

ADULTS AND DEUTONYMPHS OF *EUTROMBIDIUM* (ACARINA : TROMBIDIOIDEA) IN NORTH AMERICA

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TAXONOMY SUMMARY : The post-larval *Eutrombidium* (Acarina : Trombidoidea) of North America are reviewed and described. *Eutrombidium locustarum* (Walsh) is accepted in the sense of BERLESE (1912), and three other species, all new, *E. walshi*, *E. lebaroni* and *E. rileyi* are defined and described.

A key is given to the post-larval instars of the Eutrombidiinae (family Microtrombidiidae).

TAXONOMIE RÉSUMÉ : Les *Eutrombidium* post-larvaires (Acarina : Trombidoidea) de l'Amérique du Nord sont passés en revue, et décrits. *Eutrombidium locustarum* (Walsh) est accepté selon BERLESE (1912), et trois autres espèces, toutes nouvelles, *E. walshi*, *E. lebaroni* et *E. rileyi*, sont définies et décrites.

On donne une clef des stades post-larvaires des Eutrombidiinae (famille Microtrombidiidae).

INTRODUCTION

The subfamily Eutrombidiinae Thor 1935, placed here in the family Microtrombidiidae of the Trombidoidea, was founded on the genus *Eutrombidium* Verdun, 1909, which was based on larvae, but without a formal type species being nominated by its author. OUDEMANS (1909, p. 16) stated that the type species was *E. trigonum* (Hermann, 1804), an adult European mite which had been correlated with recognizable larvae shortly before, by BRUYANT (1909). *Eutrombidium* is the only genus of Eutrombidiinae adults which has been recognized in North America, since the two adult-based genera

are not American — *Leptothrombium* Berlese, 1912, being recorded from European and African localities (THOR and WILLMANN, 1947), and *Caecothrombium* André, 1945, being recorded from Europe.

About 30 species or subspecies of *Eutrombidium* have been described from Europe, Africa, Asia, North America and Australia, including larvae, deutonymphs and adults. Larvae are ectoparasites on Arthropoda, all records referring to Orthoptera, except one species recorded as parasitic on spiders (WELBOURN and YOUNG, 1988); the deutonymphs and adults are predatory on small Arthropoda. In North America SEVERIN (1944) identified "the grasshopper mite" as *E. trigonum* (Hermann),

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following EWING and HARTZELL (1918), and achieved rearings from larvae to deutonymphs and adults, which he described and figured. However, he gave little detail of the crista and palp, and no metric data of the setation, leg segments, and other features now considered important in species identifications.

As Severin was aware, other nominal species of *Eutrombidium* were recorded for North America during the nineteenth century, namely *E. locustarum* (Walsh, 1866) and *E. gryllaria* (LeBaron, 1872) based on larvae parasitizing Orthoptera. There is however, no evidence that type specimens of these nominal species exist, if they ever did. BERLESE (1912) described a post-larval specimen from some unspecified locality in North America which EWING had sent him as *Eutrombidium locustarum* (Walsh). From its dimensions, this specimen was presumably an adult, although BERLESE does not describe the genitalia or specify the sex. There is no evidence in BERLESE's account that the specimen had been obtained by rearing. BERLESE's identification of the specimen as *E. locustarum* is accepted in the present work. A further nominal species has been described from North America (Urbana, Illinois) as *Microtrombidium magnum* Ewing, 1909, from a presumably adult specimen 4.5 mm long by 2.6 mm wide, with a posterior dorsal idiosomal (pygosomal) shield. It was considered an uncertain species of *Eutrombidium* by THOR and WILLMANN (1947); it clearly needs redescribing for its status to be determined. A further North American species, *Ottonia trombidioides* Banks, 1896, was stated to belong to *Eutrombidium* by WELBOURN and YOUNG (1988) after examination of the type material, but they do not redescribe it.

The present paper examines the taxonomy of available North American post-larval *Eutrombidium*, using a small collection available to the author. A key is given for the genera of post-larval Eutrombidiinae.

MATERIAL AND METHODS

Slide-mounted post-larval Eutrombidiinae were made available from the Canadian National Collection, Ottawa, and the South Australian Museum

acarological collection, Adelaide; other material was forwarded by Dr. W. W. Moss, U.S.A. Two specimens were deutonymphs; all others were adults. All specimens had been mounted in water-based media, either with a gum-choral hydrate base, or in polyvinyl. Only two specimens were remounted by the author.

All material available to the author has been studied.

Type material will be located in the Canadian National Collection, Biosystematics Research Centre, or the acarological collection, South Australian Museum.

Observations were made with a Leitz Ortholux microscope with phase-contrast and polarizing facilities. All drawings were made with a camera lucida attachment.

Setal terminology follows SOUTHCOTT (1961a, b, 1963).

Coding for cristal measurements: CL total length of crista from tip of nasus or sagitta (SOUTHCOTT, 1986) or anterior edge of transverse anterior extension of crista ('vomer') to posterior end of cristal rod; divided into anterior part, ASB from anterior end to level of cristal sensilla sockets, and PSB, the rear part from sockets centre to posterior end of crista. Leg segmental measurements represent lengths between proximal and distal chitinized parts of each segment (omitting claws in case of tarsi); Ta (L) = tarsus length; Ta (H) = tarsus height; leg lengths represent distance from proximal end of trochanter to tip of tarsal claws. PDS refers to the posterior dorsal idiosomal setae.

Particular attention is paid to palpal tibial structures in the taxonomic key and descriptions. The palp tibia is provided with a robust 'claw' (odontus of NEWELL, 1958) which is a modified seta. In the Microtrombidiidae and in various other members of the Trombidoidea, this modified seta is supported by another, smaller, thickened seta, an 'accessory' tooth or paradont of NEWELL. Additionally, the palpal tibia bears other thickened, spine-like setae ('spinisetae') commonly in comb-like groups or ctenidia, or in small numbers (generally 2-3) along the flexor surface of the palpal tibia.

All measurements are in micrometres (μm) unless stated otherwise.

Abbreviations for institutions : CNC : Canadian National Collection, Biosystematic Research Centre, Ottawa. SAM : South Australian Museum, Adelaide.

SUBFAMILY EUTROMBIDIINAE THOR

Eutrombidiinae THOR, 1935, p. 108; THOR and WILLMANN, 1947, p. 228; FEIDER 1955, p. 132. Eutrombidiidae : FEIDER, 1959, p. 544; WELBOURN and YOUNG, 1988, p. 373. Eutrombidiini : WELBOURN, 1984, pp. 138, 141. Eutrombiini (lapsus) : WELBOURN, 1984, p. 141.

Definition of adult instar : Trombidoidea, with dorsal crista, with or without nasus, with a single pair of sensilla in middle region, each with filiform sensillary (trichobothrial) seta. Eyes absent, or, if present, sessile or on short peduncles. Palpal tibia with claw (odontus) and accessory claw (paradont), with thickened setae in short rows (ctenidia). Idiosoma with posterior dorsal idiosomal (pygosomal) shield. External genitalia with three pairs of acetabula.

Definition of deutonymph : as for adult but external genitalia with two pairs of acetabula.

KEY TO GENERA OF EUTROMBIDIINAE, ADULTS AND DEUTONYMPHS

- 1 Eyes present. Palpal tibia with odontus and paradont; at least six thickened spine-like setae (spinisetae) on dorsal and ventral edges, and on medial face..... 2
- Eyes absent. Palpal tibia with odontus and paradont; less than four thickened spine-like setae (spinisetae) placed dorsally behind paradont.... 3
- 2 Dorsal idiosomal setae of two distinct shapes..
..... *Leptothrombium* Berlese
Dorsal idiosomal setae not separable into two distinct shapes..... *Eutrombidium* Verdun

- 3 Dorsal idiosomal setae with a basket-like set of curved projections *Caecothrombium* André, 1945
Dorsal idiosomal setae with coarse pointed setules, diverging fanwise
..... genus "B" (undescribed).*

Eutrombidium Verdun

Eutrombidium VERDUN, 1909, p. 244. *Euthrombidium* OUDEMANS, 1909, p. 16; 1912, p. 106; ROBAUX, 1974, p. 55. *Astoma* : WALSH, 1866, p. 126. *Atoma* : LEBARON, 1872, p. 157. *Trombidium* : RILEY, 1877, p. 175 (partim). *Otonia* : BANKS, 1894, p. 213; 1896, p. 74 (partim). (for other synonymy see THOR and WILLMANN, 1947, p. 232).

Type species (designation by OUDEMANS, 1909, p. 16) *Trombidium trigonum* Hermann, 1804.

Diagnosis of adult : Eutrombidiinae. Eyes present. Palpal tibia with thickened setae ('spinisetae') in short rows or ctenidia, additional to the palpal tibial claw (odontus) and accessory claw (paradont). Three pairs of genital acetabula. Dorsal idiosomal setae not divisible into two distinct types. Diagnosis of deutonymph : As for adult but with two pairs of genital acetabula.

REMARKS : The genus *Eutrombidium* Verdun was based on larval forms. The name *trigonum* was based on adults. Correlation between the larvae and mobile post-larval instars (deutonymphs and adults) has been well established by BRUYANT (1909) and SEVERIN (1944). EWING (in EWING and HARTZELL, 1918) also claimed to have "succeeded in rearing an adult from a larva infesting *Melanoplus bivittatus*."

Nearly all described species or subspecies have been based on adults (or possibly deutonymphs), from Europe, Africa, Asia, and North America. However the wide distribution of *Eutrombidium* larvae on e.g. grasshoppers in Europe, Africa, Asia, North America and Australia indicates a larger number of species remains to be described.

* Genus "B" has now been described as *Bruyantella* Southcott, in : SOUTHCOTT (R. V.), 1991. — A new adult eutrombidiine mite (Acari : Microtrombidiidae) from North America. — Internat. J. Acarol. 17 (4) : 271-274.

KEY TO NORTH AMERICAN ADULTS OF *Eutrombidium*

- 1 Palpal tibial claw (odontus) with length less than twice its basal width..... 2
 Palpal tibial claw (odontus) with length more than twice its basal width..... 3
- 2 (1) Four coarse spinisetae on lateral side of palpal tibia. Pygosomal scutum oval, flattened anteriorly, length/width ratio 1.34 *E. walshi* n. sp.
 Three coarse spinisetae on lateral side of palpal tibia. Pygosomal scutum near-circular, length-width ratio 1.13..... *E. lebaroni* n. sp.
- 3 (1) Three or four coarse spinisetae on flexor margin of palpal tibia. Posterior dorsal idiosomal setae to about 140 μm long. Pygosomal scutum anteriorly truncate..... *E. rileyi* n. sp.
 Two to four * coarse spinisetae on flexor margin of palpal tibia. Posterior dorsal idiosomal setae about 60 μm long. Pygosomal scutum anteriorly evenly rounded..... *E. locustarum* (Walsh).

REMARKS : I have accepted the determination of BERLESE (1912) as specifying the characters of *E. locustarum* (see further below). I have accepted the PDS value of the deutonymph of *E. locustarum* as being likely to apply also to the adult.

Eutrombidium walshi n. sp.

(Fig. 1 A-E)

Diagnosis of adults :

Large mite. Palpal tibia shaped as a short cone, about 1.62 times as long as its basal width. Odontus and paradont short. Four coarse lateral spinisetae along flexor edge; medial side of tibia with c. 20 elongate spinisetae, to 101 μm long, in two transverse and one longitudinal ctenidia. Posterior dorsal idiosomal setae up to 84 μm long. Pygosomal scutum oval, about 1180 μm long by 880 μm wide, flattened anteriorly.

* Two for deutonymph.

Description of holotype ACB1194, slide-mounted.

Colour in life not recorded, presumably red, in slide mount, brownish. Idiosoma of normal shape for genus, with 'shoulders' and with a constriction at about level of coxae III and IV. Idiosomal length 4400, maximum width 2250; over-all length to tip of cheliceral blades 4900.

Crista well developed and chitinized, expanding anteriorly to a bilateral plate structure ('vomeres') with a sinuous anterior edge, and carrying many pointed, setulose setae, 81-100 long, similar to general dorsal idiosomal setae. Sensillary area well developed (sensillary setae missing in preparation). Crista produced well posteriorly, to a blunt posterior end.

Metric data as in Table 1.

TABLE 1. Metric data for *Eutrombidium walshi* n. sp., adult, holotype ACB1194.

Character	
CL	741
ASB	399
PSB	342
SB	42
Sens	—
DS	48-90
MDS	48-90
PDS	55-84
Pygosomal scutum length	1180
Pygosomal scutal width	880
Pygosomal scutal L/W	1.34
Genu I	408
Tibia I	472
Tarsus I (L)	517
Tarsus I (H)	190
TiI/GeI	1.16
TaI(L)/TaI(H)	2.72
Genu II	295
Tibia II	359
Tarsus II(L)	394
Tarsus II(H)	126
TiII/GeII	1.22
TaII(L)/TaII(H)	3.13
Genu III	265
Tibia III	317
Tarsus III(L)	380
Tarsus III(H)	141
TiIII/GeIII	1.20
TaIII(L)/TaIII(H)	2.70
Genu IV	405
Tibia IV	520
Tarsus IV(L)	480
Tarsus IV(H)	130
TiIV/GeIV	1.28
TaIV(L)/TaIV(H)	3.69

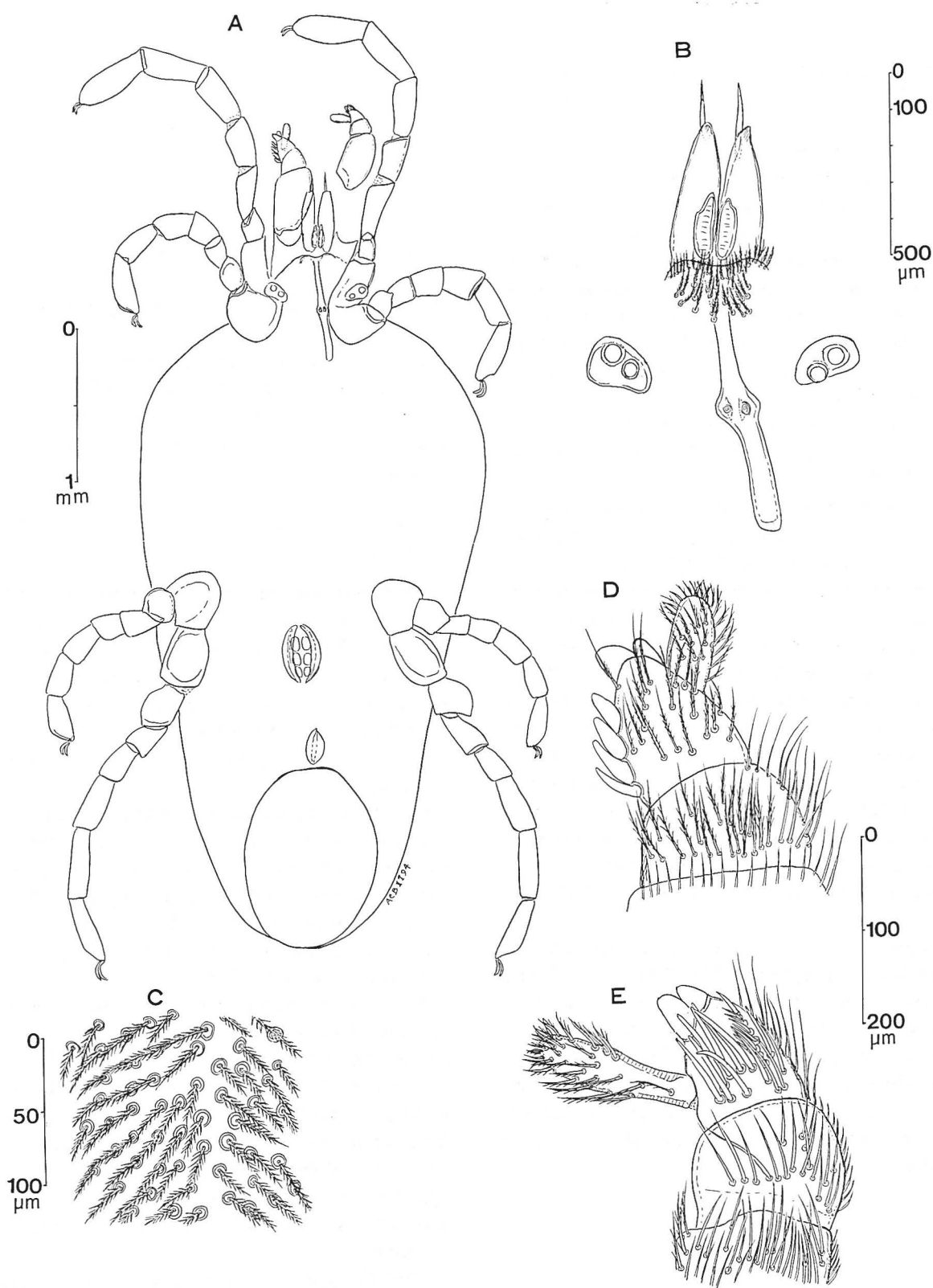


FIG. 1 : *Eutrombidium walshi* n. sp., adult, holotype.

A. — Entire, in transparency, setae omitted (palp on right dislocated). B. — Dorsal aspect of chelicerae, crista and eyes. C. — Patch of dorsal idiosomal setae. D. — Tip of palp, lateral aspect. E. — Tip of palp, medial aspect. (Each to nearest scale).

Eyes : each lateral pair on a short peduncle, $170 \times (95-100)$ in dorsal view, anterolateral to cristallary sensillary area. Lenses circular, anterolateral 48 across, posteromedial 40.

Dorsum of idiosoma with dense pelage of slender, pointed, setulose setae, each seta arising from a narrow cylindrical or truncate papilla. Pygosomal scutum oval, flattened anteriorly, densely pitted with small rounded foveae, 13-18 across, each with a seta similar to the setae adjacent to scutum.

Ventral surface : densely hirsute, similar to dorsum. External genitalia and anus obscured in the preparation.

Legs of normal character for genus; lengths (trochanters to tarsal claws), I 2320, II 1800, III 1710, IV 2345.

Gnathosoma : palp robust, with dense pelage of pointed setae, asetulose along dorsal (extensor) surface, setulose elsewhere. Palpal tibia 210 long by 132 wide at base, i.e. a ratio of 1.62x, with blunt odontus and paradont, and with four coarse spinisetae along flexor edge laterally; on medial face about 20 spinisetae, to 84 long, in two transverse ctenidia of larger setae, plus a ctenidium of smaller spinisetae (to c. 30 long), extending anteriorly. Palpal tarsus 180 long by 53 wide, densely hairy, with setulose and simple setae, including solenoidales. Cheliceral bases narrow, each about 450 long by 110 across; cheliceral blades narrow, pointed, 160 long, with a number (indeterminate, from obscurity) of fine denticles along dorsal (flexor) edge.

Material examined : Holotype, United States : Johnsonburg, Pennsylvania, 31.v.1946, J. M. FRITTS, in open soil, garden (per G. W. WHARTON, Duke University), ACB1194, holotype, remounted in Hoyer's medium 7.viii.1990 (SAM).

Etymology : Named for the North American entomologist B. D. WALSH, the first significant contributor to knowledge of Eutrombidiinae in North America.

Eutrombidium lebaroni n. sp.

(Fig. 2 A-F)

Diagnosis (adult) :

Large mite. Palpal tibia conical, about 1.84 times as long as its basal width. Odontus and paradont short. Three coarse thickened spinisetae along flexor edge of palpal tibia laterally; medial surface with c. 21 spinisetae to $72 \mu\text{m}$ long, arranged in irregular ctenidia. Posterior dorsal idiosomal setae $56-84 \mu\text{m}$ long. Pygosomal scutum near-circular, c. $1020 \mu\text{m}$ long by c. $900 \mu\text{m}$ wide, not flattened anteriorly.

Description of adult (from holotype ACB1083, slide-mounted)

Colour in life not recorded, presumably red; in slide mount, brownish. Large mite; idiosoma 3200 long by 1875 wide; over-all length to tip of cheliceral blades 3750. Idiosoma of characteristic shape for genus, wider anteriorly, with rounded 'shoulders' and posterior pole; somewhat constricted at level of coxae III, IV; more pointed posteriorly.

Crista well developed and chitinized, with anterior plate with sinuous anterior edge and with numerous tapering, pointed, setulose setae to 120 long. Sensillary area well developed, with two filiform sensillary setae. Crista continues posterior of sensillary area to a blunt posterior end.

Metric data as in Table 2.

Eyes : each lateral pair on a short peduncle, 160×80 in dorsal view; lenses circular, subequal, anterolateral 47 across, posteromedial 43.

Dorsum of idiosoma with a dense pelage of slender, pointed, well setulose setae, each arising from a small papilla. Pygosomal scutum near-circular, not flattened anteriorly, with many small rounded foveae, 8-11 across, each bearing a setulose seta similar to those of the surrounding idiosoma.

Ventral surface of idiosoma : densely hirsute, setae similar to those of dorsal surface. External genitalia 410 long by 270 wide, bearing three pairs

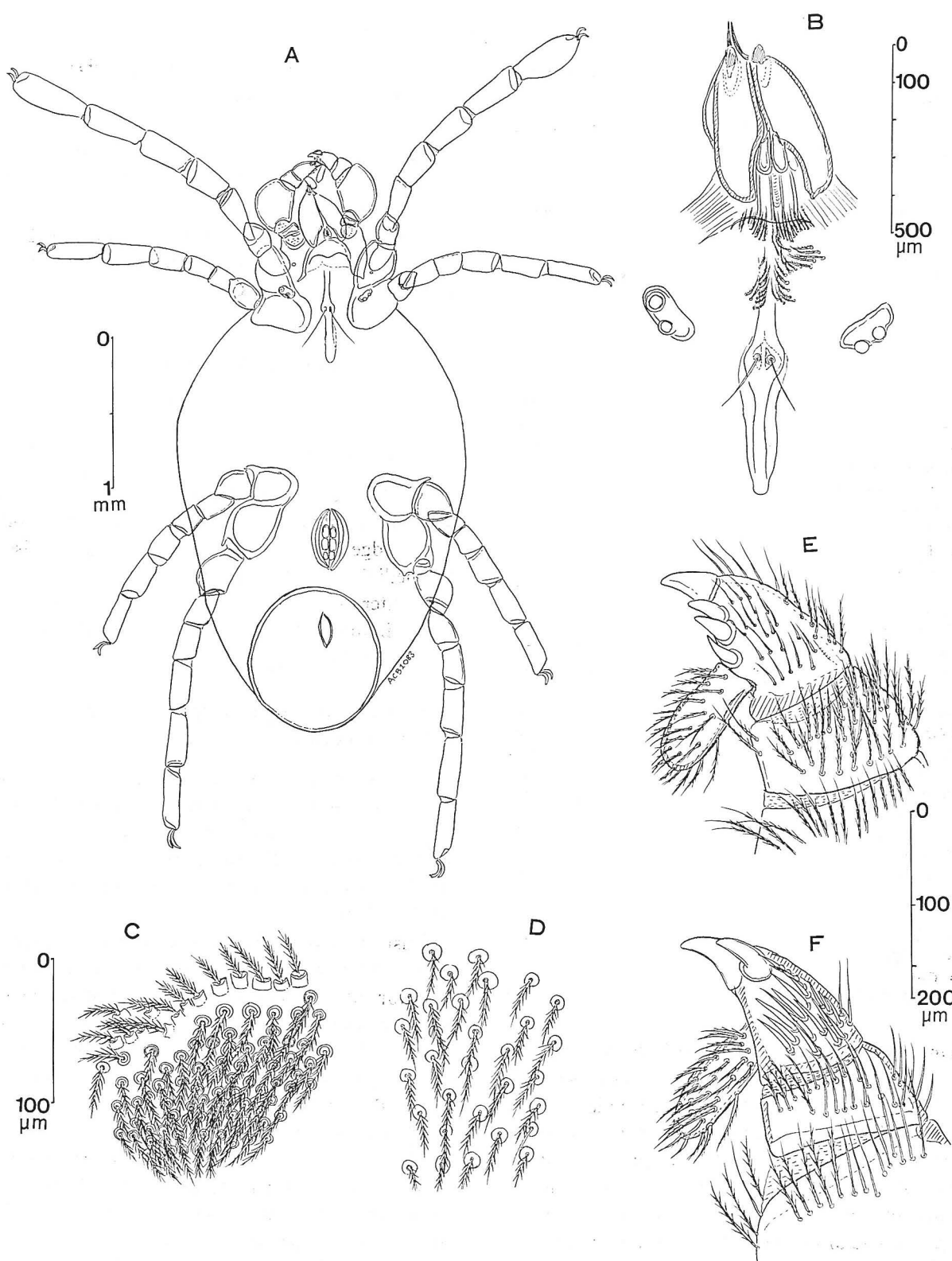


FIG. 2 : *Eutrombidium lebaroni* n. sp., adult, holotype.

A. — Entire, in transparency, setae mostly omitted. B. — Dorsal aspect of chelicerae, crista and eyes. C. — Patch of central dorsal idiosomal setae. D. — Patch of setae from pygosomal scutum. E. — Tip of palp, lateral aspect. F. — Tip of palp, medial aspect. (Each to nearest scale).

of oval acetabula, 80×45 . Anus oval, 170 long by 90 wide.

Legs of normal stature for genus, lengths : I 2240, II 1705, III 1640, IV 2130.

TABLE 2. Metric data for *Eutrombidium lebaroni* n. sp., adult, holotype.

Character	
CL	730
ASB	365
PSB	365
SB	45
Sens	150
DS	45-84
MDS	45-81
PDS	56-84
Pygosomal scutum length	1021
Pygosomal scutal width	901
Pygosomal scutal L/W	1.13
Genu I	373
Tibia I	444
Tarsus I (L)	495
Tarsus I (H)	190
TiI/GeI	1.19
TaI(L)/TaI(H)	2.61
Genu II	282
Tibia II	338
Tarsus II(L)	380
Tarsus II(H)	106
TiII/GeII	1.20
TaII(L)/TaII(H)	3.58
Genu III	250
Tibia III	312
Tarsus III(L)	352
Tarsus III(H)	120
TiIII/GeIII	1.25
TaIII(L)/TaIII(H)	2.93
Genu IV	346
Tibia IV	436
Tarsus IV(L)	422
Tarsus IV(H)	120
TiIV/GeIV	1.26
TaIV(L)/TaIV(H)	3.52

Gnathosoma : palp robust, with dense pelage of pointed, setulose setae (some are asetulose, see Fig. 2E, F) ; palpal tibia 224 long by 122 wide at bases (ratio 1.84 : 1). Odontus 75 long by 47 wide, paradont 70×36 . Three conical spinisetae along flexor surface of palpal tibia laterally ; medial surface of palpal tibia with 21 spinisetae, to 72 long, in irregular ctenidia. Palpal tarsus 143 long by 55 wide, with numerous pointed, setulose setae, and some terminal solenoidae. Chelicerae robust ; basis (one side) 445 long by 141 wide ; blades

slender, pointed, 171 long, with a number (indeterminate) of fine denticles along flexor (dorsal) edge.

Material examined : Holotype, Canada, Ontario, Carleton Co., Ottawa, Mer Bleue, sphagnum, 4 May — 9 June 1975, DONDALE and REDNER, one adult, holotype, ACB1083, CNC Type No. 20893.

Etymology : Named to commemorate W. LEBARON, an early student of larval Eutrombidiinae, at Illinois, United States.

Eutrombidium rileyi n. sp.

(Fig. 3 A-F)

Diagnosis of adult.

Large mite. Palpal tibia more than twice as long as wide basally, with 3-4 coarse spinisetae along flexor edge laterally, and with about 20 spinisetae on medial face. Pygosomal scutum oval with truncate anterior end, with numerous small foveae $13-22 \mu\text{m}$ in diameter. Posterior dorsal idiosomal setae $60-140 \mu\text{m}$ long.

Description of adult (from holotype ACB1084, slide-mounted)

Colour in life not recorded ; on slide, light brown. Idiosoma oval, narrower posteriorly ; anteriorly with 'shoulders' and with a constriction at level of coxae III, IV. Idiosoma 3700 long by 2015 maximum width ; over-all length to tip of cheliceral blades 4250.

Crista well developed and chitinized, expanding anteriorly into a plate ('vomer') with sinuous anterior edge ; plate with many pointed, slender, setulose setae 100-154 long. Sensillary area well developed, with two bothridia, each with a filiform sensillary seta ; crista extends posteriorly as a thick rod with a truncate posterior end.

Metric data as in Table 3.

Eyes : each lateral pair on short peduncle anterolateral to sensillary area, 150×85 in dorsal view ; corneae circular, subequal, anterolateral 49 across, posteromedial 41.

Idiosoma densely hirsute with slender, pointed, setulose setae, each arising from a small papilla. Pygosomal scutum ovoid, narrower anteriorly, and

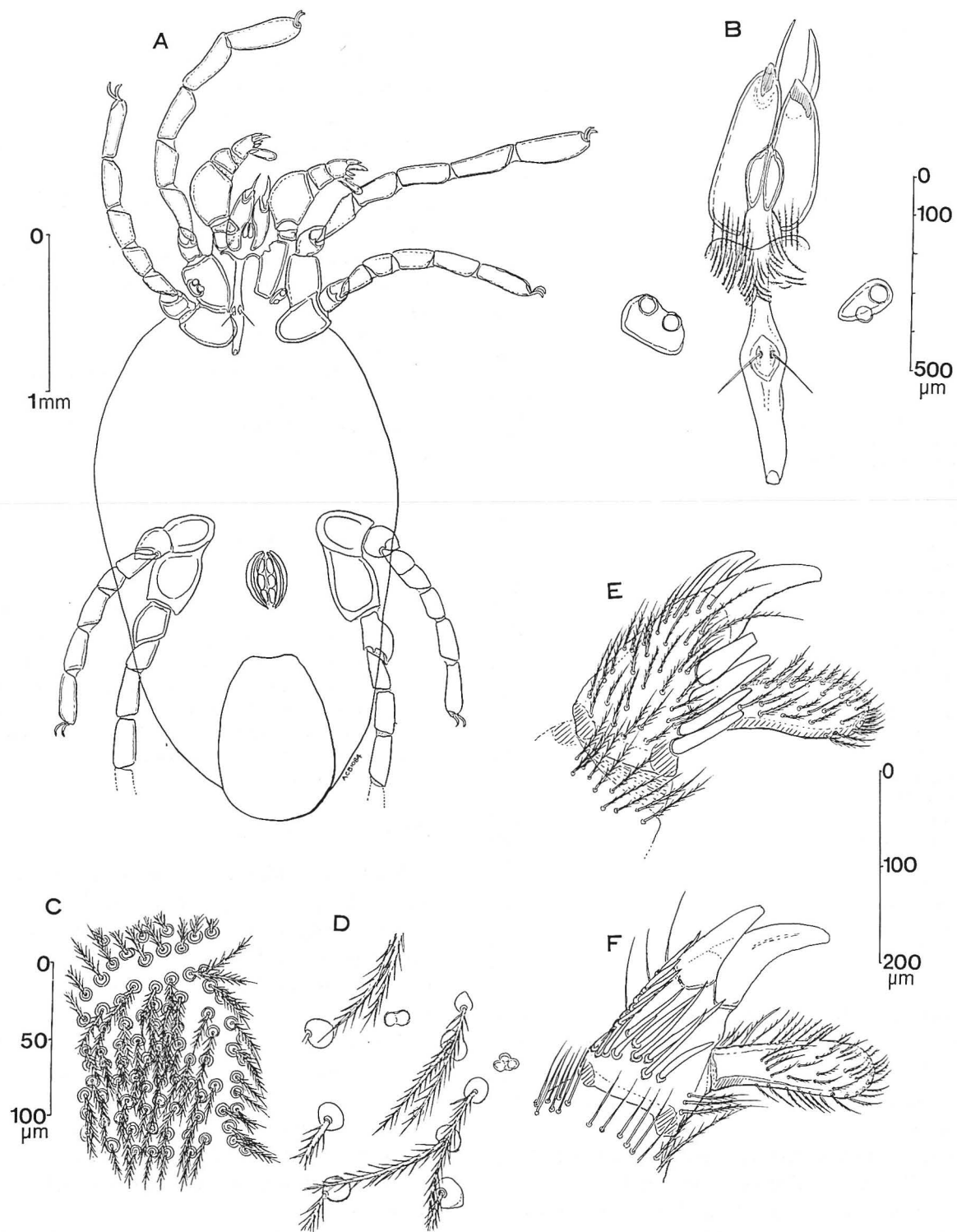


FIG. 3 : *Eutrombidium rileyi* n. sp., adult, holotype.

A. — Entire, in transparency, setae mostly omitted. B. — Dorsal aspect of chelicerae, crista and eyes. C. — Patch of central dorsal idiosomal setae. D. — Patch of setae on pygosomal scutum. E. — Tip of palp, lateral aspect. F. — Tip of palp, medial aspect. (Each to nearest scale).

with slightly emarginate anterior border, with numerous small rounded foveae, 13-22 across, each with a seta similar to general dorsal idiosomatae, 72-143 long.

TABLE 3. Metric data for *Eutrombidium rileyi* n. sp., adult, holotype ACB1084.

Character	
CL	740
ASB	388
PSB	352
SB	48
Sens	135
DS	60-140
MDS	60-90
PDS	60-140
Pygosomal scutum length	1055
Pygosomal scutal width	830
Pygosomal scutal L/W	1.27
Genu I	392
Tibia I	455
Tarsus I (L)	493
Tarsus I (H)	192
TiI/GeI	1.16
TaI(L)/TaI(H)	2.57
Genu II	270
Tibia II	335
Tarsus II(L)	388
Tarsus II(H)	113
TiII/GeII	1.24
TaII(L)/TaII(H)	3.43
Genu III	253
Tibia III	311
Tarsus III(L)	338
Tarsus III(H)	120
TiIII/GeIII	1.23
TaIII(L)/TaIII(H)	2.82
Genu IV	366
Tibia IV	—
Tarsus IV(L)	—
Tarsus IV(H)	—
TiIV/GeIV	—
TaIV(L)/TaIV(H)	—

Ventral surface : external genitalia oval in outline, 380 long by 290 wide, with 3 + 3 oval acetabula, 78-98 long by 64-70 wide. Anus *c.* 200 long by *c.* 100 wide (somewhat obscured in preparation).

Legs of normal stature, lengths : I 2300, II 1740, III 1690, IV — (damaged, incomplete).

Gnathosoma : palp robust. Palpal tibia 298 long by 123 wide at base, i.e. 2.42 times as long as basal width. Odontus and paradont curved, pointed; odontus 143 long by 66 where widest, paradont 116 long by 38 where widest. Flexor surface of palpal

tibia with three or four coarse spinisetae laterally; medial face of palpal tibia with *c.* 20 spinisetae in an irregular transverse ctenidium, running into a longitudinal dorsal ctenidium. Palpal tarsus slender, 199 long by 53 wide, hirsute with well setulose setae. Cheliceral bases 445 long by 135 wide (each); cheliceral blade 211 long, with *c.* 15 fine dorsal (flexor) denticles.

Material examined : Holotype, Canada, Kirkwood Township District, 6.v.1964, J. MARTIN, red pine plantation, soil surface, vial #3, 64.671, ACB1084, CNC Type No. 20894.

Etymology : Named to commemorate C.V. RILEY, an early (1877) student of the Eutrombidiinae larvae parasitic on the "Rocky Mountain locust" in North America.

Eutrombidium locustarum (Walsh)

(Fig. 4 A-G)

Astoma locustarum WALSH, 1866, p. 126. *Microtrombidium locustarum* (Walsh) : EWING, 1909, pp. 53, 94. *Eutrombidium locustarum* (Walsh) : BERLESE, 1912, p. 113; THOR and WILLMANN, 1947, p. 235. *Euthrombidium trigonum* (Hermann, 1804) : EWING and HARTZELL, 1918, p. 262. *Eutrombidium trigonum* (Hermann) : SEVERIN, 1944, p. 1.

Diagnosis of adults :

Small mites, idiosoma to about 2.7 mm long (♂), 3.5 mm long (♀, unengorged). Palpal tibia about 2.3 times as long as its basal width, with two coarse spinisetae on its flexor edge laterally, and about 10 spinisetae on medial face in a single curved ctenidium.

Pygosomal scutum oval, with numerous shallow seta-bearing foveae. Three pairs of genital acetabula.

Deutonymph : as for adult, but dimensions reduced by about 1/3, and two pairs of genital acetabula. Posterior dorsal idiosomal setae 36-60 µm long.

Description of deutonymph (from ACB652, slide-mounted) (Fig. 4 A-G).

Colour in life not recorded, presumably red. Idiosoma rhomboidal in dorsal view, with weak

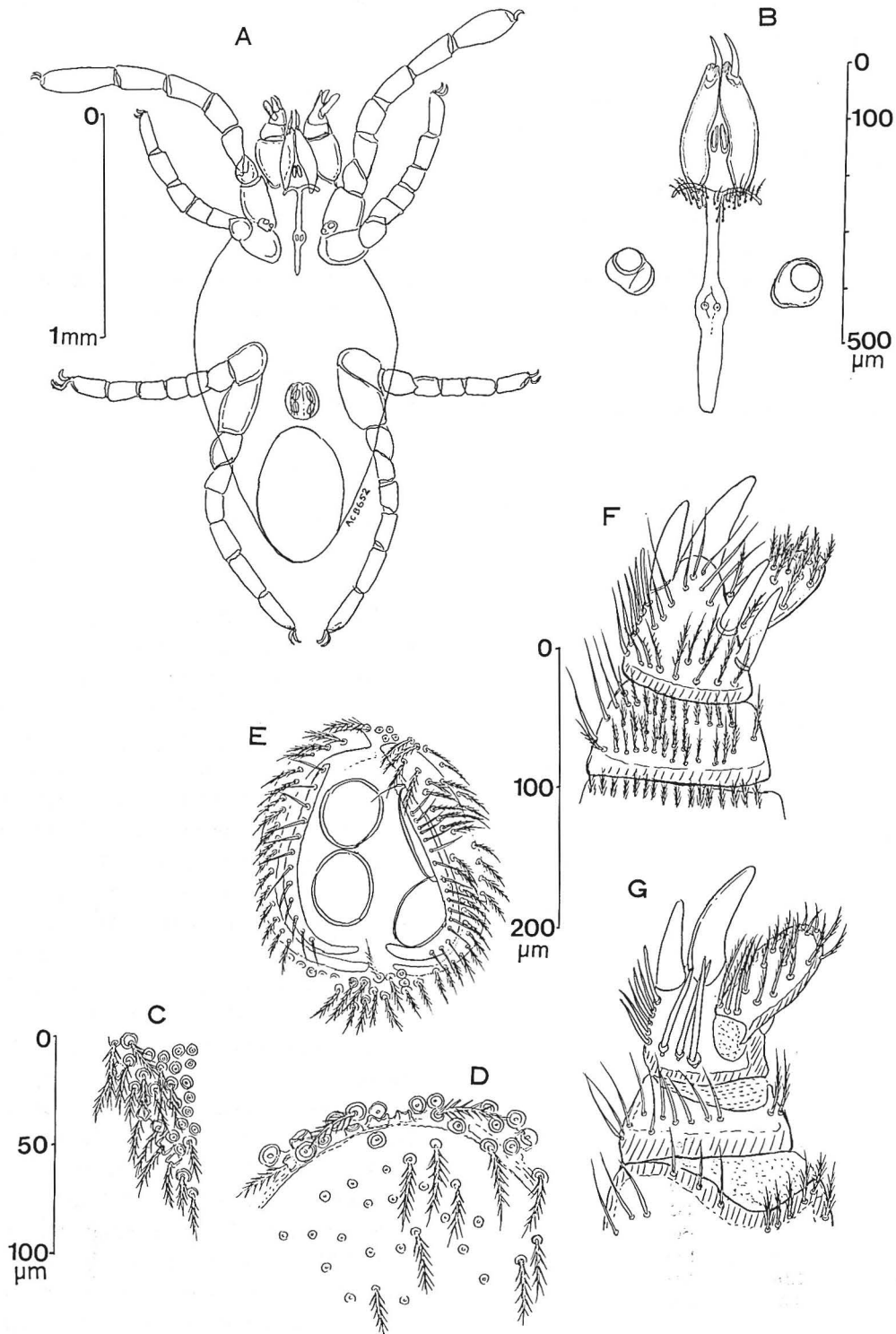


FIG. 4 : *Eutrombidium locustarum* (Walsh), deutonymph specimen ACB652.

A. — Entire, in transparency, setae omitted. B. — Dorsal aspect of chelicerae, crista and eyes. C. — Patch of posterior dorsal idiosomal setae. D.— Anterior end of pygosomal scutum. E. — External genitalia. F. — Tip of palp, lateral aspect. G. — Tip of palp, medial aspect. (Each to nearest scale; C, D to scale on left).

'shoulders' and rounded angles; posterior end narrowed; length 1690, width 950, over-all length to tip of cheliceral blades 1940.

Crista moderately chitinated, expanding anteriorly to a thin plate ('vomer') with a sinuous anterior margin, and covered with numerous, slender, pointed, setulose setae 56-68 long. Sensillary area of crista expanded, with two bothridia (sensillary seta of each missing in preparation; present, filiform, in deutonymph ACB1082). Crista extends posteriorad to a truncate posterior end.

Metric data as in Table 4.

TABLE 4. Metric data for *Eutrombidium locustarum* (Walsh), deutonymphs and adult

Specimen	Deutonymph ACB652	Deutonymph ACB1082	Adult (Berlese, 1912)
Character			
CL	394	361	—
ASB	210	196	—
PSB	184	165	—
SB	26	23	—
Sens	—	135	—
DS	30-59	29-72	—
MDS	30-43	29-36	—
PDS	36-59	47-57	—
Pygosomal scutum			
length	630	600	980
Pygosomal scutal			
width	408	422	590
Pygosomal scutal			
L/W	1.54	1.42	1.66.
Genu I	214	180	—
Tibia I	251	216	330
Tarsus I (L)	297	280	380
Tarsus I (H)	115	91	130
TiI/GeI	1.17	1.20	—
TaI(L)/TaI(H)	2.58	3.08	2.92
Genu II	141	128	—
Tibia II	157	154	—
Tarsus II(L)	200	203	—
Tarsus II(H)	59	53	—
TiII/GeII	1.11	1.20	—
TaII(L)/TaII(H)	3.39	3.83	—
Genu III	123	120	—
Tibia III	148	139	—
Tarsus III(L)	184	182	—
Tarsus III(H)	72	56	—
TiIII/GeIII	1.20	1.16	—
TaIII(L)/TaIII(H)	2.56	3.25	—
Genu IV	197	181	—
Tibia IV	238	—	—
Tarsus IV(L)	238	—	—
Tarsus IV(H)	76	—	—
TiIV/GeIV	1.21	—	—
TaIV(L)/TaIV(H)	3.13	—	—

Eyes: each lateral pair on a short peduncle, 90 by 64 (maximum and minimum diameters in dorsal view); corneal lenses subequal, anterolateral 63 across, posteromedial 39.

Dorsum of idiosoma thickly covered with slender, pointed, setulose setae, each arising from a small papilla. Pygosomal scutum ovoid, narrowing slightly anteriorly, covered with numerous shallow, rounded foveae 6-11 across, each bearing a seta similar to those of surrounding idiosoma.

Ventral surface of idiosoma: with numerous setae similar to those of dorsum. External genitalia oval, 170 long by 180 wide, with two valves on each side; inner valve plate with 13-15 pointed, simple setae, 25-36 long; outer valve plate with setae similar to adjacent idiosoma. Genital acetabula: two pairs, large, oval, 54-59 long by 42-45 wide. Anus oval, 110 long by 60 wide.

Legs of normal stature for genus, lengths: I 1255, II 900, III 830, IV 1160.

Gnathosoma: palp robust, palpal tibia 165 long by 93 wide at base, ratio L/W = 1.77. Odontus strong, curved, paradont similar, diverging from odontus; odontus 95 long by 34 wide where widest; paradont 72 long by 21 wide where widest. Two stout spinisetae on flexor edge of palp tibia laterally. On medial face of palpal tibia six weak spinisetae behind paradont, and three stronger, in a short, transverse ctenidium. Palpal tarsus 90 long by 38 wide, with numerous pointed, setulose setae; some pointed solenoidae terminally.

Each cheliceral basis 235 long by 76 wide; cheliceral blades slender, pointed, 102 long, with c. 15 fine dorsal (flexor) denticles.

Material examined: United States, Jefferson Co., Missouri, 10.vi.1962, W. W. DOWDY, 0-2 in. [0-5 cm] deep in bluegrass comm. Hoyer's medium - 1 [acto?] p [henol?], deutonymph, ACB652 (per W. W. Moss). Remounted on two slides, in Hoyer's medium, 7.viii.1990 (SAM). Canada: New Brunswick Kent Co., Kouchibouguac National Park, 27-28.ix.1977, I. M. SMITH 6089E, one deutonymph, ACB1082, from "mouse run litter and soil in old field" (?mountant; genitalia obscured). (CNC).

REMARKS

BERLESE (1912) described an adult (or conceivably, a deutonymph) of *Eutrombidium* sent to him by H. E. EWING from an unspecified North American locality as *Eutrombidium locustarum*. Although the information available and the presumed lack of preserved type material of WALSH does not allow one to know which species WALSH had under examination (or in fact, as to whether was more than one species) I have accepted the determination of BERLESE as defining *E. locustarum*.

The present writer has been able to study only two post-larval specimens of *E. locustarum*, as listed above. One (ACB652) is certainly a deutonymph. In the other (ACB1082) the genitalia are obscured, but its leg dimensions are similar to those of ACB652, and significantly smaller than those given by BERLESE. Although BERLESE did not describe the genitalia of his specimen, one may accept it as an adult on the dimensions he gave for the tibia I and tarsus I. The structure of the palp of the two deutonymphs listed above matches the figure and description of BERLESE. If we accept that SEVERIN's specimens are also of *E. locustarum* based on the similarity of the figure given for the palpal tibia to those of ACB652 and ACB1082 for deutonymphs, we may compare the idiosomal sizes of the material studied by these three authors in Table 5. From a comparison of the data given by SEVERIN, BERLESE's specimen can reasonably be identified as an adult male (from the idiosomal width).

TABLE 5. Idiosomal sizes (mm) of post-larval *Eutrombidium locustarum*

Author	Instar	Idiosomal length	Idiosomal width
Severin (1944)	Deutonymph	0.7-2.0	0.4-1.0
»	adult ♂	1.2-2.7	1.0-1.5
»	adult ♀	2.2-3.5	1.3-2.0
»	(unengorged)		
»	adult ♀	(max.) 5.0	(max.) 2.7
»	(engorged)		
Berlese (1912)	presumed adult (?sex)	2.3	1.1
This paper	deutonymph, mounted, ACB652	1.7	0.95
»	presumed deutonymph, mounted, ACB1082	2.2	1.2

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