

SIX NEW SPECIES OF *TRICHOCYLLIBA* (ACARI : UROPODINA) ASSOCIATED WITH ARMY ANTS ¹

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SYSTEMATICS
TRICHOCYLLIBA
ARMY
ANT MITES

TAXONOMIE
TRICHOCYLLIBA
MILBEN
VON
WANDERAMEISEN

SYSTÉMATIQUE
TRICHOCYLLIBA
ACARIENS DES
FOURMIS COMBATTANTES

ABSTRACT : Six new species of *Trichocylliba* are described from the army ant genus *Labidus* (*agnesae*, *galea*, *neili*), one from *Neivamyrmex* (*gibbata*), one from *Cheliomyrmex* (*morosa*), and one was from *Eciton* refuse deposits (*tumba*). A key to the species of *Trichocylliba* associated with neotropical army ants is presented.

ZUSAMMENFASSUNG : Sechs neue *Trichocylliba*-arten von Wanderameisen der Gattung *Labidus* (*agnesae*, *galea*, *neili*), davon eine von *Neivamyrmex* (*gibbata*), eine von *Cheliomyrmex* (*morosa*), sowie eine aus einer Ablagerung von Überresten aus einem *Eciton*-nest werden beschrieben. Ein Schlüssel zu den mit neotropischen Wanderameisen vergesellschafteten *Trichocylliba*-arten wird dargestellt.

RÉSUMÉ : Six espèces nouvelles de *Trichocylliba* sont décrites ; elles ont été trouvées associées aux fourmis combattantes du genre *Labidus* (*agnesae*, *galea*, *neili*), du genre *Neivamyrmex* (*gibbata*), du genre *Cheliomyrmex*, (*morosa*), et du genre *Eciton*, dans les dépôts de rebuts (*tumba*). Une clé des espèces de *Trichocylliba* associées aux fourmis combattantes néotropicales est présentée.

INTRODUCTION

The mite genus *Trichocylliba* is known primarily from the New World. It consists of free-living species (*castrii*, *baloghi*, *kaszabi*, *mahunkai*) ; non-army ant associates (*ablesi*, *comata*) ; and army ant associates (*chiapensis*, *hirticoma*, *napoensis*, *praedator*, *schneirlai*, *suctoroda*, *watkinsi*). The free-living species were described by HIRSCHMANN (1973), and each possesses a venter with uniform sclerotization. The army ant associates are usually carried as adults on hypogaec hosts and normally have modifications of their ventral sclerotization and dorsal to enhance phoresy. These latter *Trichocylliba* appear to represent the niche equivalent of *Circocylliba* mites which are normally phoretic on

the more advanced and mostly epigaeic *Eciton* army ants.

The taxonomic history of *Trichocylliba* is summarized by ELZINGA (1981), who also postulated the relationships of this genus within the *Trichocylliba*, *Planodiscus*, *Circocylliba*, *Antennequesoma*, and *Coxequesoma* complex. Six new species of *Trichocylliba* have been identified since and are herein described.

Specimens were studied using both phase and scanning electron microscopy. For the former, mites were cleared in Nesbitt's solution, dissected into dorsal and ventral halves, mounted in Hoyer's medium, and ringed with glyptol. Specimens for S.E.M. observations were prepared and subsequently stored as outlined in ELZINGA (1981).

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Trichocylliba gibbata n. sp.

Body nearly round from dorsal view; light colored; punctation on dorsum weak over entire

surface; venter sclerotization moderate, lacking punctation.

FEMALE : Body 519 μ m. long; other measurements in Table I.

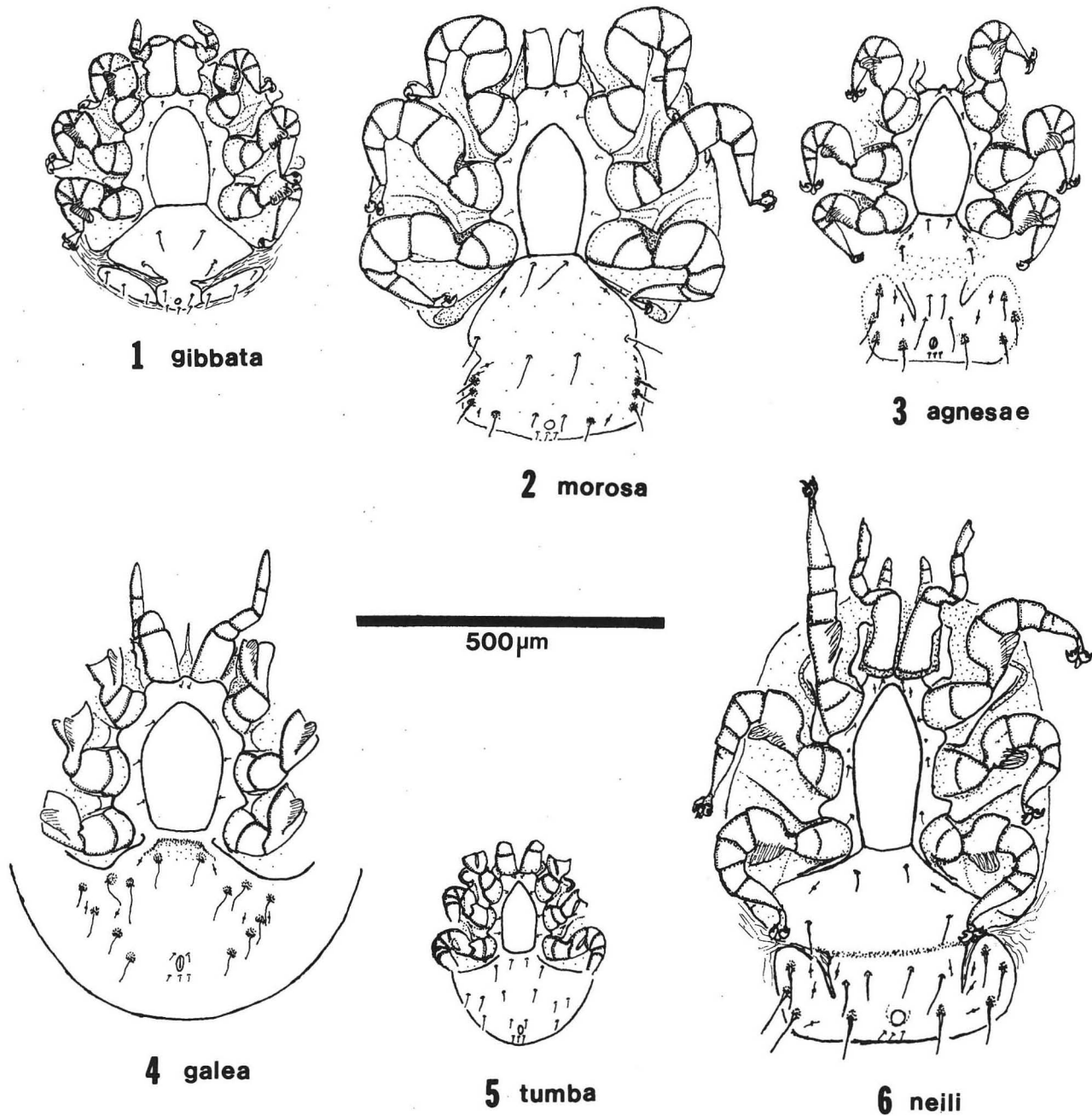
| Characteristic | <i>T. gibbata</i> (1 ♀, 0 ♂) Range | <i>T. morosa</i> (1 ♀, 2 ♂) Range | <i>T. agnesae</i> (3 ♀, 4 ♂) Range | <i>T. galea</i> (4 ♀, 5 ♂) Range | <i>T. tumba</i> (1 ♀, 0 ♂) Range | <i>T. neili</i> (1 ♀, 0 ♂) Range |
|---|--|---|--|--|--|--|
| Body length | 519 ♀ — ♂ | 810 ♀ 685-785 ♂ | 580-634 ♀ 570-600 ♂ | 820-1,100 ♀ 785-940 ♂ | 342 ♀ — ♂ | 700 ♀ * — ♂ |
| Length anterior sternal plate to genital plate | 22 ♀ — ♂ | 29 ♀ 143-163 ♂ | 15-27 ♀ 115-125 ♂ | 30-50 ♀ 172-185 ♂ | 8 ♀ — ♂ | 20 ♀ — ♂ |
| Length anterior sternal plate to posterior edge genital plate | 185 ♀ — ♂ | 239 ♀ 238-248 ♂ | 200-215 ♀ 180-185 ♂ | 230-270 ♀ 265-270 ♂ | 118 ♀ — ♂ | 210 ♀ — ♂ |
| Length anterior sternal plate to posterior edge anal plate | 341 ♀ — ♂ | 486 ♀ 476-543 ♂ | 375-450 ♀ 360-375 ♂ | 480-610 ♀ 500-570 ♂ | 243 ♀ — ♂ | 431 ♀ — ♂ |
| Width sternal plate anterior coxae II | 103 ♀ — ♂ | 143 ♀ 119-125 ♂ | 80-100 ♀ 60-125 ♂ | 100-120 ♀ 110-120 ♂ | 58 ♀ — ♂ | 93 ♀ — ♂ |
| Width sternal plate between coxae III-IV | 200 ♀ — ♂ | 190 ♀ 167-181 ♂ | 150-185 ♀ 120-130 ♂ | 200-210 ♀ 155-215 ♂ | 101 ♀ — ♂ | 170 ♀ — ♂ |
| Length genital plate | 163 ♀ — ♂ | 180 ♀ 58-67 ♂ | 180-190 ♀ 45-50 ♂ | 200-210 ♀ 60-72 ♂ | 110 ♀ — ♂ | 190 ♀ — ♂ |
| Width genital plate | 111 ♀ — ♂ | 114 ♀ 57-59 ♂ | 130-150 ♀ 42-50 ♂ | 132-160 ♀ 60-72 ♂ | 63 ♀ — ♂ | 105 ♀ — ♂ |
| Length lateral plate | 96 ♀ — ♂ | — — | — — | — — | — — | — — |
| Width lateral plates | 22 ♀ — ♂ | — — | 70-80 ♀ 68-76 ♂ | — — | — — | 78 ♀ — |
| Posterior edge genital plate to posterior edge anal plate | 156 ♀ — ♂ | 247 ♀ 238-295 ♂ | 150-240 ♀ 165-190 ♂ | 260-350 ♀ 250-350 ♂ | 125 ♀ — ♂ | 220 ♀ — ♂ |
| Maximal width across ventral-lateral plate complex | 252 ♀ — ♂ | 280 ♀ 250-286 ♂ | 120-130 ♀ 110-130 ♂ | 270-340 ♀ 230-330 ♂ | 211 ♀ — ♂ | 330 ♀ — ♂ |

TABLE 1 : Measurements (in micrometers) of six new species of *Trichocylliba*

Dorsum (Fig. 7) : moderately convex ; marginal notching absent ; dorsal shield uniformly sclerotized over entire surface ; anterior unpaired large dorsal setae absent ; 90-100 large paired dorsal setae of moderate length, evenly distributed, lacking apical notch and barb ; no greatly elongate setae ; 2 rows of mushroom-shaped setae with 10-17 teeth, anterior row of 4 along median posterior margin of dorsal shield, posterior row of 8 on separate narrow

plate ; 32 small setae in inner submarginal row and 48 shorter marginal setae ; setal pore canals leading medially from marginal and submarginal setae poorly developed.

Venter (Fig. 1) : lateral laciniae of tritosternum medially branched ; sternal plate completely separated from ventral plate ; genital plate bullet-shaped, length slightly less than 1.7 width ; ventral plate wider than long, narrowly fused with anal



FIGS. 1-6 : Venters of females of 6 new species of *Trichocylliba*. Drawn to 500 μm scale as indicated.

plate; 3 pairs of moderate length ventral setae, 1 pair anterior to widest part of ventral plate and 2nd pair posterior to this point, 3rd pair on anterior part of anal plate near fusion with ventral plate; lateral plates separate but touching anal plate, each containing 3 setae in normally sclerotized sockets and 1 or 2 lyriform pores; metapodal plates triangular, touching ventral plate.

Legs : femora II-IV each with well-developed flange.

Gnathosoma : chelicerae rounded to point at tip of fixed digit, roll plate present, slender sensory seta of fixed digit present and pointed, distal sensory body of fixed digit not oval, with terminal tooth; corniculi rounded.

MALE : unknown.

TYPES : Holotype female in alcohol with the following data : COSTA RICA : Osa Peninsula, 2.5 miles S.W. Rincon, 08°42' N, 83°29' W ; 4.III.1967 ; Carl W. RETTENMEYER ; Host : *Neivamyrmex gibbatus*, Colony E.-495. Holotype deposited in author's collection.

This species is named for the army ant host.

LOCALITIES AND HOST : *T. gibbata* is known only from the holotype and its locality and host.

Trichocylliba morosa n. sp.

FEMALE : Body 732-800 μ m long ; other measurements in Table I. Agrees with description of *T. gibbata* except as follows.

Dorsum (Fig. 8) : color medium tan ; convexity low to medium ; marginal notching indistinct ; sclerotization of dorsal plate lacking punctation ; 70 large dorsal paired and 2 median anterior unpaired setae of moderate length, barbed (Fig. 9) ; 12 greatly elongate setae, each lacking barb, located over middorsal crest of dorsum ; posterior mushroom-shaped setae with 17-23 teeth ; 58 long submarginal setae, fused to dorsum (Fig. 9) ; 68 marginal setae.

Venter (Fig. 2) : tritosternum as in Fig 10 ; ventral, anal, and lateral plates unseparated ; 3 pairs of moderately long ventral setae and 1 pair shorter setae adjacent to anus ; 4 pairs of moderate length lateral plate setae, each in special porose socket ; 3 pairs of lyriiform pores in each lateral plate region ; metapodal plate triangular, well separated from ventral plate.

Legs : femora II-IV each with weakly developed flange.

Gnathosoma (Fig. 10) : similar to *T. schneirlai* (ELZINGA, 1981) ; corniculi with short pointed apices ; large palpal trochanteral seta present.

MALE : Body similar to female but slightly smaller ; other measurements in Table I. Sternal and ventral plates separated.

TYPES : Holotype female with following data : MEXICO : Veracruz, 2 mi. S. Huatusco on Fortin

Road ; 3.VII. 1965 ; Cornell Univ. Mexico Field Party ; Host : *Cheliomyrmex morosus*, Colony D-304 ; RJE Slide No. 1,441. Allotype male with same data except in alcohol. Holotype and allotype deposited in the U.S. Natl. Museum. Paratype in alcohol from same locality and host and deposited in author's collection.

This species is named for the army ant host.

LOCALITIES AND HOSTS : *T. morosa* is known only from the type locality and host.

Trichocylliba agnesae n. sp.

FEMALE : Body oval from dorsal view, 580-634 μ m. long ; other measurements in Table I. Agrees with the description of *T. gibbata* except as follows.

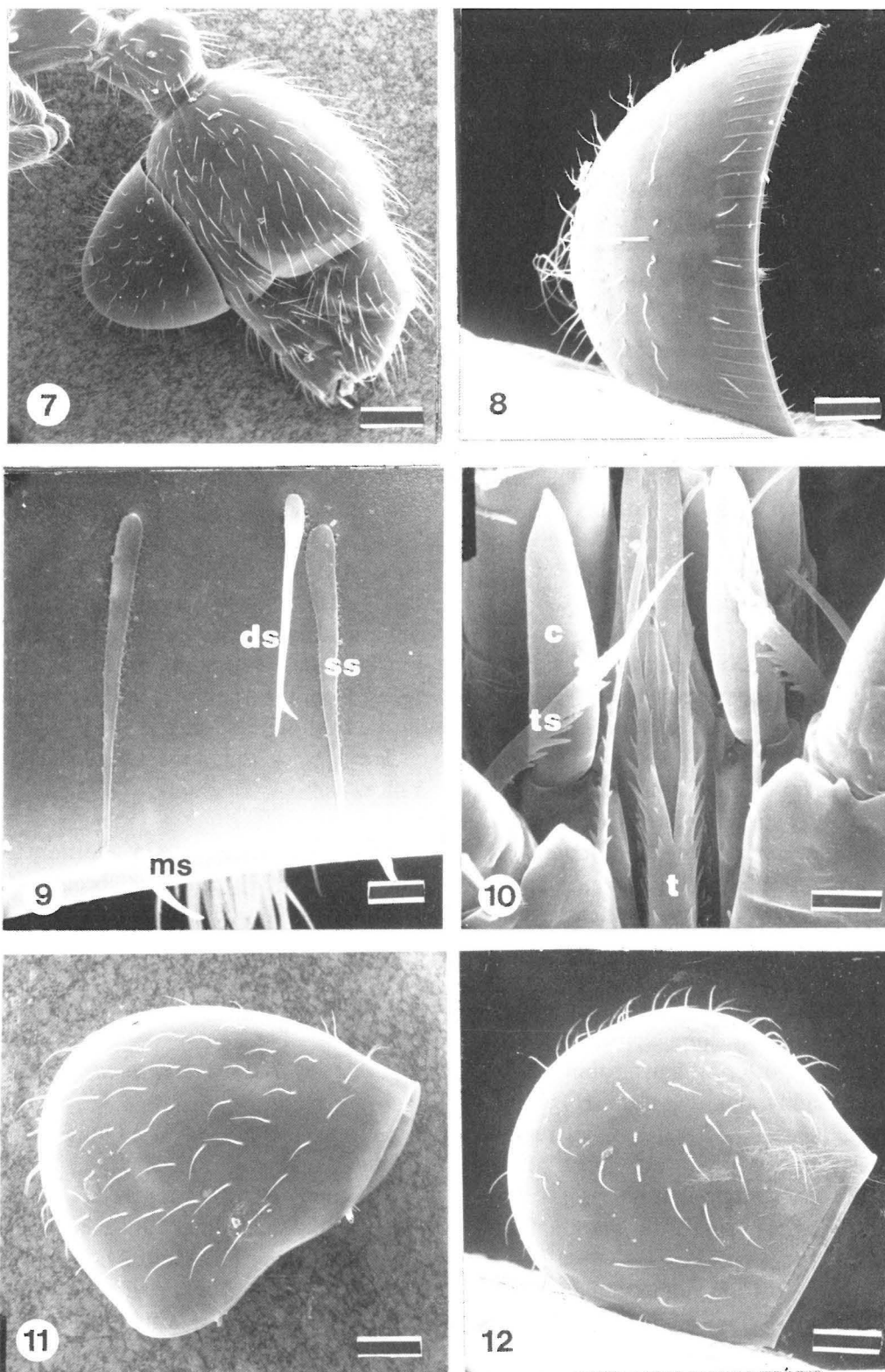
Dorsum (Figs. 11, 12) : highly convex ; 124-128 large dorsal setae including 2 anterior median unpaired setae, barbs about 1/3 distance from tip ; posterior mushroom-shaped setae with 18-24 teeth ; 40-44 large submarginal setae, about 1/2 size of large paired dorsal setae, appressed but not fused to dorsal shield (Fig. 13) ; marginal setae 40-42, much shorter than submarginals.

Venter (Fig. 3) : tritosternum as in *T. praedator* ; genital plate an elongate pentagon ; ventral plate poorly sclerotized, particularly midregionally, with 2 pairs of setae in anterior region and 1 posterior pair ; posterior part of ventral plate fused to anal plate, containing 2 pairs of setae, posterior pair extending beyond anus ; lateral plates broadly fused to ventrianal plate complex, each containing 3 pairs of setae in porose sockets (Fig. 14) and 2 pairs of lyriiform pores ; metapodal plate indistinct.

Legs : femora II-IV each with well-developed flanges.

Gnathosoma : chelicerae and other structures similar to *T. praedator* (ELZINGA, 1981), except anterior margin of palpal coxa is roughly serrate rather than smooth.

MALE : Body similar to female but slightly smaller, 570-600 μ m ; other measurements in Table I. Distinct separation between sternal and ventral plates.



FIGS. 7-12 : 7. — *Trichocylliba gibbata*, under abdomen of *Neivamyrmex gibbatus* host, anterior view of mite. Scale bar = 200 μ m. 8. — *T. morosa*, anterior view. Scale bar = μ m. 9. — *T. morosa*, dorsal edge. Scale bar = 10 μ m. 10. — *T. morosa*, ventral view of gnathosoma. Scale bar = 10 μ m. 11. — *T. agnesae*, lateral view. Scale bar = 100 μ m. 12. — *T. agnesae*, posterior view. Scale bar = 100 μ m.
c = corniculus ; ds = large dorsal seta ; ms = marginal seta ; ss = submarginal seta ; t = tritosternum ; ts = large trochanteral seta of palp.

TYPES : Holotype female in alcohol with the following data : ECUADOR : Oriente 00°24' S, 76°36' W, Limoncocha ; 16.VI.1970 ; C. W. RETTENMEYER ; Host : *Labidus praedator*, Colony E-668. Allotype male also in alcohol with same data except 25.XI.1967, Colony E-575. Holotype and allotype deposited in U.S. Natl. Museum. Additional paratypes from the same locality and host species are deposited in the author's collection.

The species is named for the author's wife.

LOCALITY AND HOSTS : *T. agnesae* is known only from this locality and host but has also been collected on 15-16. VI.1970 by C. W. RETTENMEYER (2 ♀, 2 ♂), once from an army ant larva.

Trichocylliba galea n. sp.

FEMALE : Body oval from dorsal view, 920-1,100 µm. long ; other measurements in Table I. Agrees with description of *T. gibbata* except as follows.

Dorsum (Fig. 15) : highly convex ; marginal notching distinct ; punctation formed by rows of spines on dorsal plate, appearing honeycomb-like with distinct interior spines (Fig. 16) ; margins lengthened to give helmetlike appearance, lacking punctation but possessing radiating striations to margin (Figs. 15, 16) ; 200-210 large dorsal setae (including 2 anterior unpaired setae) in honeycombed region, moderately long, with barb near midlength position ; posterior mushroom-shaped setae with 16-19 highly pointed teeth (Fig. 16) ; 34-40 submarginal setae in lateral striated region, positioned slightly dorsal to lowest row of large paired setae ; 280-300 marginal setae ; setal pore canals amid striations radiating from marginal and submarginal setae.

Venter (Fig. 4) : tritosternum similar to *T. chiapensis* (ELZINGA, 1981) ; genital plate bullet-shaped, length slightly less than 0.8 × width ; all other plates fused ; 3 pairs of ventral and 4 pairs lateral setae in porose sockets ; additional short ventral pair of setae in normal socket anterior to anus (same size as adanal and postanal setae) ; 1 pair of ventral and 2 pairs of lateral plate lyriform

pores ; metapodal plates separate from ventral plate, with rounded margin and reduction in size.

Gnathosoma : similar to *T. praedator* (ELZINGA, 1981) except as follows : distal sensory body with longer hook (Fig. 17) and notch behind large terminal tooth of fixed cheliceral digit acute ; corniculi slightly pointed, elongate and slender ; hypostomal setae I with elongate barbs.

MALE : Body similar to female but slightly smaller, 685-940 µm ; other measurements in Table I. No separation between sternal and ventral plates.

TYPES : Holotype female in alcohol with the following data : ECUADOR : Oriente 00°24' S, 76°36' W, Limoncocha, 25.XI.1976 ; C. W. & M. E. RETTENMEYER ; Host : *Labidus praedator*, colony E-575. Allotype male also in alcohol with the same data as holotype. Holotype and allotype deposited in U.S. Natl. Museum. Additional paratypes collected from the same locality and host are deposited in the author's collection.

The species is named for its helmetlike appearance.

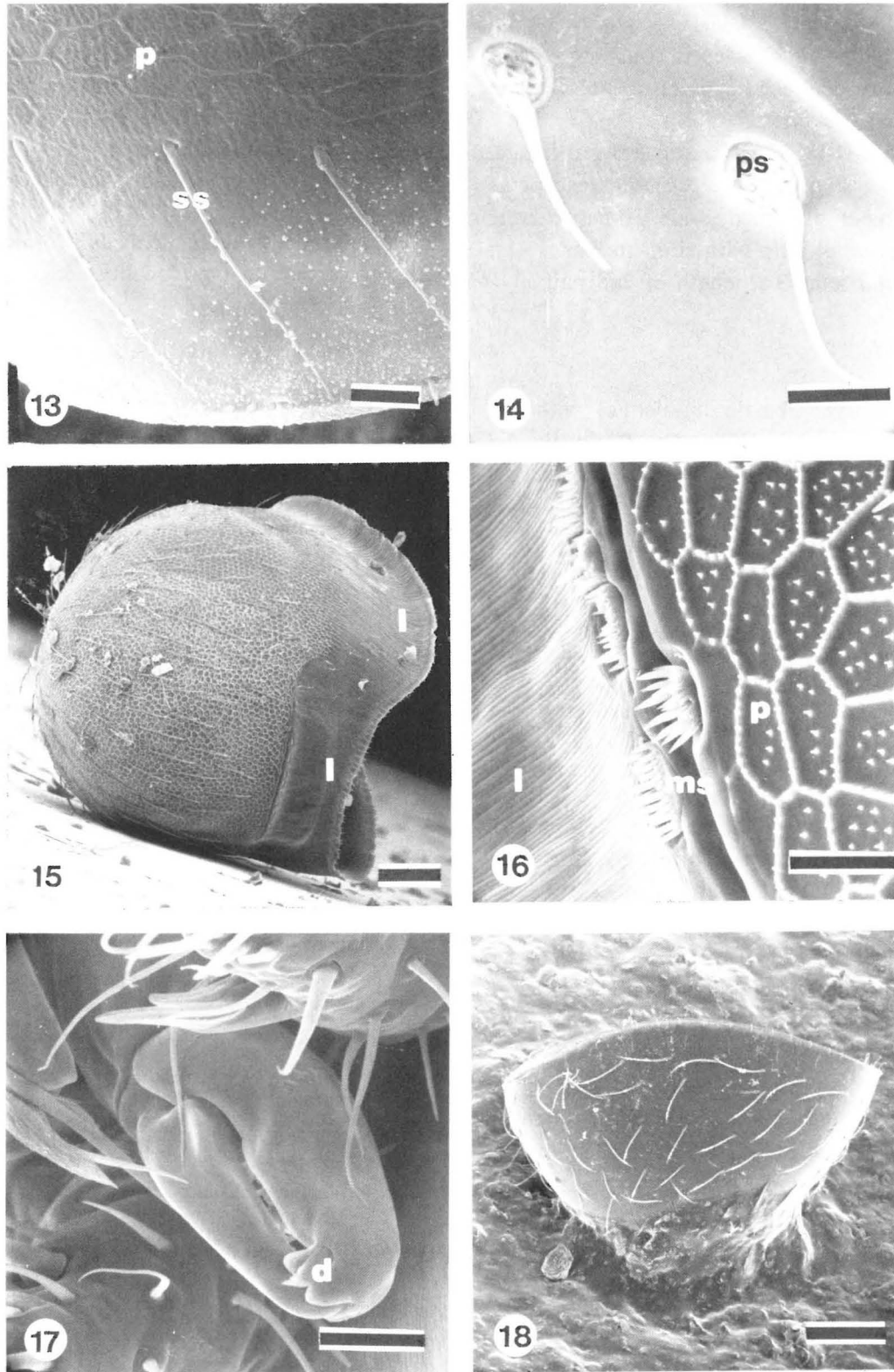
LOCALITY AND HOST : In addition to the locality and host, *T. galea* has been collected from PANAMA : Barro Colorado Island ; 19.III.1952 ; C. W. RETTENMEYER ; Host : *Labidus praedator*, Colony '52 P-7.

Trichocylliba tumba n. sp.

FEMALE : Body 342 µm. long ; other measurements in Table I.

Dorsum (Fig. 18) : moderately convex ; 104 large dorsal setae (including 2 anterior unpaired setae) of moderate length, multiply barbed ; posterior mushroom-shaped setae with 14-16 teeth ; 18 submarginal setae ; 44 marginal setae.

Venter (Fig. 5) : shape of genital plate an elongate pentagon, about 2 × longer than wide ; other plates fused ; 4 pairs of ventral setae, 1st 2 pairs anteriorly positioned, 3rd pair about 1/2 distance between genital plate and anus, last just anterior to but extending beyond anus ; metapodal



FIGS. 13-18 : 13. — *Trichocylliba agnesae*, dorsal edge. Scale bar = 10 μ m. 14. — *T. agnesae*, lateral plate setae. Scale bar = 10 μ m. 15. — *T. galea*, posterolateral view. Scale bar = 100 μ m. 16. — *T. galea*, near posterior edge of dorsal plate. Scale bar = 10 μ m. 17. — *T. galea*, chelicera. Scale bar 10 μ m. 18. — *T. tumba*, lateral view. Scale bar = 100 μ m.
d = distal sensory body of fixed cheliceral = digit ; ms = mushroom-shaped seta ; l = lateral striate region ; p = punctation ; ps = porose socket of lateral plate seta ; ss = submarginal seta.

plate not triangular but shortened, touching ventral plate over entire distance; 3 pairs of lateral plate setae in normal sockets.

Legs : femora II-IV, each lacking ventral flange.

Gnathosoma : similar to *T. praedator* except as follows : corniculi flattened, wide at base; large trochanteral setae of palp with elongate barbs; 1st pair hypostomal setae $3 \times$ length of 2nd pair.

MALE : unknown.

TYPES : Holotype female in alcohol with the following data : COSTA RICA : Osa Peninsula, 2.5 mi. S. W. Rincon; 8.III.1967; C. W. RETTENMEYER; Host : *Eciton burchelli* refuse pile, Colony E-487.

The species is named for its refuse pile collection.

LOCALITY AND HOST : *T. tumba* is known only from the holotype specimen.

Trichocylliba neili n. sp.

FEMALE : Body about 700 μ m. long (estimate of crushed, mounted holotype); other measurements in Table I.

Dorsum : low convex arching; 122 large dorsal setae of moderate (50-70 μ m) length, barb 1/6 distance from tip; 34 small submarginal setae; 48 marginal setae; setal pore canals leading from marginal and submarginal setae easily seen.

Venter (Fig. 6) : genital plate an elongate pentagon in shape, length about 1.8X width; ventral plate weakly sclerotized at midlength region; 2 pairs of ventral setae and 1 pair of lyriform pores in anterior ventral plate sector and 2 pairs of setae and 1 pair of lyriform pores in posterior sector; lateral plates nearly separated from ventrianal plate, each with 4 pairs of setae in porose sockets and 3 pairs of lyriform pores.

Legs : femora II-IV each with well-developed flange.

Gnathosoma : corniculi pointed.

MALE : unknown.

TYPES : Holotype female with following data : BRITISH GUIANA : Oko River, Cuyuni Tributary; 24.VI.1936; Neal A. WEBER; Host : *Labidus coecus* #509, C.W.R. Slide No. 3997.

The species is named for the collector.

LOCALITY AND HOST : *T. neili* is known only from the holotype and type locality.

KEY TO FEMALE *TRICHOCYLLIBA*
ASSOCIATED WITH ARMY ANTS

1. Ventral area undivided and sclerotized posterior to legs IV except for metapodal line (Fig. 5)..... 2
Ventral area divided into separate plates and with unsclerotized areas posterior to legs IV (Figs. 1,2). 5
2. Tarsal claws present..... 3
Tarsal claws absent, suckers present
..... *suctorpoda* Elzinga
3. Dorsal margins greatly expanded laterally; body helmet-shaped (Fig. 15)..... *galea* n. sp.
Dorsum not as above 4
4. Body length less 400 μ m.; dorsal setae short (Fig. 18) *tumba* n. sp.
Body length more than 800 μ m.; dorsal setae long *hirticoma* (Leonardi)
5. Associated with *Labidus* or *Cheliomymex*; lateral plate setal sockets porose (Fig. 14)..... 6
Associated with *Eciton* or *Neivamyrmex*; lateral plate setal sockets normally developed 11
6. Deep cleft separation between lateral and ventral plate (Fig. 3) 7
Not as above 8
7. Dorsum highly arched (Figs. 11, 12)... *agnesae* n. sp.
Dorsum only moderately arched (Fig. 8). *neili* n. sp.
8. 1st pair ventral plate setae short; more than 160 large dorsal setae *praedator* Elzinga
1st pair ventral plate setae long; less than 120 large dorsal setae..... 9
9. 3rd pair ventral plate setae extending beyond anus *schneirlai* Elzinga
3rd pair ventral plate setae not extending to anus 10
10. Maximal width across ventral and lateral-ventral-anal plate complex similar; found with *Cheliomyrmex* *morosa* n. sp.
11. Maximal width across lateral-ventral-anal plate complex nearly $2 \times$ that spanning ventral plate at widest point; found with *Labidus*..... *napoensis* Elzinga

12. Lateral plates separated from anal plate ; sternal plate
separate from ventral plate (Fig. 1) . *gibbata* n. sp.
Lateral plates not separate from anal ; sternal and
ventral plates fused 12
13. 3 pairs lateral plate setae ; *Neivamirmex* host.....
..... *watkinsi* Elzinga
4 pairs lateral plate setae ; *Eciton* host.....
..... *chiapensis* Elzinga

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