Acarina 10 (2): 149–154

NEW DATA ON CHIGGER MITES OF THE SUBFAMILY LEEUWENHOEKIINAE (ACARI: TROMBICULIDAE) PARAZITIZING BATS IN CUBA

НОВЫЕ ДАННЫЕ О КЛЕЩАХ-КРАСНОТЕЛКАХ ПОДСЕМЕЙСТВА LEEUWENHOEKIINAE (ACARI: TROMBICULIDAE) — ПАРАЗИТАХ ЛЕТУЧИХ МЫШЕЙ КУБЫ

M. Daniel[1], A.A. Stekol'nikov[2]
М. Даниел[1], А.А. Стекольников[2]

[1] School of Public Health, Institute for Post-Graduate Medical Education, Ruská 85, 100 05 Prague 10, Czech Republic
[2] Zoological Institute, Russian Academy of Sciences, Universitetskaya emb. 1, Saint-Petersburg, 199034, Russia
[1] Школа здравоохранения, Институт последипломного медицинского обучения, Руска, 85, 100 05, Прага 10, Чешская Республика
[2] Зоологический институт, Российская Академия наук, Университетская наб., 1, С.Петербург, 199034, Россия.

Key words: mites, Leeuwenhoekiinae, chiggers, systematics, bats, Cuba
Ключевые слова: клещи, Leeuwenhoekiinae, краснотелки, систематика, летучие мыши, Куба

ABSTRACT

The genus *Ischnothrombium* Feider, 1983 is synonymized with *Whartonia* Ewing, 1944. Redescription of *Whartonia diploctenum* (Feider, 1983) **comb.n.** is given based on larvae collected in nature. A new species, *Whartonia delacruzi* **sp.n.** from bats is described. *Wagenaaria similis* Brennan, 1967 is reported from a new locality in Cuba; morphological data are provided.

РЕЗЮМЕ

Род *Ischnothrombium* Feider, 1983 сведен в синоним к *Whartonia* Ewing, 1944. Дано переописание *Whartonia diploctenum* (Feider, 1983) **comb.n.** по личинкам, собранным в природе. Описан новый вид, *Whartonia delacruzi* sp.n., с летучих мышей Кубы. *Wagenaaria similis* Brennan, 1967 отмечается в новом местонахождении на Кубе; приведены морфологические данные.

INTRODUCTION

The recent revision of Cuban Leeuwenhoekiinae [de la Cruz, Daniel, 1994] included data on 4 species. One of them, *Pentagonotectum decui* Feider, 1983, is a species of dubious systematic position, with its larvae remaining unknown. This situation is not unique in trombiculid mites, which taxonomy is based mainly on larval characters. The other species were *Antrohoekia inexpectata* Cruz et Daniel, 1994, *Ischnothrombiiim diploctenum* Feider, 1983 and *Wagenaaria similis* Brennan, 1967. The subsequent study of the collections made in 1965-1985 by Czechoslovak-Cuban joint expeditions revealed one new species close to *I. diploctenum*. Its description is given below. Some new data on *W. similis* are also provided.

The chiggers were collected in 1965-1966 by Drs. V. Černý, F. Dusbábek, M. Daniel, J. de la Cruz and other Czech and Cuban zoologists [de la Cruz, Daniel, 1994]. Individual collectors were not indicated in the field protocols. Therefore, the collectors names are also not included individually in the present paper. Dr. G. Silva-Taboada determined hosts.

MATERIALS AND METHODS

Mites were mounted in Hoyer's medium. All measurements are given in micrometers (μm). In the formulas of dorsal idiosomal setae arrangement (fD) the double rows are given in square brackets, variations of setae numbers are given in round brackets. The paragraph "N" indicates a number of measured structures in the tables. If some structure is unpaired, this number coincides with a number of measured specimens (except those with this structure damaged or bent; in such case it can not be measured). In other case N is about two times as much as the number of specimens. We follow the terminology of Goff et al. [1982], with some adaptations: "ventral setae" (V) are the 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 the leg III tarsus; TaW — width of the leg III tarsus. Materials examined are deposited in the collections of Zoological Institute of the Russian Academy of Sciences, St. Petersburg (ZISP), in the acarological collections of the Institute of Parasitology of the Academy of Sciences of the Czech Republic, České Budějovice (ASCR) and in the acarological collection of the senior author.

GENUS *WHARTONIA* EWING, 1944

Ewing, 1944: 102; Brennan, Goff, 1977: 565; Hoffmann, 1990: 190. — *Ischnothrombium* Feider, 1983: 149, **syn.n.;** de la Cruz, Daniel, 1994: 71.

Whartonia diploctenum (Feider, 1983), comb.n.

Figs. 1-3.

Feider, 1983: 149, fig. 1–*8 (Ischnothrombium; adult)*; *de* la Cruz, Socarrás, 1993: 2, fig. 1-2 *(Ischnothrom bium*; larva); de la Cruz, Daniel, 1994: 71 (*Ischno thrombium*).

Material. 4 larvae, Matanzas Province, Camarioca, Cueva de Santa Catalina, 3 Aug. 1965, from *Ph. poeyi;* 1 larva, from *M. blainvillii,* other data same; 10 larvae, Habana Province, Tapaste, Cueva del Indio, 28 Dec. 1965, from *B. nana*; 1 larva, same locality, 24 May 1965, from *Pt. quad rid ens.*

Diagnosis: SIF=7B–N–(6–7)–2211.1000; fPp=B/B/BBN; fCx=2.1.1; fSt=0.2; fSc: PL>AM> AL; Ip=1042; fD=[7–11]–12–15–9–7–6; DS=66; VS=56; NDV=122.

DESCRIPTION OF LARVA

Gnathosoma. Cheliceral blade strong, having about 8 broad ventral teeth with their size decreasing from the base to the apex, the large dorsal hook and about 4 or more small teeth located between this hook and the apex; cheliceral base moderately punctate; gnathobase moderately punctate, bearing a pair of branched setae similar with coxal and sternal setae; galeala nude; palpal claw with 3 large apical and about 3–4 lateral prongs; setae on palpal femur and genu with few hardly visible ciliae or nude; palpal tibial setae: dorsal seta strong, densely covered with small barbs, lateral seta with few ciliae or nude, ventral seta short and nude; palpal tarsus with 4 weakly barbed and 3 nude or almost nude setae and tarsala.

Idiosoma. Densely punctate with large punctae. Eyes absent. Spiracles and tracheae absent. Humeral setae not separated from dorsal; 62–68 dorsal idiosomal setae, weakly barbed, arranged [(5–8)–(11–12)]–(11–13)–(13–16)–(8–9)–(5–7)–(4–7); 1 pair of sternal setae, situated between coxae III, with rare, strong, pointed barbs; 50–63 ventral setae; total idiosomal setae 114–131.

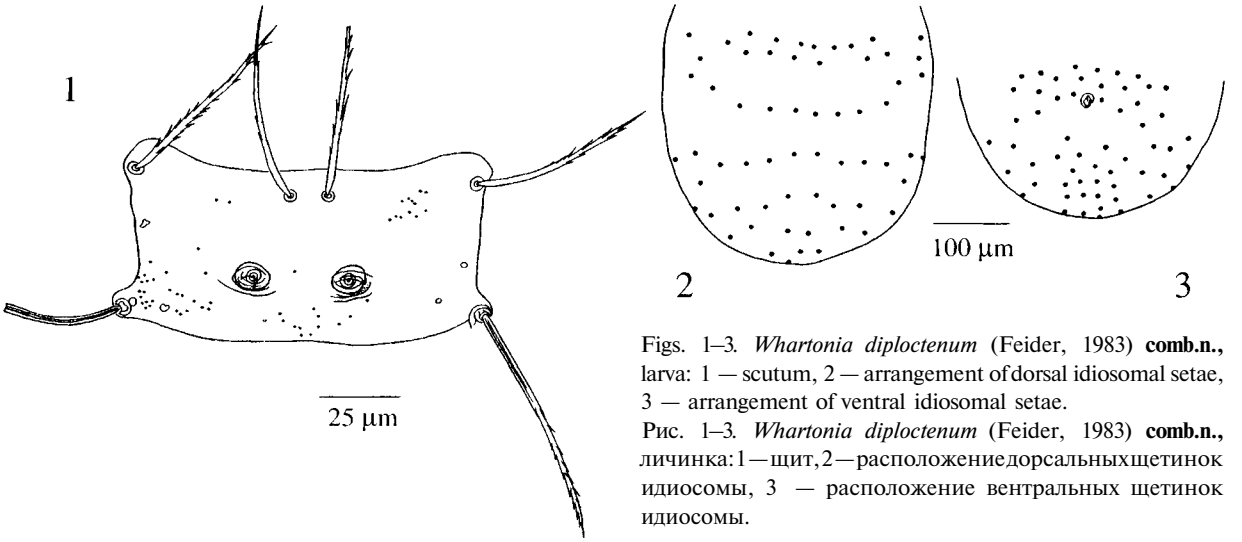
Scutum. Sparsely punctate, trapezoidal, with anterolateral shoulders, straight anterior and almost straight posterior margins; AM bases originate slightly posteriad to the level of AL bases; SB originate anteriad to the level of PL bases; PL situated on posterolateral projections of scutum; PL>AM>AL; sensillae flagelliform and nude.

Legs. All 6-segmented, terminating in a pair of claws and a claw-like empodium, onychotriches absent. Specialized microchaetae long; nonspecialized setae with rare, strong, pointed barbs. Leg I: coxa with 2 non-specialized branched seta (2B); trochanter 1B; femur 6B; genu 4B, 2 genualae, microgenuala; tibia 8B, 2 tibialae (distal 20, proximal 18 μm long), microtibiala (10 μm long); tarsus 24B, tarsala (22 μm long), microtarsala, subterminala, parasubterminala, pretarsala. Leg II: coxa 1B; trochanter 1B; femur 5B; genu 4B, 2 genualae (distal 16, proximal 34 μm long); tibia 6B, 2 tibialae (distal 16, proximal 18 μm long); tarsus 17B, tarsala (21 μm long), microtarsala, pretarsala.

Standard measurements

	AW	PW	SB	ASB	PSB	SD	P-PL	AP	AM	AL	PL	S	H
Min	94	97	28	38	16	57	5	40	50	49	68	74	50
Max	106	110	30	43	20	63	14	49	69	61	86	74	59
m	99	105	29	41	19	60	9	42	62	55	77	74	56
N	6	6	6	6	6	6	6	12	13	14	16	1	15

D	V	pa	pm	pp	Ip	DS	VS	NDV	TaIII	TaW
41-54	32-54	360	322	324	1019	62	50	114	97	19
50-58	36-54	382	346	349	1058	68	63	131	101	22
47-56	34-54	372	331	339	1042	66	56	121	98	20
6	2	5	5	5	5	5	5	5	6	6



Figs. 1–3. *Whartonia diploctenum* (Feider, 1983) **comb.n.**, larva: 1 — scutum, 2 — arrangement of dorsal idiosomal setae, 3 — arrangement of ventral idiosomal setae.
Рис. 1–3. *Whartonia diploctenum* (Feider, 1983) **comb.n.**, личинка: 1 — щит, 2 — расположение дорсальных щетинок идиосомы, 3 — расположение вентральных щетинок идиосомы.

Leg III: coxa 1B; trochanter 1B; femur 4B; genu 4B, genuala; tibia 6B, tibiala; tarsus 14B, mastitarsala (34 μm long).

REMARKS

The species was described from the adult stage collected on guano. Later the larvae reared in the laboratory were described [de la Cruz, Socarrás, 1993]. Findings of larvae in nature, on guano and bat hosts, were reported [de la Cruz, Daniel, 1994]. The morphological description presented above is the first description of *W. diploctenum* larvae collected in nature.

The description by de la Cruz and Socarrás [1993] had several errors. For example, the palpal claw was figured and described as 3-pronged. The authors overlooked all lateral prongs. It is not surprising, however, as these prongs sometimes are hardly visible. Besides, a variation in their number and position can take place, as it was reported for *W. glenni* Brennan, 1962 [Vercammen-Grandjean et al., 1965]. Numbers of non-specialized leg setae in the original description in some cases were probably erroneous: 5B on femur I comparing to 6, 4B on femur II comparing to 5, 5B on tibia II and III comparing to 6, 16B on tarsus II comparing to 17. On tarsus III 17 non-specialized setae comparing to 14 were figured. It might be a result of the variance or miscounting.

One of the palpal tarsal setae (distal) was figured by mistake as "striate" solenidion and described as subterminala [de la Cruz, Socarrás, 1993]. Consequently the authors supposed that the tarsal palpal setation in this species is unique for Leeuwenhoekiinae and constitutes the main diagnostic feature of the genus *Ischnothrombium*. But indeed the palpal tarsus in *W. diploctenum* bears 7 weakly barbed or almost nude non-specialized setae that is usual for the genus *Whartonia*. So there are no evidence to consider *Ischnothrombium* as a separate genus, and it is synonymized here with *Whartonia*.

Hosts. *Brachyphylla nana* Miller, 1902, *Mormoops blainvillii* Leach, 1821, *Phyllonycteris poeyi* Gundlach, 1860, *Pteronotus quadridens* (Gundlach, 1840).

Whartonia delacruzi Daniel et Stekolnikov, sp.n.

Figs. 4–14.

Type material. Holotype larva (C-566, T-Tr.-21, left specimen), Habana Province, Tapaste, Cueva del Indio, 28 Dec. 1965, from *B. nana*. 5 paratypes: 4 larvae, same data; 1 larva, Sancti Spiritus Province, Mayajigua, Cueva de Colón, 9 June 1965, from *E. sezecorni*.

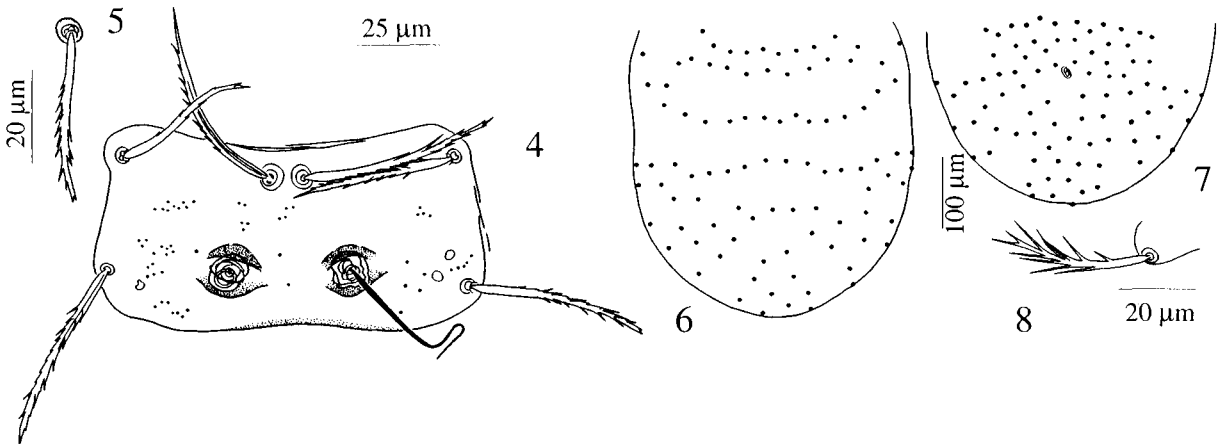
The holotype and three paratypes are deposited in ZISP; one paratype is deposited in ASCR; one paratype is deposited in the collection of the senior author.

Diagnosis: SIF=7B–N–(6–7)–2211.1000; fPp=B/B/BBN; fCx=2.1.1; fSt=0.2; fSc: AM>PL>AL; Ip=999; fD=[10–14]–16–24–14–6–10; DS=93; VS=87; NDV=180.

DESCRIPTION OF LARVA

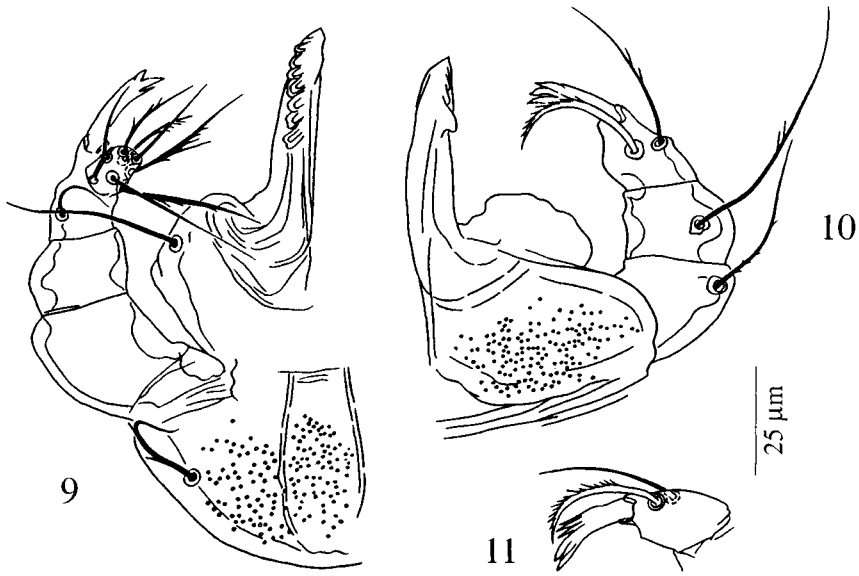
Idiosoma. 91–95 dorsal idiosomal setae, moderately barbed with thick barbs, arranged [(9–10)–14]–(15–17)–(24–25)–(12–15)–(6–7)–(7–10), in holotype [10–14]–17–25–12–6–7; 83–91 ventral setae; total idiosomal setae 178–184.

Scutum. Sparsely punctate, trapezoidal, with anterolateral shoulders, concave anterior and slightly concave posterior margins; SB located on level of PL bases or slightly anteriad; posterolateral projections of scutum absent; AM>PL>AL.



Figs. 4–8. *Whartonia delacruzi* **sp.n.,** larva: 4 — scutum, 5 — dorsal idiosomal seta, 6 — arrangement of dorsal idiosomal setae, 7 — arrangement of ventral idiosomal setae, 8 — coxal seta.

Рис. 4–8. *Whartonia delacruzi* **sp.n.,** личинка: 4 — щит, 5 — дорсальная щетинка идиосомы, 6 — расположение дорсальных щетинок идиосомы, 7 — расположение вентральных щетинок идиосомы, 8 — коксальная щетинка.



Figs. 9–11. *Whartonia delacruzi* **sp.n.,** larva: 9 — ventral aspect of gnathosoma, 10 — dorsal aspect of gnathosoma, 11 — palpal tibia.

Рис. 9–11. *Whartonia delacruzi* **sp.n.,** личинка: 9 — гнатосома вентрально, 10 — гнатосома дорсально, 11 — голень пальпы.

Legs. Leg III tarsus with 15 non-specialized setae and mastitarsala.

Other features as in previous species.

Standard measurements of the holotype: AW=92, PW=100, SB=33, ASB=40, PSB=16, SD=56, P-PL=16, AP=35, AM=56, AL=45, PL=53, H=52, D=32–46, V=25–40, pa=358, pm=315, pp=319, Ip=992, DS=91, VS=88, NDV=179, TaIII=90, TaW=20.

DIFFERENTIAL DIAGNOSIS

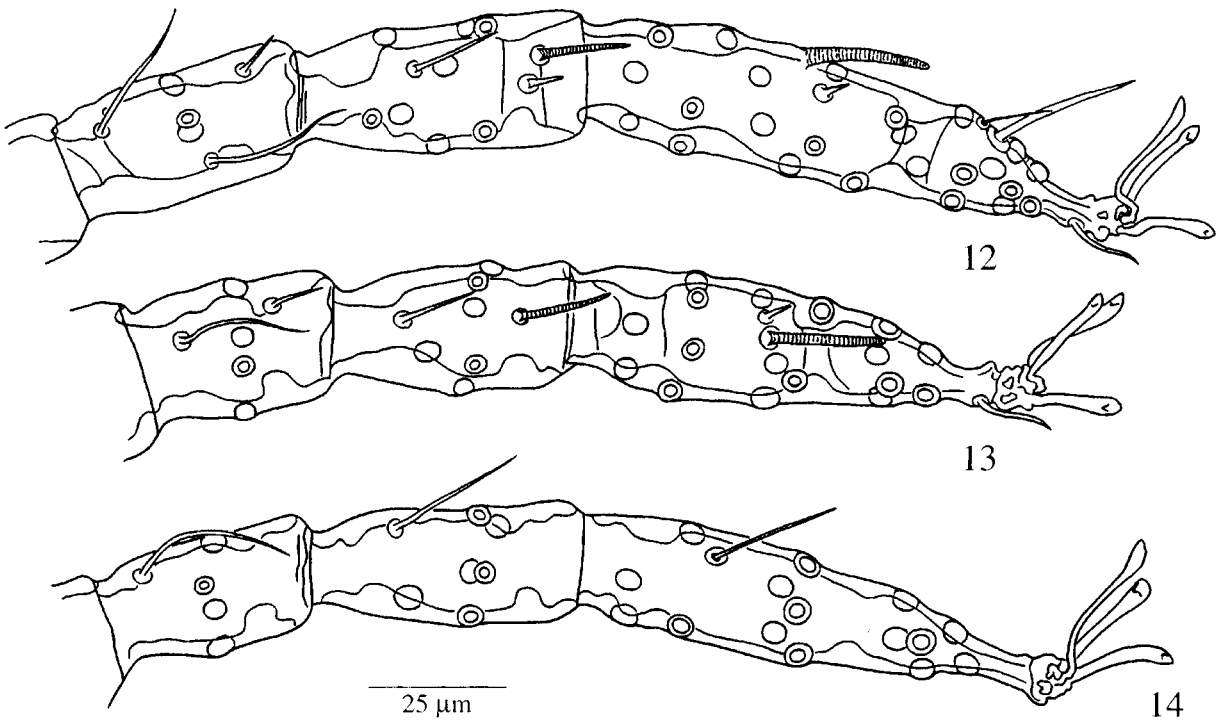
The new species is close to *W. diploctenum* and differs from the latter by larger number of idiosomal setae (NDV= 178–184 against 114–131), lesser lengths of setae (AL=40–45 against 49–61, PL=49–57 against 68–86, D_{max}=42–46 against 54–58), AM>PL against PL>AM, SB on level of PL bases against SB clearly anteriad to level of PL bases, distance between SB is as long as distance between them and PL bases (SB=31–37 against 28–30 in *W. diploctenum)* and in shape of scutum: posterolateral projections of scutum absent, scutum broader in anterior part (AW=89–94 against 94–106), posterior scutal margin more prominent posteriad to PL bases (P-PL=15–16 against 5–14), AP=32–38 against 40–49.

Hosts. *Brachyphylla nana, Erophylla sezecorni* (Gundlach, 1860).

Standard measurements

	AW	PW	SB	ASB	PSB	SD	P-PL	AP	AM	AL	PL	H
Min	89	99	31	40	15	56	15	32	56	40	49	49
Max	94	105	37	41	18	59	16	38	59	45	57	54
m	91	101	33	41	17	57	16	35	57	42	53	51
N	4	4	4	4	4	4	4	8	5	6	11	6

D	V	pa	pm	pp	Ip	DS	VS	NDV	TaIII	TaW
27-42	24-40	344	315	319	988	91	83	178	90	20
32-46	25-42	365	319	333	1017	95	91	184	94	21
30-44	25-41	356	317	326	999	93	87	180	92	20
4	2	3	3	3	3	3	3	3	4	4



Figs. 12-14. *Whartonia delacruzi* **sp.n.**, larva: 12 — leg I, 13 — leg II, 14 — leg III.
Рис. 12-14. *Whartonia delacruzi* **sp.n.,** личинка: 12 — нога I, 13 — нога II, 14 — нога III.

Etymology. The species is named in honor of Dr. J. de la Cruz, one of the main collectors.

Wagenaaria similis Brennan, 1967

Figs. 15–16

Brennan, 1967: 148, fig. 42; Hoffmann, 1990: 190, fig. 156; de la Cruz, Daniel, 1994: 72.

Material. 6 larvae, Sancti Spiritus Province, Yaguajay, Cueva de Colón, 23 Apr. 1965, from *Ph. poeyi*; 3 larvae, Matanzas Province, Camarioca, Cueva de Santa Catalina, 3 Aug. 1965, from *Ph. poeyi*; 1 larva, Sancti Spiritus Province, Mayajigua, Cueva de Colón, 9 June 1965, from *Ph. poeyi.*

Diagnosis: SIF=7B–B–9–3211.0000; fPp=B/B/BBB; fCx=2.1.1; fSt=0.2; fSc: AM>PL=AL; Ip=964; fD=2H–50–[10–10]–[12–16]–36-44; DS=188; VS=147; NDV=335.

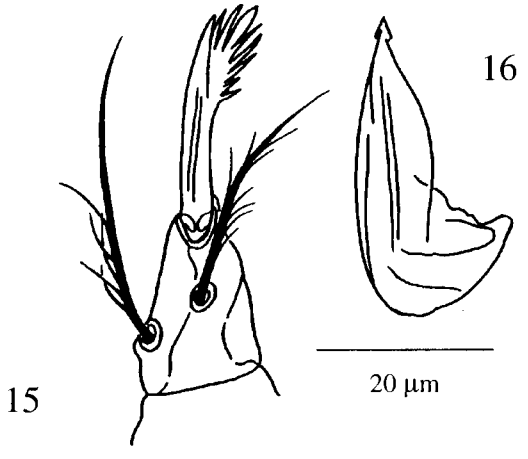
Arrangement of dorsal idiosomal setae is generally the same as in the above species of *Whartonia,* but these setae are much more numerous; 2nd and 3rd rows of D are doubled, 1st and 4th rows are approximately triple. fD=2H–(50–52)–[(10–11)–(10–13)]–[(12–15)–(16–18)]–(36–38)–(44–54).

Remarks. In the original description of this species [Brennan, 1967] and in later references [Brennan, Goff, 1977] palpal tibial claw was described as bifurcate with a row of "tenent hairs" on inner ventral surface, compared with onychotriches on tarsal claws of legs. Obviously these structures are usual prongs (fig. 15), as in the genus

Standard measurements

	AW	PW	SB	ASB	PSB	SD	P-PL	AP	AM	AL	PL	H
Min	61	68	27	36	13	49	23	14	50	38	38	47
Max	68	79	33	36	14	50	25	16	61	43	43	52
m	65	74	31	36	13	49	24	15	57	41	41	49
N	5	5	5	4	5	4	5	10	8	6	9	8

D	pa	pm	pp	Ip	DS	VS	NDV	TaIII	TaW
27-40	326	293	319	949	182	139	327	94	16
31-47	344	313	335	983	197	154	343	99	17
29-42	333	303	328	964	188	147	335	97	17
5	5	5	5	5	4	4	4	5	5



Figs. 15–16. *Wagenaaria similis* Brennan, 1967, larva: 15 — palpal tibia, 16 — cheliceral blade.
Рис. 15–16. *Wagenaaria similis* Brennan, 1967, личинка: 15 — голень пальпы, 16 — коготь хелицеры.

Whartonia. The general number of prongs is 8–9. Cheliceral blade with usual tricuspid cap (fig. 16). The genus *Wagenaaria* is close to *Sasacarus* Brennan et Jones, 1959 and after a revision it probably can be put into the latter.

Morphometric data on this species in the original description are incomplete (no data on legs lengths and exact number of idiosomal setae presented, measurements of the single specimen only are given). Also an arrangement of dorsal idiosomal setae was not indicated. Thus, further study of the morphology of *W. similis* is required.

Distribution. Mexico, Venezuela, Curacao, Cuba: Habana and Sancti Spiritus Provinces; recorded in Matanzas Province for the first time.

Hosts. *Mormoops blainvillii, M. megalophylla* (Peters, 1864), *Phyllonycteris poeyi, Pteronotus davyi* Gray, 1838, *Pt. parnellii* (Gray, 1843).

REFERENCES

Brennan J.M. 1967. New records of chiggers from the West Indies. *Studies on the Fauna of Curacao and Other Caribbean Islands,* 24 (95), 146–156.

Brennan J.M., Goff M.L. 1977. Keys to the genera of chiggers of the Western Hemisphere (Acarina: Trombiculidae). *The Journal of Parasitology,* 63 (3), 554–566.

de la Cruz J., Daniel M. 1994. Chigger mites (Acarina: Leeuwenhoekiidae) from Cuba. *Folia Parasitologica*, 41,71–74.

de la Cruz J., Socarras A.A. 1993. Los generos *Ischnothrombium* y *Tectumpilosum* (Acarina: Trombiculidae) en Cuba. *Poeyana,* 437. 14 pp.

Ewing H.E. 1944. Notes on the taxonomy of the trombiculid mites. *Proceedings of the Biological Society of Washington,* 57, 101–104.

Feider Z. 1983. Un Leeuwenhoekiidae (Acariformes) cavernicole collecté à Cuba. *Orghidan,* T. et al. (eds): Résultats des expéditions biospéologiques Cubano-Roumaines à Cuba. Editura Academiei Republicii Socialiste Romania. Bucuresti, 4, 149–153.

Goff M.L., Loomis R.B., Welbourn W.C., Wrenn W.J. 1982. A glossary of chigger terminology (Acari: Trombiculidae). *The Journal of Medical Entomology,* 19(3), 221–238.

Hoffmann A. 1990. Los Trombiculidos de Mexico (Acarida: Trombiculidae). *Parte taxonomica.* Publicaciones especiales del Instituto de Biologia. México, 2, 276 pp.

Vercammen-Grandjean P.H., Watkins S.G., Beck A.J. 1965. Revision of *Whartonia glenni* Brennan, 1962, an american bat parasite (Acarina: Leeuwenhoekiidae). *Acarologia,* 7 (3), 492–509.