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Chigger mites of the genus *Eutrombicula* Ewing, 1938 (Acari: Trombiculidae) from Cuba, with the description of three new species

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Abstract. Three new species of chigger mites, *Eutrombicula cubensis* sp. n. and *E. anguliscuta* sp. n. from lizards and bats, and *E. leiocephali* sp. n. from lizards, are described. One species, *E. lipovskyana* (Wolfenbarger, 1953), is recorded for the first time in Cuba. Data on distribution of *E. alfreddugesi* (Oudemans, 1910) in Cuba are reported.

The genus *Eutrombicula* Ewing, 1938 including nearly 80 species is distributed mainly in the Western Hemisphere. Several species were reported as having medical and veterinary importance. The last revision of the genus *Eutrombicula* was presented by Loomis and Wrenn (1984) briefly and classified the known species into six groups involving 30 unnamed species. Therefore, further taxonomic investigations and descriptions of new *Eutrombicula* species are urgently needed, especially in northern South America where the *Eutrombicula* fauna is abundant.

Only one species of the genus *Eutrombicula*, *E. alfreddugesi* was previously reported from Cuba. In the present paper five *Eutrombicula* species including three new to science are described.

MATERIALS AND METHODS

The chiggers were collected by the group of Czech and Cuban zoologists individually mentioned in the paper by de la Cruz and Daniel (1994). Hosts were determined by Drs. O.H. Garrido (reptiles and birds) and G. Silva-Taboada (bats). Mites were mounted in Hoyer's medium or in de Faure-Berlese's medium. All measurements are given in micrometres (μm). Terminology follows Goff et al. (1982), with some adaptation: "ventral setae" (V) – setae on the ventral surface of idiosoma excluding coxal and sternal setae; VS – number of ventral setae; D – dorsal idiosomal setae; DS – number of dorsal idiosomal and humeral setae; TaIII – length of leg III tarsus; TaW – width of leg III tarsus; m-t – ratio between distance from mastitarsala to the base of leg III tarsus and length of leg III tarsus. Type specimens are deposited in the acarological collections of the Zoological Institute of the Russian Academy of Sciences, Saint-Petersburg (ZIN), the Institute of Parasitology, Academy of Sciences of the Czech Republic, České Budějovice (PaÚ) and in the collection of the senior author.

RESULTS

Eutrombicula cubensis sp. n. Figs. 1–11

Diagnosis. SIF = 7BS-N-2-3111.1000; fPp = B/N/NNB; fCx = 1.1.1; fSt = 2.2; fSc: PL>AL = AM; Ip = 747; fD = 2H-6-6-6-2; fV = 6-2-2-2; DS = 22; VS = 12; NDV = 34.

Description. LARVA. Idiosoma. Eyes 2+2. One pair of humeral setae; 20 dorsal idiosomal setae, arranged 6-6-6-2 (6-6-4-4); 2 pairs of sternal setae and 12 ventral setae, arranged 6-2-2-2; total idiosomal setae 34. Gnathosoma. Cheliceral blade with tricuspid cap; cheliceral base with dense small puncta in basal part and sparse large puncta in middle portion; gnathobase with sparse puncta and transverse striations, bearing a pair of branched setae; palpal femur and genu sparsely punctate; galeala nude; palpal claw with 2 equal prongs; seta on palpal femur branched; seta on palpal genu nude; dorsal and lateral palpal tibial setae nude, ventral palpal tibial seta with few branches; palpal tarsus with strongly branched dorsal seta, 6 weakly branched ventral and lateral setae, nude subterminala and tarsala. Scutum. Nearly rectangular, with rounded posterior margin, sparse moderate puncta, and indistinct transverse striations; AM base on level of ALs; SB anterior to level of PLs; PL>AL = AM; sensilla flagelliform with 7–8 branches in distal half. Legs. All 7-segmented, with a pair of claws and clawlike empodium. Leg I: coxa with 1 non-specialised branched seta (1B); trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 genualae, microgenuala; tibia 8B, 2 tibialae, microtibiala; tarsus 22B, tarsala 19–22 (20) long, microtarsala, subterminala, parasubterminala, pretarsala. Leg II: coxa 1B; trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, genuala; tibia 6B, 2 tibialae; tarsus 16B, tarsala 13–14 (13) long, microtarsala, pretarsala. Leg III:

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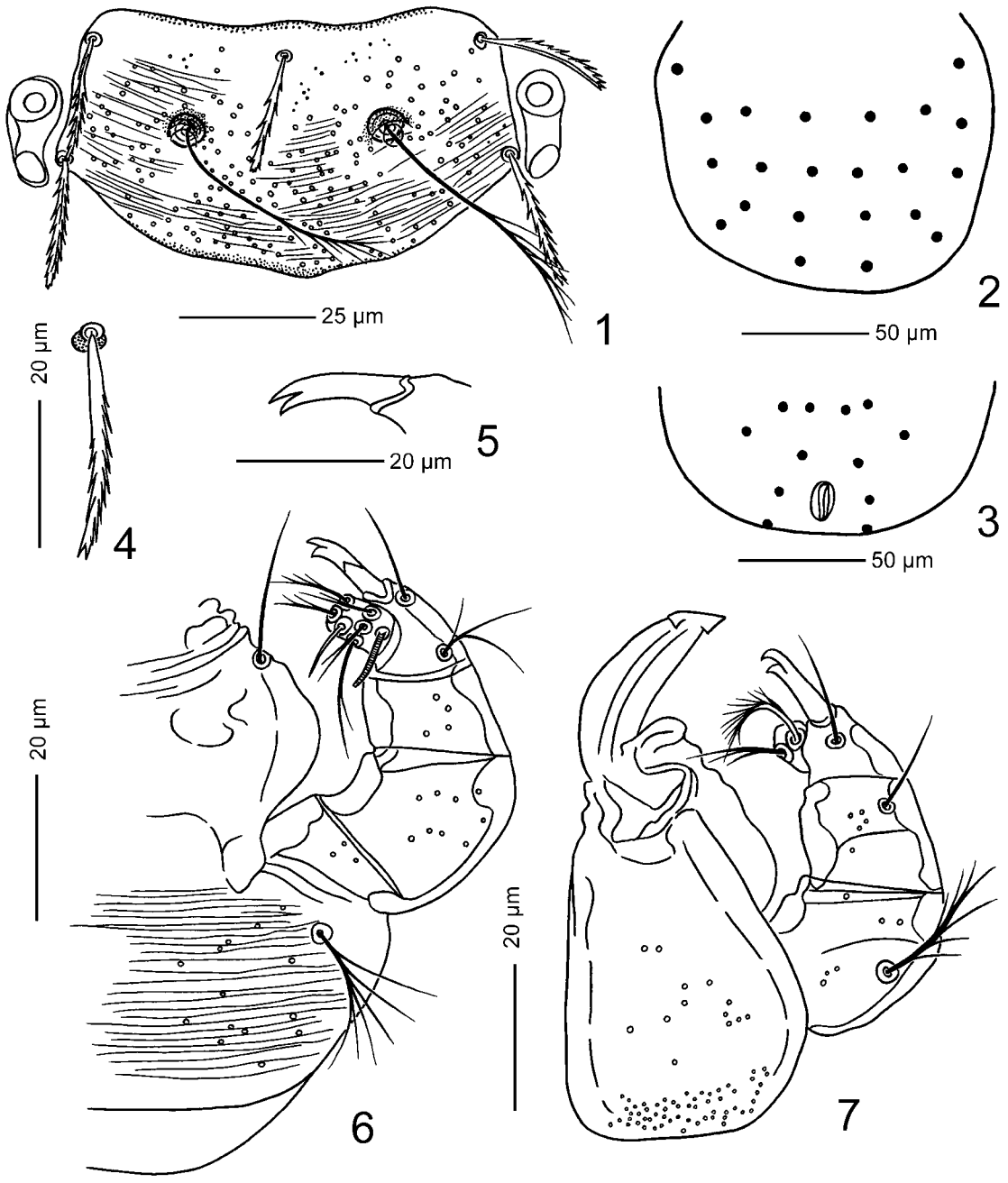


Figs. 1–7. *Eutrombicula cubensis* sp. n., larva. **Fig. 1.** Scutum and eyes. **Fig. 2.** Arrangement of dorsal idiosomal setae in unengorged specimen. **Fig. 3.** Arrangement of ventral idiosomal setae in unengorged specimen. **Fig. 4.** Dorsal idiosomal seta. **Fig. 5.** Palpal claw, lateral view. **Fig. 6.** Ventral aspect of gnathosoma. **Fig. 7.** Dorsal aspect of gnathosoma.

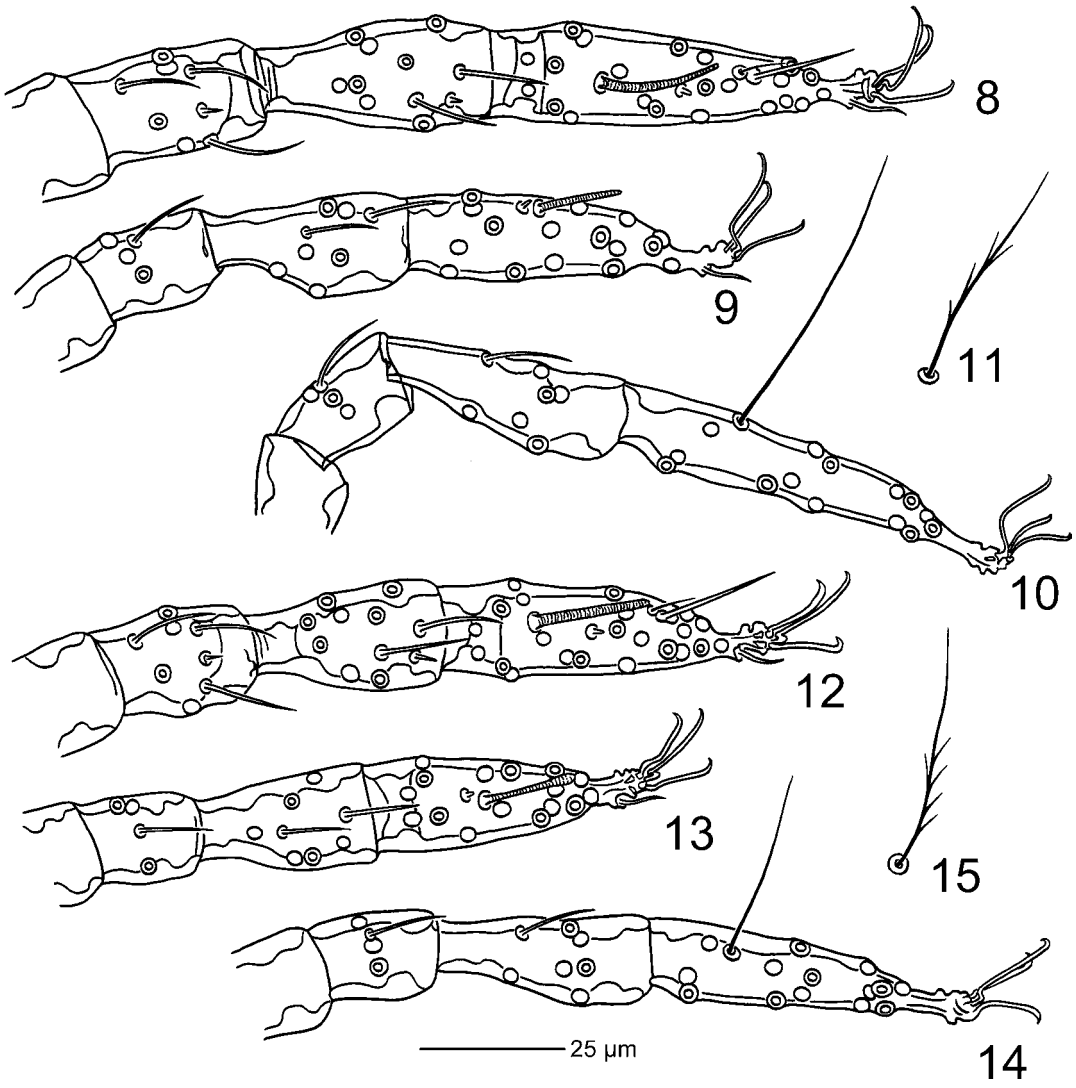
coxa 1B; trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, genuala; tibia 6B, tibiala; tarsus 14B, mastitarsala nude or weakly branched.

Standard measurements of the type series (n = 16):

	AW	PW	SB	ASB	PSB	SD
Holotype	68	79	36	20	26	46
Minimum	59	73	32	20	23	45
Maximum	72	83	38	24	29	52
Mean	64	78	35	21	27	48

P-PL	AP	AM	AL	PL	S	H	D
20	21	21	22	24	44	25	21–27
17	19	21	20	24	40	25	19–26
22	27	26	25	32	50	35	30–35
19	24	23	22	29	45	31	25–30

V	pa	pm	pp	Ip	TaIII	TaW	m-t
22–27	261	216	230	707	61	12	0.382
22–27	256	207	230	700	58	11	0.264
23–31	286	239	277	803	72	13	0.400
23–29	268	226	253	747	67	12	0.320



Figs. 8–11. *Eutrombicula cubensis* sp. n., larva. **Fig. 8.** Leg I. **Fig. 9.** Leg II. **Fig. 10.** Leg III. **Fig. 11.** Branched variant of mastitarsala. **Figs. 12–15.** *Eutrombicula anguliscuta* sp. n., larva. **Fig. 12.** Leg I. **Fig. 13.** Leg II. **Fig. 14.** Leg III. **Fig. 15.** Branched variant of mastitarsala.

H o s t s : *Leiocephalus cubensis* (Gray, 1840), *L. macropus* Cope, 1863, *L. stictigaster* Schwartz, 1959 (Reptilia, Squamata, Iguanidae); *Ameiva auberi* Cocteau, 1838 (Reptilia, Squamata, Teiidae); *Pteronotus macleayii* (Gray, 1839) (Mammalia, Chiroptera, Mormoopidae).

T y p e d a t a : Holotype larva (C-36, T-Tr.-22), Cayuelo de la Vela, 13 March 1965, from *A. auberi*. 147 paratypes: 14 larvae, same data as holotype; 4 larvae, Trinidad Province, Guaurabo, Carretera del Rio, 1 March 1965, from *L. cubensis*; 17 larvae, Trinidad Province, Rio Guaurabo, Ceiba de Hernan Cortez, 1 March 1965, from *L. cubensis*; 32 larvae, Cayo Lanzanillo, 11–12 March 1965, from *A. auberi*; 1 larva, Santa Cruz del Zaele, 24 March 1965, from *L. cubensis*; 2 larvae, Oriente Province, Gibara, 28 March 1965, from *L. cubensis*; 12 larvae, Oriente Province, Vereon, Cabo Cruz, 30 March 1965, from *A. auberi* and *L. macropus*; 49 larvae, Cayo Postrero, 15 Apr. 1965, from *L. cubensis*; 1 larva, Cayo Piedra, 15 Apr. 1965, from *L. stictigaster*; 9 larvae, Punta del Este, 17 Apr. 1965, from *L. cubensis*; 6 larvae, Sancti Spiritus Province, Cueva de Colón, 25 Apr. 1965, from *P. macleayii*. The holotype and 100 paratypes (nos. C-8 to C-645) are deposited in ZIN; 27 paratypes (nos. C-12 to C-633) are deposited in PaÚ (coll. no. PaÚ 1998); 20 paratypes (nos. C-27 to C-420) are deposited in the collection of the senior author.

E t y m o l o g y : Specific epithet refers to the *terra typica*.

Differential diagnosis. The new species is similar to *Eutrombicula belkini* (Gould, 1950) and differs from it in having fD = 2H-6-6-6-2 versus 2H-6-6-4-2 (6-6-2-4), shorter setae (average AL = 22 versus 31, PL = 29 versus 41), shorter and less branched sensilla (S = 45 versus 55, sensilla with 7–8 branches versus 10–14), tarsala I 19–22 long versus 10–12 according to Wolfenbarger (1953), mastitarsala frequently nude versus always branched and palpal genual seta always nude versus frequently branched.

Eutrombicula anguliscuta sp. n. Figs. 12–21

Diagnosis. SIF = 7BS-N-2-3111.1000; fPp = B/B/NNN; fCx = 1.1.1; fSt = 2.2; fSc: PL>AM>AL; Ip = 678; fD = 2H-6-6-2-4; fV = 6-2-2-2; DS = 20; VS = 12; NDV = 32.

Description. LARVA. Idiosoma. Eyes 2+2. One pair of humeral setae; 18 dorsal idiosomal setae, arranged 6-6-2-4 (6-6-4-2); 2 pairs of sternal setae and 12 ventral setae, arranged 6-2-2-2; total idiosomal setae 32. Gnathosoma. Cheliceral blade with tricuspid cap; cheliceral base with dense small puncta in basal part and few large puncta in middle portion; gnathobase with sparse puncta, without transverse striations, bearing a pair of branched setae; palpal femur and genu with few puncta; galeala nude; palpal claw with 2 equal prongs or inner prong somewhat larger; setae on palpal femur and genu weakly branched; all palpal tibial setae nude; palpal tarsus with strongly branched dorsal seta, moderately branched lateral seta and 5 weakly branched ventral setae, nude subterminala and tarsala. Scutum. Nearly pentagonal, with angulate posterior margin and sparse puncta, without transverse striations; AM base on level of ALs; SB anterior to level of PLs; PL>AM>AL; sensilla flagelliform with 6–7 branches in distal half. Legs. All 7-segmented, with a pair of claws and claw-like empodium. Leg I: coxa 1B; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 genualae, microgenuala; tibia 8B, 2 tibialae, microtibiala; tarsus 22B, tarsala 15–20 (18) long, microtarsala, subterminala, parasubterminala, pretarsala. Leg II: coxa 1B; trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, genuala; tibia 6B, 2 tibialae; tarsus 16B, tarsala 14–16 (15) long, with inflated apex, microtarsala, pretarsala. Leg III: coxa 1B; trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, genuala; tibia 6B, tibiala; tarsus 14B, mastitarsala nude or branched.

Standard measurements of the type series (n = 15):

	AW	PW	SB	ASB	PSB	SD
Holotype	65	74	36	23	25	48
Minimum	59	70	33	17	23	42
Maximum	68	82	38	23	29	51
Mean	64	75	36	20	26	46

P-PL	AP	AM	AL	PL	H	D	V
20	22	25	22	36	33	28–34	25–31
16	19	21	18	29	29	23–29	23–25
20	25	25	23	41	38	31–36	28–33
19	22	23	21	35	33	26–33	25–30

pa	pm	pp	Ip	TaIII	TaW	m-t
245	211	239	695	61	12	0.309
220	178	218	616	50	11	0.239
256	227	245	722	61	14	0.359
239	206	232	678	57	12	0.314

H o s t s : *Anolis bartschi* (Cochran, 1928), *A. chamaeleonides* Dumeril et Bibron, 1837, *A. equestris* Merrem, 1820, *Norops sagrei* (Dumeril et Bibron, 1837), *Leiocephalus cubensis*, *L. macropus*, *L. stictigaster* (Reptilia, Squamata, Iguanidae); *Natalus lepidus* (Gervais, 1837) (Mammalia, Chiroptera, Natalidae); *P. macleayii* (Mammalia, Chiroptera, Mormoopidae).

T y p e d a t a : Holotype larva (C-221, T-Tr.-24), Cayo Postrero, 15 Apr. 1965, from *L. cubensis*. 63 paratypes: 9 larvae, same data as holotype; 4 larvae, Zapata, Camino de Santo Tomas (between Santo Tomas and Playa Larga), 26 Feb. 1965, from *A. chamaeleonides*; 1 larva, Zapata, Santo Tomas, 26 Feb. 1965, from *N. sagrei*; 8 larvae, Oriente Province, Vereon, Cabo Cruz, 30 March 1965, from *N. sagrei* and *L. macropus*; 24 larvae, Cayo Piedra, 15 Apr. 1965, from *L. stictigaster*; 1 larva, Siguanea, 16 Apr. 1965, from *L. cubensis*; 8 larvae, Punta del Este, 17 Apr. 1965, from *L. cubensis*; 1 larva, Pinar del Rio Province, Viñales, Valle de San Vincente, 20 Aug. 1965, from *A. bartschi*; 4 larvae, Carapachibey, 18 Apr. 1965, from *A. equestris*; 1 larva, Sancti Spiritus Province, Cueva de Colón, 25 Apr. 1965, from *P. macleayii*; 2 larvae, La Habana Province, Guanajay, Cueva de William Palmer, 12 Aug. 1965, from *N. lepidus*. The holotype and 33 paratypes (nos. C-1 to C-655) are deposited in ZIN; 15 paratypes (nos. C-2 to C-652) are deposited in PaÚ (coll. no. PaÚ 1999); 15 paratypes (nos. C-62 to C-654) are deposited in the collection of the senior author.

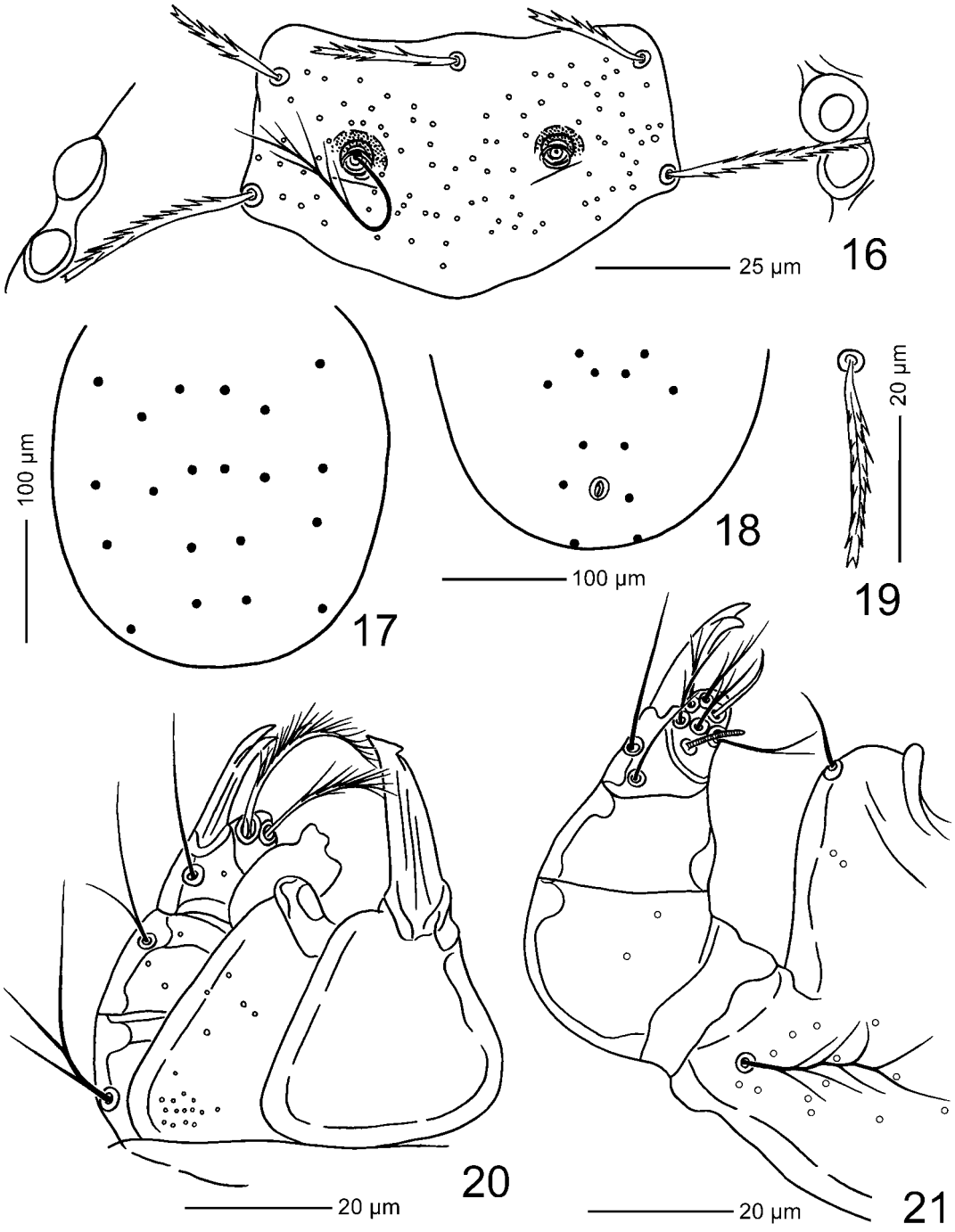
E t y m o l o g y : Specific epithet refers to the angulate posterior margin of the scutum.

Differential diagnosis. The new species differs from all other *Eutrombicula* species in having an angulate posterior margin of the scutum, which is characteristic of the genus *Neotrombicula* Hirst, 1925. It is most similar to *E. belkini* and differs from this species, in addition to the above character, in having a nude ventral palpal tibial seta, less branched sensilla (6–7 branches versus 10–14), much longer tarsala I (15–20 versus 10–12) and absence of striations on the scutum and gnathobase.

Eutrombicula leiocephali sp. n. Figs. 22–29

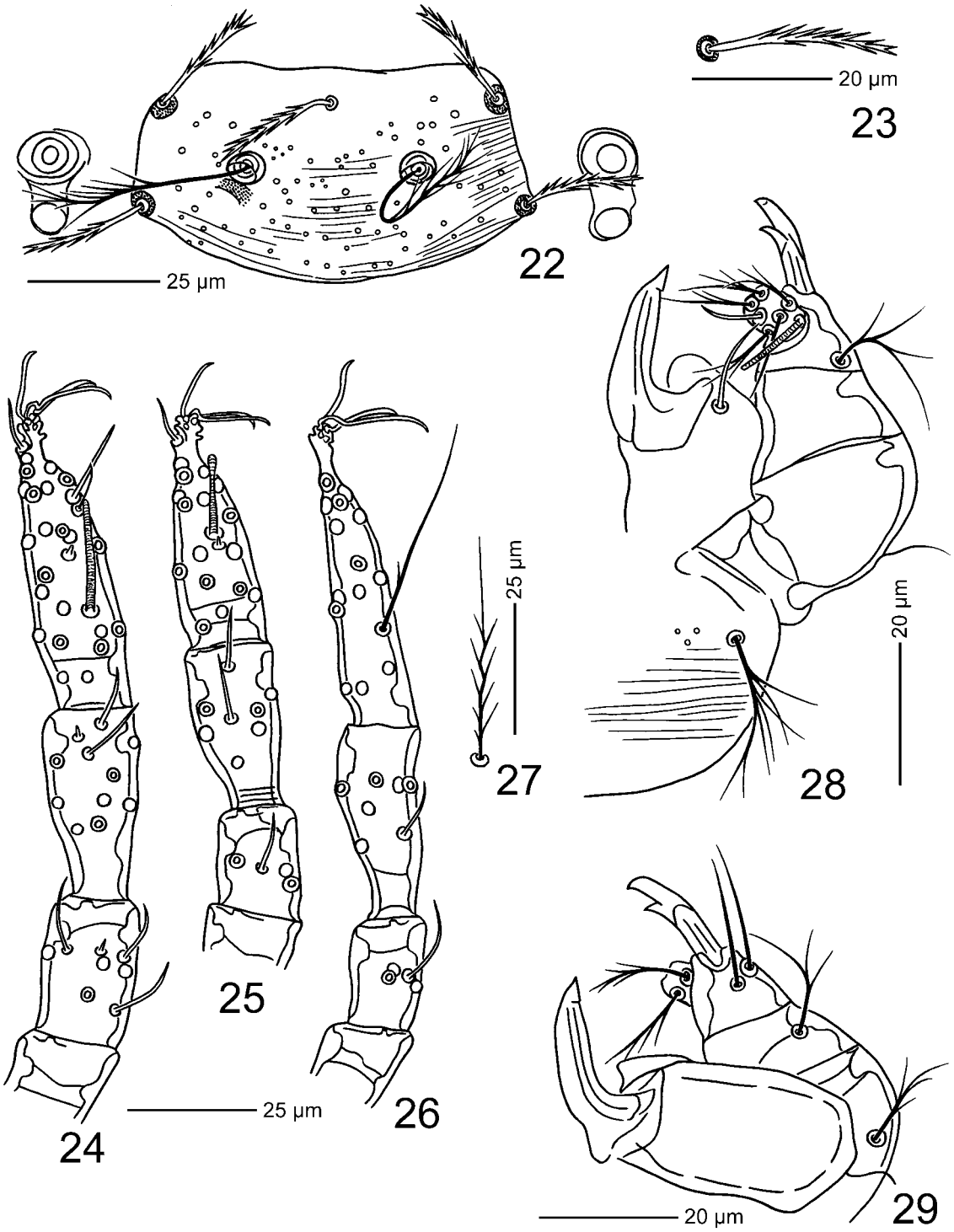
Diagnosis. SIF = 7BS-N-2-3111.1000; fPp = B/B/NNB; fCx = 1.1.1; fSt = 2.2; fSc: PL>AM>AL; Ip = 692; fD = 2H-6-6-6-2 or 2H-6-6-2-4; fV = 6-2-2-2; DS = 22 or 20; VS = 12; NDV = 34 or 32.

Description. LARVA. Idiosoma. Eyes 2+2. One pair of humeral setae; 20 dorsal idiosomal setae, arranged 6-6-6-2, or 18 dorsal idiosomal setae, arranged 6-6-2-4 (in 25% of specimens examined); 2 pairs of sternal setae and 12 ventral setae, arranged 6-2-2-2; total idiosomal setae 34 or 32 (34 in holotype). Gnathosoma. Cheliceral blade with tricuspid cap; cheliceral base and palpi not punctate; gnathobase with few puncta and transverse striations, bearing a pair of branched setae; galeala nude; palpal claw 2-pronged, the outer prong much more larger; setae on palpal femur and genu weakly branched; dorsal and lateral palpal tibial setae nude, ventral palpal tibial seta with few branches; palpal tarsus with 7 weakly branched setae, nude subterminala and tarsala. Scutum. Nearly rectangular, with rounded posterior margin, sparse puncta of different size, and indistinct transverse striations; AM base on level of



Figs. 16–21. *Eutrombicula anguliscuta* sp. n., larva. **Fig. 16.** Scutum and eyes. **Fig. 17.** Arrangement of dorsal idiosomal setae in engorged specimen. **Fig. 18.** Arrangement of ventral idiosomal setae in engorged specimen. **Fig. 19.** Dorsal idiosomal seta. **Fig. 20.** Dorsal aspect of gnathosoma. **Fig. 21.** Ventral aspect of gnathosoma.

ALs; SB anterior to level of PLs; PL>AM>AL; sensilla flagelliform with 9–11 branches in distal half. Legs. All 7-segmented, with a pair of claws and clawlike empodium. Leg I: coxa 1B; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 genualae, microgenuala; tibia 8B, 2 tibialae, microtibiala; tarsus 22B, tarsala 17–24 (20) long, microtarsala, subterminala, parasubterminala, pretarsala. Leg II: coxa 1B; trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, genuala; tibia 6B, 2 tibialae; tarsus 16B, tarsala 14–18 (15) long, with inflated apex, microtarsala, pretarsala. Leg III: coxa 1B; trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, genuala; tibia 6B, tibiala; tarsus 14B, mastitarsala almost nude or branched.



Figs. 22–29. *Eutrombicula leiocephali* sp. n., larva. **Fig. 22.** Scutum and eyes. **Fig. 23.** Dorsal idiosomal seta. **Fig. 24.** Leg I. **Fig. 25.** Leg II. **Fig. 26.** Leg III. **Fig. 27.** Branched variant of mastitarsala. **Fig. 28.** Ventral aspect of gnathosoma. **Fig. 29.** Dorsal aspect of gnathosoma.

Standard measurements of the type series (n = 16):

	AW	PW	SB	ASB	PSB	SD	P-PL
Holotype	62	75	35	20	22	42	14
Minimum	60	70	30	19	20	40	12
Maximum	67	81	37	23	24	45	18
Mean	63	76	34	20	22	42	15

AP	AM	AL	PL	H	D	V	pa	pm
22	25	22	27	31	24–32	23–32	245	212
19	22	20	22	26	18–25	19–30	229	202
24	27	24	32	35	27–33	25–32	259	220
22	25	22	28	32	24–30	23–31	243	211

pp	Ip	DS	VS	NDV	TaIII	TaW	m-t
230	688	22	12	34	59	12	0.333
223	657	20	11	32	58	11	0.297
250	724	24	12	36	67	14	0.382
238	692	22	12	34	61	12	0.337

H o s t s : *Leiocephalus carinatus* (Gray, 1827), *L. macropus*, *L. raviceps* Cope, 1863 (Reptilia, Squamata, Iguanidae).

T y p e d a t a : Holotype larva (C-402, T-Tr.-23), Santiago de Cuba, Ciudamar, 20 Sept. 1965, from *L. carinatus*. 42 paratypes: 22 larvae, same data as holotype; 10 larvae, Oriente Province, Vereon, Cabo Cruz, 30 March 1965, from *L. macropus* and *L. carinatus*; 10 larvae, Oriente Province, Baitiquiri, 1 Apr. 1965, from *L. raviceps*. The holotype and 22 paratypes (nos. C-88 to C-414) are deposited in ZIN; 10 paratypes (nos. C-106 to C-413) are deposited in PaÚ (coll. no. PaÚ 2000); 10 paratypes (nos. C-104 to C-401) are deposited in the collection of the senior author.

E t y m o l o g y : Specific epithet derives from the generic name of the hosts.

Differential diagnosis. The new species is similar to *E. cubensis* and differs from it in a branched palpal genual seta, palpal claw with the outer prong much more larger than the inner prong, tarsala II with inflated apex, punctation of scutum and gnathosoma more sparse, scutum shorter (PSB = 20–24 versus 23–29, P-PL = 12–18 versus 17–22, SD = 40–45 versus 45–52) and legs shorter (Ip = 657–724 versus 700–803).

Remarks. Variation of fD in this species is unusual for the chiggers having so few idiosomal setae. Probably, *E. leiocephali* is identical with the unnamed species of *Eutrombicula* reported from Cuba by Dusbábek (1970). According to this author, his species resembles *E. belkini*, but differs in another form of posterior scutal margin and palpal claw as in *E. goeldii* (Oudemans, 1910) (the latter has a palpal claw with a long stout outer prong and a short inner prong). But possible host specificity of *E. leiocephali* (which was found at the time on lizards of the genus *Leiocephalus* only) is against this supposition, since the material studied by Dusbábek was collected on a host from another class, *Capromys pilorides* (Say, 1822) (Mammalia, Rodentia, Capromyidae). Unfortunately, the author did not give a complete morphological description of the species.

Eutrombicula alfreddugesi (Oudemans, 1910)

Standard measurements (n = 6):

	AW	PW	SB	ASB	PSB	SD
Minimum	73	86	41	23	30	56
Maximum	78	91	46	26	33	59
Mean	77	90	43	25	32	57

P-PL	AP	AM	AL	PL	H	D
20	25	30	29	34	35	27–35
23	31	33	34	39	41	30–38
21	28	31	32	37	39	29–36

pa	pm	pp	Ip	TaIII	TaW	m-t
288	247	279	815	70	14	0.256
311	279	306	896	77	15	0.275
298	261	288	847	73	14	0.264

H o s t s : Many species of reptiles, mammals, birds, amphibians and also human.

D i s t r i b u t i o n : Throughout the American continent from southern Canada to Argentina, Caribbean Islands.

M a t e r i a l e x a m i n e d : 9 larvae, Cayo Postrero, 15 Apr. 1965, from *Leiocephalus cubensis*; 11 larvae, Cayo Piedra, 15 Apr. 1965, from *L. stictigaster*.

Remarks. *E. alfreddugesi* is the only species of the genus *Eutrombicula* previously reported from Cuba (de la Cruz and Abreu 1986, de la Cruz and Daniel 1994). But all data concerning findings of this species should be verified, since literary faunistic records of *E. alfreddugesi* include many cases of misidentification (Loomis and Wrenn 1984). According to our data, *E. alfreddugesi* is a rather rare species in Cuba, as compared with *E. cubensis* and *E. anguliscuta*.

Eutrombicula lipovskyana (Wolfenbarger, 1953)

Standard measurements (n = 7):

	AW	PW	SB	ASB	PSB	SD
Minimum	76	87	40	25	28	54
Maximum	86	98	44	32	35	65
Mean	81	94	43	28	31	59

P-PL	AP	AM	AL	PL	H	D
18	27	31	29	44	43	32–41
24	32	38	38	52	50	41–49
20	29	35	34	49	46	37–46

pa	pm	pp	Ip	TaIII	TaW	m-t
324	286	322	949	79	16	0.269
358	306	356	1021	90	17	0.323
346	298	340	984	86	16	0.304

H o s t s : Many species of birds, reptiles, mammals and rarely amphibians.

D i s t r i b u t i o n : southern United States (Kansas, Tennessee, Mississippi, Louisiana, Arkansas, Oklahoma), Panama. Recorded in Cuba for the first time.

M a t e r i a l e x a m i n e d : 23 larvae, Zapata, Camino de Santa Tomas, 26 Feb. 1965, from *Saurothera merlini* Orbigny, 1839 (Aves, Cuculiformes, Cuculidae); 15 larvae, Cayo Postrero, 15 Apr. 1965, from *Leiocephalus cubensis* and *S. merlini*.

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