THE GENERIC STATUS AND SIX NEW SPECIES OF *TRICHOCYLLIBA* (ACARI : UROPODINA) [1]

BY Richard J. ELZINGA [2]

SYSTEMATIC TRICHOCYLLIBA

ABSTRACT : The genera *Planodiscus, Circocylliba, Coxequesoma, Antennequesoma,* and *Trichocylliba* are confirmed with the latter including the described species *T. ablesi, T. baloghi, T. castri, T. comata, T. hirticoma, T. kaszabi, T. mahunkai,* and the following new species described *T. chiapensis, T. napoensis, T. praedator, T. schneirlai, T. suctorpoda,* and *T. watkinsi.* A key to the above genera is included as well as a redescription of the genus *Trichocylliba. Panamatrichocylliba panamaensis* is a *Coxequesoma. Circocylliba krantzi* is a junior synonym of *C. ecitonis.*

SYSTEM TRICHOCYLLIBA

ZUSAMMENFASSUNG : Die Gattungen *Planodiscus, Circocylliba, Coxequesoma, Antennequesoma* und *Trichocylliba* werden bestätigt, wobei die letztere die schon beschriebenen Arten *T. ablesi, T. baloghi, T. castri, T. comata, T. hirticoma, T. kaszabi, T. mahunkai,* und die neuen, im folgenden beschriebenen Arten *T. chiapensis, T. napoensis, T. praedator, T. schneirlai, T. suctorpoda,* and *T. watkinsi* enthalt. Ein Schlüssel für die obigen Gattungen sowohl als auch eine Wiederbeschreibung der Gattung *Trichocylliba* ist angeführt. *Panamatrichocylliba panamaensis* ist eine *Coxequesoma. Circocylliba krantzi* ist ein neues Synonym fur *C. ecitonis.*

The genus *Trichocylliba* (Berlese, 1903), as defined by HIRSCHMANN and ZIERNGIEBL-NICOL (1964, 1967, 1969), is known primarily from 22 species of mites found on army ants (Formicidae : Ecitoninae), but 4 species are also known to be soil-dwellers and 2 have been collected from non-doryline ants. The earliest described species, *T. comata* (Berlese, 1893) and *T. hirticoma* (Leonardi, 1895), were originally placed into the genus *Discopoma* but were relocated to the genus *Cyllibano* and subgenus *Thrichochylliba* by BERLESE (1903) with *T. comata* designated as the type species. *Thrichochylliba* was later emended to *Trichocylliba* (reason unknown) by BERLESE in 1917 (NICOL, 1979). *T. comata* is known from European ants in the genera *Campanotus, Myrmica,* and *Lasius* whereas *T. hirticoma* has been collected only from the army ant *Nèivamyrmex nigrescens* (originally *Eciton schmitti*). Both species and the genus *Cyllibano* were classifed as Uropodidae in the tribe Uropodini by BERLESE (1903).

The remaining *Trichocyllib* › species were described as follows. In 1926 SELLNICK described 5 species from doryline ants in Brazil but placed them into 4 new genera, *Planodiscus squamatim, Circocylliba camerata, Coxequesoma collegianorum, Antennequesoma reichenspergeri,* and *Anten-*

1. Contribution No. 78-77-j, Department of Entomology, Kansas Agricultural Experiment Station, Manhattan, Kansas 66506. Supported by Experiment Station Project H033.

2. Kansas State University, Manhattan, Kansas 66506.

nequesoma lujа. SELLNICK indicated the uniqueness of these species by also erecting the tribes Planodiscini for *Planodiscus*, Circocyllibanini for *Circocylliba*, and Coxequesomini for *Coxequesoma* and *Antennequesoma*, but all within the family Uropodidae. VITZTHUM (1943) further separated the species by converting the previous tribes to families, the Planodiscidae, Circocyllibanidae, and Coxequesomidae while *hirticoma* and *comata* remained within Uropodidae. Later TRÄGÅRDH (1944) relocated *comata* and *hirticoma* into Cillibidae in the genus *Cilliba*. BAKER and WHARTON (1952) transferred *hirticoma* and *comata* into the genus *Thrichocylliba* (original spelling) in the same family, Cillibidae, but retained the other SELLNICK, species as 3 separate families as per VITZTHUM.

In 1966 *Planodiscus burchelli* was described by ELZINGA and RETTENMEYER. HIRSCHMANN and ZIRNGIEBL-NICOL (1964, 1967, 1969) considered all the previous species to be in the genus *Trichocylliba* (emended spelling). ELZINGA and RETTENMEYER (1970, 1974) reaffirmed the status quo of the SELLNICK genera, redescribed the genera *Planodiscus* and *Circocylliba*, and named 5 and 7 new species, respectively. HIRSCHMANN (1973 *a, b*), however, indicated his continued preference for the genus *Trichocylliba* and included 4 new species (*baloghi, castri, kaszabi, mahunkai*) from soil and litter in South America and one new species (*ablesi*) from Formicine ants in the eastern United States. HIRSCHMANN (1973 *c*) also proposed a new name, *Trichocylliba elzingai* for the neotype designated for *Planodiscus squamatim* by ELZINGA and RETTENMEYER (1966) after he found the lost *squamatim* type and believed the two to be different species. KRANTZ (1978), citing AINSCOUGH (personal communication), restricted *Trichocylliba* to holarctic myrmecophiles. HIRSCHMANN (1979 *a*), however, used the genus *Trichocylliba* as previously cited, but separated the species into supraspecific " gruppen " : *comata*-guppe (*comata, baloghi*) ; *camerata*-gruppe (*crinita, krantzi, weberi, oligochaeta, ecitonis, ecuadorensis, brachychaeta, camerata, minuta*) ; *squamatim*-gruppe (*squamatim, foreli, hamata, burchelli, elzingai, elongata, cupiens, setosa*) ; *hirticoma*-gruppe (*hiticoma, castri, kaszabi, mahunkai*) ; *reichenspergeri*-gruppe (*reichenspergeri, lujai*) ; *collegianorum*-gruppe (*collegianorum*) ; and *panamaensis*-gruppe (*panamaensis*). These " gruppen " were then given generic status by HIRSCHMANN (1979 *b*) in his new classification with the *comata*-gruppe becoming *Trichocylliba, hirticoma*-gruppe becoming the new genus *Hirtitrichocylliba, panamaensis*-gruppe becoming the new genus *Panamatrichocylliba, camerata*-gruppe returning to *Circocylliba, squamatim*-gruppe returning to *Planodiscus, reichenspergeri*-gruppe returning to *Antennequesoma*, and the *collegianorum*-gruppe returning to *Coxequesoma* : the former three genera were classified into the new family Trichocyllibidae Hirschmann whereas the subsequent genera were restored to the former families of VITZTHUM (1943).

There remains, however, some uncertainty concerning this latest classification of the entire complex because (1) variation within new species in the possession of this author, (2) questions concerning the status of several species included in HIRSCHMANN's classification, i.e., *Circocylliba krantzi* (Hirschmann) which was described from figures drawn in KRANTZ (1978) and yet the KRANTZ drawings were made from a specimen from a series used to describe *C. ecitonis* Elzinga, (3) the inadequate description of *Panamatrichocylliba panamaensis* (Hirschmann), also from a drawing in KRANTZ (1978) which did not include the enlarged dorsum, and (4) the apparent subjective way in which this and past classifications of all researchers were determined.

Methods

A numerical study commenced using 40 species from the above complex and available to the author. All species were studied by both conventional phase microscopy and an ETEC autoscan electron microscope (SEM) at the Kansas State University Scanning Electron Microscope Laboratory, except for the species described by HIRSCHMANN, LEONARDI, and BERLESE ; data for these later species were obtained from original descriptions plus limited observations on *comata* and *hir-*

ticoma made by myself and acarologists, using only phase microscopy, at the Berlese collection and British Museum (Natural History) collection. When using SEM, specimens were first cleaned using an ultrasonic cleaner and detergent, transferred to Nesbitt's solution for final cleaning, washed in distilled water and 70 % ethyl alcohol, and mounted on stubs using silver conducting paint. The specimens then were coated with carbon and gold prior to placing them into the microscope. Compared to many mites, little distortion was observed under the vacuum inside the SEM. Important observations were recorded on film. Finally each specimen was removed from the stub, recleaned, and most were mounted in Hoyer's medium for further comparative observations. When body shapes were aberrant and mounting likely to cause distortion, specimens were left attached to the stub (for future SEM reference) or removed and deposited in alcohol for storage.

Included in the study were 6 new ecitonine-associated species (described later in this manuscript), 8 species of *Planodiscus*, 11 species of *Circocylliba*, 4 species of *Antennequesoma*, 3 species of *Coxequesoma*, one species of *Panamatrichocylliba*, 5 species of *Hirtitrichocylliba*, and 2 species of *Trichocylliba*. These 40 species were subjected to a numerical test along with a North American species of *Uropoda* and an undescribed African uropodid associated with termites, the latter two species to serve as controls. A series of 136 unit characters was developed (at least one species varied in respect to the character) following the general outline of SNEATH & SOKAL (1973), and each was of the two-state type to avoid subjective bias of multistate analysis. If the character was present, it was coded 1. If it was absent, it was coded 0. A no comparison situation (where structure was unobservable or biological data unknown) was recorded 3. Characters were derived from phase microscopy, SEM, biological data obtained from field and laboratory observations, and species descriptions. A complete list of OTU's is not printed because of space but included were such representative items as body shape, degree of reticulation, size, number and specialization of various setae, sclerite development and separation, chaetotaxy of legs and sclerites, cheliceral and other gnathosomal modifications, hold fast mechanism, phoretic associations with hosts including specificity and position of attachment, etc. These data were then punched onto cards and fed into an IBM S360/50 computer programmed to produce both simple matching coefficients and a rotated factor matrix for significance and character groupings. The simple matching coefficients subsequently were clustered into a phenogram.

The results of the numerical study are summarized in Figure 1. The tests indicate that statistically significant groupings exist and these coincide with the SELLNICK genera *Planodiscus, Circocylliba, Coxequesoma*, and *Antennequesoma* plus a group of miscellaneous species including the 6 new ecitonine-associated species. *Panamatrichocylliba panamaensis* is closely correlated with *Coxequesoma* and should be considered within the latter genus. *H. Hirticoma* and *T. comata* are more similar to one another than to other species and should be included in the same genus. The nonecitonine-associated species described by HIRSCHMANN (1973) did not fit into any of the SELLNICK genera but were closely related with one another ; lack of data (specimens were unavailable) and their apparent lack of phoresy and associations with ants are assumed to be critical here, and their placement is probably with the previously mentioned new species of *Trichocylliba* and *hirticoma* and *comata* (locating the nymphs of all these species may be necessary to verify this placement). The control species amplify the significant separation of most of HIRSCHMANN's " gruppen " and justify the generic, and probably the familial as per HIRSCHMANN, except as indicated previously, ranking of *Planodiscus, Circocylliba, Coxequesoma, Antennequesoma*, and *Trichocylliba*.

It is concluded that *Trichocylliba* include the following species : *hirticoma, comata, ablesi, baloghi, castri, kaszabi, mahunkai*, the new species described later within this publication, and that *T. comata* remain the type species. Generic descriptions for *Planodiscus* and *Circocylliba* have

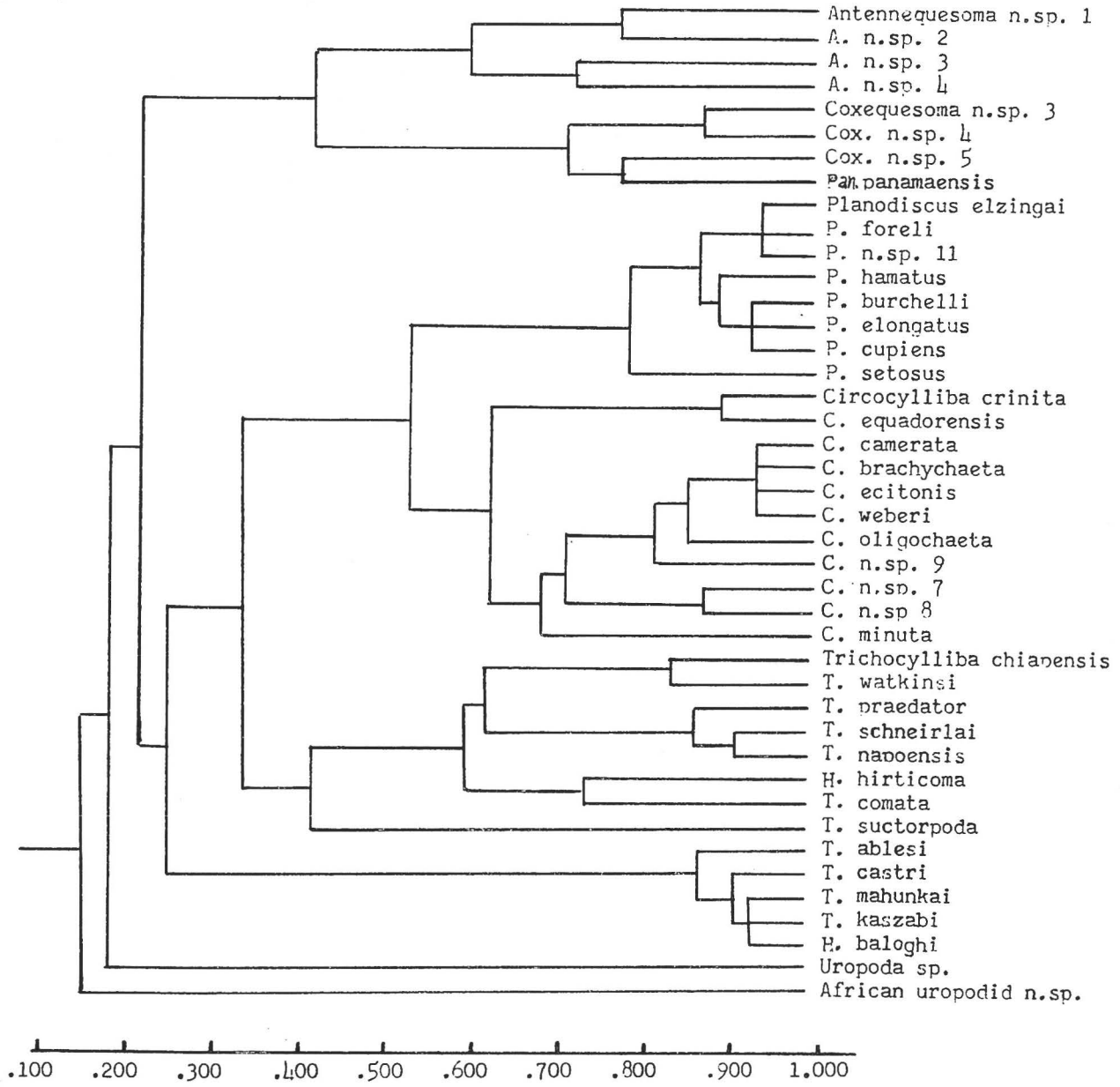


FIG. 1. Phenogram of the genera and 40 species of *Planodicus, Trichocylliba, Coxequesoma*, and *Antennequesoma*.

been published previously (ELZINGA & RETTENMEYER, 1966, 1975) while *Trichocylliba* will be redescribed within this article. The remaining two genera will be redescribed in subsequent manuscripts.

A key to the above genera will now be presented followed by the descriptions. Types of the new species have been deposited in the following collections indicated by these abbreviations : USNM, United States National Museum ; BM, British Museum (Natural History) ; KU, Snow Entomological Museum, University of Kansas, Lawrence ; RJE, Richard J. ELZINGA ; and CWR, Carl W. RETTENMEYER.

KEY TO GENERA OF THE *Trichocylliba* COMPLEX

1. Ventri-anal region not subdivided into separate plates ; metapodal line incomplete to margin ; mushroom setae (when present) usually in single row.. *Trichocylliba*

   Ventri-anal region partly or completely subdivided into separate plates ; metapodal division complete ; mushroom setae in 2 or 3 rows..... 2

2. Lateral plates fused at least narrowly to ventri-anal shield 3

   Lateral plates completely separated from other plates 5

3. Dorsum not enlarged over edge of venter to form holdfast cavity ; body usually circular when viewed dorsally..... *Trichocylliba*

   Dorsum greatly enlarged over venter to form deep cavity and holdfast with teeth or ridges present ; body longer than broad..... 4

4. Lateral plates joined or touching broadly over entire length of ventri-anal shield ; holdfast mechanism of ridged cuticular type (Elzinga, 1978)..... *Antennequesoma*

   Lateral plates usually joined narrowly to posterior anal section of a divided ventri-anal shield ; holdfast mechanism of toothed cuticular type (Elzinga, 1978) ..... *Coxequesoma*

5. Anal plate fused to ventral plate ; body usually much longer than broad..... *Planodiscus*

   Anal plate separated from ventral plate ; body rounded..... *Circocylliba*

TRICHOCYLLIBA BERLESE 1903

Cream to light brown in color, sclerotization usually light ; length 500 to 1100 μ ; nearly round from dorsal view ; dorsum with punctation absent to moderate ; venter distinctly smaller than dorsum and lacking punctation or reticulation.

■ *Female*

Dorsum : usually low to rarely highly convex, covered by one dorsal shield except for a narrow, crescent-shaped posterior area ; anterior margin never prolonged as in many *Planodiscus* ; lateral margins usually smooth but may be notched ; large setae fairly uniformly distributed, barb if present far removed from tip ; 0 to 2 unpaired medial setae near anterior margin ; 2 rows of small unforked setae, one outer marginal and one inner submarginal row of longer setae ; submarginal setae may become enlarged and fuse with dorsum to form distinct ridges radiating toward meson ; anterior row with 0 to 5 and posterior row of 8 fringed " mushroom setae ", 3 to 9 μ wide at widest point.

Venter : concave, recessed from margins of dorsum ; tritosternum lacking a basal fusion of the medial branches of the lacinia as in *Planodisçus* and *Circocylliba* (ELZINGA and RETTENMEYER, 1975, Fig. 18) ; sternal shield separate or fused with ventral plate with pronounced indentations adjacent coxae II to IV ; genital shield often with blunt hyaline edge at anterior margin ; metapodal plate triangular, sometimes indistinct but always with at least a metapodal line separating ventral plate, from metapodal plate, carina at margin of metapodal plate moderately to poorly developed ; ventral and anal plates fused ; lateral plates fused at least narrowly to anals, may be fused with ventrals ; lateral plate setae may be set in uniquely sclerotized setal sockets (many micropores open into socket).

Legs : leg I 6-segmented, legs II to IV 7-segmented (not including pretarsus but including a basitarsus) ;coxae I contiguous, at least twice as long as broad, much longer than coxae II to IV, bearing one group of glandular pores medially and usually one group dorsally, covering an inconspicuous tritosternum ; tarsus I lacking claws, with about 18-21 setae at tip including several rodlike sensory setae ; femora II to IV with hyaline flanges usually reduced ; legs II to IV fold into foveolae pedales ; leg IV chaetotaxy 2 : 5 : 7 : 7 : 7 + tarsus.

Gnathosoma : attached to bases of coxae I and capable of retraction into camerostome ; chelicerae 3-segmented, no sexual dimorphism ; palpal tibia and tarsus fused, bearing a 2-tined claw and 18 to 20 setae ; palpal trochanter with plumose seta reduced (Figs. 29-31) ; tectal lacinia branched (Figs. 32, 33) ; corniculi rounded or pointed at tip (Figs. 37, 38) ; labrum-epipharynx distinctly rounded at tip and velvety.

■ *Male*

Fusion of sternal and endopodal plates complete ; 5 pairs of setae and 4 pairs of pores on sternal shield ; male genital plate with hyaline flange along posterior and posterolateral margins.

■ *Type species*

Trichocylliba comata Leonardi (1898) by designation of BERLESE (1903).

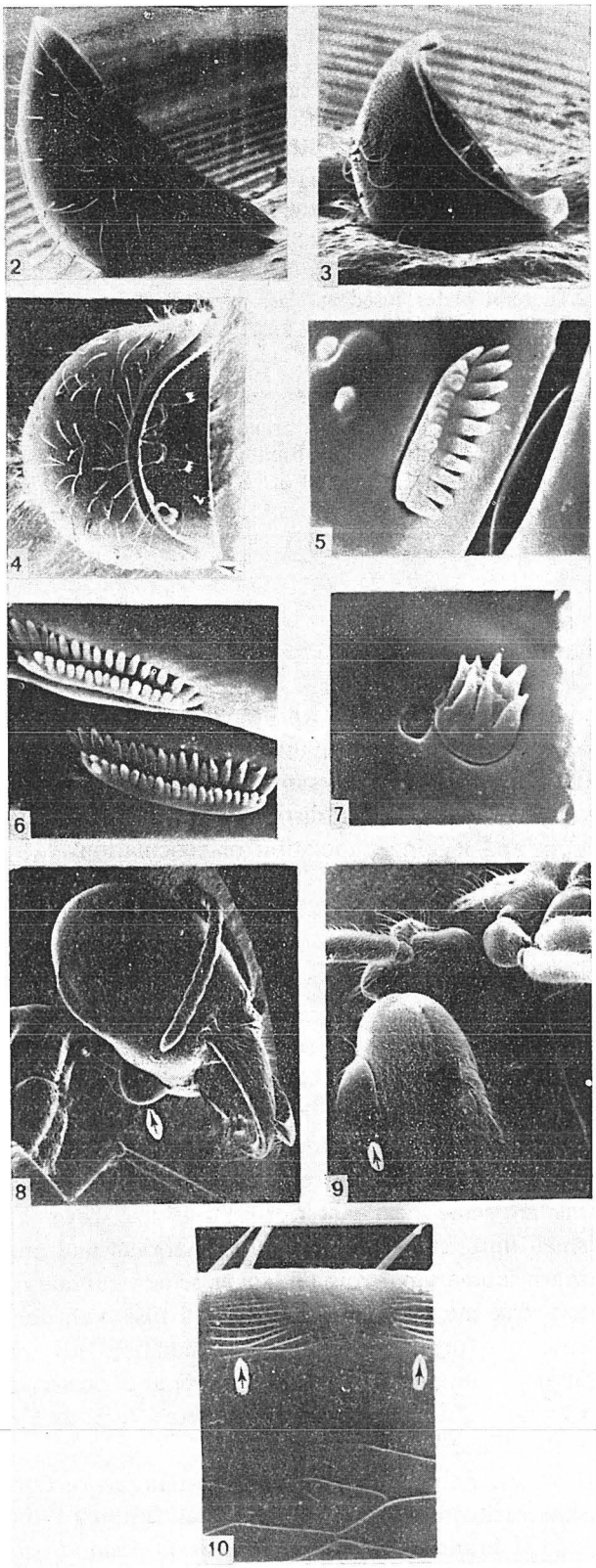
Trichocylliba chiapensis n. sp.

Body round from dorsal view ; punctation on dorsum irregular, weak at meson to strong toward edges (Fig. 3) ; venter sclerotization moderate and sclerites not sharply defined, lacking punctation.

■ *Female*

Body 950-1 000 μ long ; other measurements in Table I.

Dorsum (Fig. 17) : moderately convex ; margin progressively more deeply notched toward posterior ; dorsal shield weakly sclerotized between marginal and submarginal setae ; 140 paired and 2 anterior unpaired large setae of moderate length, evenly dispersed, flattened, lacking apical notch (Fig. 17) ; no greatly elongated setae ; 2 rows of



FIGS. 2-10 : 2. — *Trichocylliba schneirlai*, anterior view. 3. — *T. chiapensis*, posterior view. 4. — *T. suctorpoda*, posterior view. 5. — *T. schneirlai* " mushroom " seta. 6. — *T. praedator* " mushroom " setae. 7. — *T. suctorpoda* " mushroom " seta. 8. — *T. praedator* beneath head of *Labidus praedator* worker. 9. — *T. praedator* on dorsum of abdomen of *L. praedator* worker. 10. — *T. suctorpoda*, small ridged areas near body margin.

mushroom-shaped setae, anterior row of 4, along medial posterior margin of dorsum, posterior row of 8 on separate narrow plate ; mushroom setae with less than 14 teeth ; 28 small setae in inner submarginal row and 68 to 70 shorter marginal setae ; setal pore canals leading medially from marginal and submarginal setae ; 11 pairs of dorsal glandular pores.

Venter (Fig. 11) : lateral lacinia of tritosternum medially branched (Fig. 35) ; sternal, ventral, and anal plates fused, with widest distance behind level of legs IV ; shape of genital plate an elongated pentagon, twice as long as wide ; 4 pairs of short sternal setae and 2 pairs pores between legs II-IV ; 1 pair ventral setae of moderate length at posterior border of legs IV, 1 pair long setae at widest part of ventral plate, distant from margin, and 1 pair short setae (often broken off) near fusion of ventral and anal plates ; 1 pair long setae anterior to anus at distance equal to their length ; 1 pair of lyriform pores near margin of ventral plate ; lateral plates reduced and narrowly fused to anal plate, containing 3 lyriform pores and usually 4 setae (rarely 5 or with one seta displaced to membrane adjacent plate) ; metapodal plate triangular, well separated from ventral plate ; peritreme anterior to spiracle shorter than posterior length.

Legs : femurs II-IV with poorly developed flange.

Gnathosoma : chelicerae rounded to point at tip of fixed digit, roll plate present, slender distal sensory seta of fixed digit present and pointed, distal sensory body of fixed digit not oval and with terminal tooth ; corniculi rounded ; distal hypostomal setae with 12 barbs, 2nd with 2 barbs, 3rd with 4 barbs ; gnathosomal setae with 2 to 5 barbs ; deuterosternal teeth in 2 parallel linear rows ; tectum as illustrated (Fig. 33) ; large trochanteral setae as illustrated (Fig. 29).

■ *Male*

Body similar to female but slightly smaller, 985 μ ; other measurements as in Table I ; genital plate with hyaline posterior flange as illustrated (Fig. 24).

■ *Types*

Holotype female with following data ; Mexico : Eastern Chiapas, Lacandone Forest near Jetja River, 750 meters, 10.III.1945, T. C. SCHNEIRLA, Host : *Eciton hamatum* physogastric ♀, C.W.R. slide No. 4477. Allotype male with same data except RE slide No. 157. Holotype and allotype deposited in USNM. Paratypes from the same locality and host are deposited in the following collections : RJE (1 ♀, 1 ♂) and CWR (1 ♀, 1 ♂).

■ *Localities and Hosts*

This species only is known from the type locality and host.

Trichocylliba watkinsi n. sp.

■ *Female*

Body 882 μ long ; other measurements in Table I. Agrees with the description of *T. chiapensis* except as follows :

Dorsum (Fig. 18) : low convex arching ; punctation absent at meson to weak at edges ; 92-94 paired and 2 anterior unpaired large setae, 80 to 82 of moderate length, evenly dispersed, flattened, lacking apical notch (Fig. 18), 12 greatly elongated setae, not notched, located in the posterior third region ; 25 short submarginal and 67 shorter marginal setae.

Venter (Fig. 12) : genital plate bullet-shaped, 1.5 × as long as wide ; 2nd pair of ventral plate setae long (one may be absent), marginally near level of 3rd medial pair ; anal plate rectangular in shape ; 1 pair long setae immediately anterior to anus, extending posterior of anus ; lateral plates irregular in shape, narrowly joined to completely separated from anal plate, usually with 2 or 3 setae and 1 to 2 pores.

Gnathosoma : cheliceral tip similar to *T. chiapensis* and as illustrated (Fig. 28) ; corniculi similar to Fig. 37 ; distal hypostomal seta with 1 to 4 large barbs, 3rd hypostomal seta with 1 barb, 2nd hypostomal and gnathosomal setae lacking barbs.

■ *Male*

Body similar to female but smaller, 840 μ ; other measurements as in Table I.

■ *Types*

Holotype female in alcohol with the following data ; Texas : Bell Co., Killeen, Bowmer Ranch, 19.IV.1970, J. F. WATKINS II, Host : *Neivamyrmex opacithorax*. Allotype male with same data except RE slide No. 955. Paratypes from the same locality and host are deposited in the following collection : RJE (1 ♂).

■ *Localities and Hosts*

This species has also been collected from Texas : McLennan Co., Waco, 11.IV.1968, J. F. WATKINS II, Host : *Neivamyrmex nigrescens* (1 ♀, 1 ♂).

Trichocylliba praedator n. sp.

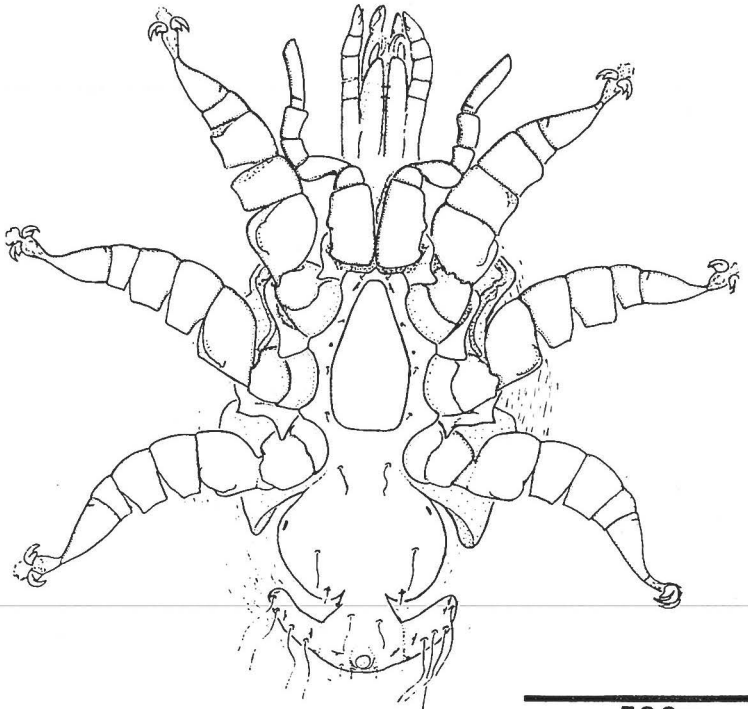
■ *Female*

Body 688-704 μ long ; other measurements in Table I. Agrees with the description of *T. chiapensis* except as follows :

Dorsum (Figs. 8, 9, 19) ; punctation minute laterally to absent at meson ; lateral notching absent ; 162 paired large setae, 144 of short, flattened, with distal barb far removed from apex (Fig. 19), unpaired setae lacking ; 16 greatly elongated setae, lacking a barb, not restricted to posterior third of dorsum ; each mushroom-shaped seta with more than 30 teeth (Fig. 6) ; 32 to 34 submarginal and 70 to 74 longer and much thicker marginal setae ; 12 to 13 pairs of lyriform pores.

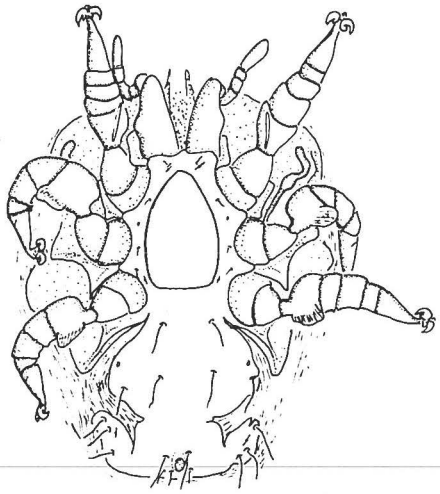
Venter (Fig. 14) : tritosternal shape as in Fig. 34 ; genital plate bullet-shaped, about 1.6 × as long as wide ; sternal and ventral plates not fused ; ventral plate poorly fused to an anal-lateral plate, 1st pair ventral setae short, in sclerotized pore sockets ; 2nd and 3rd pairs of ventral setae long, in slightly curved horizontal row ; 4 pairs of lateral setae in sclerotized sockets, one pair antero-medially displaced toward anus ; 1 pair short setae anterior to anus at poorly sclerotized region ; 5 pairs of lyriform pores in anal-lateral plate.

Gnathosoma : cheliceral distal sensory seta short, stubby ; distal sensory of chelicera curved

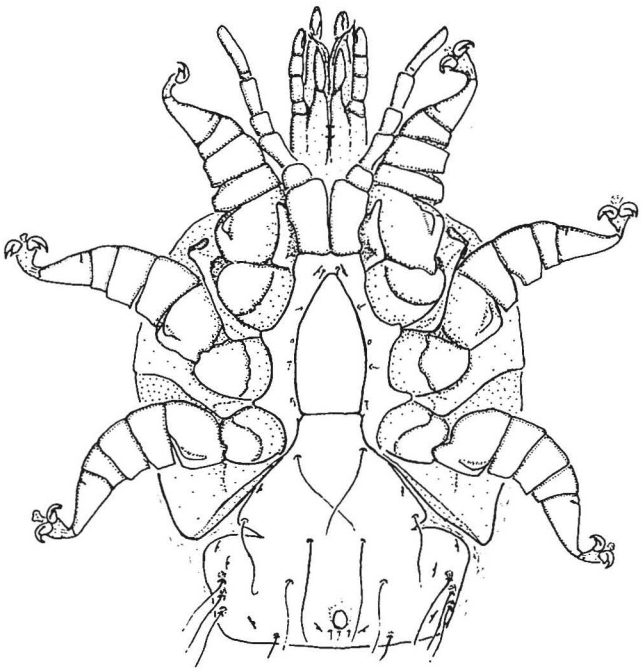


11 chiapensis

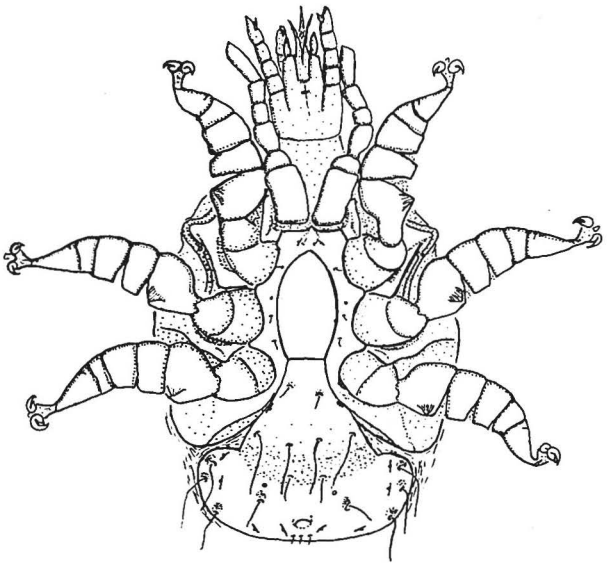
500μ



12 watkinsi

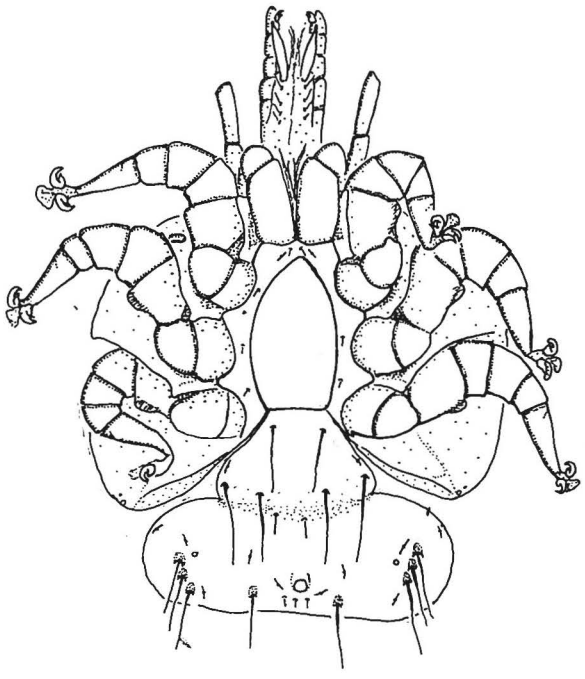


13 schneirlai

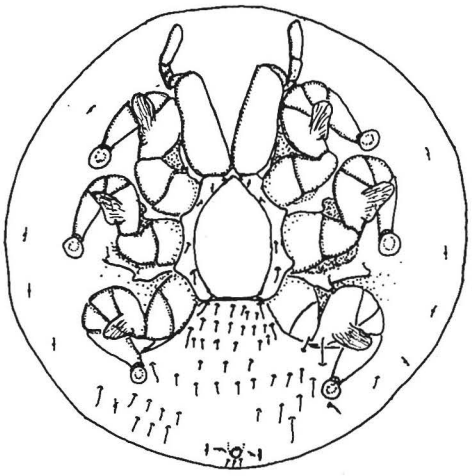


14 praedator

500μ



15 napoensis



16 suctorpoda

FIGS. 11-16 : Venters of female of 6 species of *Trichocylliba*.
Drawn to scale shown above FIG. 16.

into hook-shape ventrally (Fig. 27) ; corniculi with long thin points ; distal hypostomal setae 2 to 4 barbed, 2nd with 2 barbs, 3rd with 6 to 9 barbs ; gnathosomal setae with 7 to 8 barbs ; tectum similar to that of *T. schneirlai* ; large trochanteral seta of palp as illustrated (Fig. 30).

■ *Male*

Body similar to female but slightly smaller 640-656 μ ; other measurements in Table I.

■ *Types*

Holotype female with the following data ; Panama Canal Zone : Barro Colorado Island, 15.IV.1956, C. W. & M. E. RETTENMEYER, Host : *Labidus praedator*, colony E-146, C.W.R. slide No. 2596. Allotype male with the same data except C.W.R. slide No. 1024. Both deposited in USNM. Paratypes collected from the same locality and host species are deposited in the following collections : KU (♀, 1 ♂), BM (♀, 1 ♂), and RJE and CWR (2 ♀, 2 ♂).

■ *Localities and Hosts*

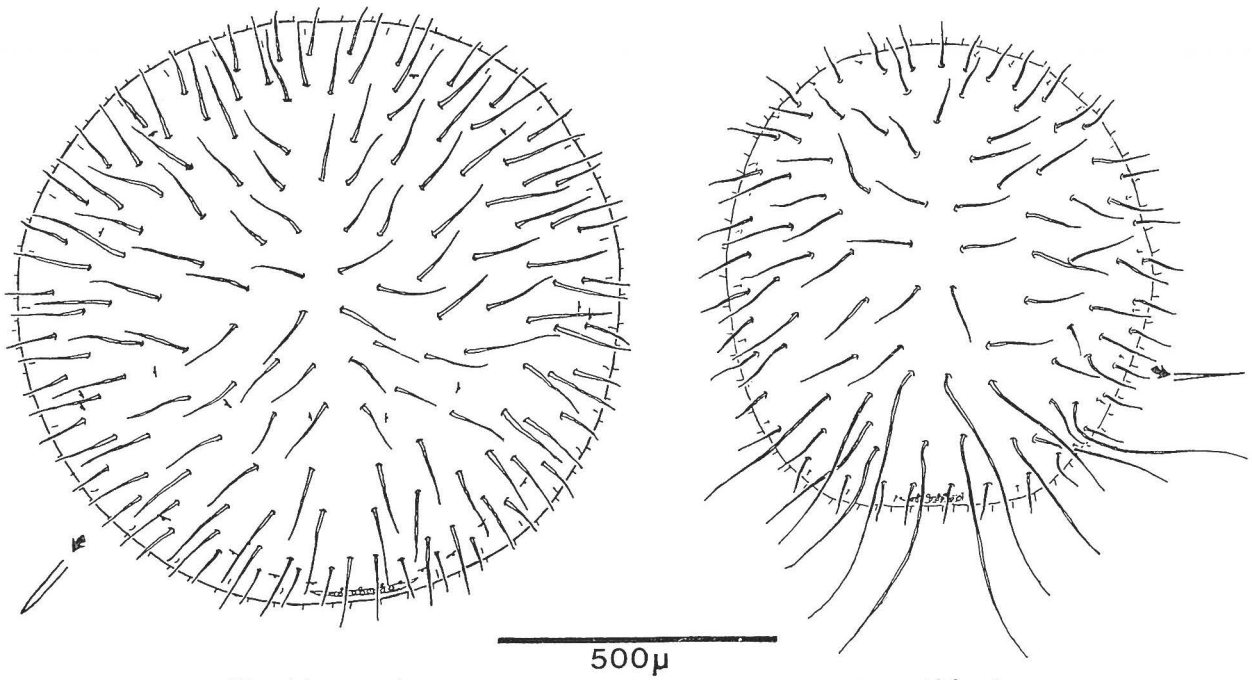
This species has been collected by C. W. & M. E. RETTENMEYER at the type locality and host at the following additional dates : 8.IV.63 (2 ♀) ; 30.V.1956 (3 ♀, 3 ♂) ; 1.VIII.56 (1 ♀, 1 ♂) ; 29.V.1956 (1 ♂) ; 18.V.1956 (1 ♀) ; 22.V.56 (1 ♀) ; 1.VII.1956 (1 ♀). Specimens have also been collected from Costa Rica : Monteverde, 10°29′N, 84°50′W, 1.II.1963, C. W. & M. E. RETTENMEYER, *Labidus praedator (2* ♀) ; Costa Rica : 6 km S. San Vito de Java, 08°42′N, 83°00′N, 23-26.VII.1969, C. W. RETTENMEYER, *L. praedator* (21 ♀, 6 ♂) ; Costa Rica : Cartago, 9°23′N, 83°25′W, 28.VII.1965, G. SMALL and H. REAL, *L. praedator* (6 ♀, 1 ♂) ; and Ecuador : Oriente, 00°24′S, 76°36′W, Limoncocha, 25-26.XI.1967, C. W. & M. E. RETTENMEYER, *L. praedator* (13 ♀, 24 ♂).

Trichocylliba schneirlai n. sp.

■ *Female*

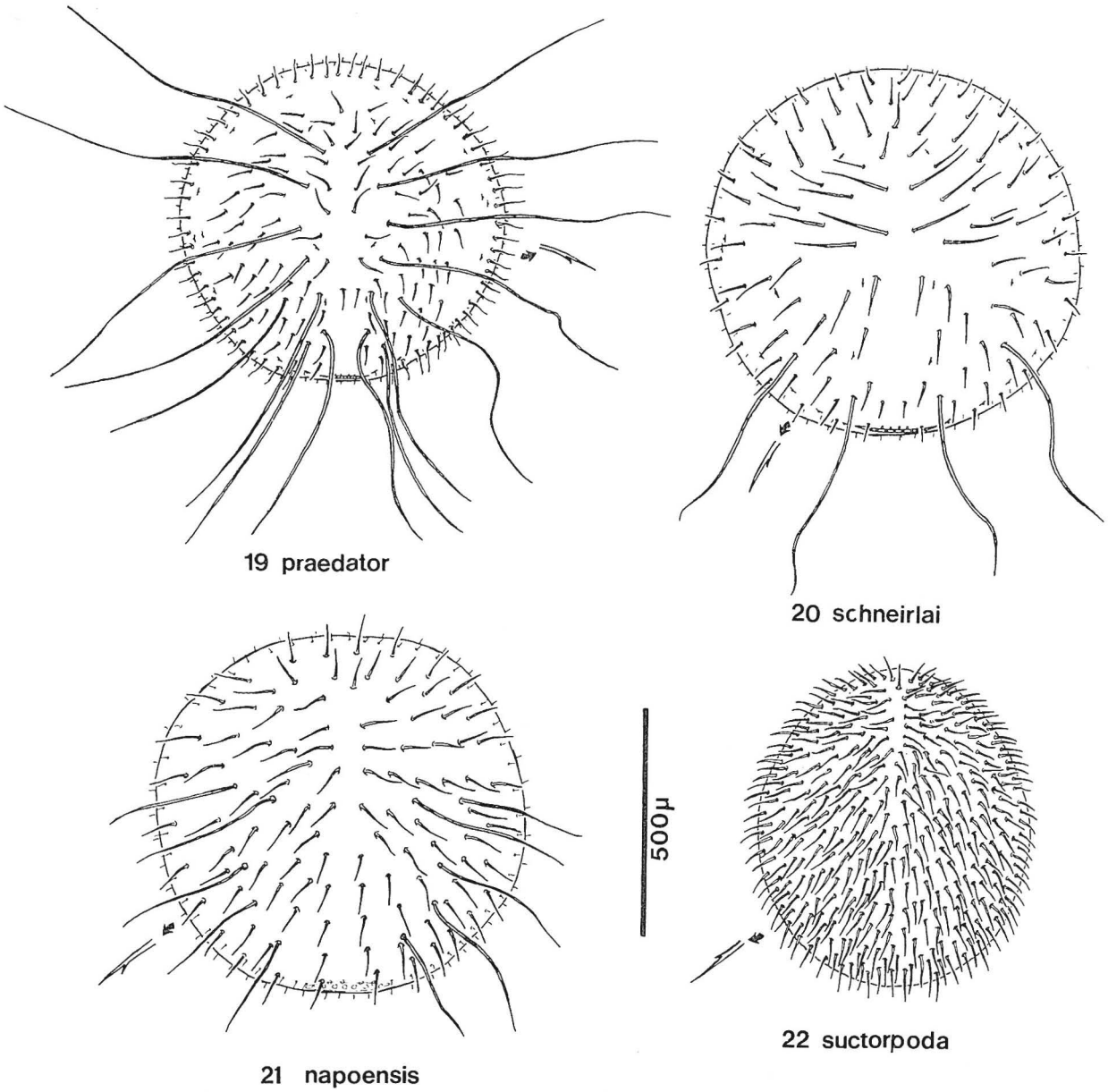
Body 780-820 μ long ; other measurements as in Table I. Agrees with description of *T. chiapensis* except as follows :

Dorsum (Figs. 2, 20) : punctation lacking ; dorsal shield beginning lateral separation at level of



17 chiapensis

18 watkinsi



FIGS. 17-22 : Dorsa of females of 6 species of *Trichocylliba*. Drawn to scale shown beside FIG. 21. Enlarged tips of typical setae shown next to each dorsum. Punctation omitted.

marginal setae ; 108 paired and 2 unpaired large setae, 104 short, flattened, with distal barb far removed from apex (Fig. 20), 4 greatly elongate setae, lacking barb, located posteriorly ; each mushroom-shaped setae with 20 to 30 teeth (Fig. 5) ; lateral notching absent ; 46 to 48 submarginal and 52 to 54 shorter but thicker marginal setae ; 12 to 13 lyriform pores.

Venter (Fig. 13) : tritosternal shape similar to *T. praedator* : genital plate narrowed anteriorly, about twice as long as wide ; sternal and ventral plates not fused ; ventral and anal-lateral plate complex fused ; 1st pair of ventral setae long, not in sclerotized pore sockets, 2nd and 3rd pair long, in slightly curved horizontal line ; 4 pairs lateral setae in sclerotized pore sockets, one pair medially

displaced postero-medially toward anus ; 1 pair long setae extending posteriorly to anus.

Gnathosoma : cheliceral distal sensory seta minute, stubby ; distal sensory body curved into hook-shape ventrally ; corniculi pointed as in Fig. 37 ; distal hypostomal setae 3 to 5 barbs, 2nd 6 barbs, 3rd 5 to 10 barbs ; gnathosomal setae with 3 to 7 barbs ; tectum similar to *T. praedator* ; large trochanteral seta of palp as illustrated (Fig. 31).

■ *Male*

Body similar to female but slightly smaller, 715-800 μ ; other measurements in Table I ; genital plate as illustrated (Fig. 23).

■ *Types*

Holotype female with the following data ; Panama Canal Zone : Barro Colorado Island. 10.VII.1956, C. W. & M. E. RETTENMEYER, Host :*Labidus coecus*, colony E-213, C.W.R. slide No. 2183. Allotype male with the same data except C.W.R. slide No. 2187. Holotype and allotype deposited in USNM. Paratypes collected from the same locality and host species are deposited in the following collections : KU (1 ♀, 1 ♂) ; BM (1 ♀, 1 ♂) ; RJE (1 ♀, 1 ♂) and CWR (1 ♀, 1 ♂).

■ *Locality and Hosts*

This species has been collected on the type host and in the type locality by the same collectors on these additional dates : 18.v.1956 (3 ♀, 5 ♂) and 1.VII.1956 (3 ♀, 2 ♂), and Costa Rica : 6 mi. S, 5 mi. W of Las Cañas, 10°19′N, 84°59′W, 3.III. 1967, C. W. RETTENMEYER, Host : *Labidus coecus*.

Trichocylliba napoensis n. sp.

■ *Female*

Body 815 μ long ; other measurements as in Table I. Agrees with description of *T. chiapensis* except as follows :

Dorsum (Fig. 21) : dorsal shield beginning lateral separation at level of marginal setae ; punctation lacking ; 116 paired and 2 unpaired large setae, 104 short, flattened, with distal barb far removed from apex (Fig. 21), 10 greatly elongate setae, lacking barb, located in the posterior 2/3 of body ; each mushroom-shaped setae with 20 to 30 teeth ; lateral notching absent ; 52 submarginal and 48 shorter but thicker marginal setae ; 20 to 24 lyriform pores.

Venter (Fig. 15) : tritosternal shape similar to *T. praedator* ; genital plate bullet-shaped, about 1.7 × as long as wide ; sternal and ventral plates not fused ; ventral and anal-lateral plate complex not completely fused, lateral plates laterally expanded well beyond lateral setae ; 1st pair ventral setae long, not in sclerotized socket, 2nd and 3rd pairs long ; 4 pairs lateral setae in sclerotized sockets, posterior pair greatly displaced toward anus ; 1 pair of short setae anterior to but not reaching anus, in region of poor sclerotization, separated from anus by about 2 × its length ; 5 pairs of lyriform pores in anal-lateral plate complex.

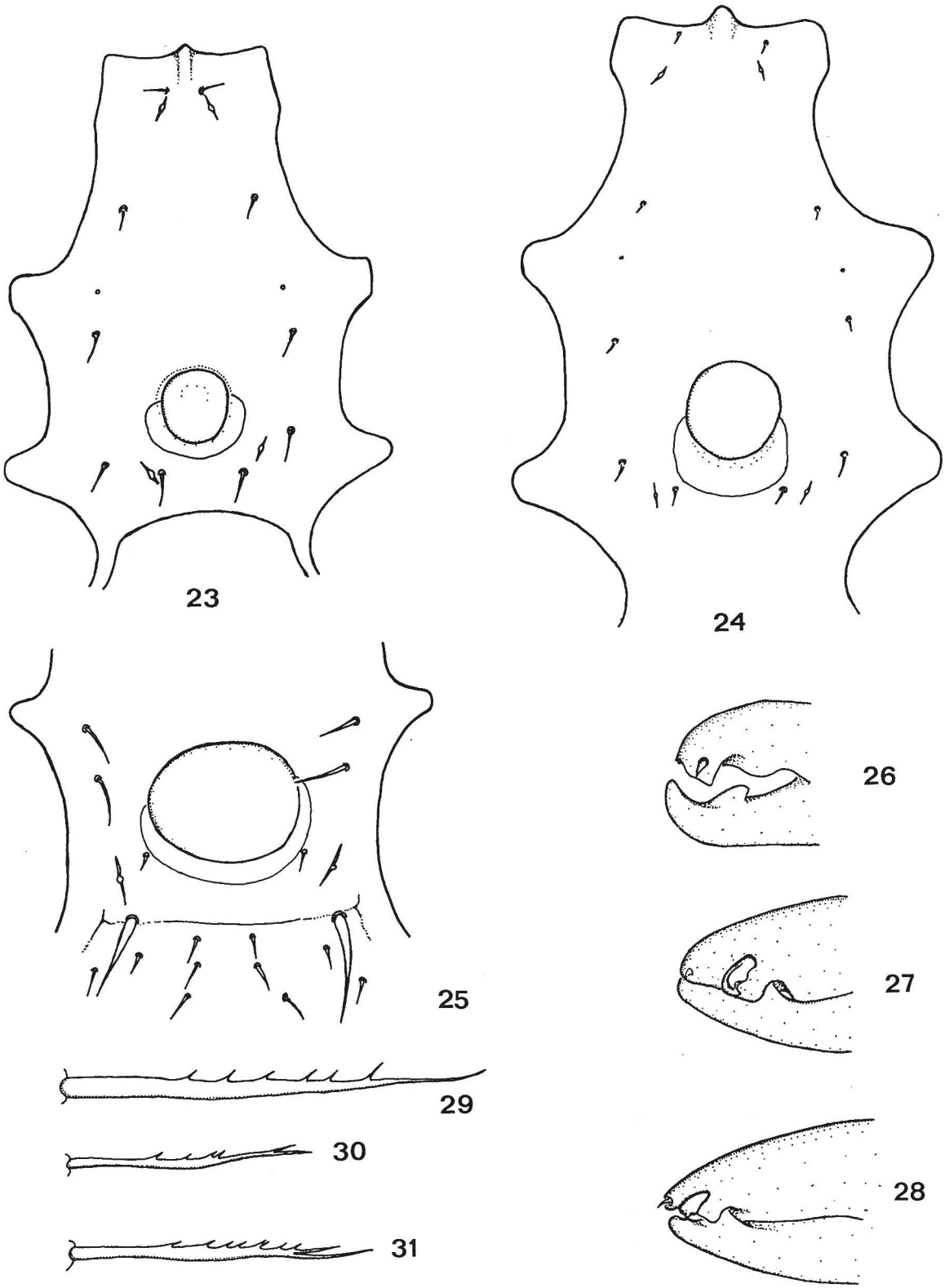
Gnathosoma : cheliceral distal sensory seta minute, stubby ; distal sensory body curved into hook-shape ventrally ; corniculi with long thin points ; distal hypostomal setae long and with 3 barbs, 2nd short and with 1 to 3 barbs, 3rd long and with 10 barbs ; gnathosomal setae with 10 to 12 barbs. Tectum similar to that of *T. praedator*.

■ *Male*

Body similar to female but slightly smaller. 761 μ ; other measurements in Table I.

■ *Types*

Holotype female with the following data : Ecuador : Oriente 00°24′S, 76°36′W, Limoncocha, Host : *Labidus coecus*, colony : E-517, 5.XI. 1967, C. W. & M. E. RETTENMEYER, RE slide No. 864. Allotype male with the same data except RE slide No. 890. Holotype and allotype deposited in USNM.



FIGS. 23-25 : Sternal plates with the medial genital plates of males of 3 species of *Trichocylliba* drawn to scale.
23. — *T. schneirlai*. 24. — *T. chiapensis*. 25. — *T. suctorpoda*.

FIGS. 26-28 : Distal portion of chelicera.
26. — *T. suctorpoda*. 27. — *T. praedator*. 28. — *T. watkinsi*.

FIGS. 29-31 : Large trochanteral seta of palp.
29. — *T. chiapensis*. 30. — *T. praedator*. 31. — *T. schneirlai*.

■ *Localities and Hosts*

This species has been collected only from the type locality and host.

Trichocylliba suctorpoda n. sp.

■ *Female*

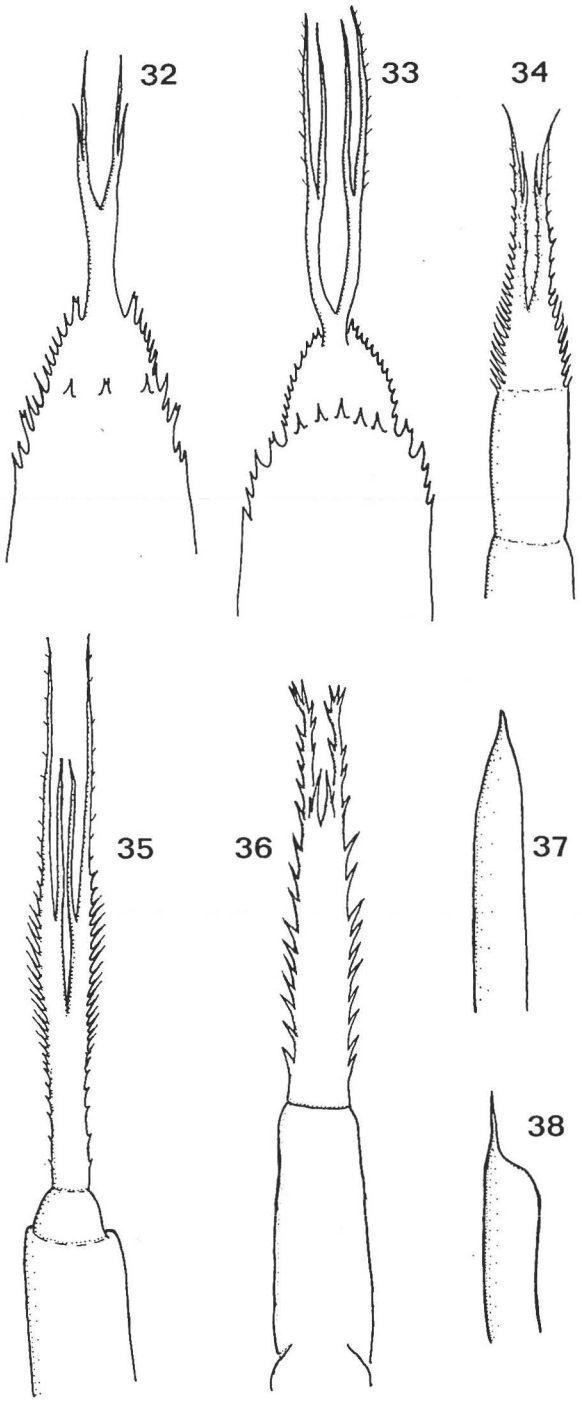
Body 724-762 μ long ; other measurements in Table I. Agrees with description of *T. chiapensis* except as follows :

Dorsum (Figs. 4, 22) : light punctation present over the entire dorsum ; dorsal shield divided laterally by membranous area into dorsal plate and marginal plate permitting telescoping into the dorsum (Fig. 4) ; 334 to 340 paired and 2 anterior unpaired setae, short, ventral row with slight barb far removed from the apex, the remaining setae without notch or barb (Fig. 22) ; no greatly enlarged setae ; single row of 8 mushroom-like setae, each with less than 8 teeth (Fig. 7) ; lateral notching absent ; 78 submarginal setae, 2 × longer at posterior than those anterior ; 84 marginal setae, absent in the extreme anterior ; both submarginal and marginal setae ventral to secondary membranization zone of dorsum ; 9 to 11 pairs of lyriform pores.

Venter (Fig. 16) : medial branches mostly fused adjacent to division of tritosternum into 2 lateral laciniae (Fig. 36) ; zone between sternal and ventral plate may be lightly sclerotized, all other plates well sclerotized and fused as in *T. comata* and *T. hirticoma* ; genital plate nearly bullet-shaped ; 3rd sternal setae displaced posteriorly to near 4th sternals ; 48 to 56 setae in region posterior to genital plate, none in sclerotized sockets ; metapodal plate separated from ventral only medially by fine metapodal line ; sclerotization laterally of exopodals to dorsal shield complete, with small areas near edge with ridges (Fig. 10).

Legs : claws lacking, replaced by suckers ; femora II-IV with highly developed flange ; setae long and large.

Gnathosoma : chelicerae not rounded at tip of fixed digit, fixed digit slightly shorter than mova-



FIGS. 32-38 : 32. — Tectum of *T. schneirlai*. 33. — Tectum of *T. chiapensis*. 34. — Tritosternum of *T. praedator*. 35. — Tritosternum of *T. chiapensis*. 36. — Tritosternum of *T. suctorpoda*. 37. — Corniculus of *T. schneirlai*. 38. — Corniculus of *T. suctorpoda*.

TABLE I. Measurements (in microns) of six new species of *Trichocylliba*.

	T. chiapensis (3 ♀, 2 ♂)		*T. watkinsi* (2 ♀, 3 ♂)		*T. praedator* (12 ♀, 3 ♂)		*T. schneirlai* (10 ♀, 10 ♂)		*T. napoensis* (1 ♀, 1 ♂)		*T. suctorpoda* (9 ♀, 13 ♂)	
	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean
Body length	970-998 ♀	985 ♀	882 ♀	* ♀	688-704 ♀	696 ♀	780-815 ♀	800 ♀	815 ♀	* ♀	724-762 ♀	741 ♀
	955-960 ♂	* ♂	840 ♂	* ♂	640-656 ♂	651 ♂	715-800 ♂	761 ♂	761 ♂	* ♂	705-743 ♂	727 ♂
Length anterior sternal shield to genital plate	25-29 ♀	27 ♀	19 ♀	* ♀	35-47 ♀	42 ♀	21-38 ♀	28 ♀	17 ♀	* ♀	24-38 ♀	32 ♀
	213-220 ♂	* ♂	169-170 ♂	169 ♂	138-145 ♂	140 ♂	170-182 ♂	174 ♂	176 ♂	* ♂	140-155 ♂	149 ♂
Length anterior sternal shield to posterior edge genital plate	288-300 ♀	295 ♀	249-255 ♀	* ♀	213-223 ♀	217 ♀	246-276 ♀	255 ♀	248 ♀	* ♀	198-238 ♀	221 ♀
	290-310 ♂	* ♂	229-243 ♂	235 ♂	210-214 ♂	212 ♂	260-273 ♂	266 ♂	269 ♂	* ♂	190-231 ♂	220 ♂
Length anterior sternal shield to posterior edge anal plate	690-740 ♀	715 ♀	565-581 ♀	* ♀	484-501 ♀	493 ♀	578-628 ♀	599 ♀	595 ♀	* ♀	488-533 ♀	508 ♀
	691-715 ♂	* ♂	538-553 ♂	548 ♂	473-482 ♂	477 ♂	575-598 ♂	588 ♂	586 ♂	* ♂	441-500 ♂	484 ♂
Width of sternal shield anterior to coxae II	123-128 ♀	125 ♀	119-133 ♀	* ♀	101-105 ♀	104 ♀	105-118 ♀	110 ♀	126 ♀	* ♀	86-100 ♀	95 ♀
	110-128 ♂	* ♂	119-121 ♂	* ♂	93-99 ♂	95 ♂	101-109 ♂	106 ♂	124 ♂	* ♂	83-93 ♂	86 ♂
Width of sternal shield between coxae III-IV	255-265 ♀	260 ♀	250-262 ♀	* ♀	160-193 ♀	181 ♀	239-273 ♀	249 ♀	283 ♀	* ♀	178-202 ♀	189 ♀
	243-248 ♂	* ♂	219-229 ♂	224 ♂	148-163 ♂	157 ♂	223-238 ♂	229 ♂	248 ♂	* ♂	167-179 ♂	173 ♂
Length of genital plate	265-270 ♀	268 ♀	230-233 ♀	* ♀	168-178 ♀	174 ♀	215-243 ♀	227 ♀	231 ♀	* ♀	184-200 ♀	193 ♀
	70-73 ♂	* ♂	58-67 ♂	63 ♂	50-55 ♂	52 ♂	51-63 ♂	57 ♂	74 ♂	* ♂	55-67 ♂	62 ♂
Width of genital plate	139-141 ♀	140 ♀	138-141 ♀	* ♀	106-116 ♀	110 ♀	115-125 ♀	119 ♀	131 ♀	* ♀	133-143 ♀	137 ♀
	68-70 ♂	* ♂	58-64 ♂	61 ♂	55-65 ♂	59 ♂	58-63 ♂	64 ♂	107 ♂	* ♂	62-74 ♂	68 ♂
Length of lateral plates	130-155 ♀	141 ♀	90-95 ♀	* ♀	—	—	—	—	—	—	—	—
	135 ♂	* ♂	57-71 ♂	66 ♂	—	—	—	—	—	—	—	—
Width of lateral plates	54-63 ♀	59 ♀	62-70 ♀	* ♀	—	—	—	—	—	—	—	—
	58-60 ♂	* ♂	48-60 ♂	55 ♂	—	—	—	—	—	—	—	—
Posterior edge genital plate to posterior edge anal plate	394-440 ♀	420 ♀	310-332 ♀	* ♀	269-288 ♀	277 ♀	331-363 ♀	344 ♀	347 ♀	* ♀	270-305 ♀	287 ♀
	398-433 ♂	* ♂	309-320 ♂	310 ♂	260-268 ♂	265 ♂	313-333 ♂	321 ♂	317 ♂	* ♂	257-276 ♂	264 ♂
Maximal width across ventral-lateral plate complex	—	—	—	—	328-365 ♀	351 ♀	401-446 ♀	417 ♀	540 ♀	* ♀	—	—
	—	—	—	—	322-329 ♂	325 ♂	393-418 ♂	405 ♂	486 ♂	* ♂	—	—

* No means calculated for fewer than three measurements.

ble (Fig. 26) ; distal sensory body not oval but tooth-like ; corniculi abruptly narrowed and elongated into thin tip (Fig. 38) ; distal hypostomal setae 3 to 4 barbs, 2nd with 3 barbs, 3rd with 1 to 3 barbs ; gnathosomal setae 3 to 7 barbed.

■ *Male*

Body similar to female but smaller, 705-743 μ ; genital plate wider than long (Fig. 25) ; other measurements in Table I.

■ *Types*

Holotype female in alcohol with following data ; Ecuador : Oriente 00°24'S, 76°36'W, Limoncocha, Host : *Labidus praedator*, Colony : D-342, 30.IX.64, H. R. HERMANN, Jr. Allotype male with same data. Holotype and allotype deposited in USNM. Paratypes from the same locality and host are deposited in the following collections : BM (2 ♀, 2 ♂) ; KU (1 ♀, 1 ♂) ; RJE (2 ♀, 2 ♂) ; and CWR (2 ♀, 2 ♂). Additional paratypes in alcohol are placed in the BM (2 ♀, 2 ♂) ; OSU (2 ♀, 2 ♂) ; UG (5 ♀, 5 ♂) ; RJE (40 ♀, 40 ♂) ; and CWR (129 ♀, 140 ♂).

■ *Localities and Hosts*

In addition to the type series which includes 185 ♀ and 197 ♂, this species has been collected also in the type locality and on the type host by C. W. and M. E. RETTENMEYER from 6-26.XI. 1967 (17 ♀, 18 ♂) and 15.VI.1970 (2 ♀).

ACKNOWLEDGMENTS

I thank the following for providing data and specimens : C. W. RETTENMEYER (Univ. of Conn.) ; the late T. C. SCHNEIRLA (American Museum Nat. Hist.) ; J. F. WATKINS II (Baylor University) ; F. PEGAZZANO (Staz. Entom. Agraria) ; D. MACFARLANE [British Museum (Nat. Hist.)] ; and H. R. HERMANN, Jr. (Univ. Georgia). I am also grateful to K. E. KEMP (Kans. St. Univ.) for statistical assistance and to E. HORBER for the German abstract.

REFERENCES

BAKER (E. W.) & (B. W.) WHARTON, 1952. — An introduction to acarology. — New York : The Macmillan Co., : 108—113.

BERLESE (A.), 1893. — Acari. Myriopoda et Scorpiones, Acari nuovi : 246.

BERLESE (A.), 1903. — Acari mirmecofili. — Redia **1** : 330-331.

ELZINGA (R.), 1978. — Holdfast mechanisms in certain Uropodine mites (Acarina : Uropodina). — Ann. Entomol. Soc. Amer. **71** (6) : 896-900.

ELZINGA (R. J.) & (C. W.) RETTENMEYER, 1966. — A neotype and new species of *Planodiscus* (Acarina : Uropodina) found on doryline ants. — Acarologia **8** (2) : 191-199.

ELZINGA (R. J.) & (C. W.) RETTENMEYER, 1970. — Five new species of *Planodiscus* (Acarina : Uropodina) found on doryline ants. — Acarologia **12** (1) : 59-70.

ELZINGA (R. J.) & (C. W.) RETTENMEYER, 1975. — Seven new species of *Circocylliba* (Acarina : Uropodina). — Acarologia **16** (4) : 595-611.

HIRSCHMANN (W.), 1979 *a*. — Gangsystematik der Parasitiformes : Bestimmbare Uropodiden — Arten der Erde (ca. 1200 arten), geordnet nach dem Gangsystem Hirschmann 1979 und nach Adulten-gruppen (Stadien, Heimatlander, Synonyma, Literature). — Acarologie **26** : 15-57.

HIRSCHMANN (W.), 1979 *b*. — Stadiensystematik der Parasitiformes : Stadienfamilien und Stadiengattungen der Atrichopygidiina, erstellt im Vergleich zum Gangsystem Hirschmann 1979. — Acarologie **26** : 57-68.

HIRSCHMANN (W.) & (I.) ZIRNGIEBL-NICOL, 1964. — Uropodiden : Das Gangsystem der Familie der Uropodidae (Berlese 1892), Bestimmungstabellen, Kurzdiagnosen, Operculumbestimmungstabellen. — Acarologie **6** : 1-22.

HIRSCHMANN (W.) & (I.) ZIRNGIEBL-NICOL, 1967. — Gangsystematik der Parasitiformes : Die Gattung *Trichocylliba* (Berlese 1903) Hirschmann & Zirngiebl-Nicol nov. comb 1964 (Dinychini, Uropodinae). — Acarologie **10** : 12-13.

HIRSCHMANN (W.) & (I.) ZIRNGIEBL-NICOL, 1969. — Gangsystematik der Parasitiformes : Typus der Gattung *Trichocylliba* (Berlese 1903). — Acarologie **12** : 94-95.

HIRSCHMANN (W.), 1973 *a*. — Gangsystematik der Parasitiformes : Stadien von 4 neuen *Trichocylliba*-arten (Dinychini, Uropodinae). — Acarologie **19** : 121-123.

HIRSCHMANN (W.), 1973 *b*. — Gangsystematik der Parasitiformes : *Trichocylliba ablesi* nov. spec., eine neue interessante Uropodide aus Ameisennestern (Dinychini. Uropodinae). — Acarologie **19** : 123-124.

HIRSCHMANN (W.) 1973 *c*. — Gangsystematik der Parasitiformes : Adulten-Bestimmungstabelle von 19 *Trichocylliba*-arten und Operculum - bestimmungstabelle von 18 *Trichocylliba* - weibchen (Dinychini, Uropodinae). — Acarologie **19** : 124-125.

NICOL (I.), 1979. — Gangsystematik der Parasitiformes : die von 1917 bis 1961 aufgestellten Uropodiden-system und ein kritische Betrachtung der Adultsystem von Berlese, Trägårdh, Vitzthum, Baker & Wharton. — Acarologie **26** : 4-15.

SELLNICK (M.), 1926. — Alguns novas acaros (Uropodidae) myrmecophilos e termitophilos. — Arch. Mus. Rio de Janeiro **26** : 29-56.

SNEATH (P. H. A.) & (R. R.) SOKAL, 1973. — Numerical Taxonomy. — San Francisco : W. H. Freeman & Co., 573 pp.

TRÄGÅRDH (I.), 1944. — Zur Systematik der Uropodiden. — Ent. Tidsk. **65** : 173-186.

VITZTHUM (H. G.), 1943. — Acarina in Bronns' Klassen und Ordungen das Tierreich. — Leipzig : Band 5, Abt. 4, Book **5** : 787-789.

Paru en avril 1982.