Fig. 104-105 — *Rhinoseius bisacculatus* Fain et al. Holotype female in dorsal and ventral view.

pairs of setae, posterior part with 15 pairs. *Venter:* tritosternum with a common base 30 μ long, lacinae thin, barbed, 45 μ long. Sternal plate without lines, prolonged anteriorly into two punctate lobes with or without distinct lines. Distance between first pair of anterior sternal setae 57 μ. Other sternal setae and genital plate as in *Rh. phaethornis*. Anal plate 135 μ long and 81 μ wide, with slightly rounded lateral margins; anus situated in the middle of the plate. Posterior anal seta 48 μ long (in the paratype), moderately inflated basally. Inseminating apparatus with two sclerotized maturation pouches: a proximal one very narrow (3 μ wide) 42 μ long and with a basal sclerotized dilatation, and a distal one fusiform (maximum width 5-6 μ) and 27 μ long. Gnathosoma: tectum strongly tapering apically with apex presenting a few barbs. Deutosternum with 7 narrow rows of denticles. Legs: coxa I without denticles; seta situated on posterior surface of coxa II is a spine 18 μ long and 3 μ wide (maximum).

Male: unknown.

Hosts and localities

The holotype female and 2 female paratypes were found in the nasal cavities of *Glaucis hirsuta*, APEG Forest, Belém, Pará, Brazil, 28.V.1968 (Host n° 38840) (Coll. A. & L.).

Two additional female paratypes were collected from *Phaethornis guy*, Vega de Oropouche, Trinidad (Host n° 4954) (Coll. T.A.).

Rhinoseius chlorestes Fain, Hyland and Aitken, 1977

This species is distinguished from the other species in the genus by the characteristic bilobate shape of the inseminating apparatus, which ends proximally in a relatively short sclerotized maturation pouch consisting of a short cylindrical part, 18-20 μ long and 4,5 μ wide, and a more proximal and subglobular part which is shorter but wider (11-13 $\mu \times 9$ μ).

Female (fig. 13, 48,70, 106-107): Idiosoma 512 μ long and 320 μ maximum width (holotype). *Dorsum:* setae of dorsal plate, subequal except that *j 1* and *z 1* are distinctly smaller. The *j 2* to *j 6* are 20-21 μ long: the *z 2* to *z 5* are 24 μ long; the *s 1* to *s 6* are 18-24 μ long. There are 17 pairs of setae on the anterior part and 15 pairs (sometimes a seta is missing on one side) on the posterior part of dorsal plate. Distance between the anterior ends of peritremes 39 μ. *Venter:* anterior lobes of sternal plate not very conspicuous; genital plate rounded posteriorly. Anal plate 126 μ long and 72 μ wide, with lateral margins very slightly rounded. Inseminating ap-

paratus as described above. Gnathosoma: the 7 deutosternal rows of denticles are narrow. Legs: posterior seta of coxa II narrow, 21 μ long. Barbed setae on trochanters and femora absent.

Male: unknown.

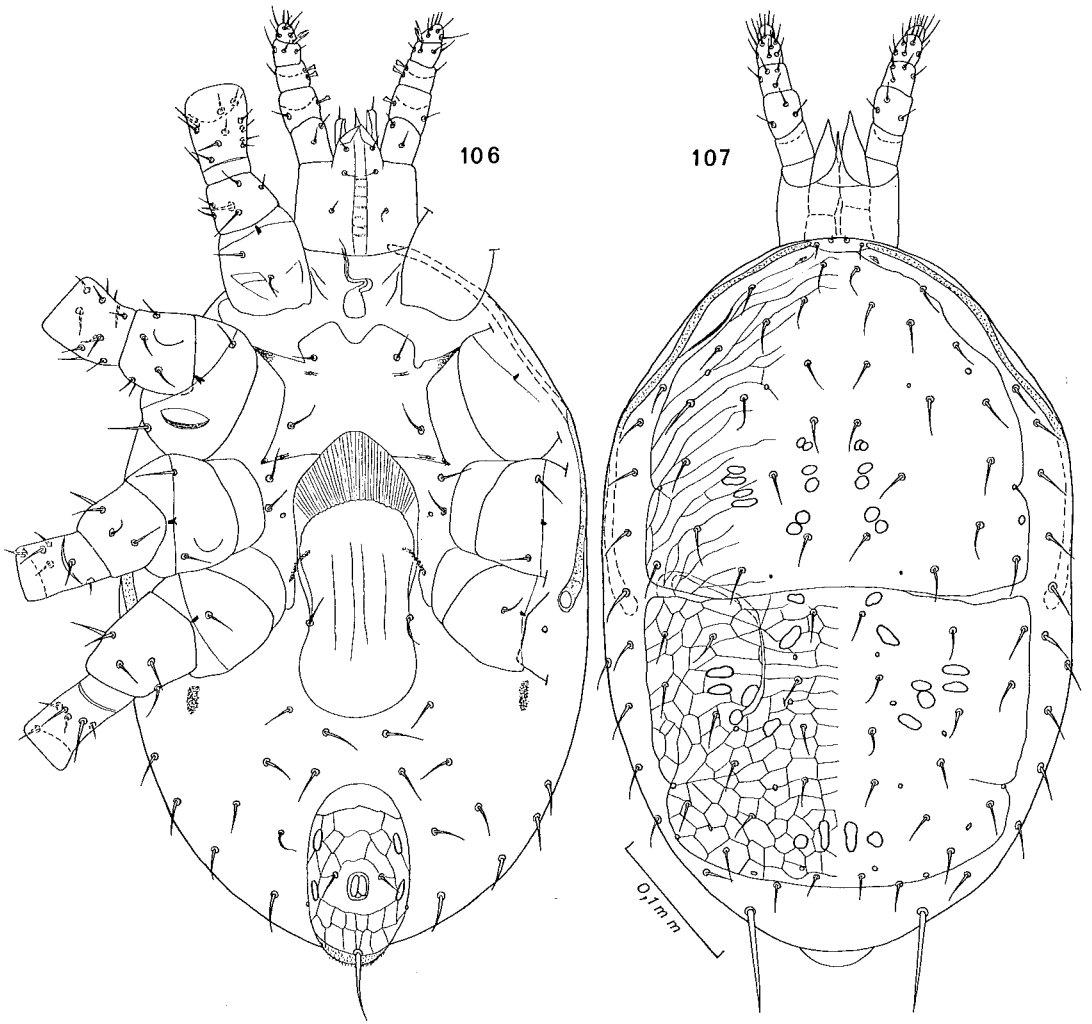

Fig. 106 - 107 — *Rhinoseius chlorestes* Fain et al. Holotype female in ventral and dorsal view.

Hosts and locality

Holotype female and 2 paratype females from *Chlorestes notatus*, collected in the APEG Forest, Station A (IPEAN) Belém, Pará, Brazil, 8.X.1969 (Host n° 53011) (Coll. A. & L.).

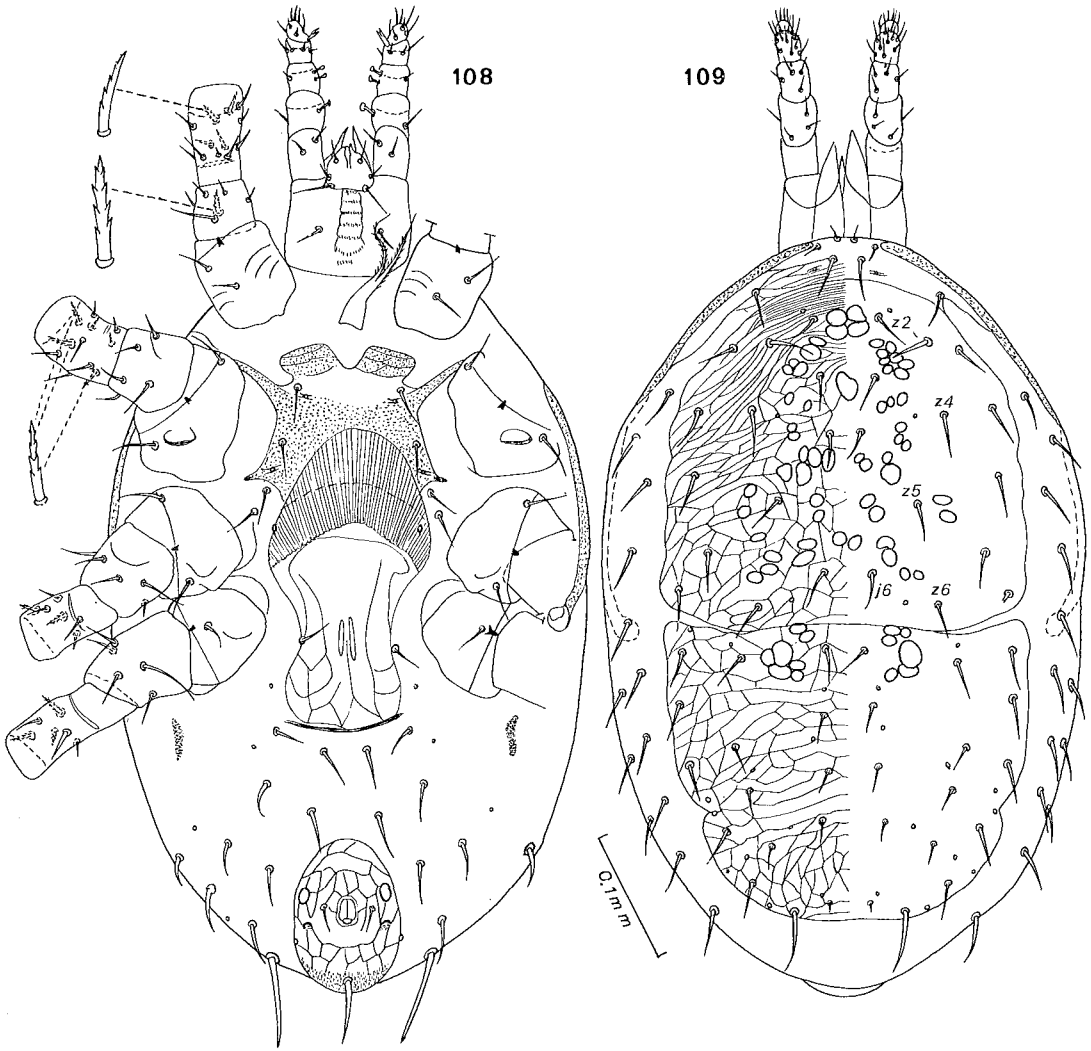

Fig. 108 - 109 — *Rhinoseius uniformis* Fain et al. Holotype female in ventral and dorsal view.

Rhinoseius uniformis Fain, Hyland and Aitken, 1977

This species is clearly distinguished from other known members of the genus by the structure of the dorsal shield on which there are numerous parallel and convex striations in the anterior part. There are about 12 striations between the *j 2* and the *j 3* setae. Another character which is shared by only a few other species is the presence of one to several rather strong barbed setae on the dorsal surface of all femora.

Female (fig. 18, 44, 108-109): Idiosoma of holotype 550 μ long, 348 μ wide. *Dorsum:* dorsal plate with a deep incision on each side. Anterior part of dorsal plate with 17 pairs of setae, posterior part with 15 pairs of setae. The dorsal setae are unequal in size. The *j 2* is 30 μ long, the *j 6* is 24 μ long, the *J 2* and *J 3* are 18 μ long. The *z 2* and *z 6* are 34 μ and 23 μ long respectively. The *z 3* is lacking. The *Z 5* is strong and 48 μ long. Anterior ends of peritremes separated by a distance of 46 μ. *Venter:* common base of tritosternum 36 μ long, lacinae barbed, 50 μ long. Sternal plate poorly sclerotized and without lines; the two anterior lobes are distinctly striated. Distance between first pair of anterior sternal setae 75 μ. Genital plate rounded posteriorly. Anal plate 110 μ long and 78 μ wide, distinctly narrowed anteriorly. Posterior anal seta 48 μ long, slightly inflated basally. Inseminating apparatus narrow, completely membranous. Gnathosoma: the rows of denticles of deutosternum are relatively wide. Tectum strongly narrowed anteriorly with a forked apex. Legs: Ventral surface of coxa I without denticles; the posterior seta of coxa II is 30 μ long.

Male: unknown.

Hosts and localities

The holotype and 2 paratype females were found in the nasal cavities of *Phaethornis superciliosus,* Mosqueiro Ferry, Marituba, Pará, Brazil, 7.II.1969 (Host n° 46546) (Coll. A. & L.)

One paratype female from *Glaucis hirsuta,* Ananindeua, Pará, Brazil, 29.X.1970 (Host n° 55570) (Coll. A. & L.).

Rhinoseius phoreticus Fain, Hyland and Aitken, 1977

This species is represented only by the holotype female. It resembles *Rh. uniformis* by the shape of the inseminating apparatus and the presence of barbed setae on some femora. It is distinguished from *Rh. uniformis* by the larger size of the body, the absence of convex and parallel striations on the anterior part of the dorsal plate between setae *j 2* and *j 3*, the greater distance between the anterior ends of the peritremes and the broader shape of the anal plate.

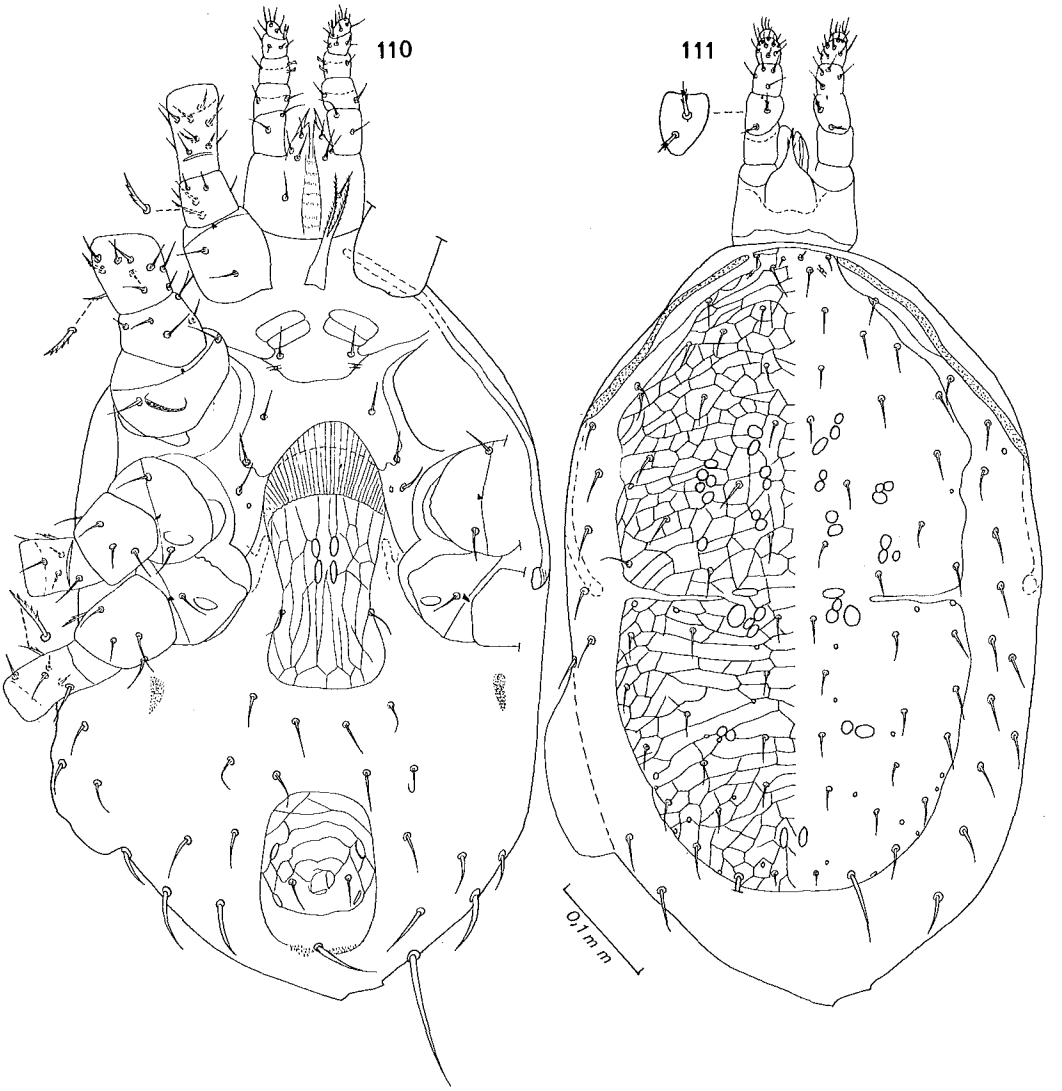

Fig. 110 - 111 — *Rhinoseius phoreticus* Fain et al. Holotype female in ventral and dorsal view.

Female (fig. 22, 41, 110-111): Idiosoma of holotype 675 μ long, 405 μ maximum width. *Dorsum:* dorsal plate with two deep lateral incisions, bearing 17 pairs of setae on its anterior part and 15 pairs of setae on its posterior part. Setae *z 3* absent. The *j 2* seta is slightly longer (25 μ) than the *j 3* to *j 6* (22 to 24 μ). The *s 3* is the longest seta (27 μ) of the *s* series. The *Z 5* is strong and 60 μ long. Distance between the anterior ends of the peritremes 75 μ. *Venter:* base of tritosternum 45 μ long, barbed lacinae 55 μ long. Sternal plate with indistinct lines, prolonged anteriorly by two lobes distinctly striated. First pair of sternal setae separated by 60 μ. Genital plate distinctly expanded posteriorly, with posterior margin almost straight. Anal plate 150 μ long and 102 μ wide, with lateral borders almost straight. Anus slightly behind the middle of the plate. Posterior anal seta 57 μ long, with base slightly thickened. Inseminating apparatus narrow and membranous. Gnathosoma: tectum tapering anteriorly into a long barbed point. Legs: coxa I without denticles ventrally; coxa II with a posterior hair 30 μ long. The dorsal surface of the following segments of palps and legs bear one or several barbed setae: the femur of the palps and of legs I to IV, the trochanter of legs, III and IV.

Male: unknown.

Host and locality

Holotype female in the nasal cavity of copper-rumped hummingbird, *Amazilia tobaci,* Tumpuna Road, Trinidad (19.VII.1960) (Coll. T.A.).

Rhinoseius phaethornis Fain, Hyland and Aitken, 1977

This species belongs to the *venezuelensis* group in which the female is characterized by the presence of a sclerotized maturation pouch in the inseminating apparatus. This species is distinguished from *Rh. venezuelensis* by the shape of the maturation pouch which is much shorter and narrower and « L »-shaped, and by the presence of a short conical spine on the posterior surface of the coxa II; in the male by the much smaller size of most of the dorsal *s, S, r* and *R* setae and the smaller size of the setae of the opisthogaster.

Female (fig. 11, 47, 112-113): Holotype 502 μ long (idiosoma), 315 μ wide (maximum width). *Dorsum:* dorsal plate with a rather deep bilateral incision. All the dorsal setae rather short (maximum length 24 μ). The two anterior ends of the peritremes are separated by a maximum distance of 33 μ in a straight line. The anterior part of the dorsal plate with 17 pairs of setae, the posterior part with 15 pairs of setae. The *z 3* is lacking. The *j 1* and *z 1* are very small, *Z 5* is 18 μ long. *Venter:* tritosternum with a common base 30 μ long, the lacinae are very narrow and finely

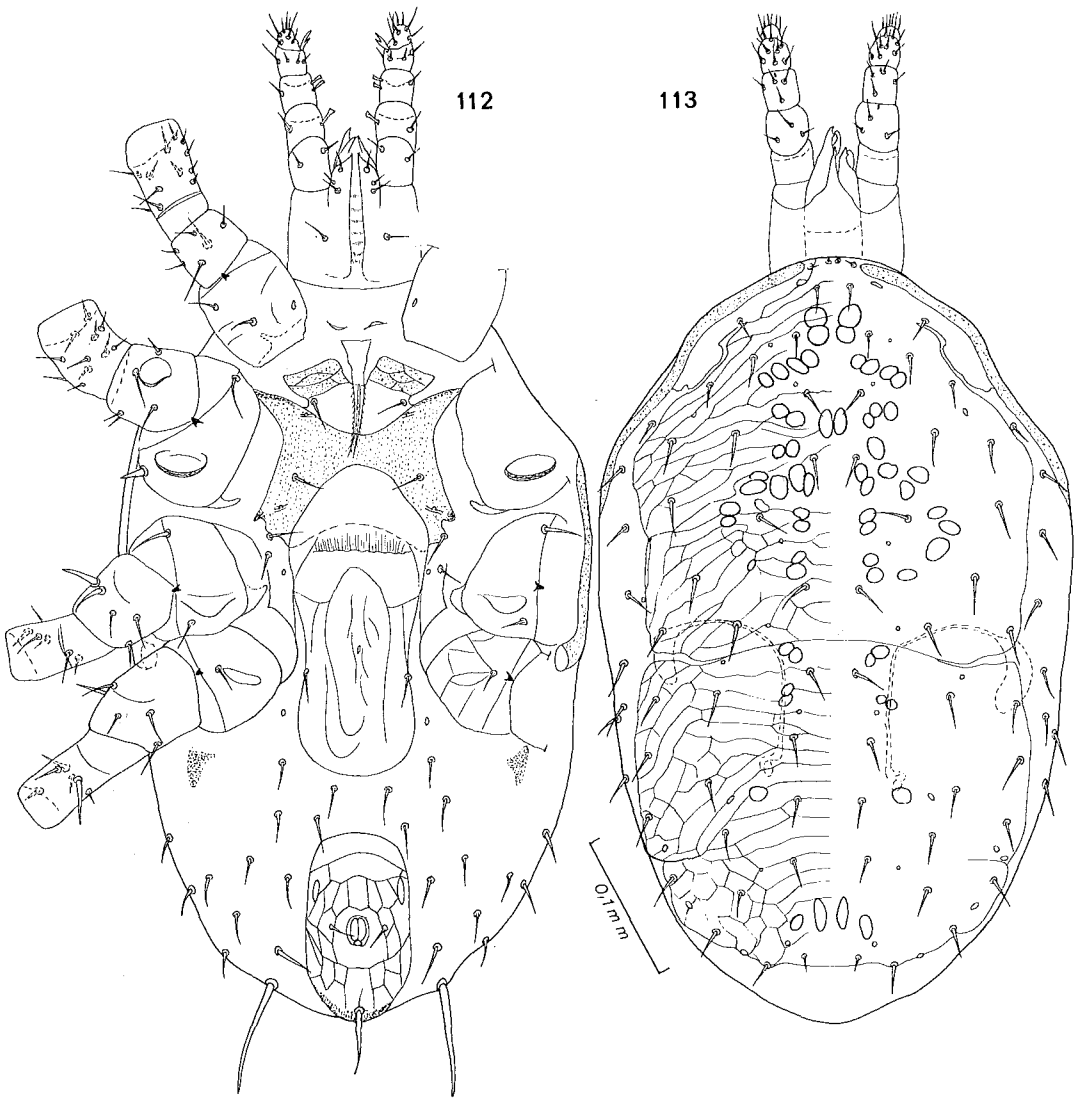

Fig. 112 - 113 — *Rhinoseius phaethornis* Fain et al. Holotype female in ventral and dorsal view.

barbed. Sternal plate generally non striated, prolonged anteriorly into two slightly punctate lobes less sclerotized than the sternal plate and bearing 3-4 transverse striations. Distance between first pair of anterior sternal setae 60 μ. Third pair of sternal setae is situated in postero-lateral corners of the shield. Fourth pair of sternal setae located off the shield on soft cuticle and flanked internally by the 3rd sternal pore. Genital plate rounded posteriorly, extending forward beyond the 2nd pair of sternal setae. Anal plate 120 μ long and 70 μ wide, with almost straight lateral margins and a slightly convex anterior margin; the anus is situated in the middle of the shield. Postanal seta 45 μ long, moderately expanded basally. Posterior part of inseminating apparatus forming a narrow sclerotized «L»-shaped pouch, the longitudinal part 33 μ long and the shorter transverse portion 15 μ long. Gnathosoma: tectum tapering into a point apically. Deutosternum with 7 narrow rows of small denticles. Legs: coxae II with a posterior seta in the form of a short and rather strong conical spine 13-15 μ long.

Male (fig. 114-117): Allotype 480 μ long, 321 μ wide (idiosoma). *Dorsum:* dorsal plate as in female but the anterior part bears 20 pairs of setae (the *r 2, r 3* and *r 4* being on the plate) and the posterior part 17-18 pairs of setae (*R 1* and *R 2* and? *R 3* being on the shield); the *Z 5* is very thick, 90 μ long. Anterior tips of peritremes 45 μ apart. *Venter*: Ventrianal plate not fused with sternigenital plate and bearing 5 pairs of ventral setae plus the 3 anal setae. Gnathosoma: spermatodactyls sinuous at apex, approximately 50 μ long. Tectum rather long and rounded with a medium narrow anterior projection. Leg II with several sclerotized thick cylindroconical spines with rounded apices: tarsus with 4 spines; tibia, genu and femur each with 1 spine. The spine on tibia is very small. while that of femur is the most developed. Leg IV normal, without such spines.

Hosts and localities

Collected by one of us (T.A.) from various species and localities in Brazil and Trinidad. Holotype female and 3 female paratypes from *Phaethornis superciliosus,* collected at Mosqueiro Ferry, Marituba, Pará, Brazil, 26.X.1968 (Host n° 42984). Other collections follow:

Phaethornis longuemareus (little hermit): Ravine Sable Trace, Vega de Oropouche, Trinidad, 8.XII.1959 (Host n° 3729) (1 male allotype, 2 female paratypes and 1 male paratype). Cumuto Road, Trinidad, 26.IV.1960 (Host n° 4301) (4 female paratypes).

Phaethornis superciliosus: APEG Forest, Belém, Pará, Brazil, 4.VI.1968 (Host n° 38999) (13 female paratypes); 4.II.1969 (Host n° 46271) (3 female paratypes). Mosqueiro Ferry, Marituba, Brazil, 7.II.1969 (Host n° 46545) (2 female paratypes);

7.II.1969 (Host n° 46559) (14 female paratypes, 1 nymph paratype). Ananindeua, Pará, Brazil, 25.VIII.1970 (Host n° 55287) (1 female paratype); 25.VIII.1970 (Host n° 55286) (2 female paratypes).

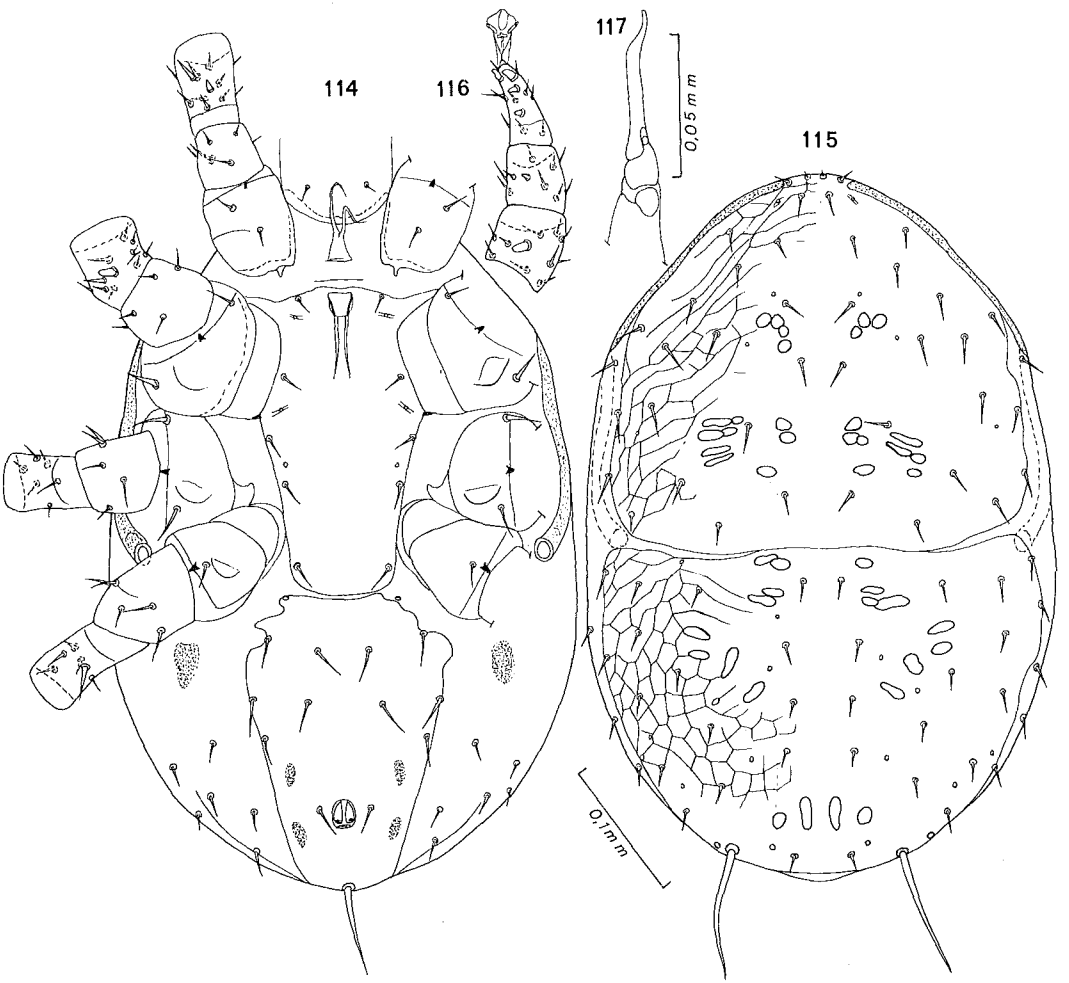

Fig. 114 - 117 — *Rhinoseius phaethornis* Fain et al. Allotype male.
Fig. 114 - 114 - Ventral and dorsal view.
Fig. 116 - Tarsus, tibia and genu II.
Fig. 117 - Spermatodactyl.

Glaucis hirsuta: Ananindeua, Brazil, 29.X.1970 (Host n° 55570) (5 female paratypes). Cumuto, Trinidad, 19.IV.1960 (Host n° 4286) (1 male paratype, 1 female paratype); 19.IV.1960 (Host n° 4289) (4 female paratypes).

Campylopterus largipennis: Ananindeua, Brazil, 11.VIII.1970) (Host n° 55178) (4 female paratypes).

Chlorestes notatus: APEG Forest (Station A), Belém, Brazil, 8.X.1969 (Host n° 53011) (1 female paratype).

Thalurania furcata (fork-tailed woodnymph): Mosqueiro Ferry, Marituba, Brazil, 15.XI.1968 (Host n° 43737) (1 female paratype).

Rhinoseius trinitatis Fain, Hyland and Aitken, 1977

This species is related to *Rh. phaethornis* but may be distinguished by the following characters: 1) The posterior border of the dorsal plate is almost straight; 2) the anal plate is relatively wider (140 μ long and 94 μ wide); 3) the anterior lobes of the sternal plate are not striated; 4) the *s 3* and *s 4* are distinctly longer (27 μ) than the *j 2* to *j 6* setae (18-20 μ); 5) the posterior pair of opisthosomal setae are stronger and longer (96 μ); 6) the sclerotized maturation pouch is longer (45-56 μ) and a little wider; 7) the posterior seta of the coxae II is not a short spine but rather a strong hair 26 μ long.

The holotype female is 580 μ long and 390 μ wide (idiosoma). Anterior part of dorsal plate with 17 pairs of setae, posterior part of this plate with 15 pairs of setae; the longest setae are 25 μ long. The anterior pair of sternal setae are 52 μ apart. Sternal plate without distinct pattern. Anal plate 140 μ long and 94 μ wide.

Male: unknown

Hosts and localities

Holotype female from *Glaucis hirsuta,* Ravine Sable Trace, Vega de Oropouche, Trinidad, 8.XII.1959 (Host n° 3729); 3 female paratypes are from the same locality, date and host species (Host n° 3728). Additional paratypes from *Phaethornis guy,* Ravine Sable Trace, 13.X.1960 (Host n° 4935) (3 females) and 20.IX.1960 (Host n° 4948) (2 females) (Coll. T.A.).

Rhinoseius chiriquensis (Baker & Yunker, 1964)

This species was hitherto known only by the holotype female taken from the nasal cavities of the snowy-breasted hummingbird, *Amazilia edward* (Delattre & Bourcier), Cerro Punta, Chiriqui, Panama.

Our specimens (4 females) were found in the nasal cavities of the magnificent hummingbird, *Eugenes fulgens,* Cerro Punta, Panama, 14.III.1968 (Host n° 413.68) (Coll. P.K.).

Rhinoseius richardsoni Hunter, 1972

Dr. P. Kirmse sent us a small collection of flower mites taken in Panama. We recognized *Rh. richardsoni* in this collection and a new species which is described below.

Those of *Rh. richardsoni* were collected from two new host species:

Campylopterus hemileucurus (violet sabrewing), Cerro Punta, Panama, 25.IX.1967 (Host n° WP 364-67) (Coll. P.K.) 9 females, 3 males, 1 nymph; 20.XI.1967 (Host n° WP 16-67) (Coll. P.K.) 8 females, 2 males.

Lampornis castaneoventris (variable mountaingem). Cerro Punta, Panama, 3.XI.1968 (Host n° 411.68) 3 females; 13.III.1968 (Host n° WP 412.68) 1 female (Coll. P.K.).

Rhinoseius panamensis Fain, Hyland and Aitken, 1977

This species is known only from the holotype male. It is distinguished from *Rh. richardsoni* Hunter by the following characters:

1. The setae *j 1* to *j 6* are much longer: *j 1, j 2* are 45 μ long; *j 3* to *j 6* are 30-33 μ long. In *Rh. richardsoni* the *j 1* and *j 2* are 27 μ long; *j 3* to *j 6* are 15 μ long.
2. The setae *s 1* to *s 5* are subequal (45-55 μ). In *Rh. richardsoni* the *s 1* is much shorter (10 μ) than *s 5*(50 μ).
3. The *Z 5* are much thicher (9 μ thick) and with a spiral pattern.
4. Most of the postero-ventral setae are longer and sinuous.

Male (fig. 118-121): Idiosoma of holotype is 510 μ long, 340 μ maximum width. *Dorsum:* most of dorsal setae are longer than in *Rh. richardsoni.* The *s* and *r* setae are distinctly longer than the *j 3* to *j 6*. The four very heavy paramedian spines on posterior third of dorsum represent probably the *J 1* and *J 2* setae. The *J 3* and *J 4* are replaced by small pores. *Z 5* very strong and with a spiral pattern. The peritremes are short and do not extend to the level of *s 2*. *Venter:* sternal plate with well-developed network. Ventrianal plate very broad bearing 6-8 pairs of ventral setae and the 3 anal setae. Gnathosoma: deutosternum with 6 narrow rows of small denticles Spermatodactyl 93 μ long. Legs: ventral surface of coxa I with an external row of denticles and an internal row arranged in a triangle. Other characters as in *Rh. richardsoni.*

Female: unknown.

Host and locality

Holotype in nasal cavities of *Campylopterus hemileucurus,* Cerro Punta, Prov. Chiriqui, Panama, 25.IX.1967 (Host n° WP 364-67) (Coll. P.K.).

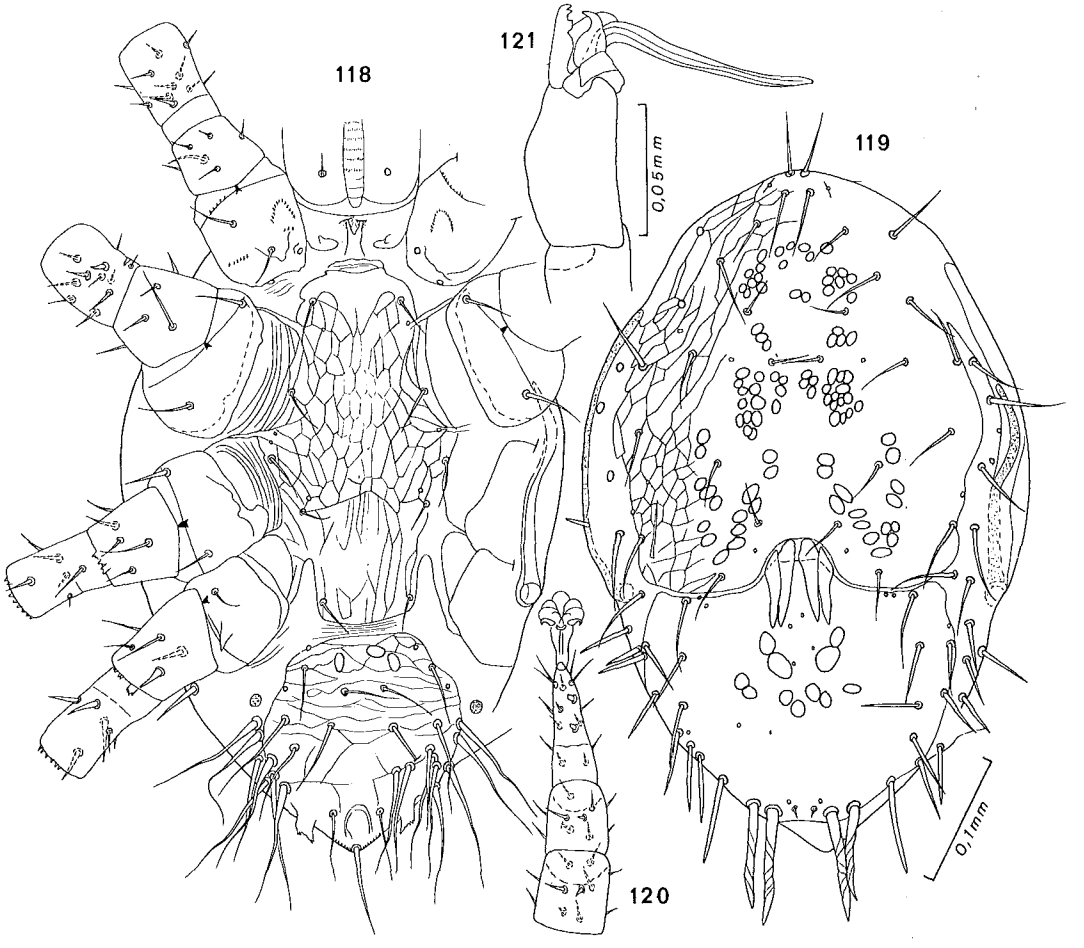

Fig. 118 - 121 — *Rhinoseius panamensis* Fain et al. Holotype male.
Fig. 118-119 - Ventral and dorsal view.
Fig. 120 - Tarsus, tibia and genu II.
Fig. 121 - Spermatodactyl.

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RESUME

Les auteurs étudient une collection d'acariens de la famille Ascidae récoltée dans les fosses nasales de Colibris (Trochilidae), de Trinidad, Brésil, Panama et Venezuela. Cette collection comprend 15 espèces dont 12 sont nouvelles. Ces espèces nouvelles qui ont fait l'objet de diagnoses préliminaires, sont décrites ici en détail. Elles appartiennent aux genres *Rhinoseius, Proctolaelaps* et *Lasioseius*. Les auteurs donnent une clé des espèces néotropicales décrites jusqu'ici.

SUMMARY

A collection of mites of the family Ascidae, taken from the nasal passages of birds mostly Trochilidae (hummingbirds) from Trinidad, Brazil, Panama and Venezuela was studied. Fifteen species were encountered, of which 12 are new. These new species have been briefly described in a preliminary note and are described here in detail. They belong to the genera *Rhinoseius, Proctolaelaps* and *Lasioseius*. A key is given to the known neotropical species.

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