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A NEW PREDACEOUS MITE, *NODELE* (*AZTECOCHEYLETUS*) *CONQUISTADOR* SUBG. N., SP. N. (ACARI: CHEYLETIDAE), PHORETIC ON A BEE *AZTECANTHIDIUM TENOCHTITLANICUM* (HYMENOPTERA: MEGACHILIDAE)

НОВЫЙ ВИД ХИЩНЫХ КЛЕЩЕЙ *NODELE* (*AZTECOCHEYLETUS*) *CONQUISTADOR* SUBG. N., SP. N. (ACARI: CHEYLETIDAE), ФОРЕЗИРУЮЩИХ НА ПЧЕЛЕ *AZTECANTHIDIUM TENOCHTITLANICUM* (HYMENOPTERA: MEGACHILIDAE)

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ABSTRACT

A new subgenus and species of predaceous cheyletid mite *Nodele* (*Aztecocheyletus*) *conquistador* subg. n., sp. n. (Acari: Cheyletidae) is described from females found on the bee *Aztecanthidium tenochtitlanicum* (Hymenoptera: Megachilidae) in Mexico. Host associations of the new species are discussed.

РЕЗЮМЕ

Описан новый вид хищных клещей-хейлетид *Nodele* (*Aztecocheyletus*) *conquistador* subg. n., sp. n. (Acari: Cheyletidae) по самкам, найденным на пчеле *Aztecanthidium tenochtitlanicum* (Hymenoptera: Megachilidae) в Мексике. Рассмотрены связи нового вида с хозяином.

INTRODUCTION

To date, the genus *Nodele* represents a morphologically uniform group including five species, *N. calamondin* Muma, 1964, *N. philippinensis* (Baker, 1949), *N. coccinae* Thewke et Enns, 1968, *N. superba* Kuznetzov, 1977, and *N. mu* Haines, 1988 [Fain, Bochkov, 2001]. This genus belongs to the *Cheletacarus* generic group including four other genera, *Cheletacarus, Cheletophanes*, *Paracheyletia*, and *Paracheyletiella*. The group is characterized by legs I which are relatively long but not exceeding the length of idiosoma, the well-developed eyes, the presence of guard seta (*ft'*) on tarsus I, and the palpal claws with basal teeth [Bochkov, Fain, 2001].

A new predaceous cheyletid species was collected recently by PBK from a museum specimen of the megachilid bee *Aztecanthidium tenochtitlanicum* Snelling, 1987 (Hymenoptera: Megachilidae) originated from Mexico. This new species obviously belongs to the *Cheletacarus* generic group, and is closely related to the genus *Nodele*, based on the following female synapomorphies: the palpal claw has a single basal tooth, the palpal femur bears four setae, there are well-developed propodonotal and hysteronotal shields, the tarsal claws I–IV are subequal, and tibia I bears five setae. The new species differs, however, from *Nodele* by some important characters (see differential diagnosis). Therefore, we created for this species a new subgenus *Aztecocheyletus* subg.n. within the genus *Nodele*. It seems quite possible that the taxonomical status of this newly recognized subgenus will be elevated in the future when a comprehensive phylogenetic analysis is conducted.

In the description, the idiosomal and leg chaetotaxy follows Grandjean [1939, 1944]. All measurements are in micrometers (μm).

Family Cheyletidae Leach, 1815

Tribe Cheyletiini Volgin, 1969

Genus *Nodele* Muma, 1964

Aztecocheyletus subg. nov.

Female. *Gnathosoma.* Palpal tarsus with 4 setae and short ventral solenidion: 2 dorsal comb-like setae with numerous teeth and 2 sickle-like ventral setae. Palpal claw with basal tooth. Palpal tibia with 3 filiform setae. Palpal genu with single dorsal seta. Palpal femur with 4 setae. Peritremes I-shaped. *Idiosoma.* Rhomb-shaped, about 2.5 times longer than gnathosoma. *Dorsum.* Eyes present.

Propodonotal and hysteronotal shields present, well-developed. Propodosoma bearing lateral setae *vi, ve, sci, sce,* and *c1–c3*. Hysterosoma with setae *d1, d2, e1, e2, f1, f2, h1, h2,* and cupules *ip* and *im*. *Venter*. Setae *1a, 3a, 4a, ag1–ag3, g1, g2,* and *ps1–ps3* filiform; setae *ps3* barbed; cupules *ih* present. *Legs*. Tarsi of all legs with subequal claws and empodium. Tarsus I–II, tibia I, and genu I with solenidia. Guard seta *ft'* well-developed, filiform. Apical tarsal knobs developed, claw angles absent. Setae *3b* and *4b* serrate-lanceolate. Leg I 1.6 times shorter than idiosoma. Leg tibiae 2.3–2.5 times shorter than respective tarsi. Leg setation, including intercoxal setae and solenidia: tarsi I 10 — *ft, tc', tc'', p', p'', a'', u', u'', vs''*, and solenidion *ω*; tarsi II 8 — *tc', tc'', p', p'', u', u'', vs''*, and solenidion *ω*; tarsi III and IV 7 — *tc', tc'', p', p'', u', u'', vs''*; tibia I 6 — *v', v'', l', l'', d*, and solenidion *φ*; tibiae II–IV 4 — *v', v'', l''* and *d*; genu I 3 — *l', d*, and solenidion *σ*; genua II–IV 2 — *l'* and *d*; femora I–III 2 — *d* and *v''*; femur IV 1 — *d*; trochanters I, II, and IV 1 — *sc1*; trochanter III 2 — *sc1* and *sc2*; coxa I 3 — *1a–c*; coxa II 1 — *2b*; coxa III 3 — *3a–c*; coxa IV 3 — *4a–c*.

Type species. *Nodele* (*Aztecocheyletus*) *conquistador*, sp. n.

Nodele (*Aztecocheyletus*) *conquistador* sp. n.

Figs. 1–5.

Female (holotype). Body, including gnathosoma, 520 long (420 and 455 in 2 paratypes), maximum width 260 (215, 230) (Figs. 1, 4). *Gnathosoma* 150 long (138, 145). Palpal femur 57 long (55, 55), bearing barbed clavate dorsal seta 60 long (55, 60), 2 pairs of nude filiform ventral setae, and 1 serrate lateral seta. Palpal genu with barbed clavate dorsal seta. Palpal tibia with nude filiform dorsal and inner lateral setae, and serrate ventral seta. Palpal claw slightly longer than palpal tibia. Comb-like setae of palpal tarsus with numerous tines (Fig. 2). Peritremes Π-shaped, with 6–7 pairs of segments. Rostral shield (=tegmen) with ornamentation. Protegmen with pair of large lateral teeth. *Idiosoma* 380 long (325, 340). *Dorsum*. All dorsal idiosomal setae barbed, clavate, 45–50 long; setae *c3* similar in shape with other dorsal setae, 95 long (85, 100). Dorsal shields ornamented. Propodonotal shield 165 long (147, 155), roughly striated transversally in median part, bearings setae *vi, ve, sci, sce, c1*, and *c3*. Hysteronotal shield 185 long (155, 160), striated transversally in anterior part and longitudinally in posterior part, bearing setae *d1, d2, e1, e2, f1, f2, h1, h2,* cupules *ip* situated between bases of setae *d2–l2*, and *im* situated near bases of setae *f1*. Distance between bases of setae *d1* and *e1* 55 (55, 60). *Venter*. Lengths of setae: *1a, 2a,* and *3a* about 30–40; *ag1–ag3* about 30–35; setae *g1, g2* about 20–23, setae *ps1* and *ps2* about 20–22, and *ps3* 23–27. Cupules *ih* ventro-lateral, at level of setae *ag2*. *Leg* segments, including coxae, striated. Solenidion *ω1* of tarsus I 11 long, situated on nipple-like protrusion, far from guard seta (Fig. 3). Solenidion *ω1* of tarsus *II* ventral. Guard seta (*ft*) slightly serrate, 45 long. Lengths of legs (excluding pretarsi): I 240, II 200, III 230, and IV 255. Ratio of tarsus/pretarsus+claw I–IV: I — 3.0:1.0, II — 1.2:1.0, III — 1.5:1.0, and IV — 1.5:1.0. Shape of leg setae as in Figs. 1, 4, and 5.

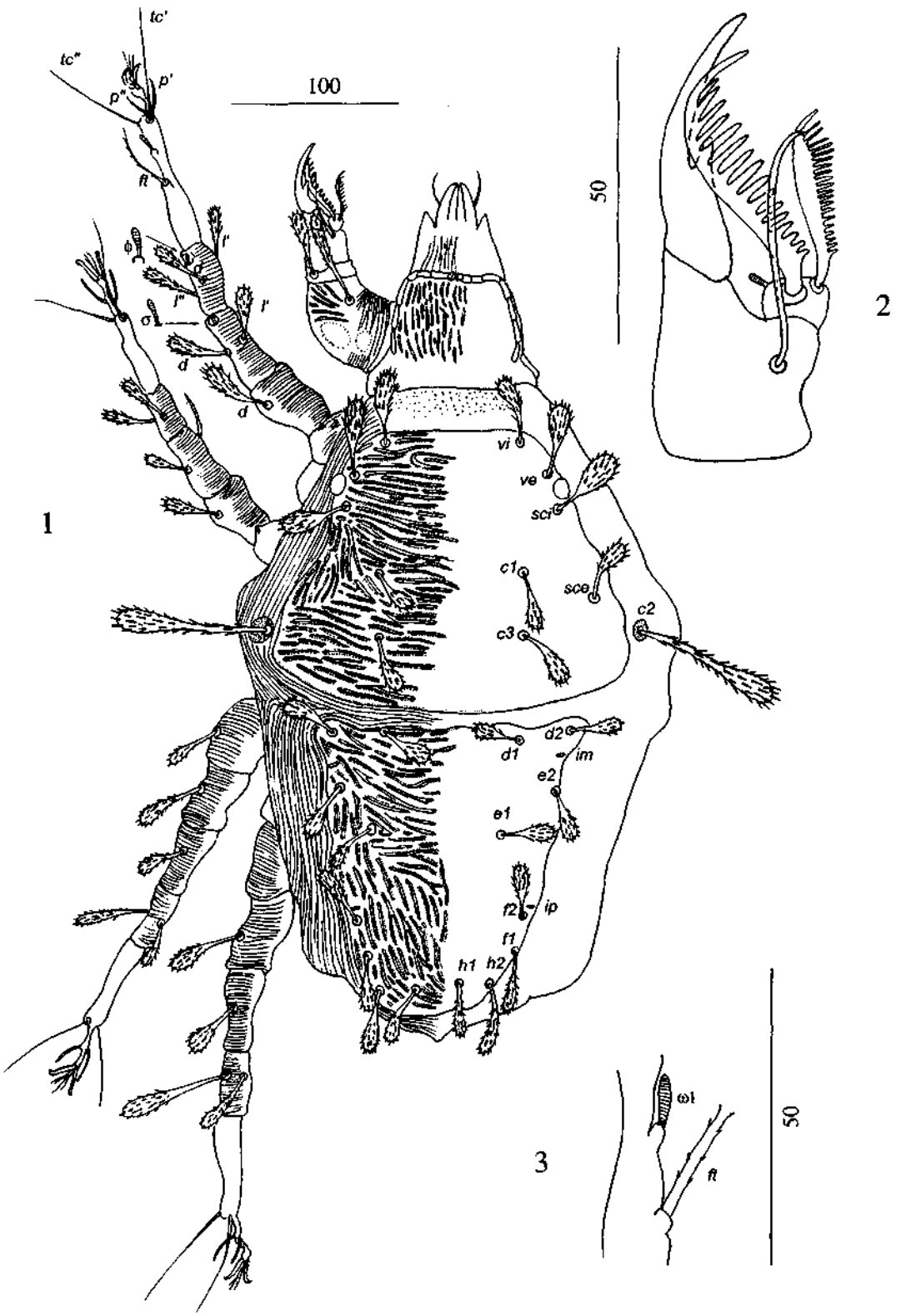
Differential diagnosis. In the new subgenus, the series E includes two pairs of setae, *e1* and *e2*; all dorsal idiosomal setae are clavate; tibia I is relatively short, the ratio tarsus I without pretarsus /tibia I is 2.3:1.0. In the subgenus *Nodele*, the series E includes three pairs of setae, *e1–e3*; all dorsal idiosomal setae are rod-shaped; tibia I is elongated, the ratio tarsus I without pretarsus /tibia I is 1.3:1.0. Moreover, this new subgenus has some autapomorhic characters, the protegmen bears a pair of well-developed lateral teeth; solenidion *ω*1 of tarsus I is 4 times shorter than seta *ft'*, and situated far from the guard seta, the propodonotal shield is transversally striated.

Type material. Female holotype (BMOC 03–1003–043–1) and 2 female paratypes (BMOC 03–1003–043–2 and BMOC 03–1003–043–3) from *Aztecanthidium tenochtitlanicum* Snelling, 1987 (Hymenoptera: Megachilidae) on *Croton* sp. (Euphorbiales: Euphorbiaceae), MEXICO, Jalisco, Chamela, Estacion Biologica, 10–14.07.1989. Coll. T. Griswold. Holotype in USDA Pollinating Insect-Biology, Management and Systematics Research Unit, Logan, Utah, paratypes in Museum of Zoology, University of Michigan, Ann Arbor, Michigan.

Etymology. The name of the new subgenus is derived from the first root of the host name, *Aztecanthidium* and *Cheyletus*, the type genus of the family Cheyletidae. The name is in the masculine gender. The specific name is formed from the Spanish word conquistador, a 16th century Spanish conqueror of the Americas, including modern Mexico. The species name is treated here as a noun in apposition.

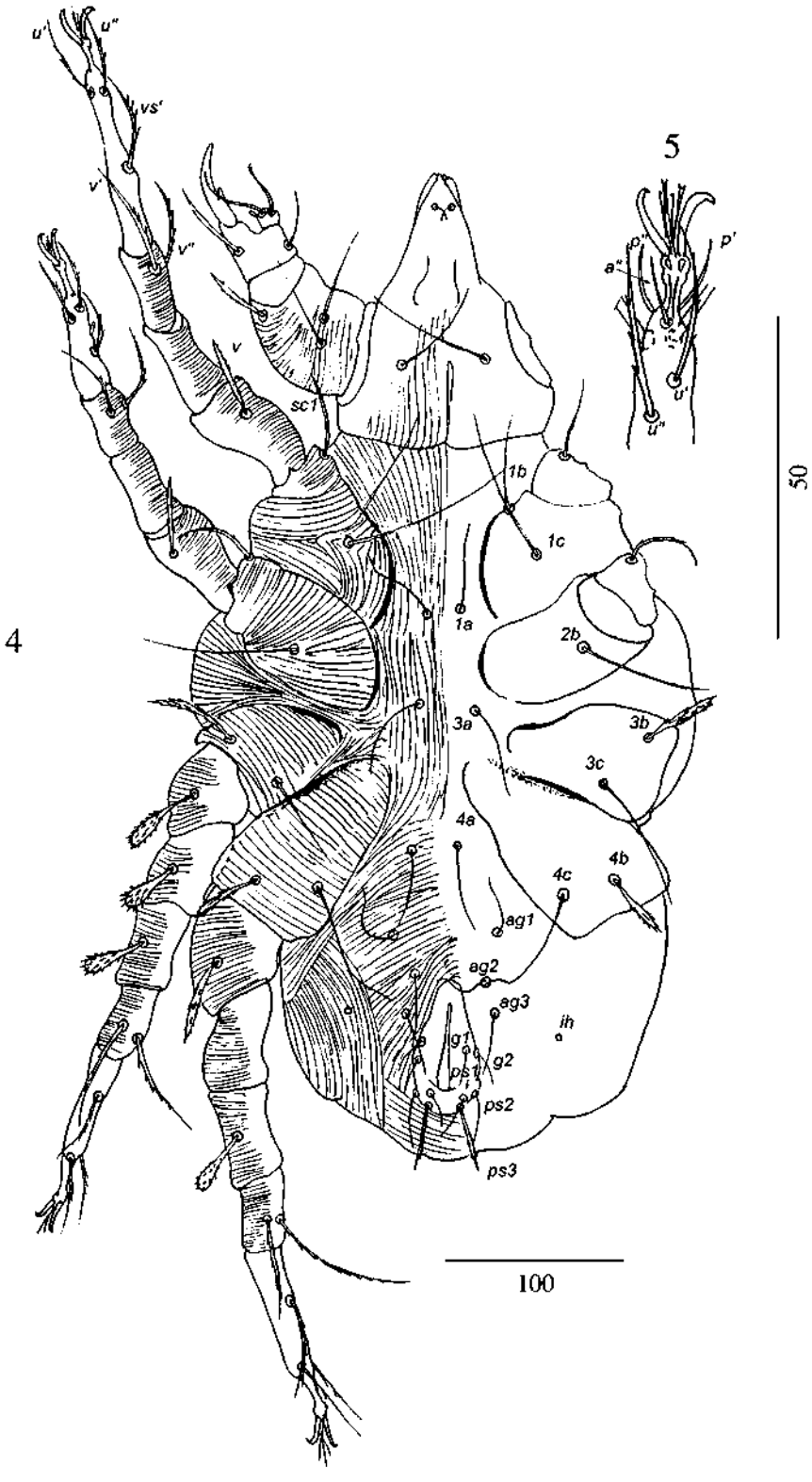
DISCUSSION

Many cheyletid mites inhabit nests of vertebrates or are their parasites, while true associations



Figs. 1–3. *Nodele* (*Aztecocheyletus*) *conquistador* subg. n., sp. n., holotype female: 1 — dorsum, 2 — palpal tibia and tarsus, dorsal view, 3 — solenidion *ω1*.

of cheyletids with invertebrates are less frequent and mostly restricted to phoresy [Bochkov, Fain, 2001]. A single known example of cheyletid mite parasitizing insects is *Pavlovskicheyla platydemae* Thewke et Enns, 1975. All stages of this species live under elytra of *Platydema ruficorne* (Sturm) (Coleoptera: Tenebrionidae) [Thewke, Enns, 1975]. Among cheyletid genera known from insects or their nests, only a few mite species are involved obligate associations.



Figs. 4–5. *Nodele* (*Aztecocheyletus*) *conquistador* subg. n., sp. n., holotype female: 4 — venter, 5 — pretarsus I, ventral view.

Mites of the genus *Cheletophyes* are associated with carpenter bees (Apidae: Xylocopinae). All stages of these mites inhabit nests of their hosts where they prey on microarthropods, including some cleptoparasitic mites. The phoretic stage of *Cheletophyes* mites is represented by females, which disperse on bees in special mesosomal acarinaria [OConnor, 1993].

Three insect associated genera, *Cheyletia*, *Hypopicheyla*, and especially *Samsinakia*, are very specialized. In their females, the shape of idiosoma is similar to astigmatid deutonymph (hypope), the gnathosoma situated ventrally and covered by dorsal idiosomal projection, and dorsal idiosomal setae in form of wide scales. These characters are obvious modifications to phoresy on insects, bugs of the family Aradidae and beetles of the family Tenebrionidae [Volgin, 1969]. Perhaps, mites of the genus *Samsinakia* are associated exclusively with tenebrionids [Bochkov, Mironov, 1998]. Mites of the genus *Paracaropsis* are, probably, obligate associates of robber flies of the genera *Laphria* and *Pagidolaphria*, phoretic as females between the coxae of adult flies (Diptera: Asilidae) [Klimov, 1997].

In some other predaceous cheyletid genera, phoresy on insects or living in their nests is common, but not obligate, for example, *Cheletomorpha lepidopterorum* (Shaw, 1794) on butterflies or species of *Neochelacheles* on tenebrionid beetles [Van Eyndhoven, 1964; Volgin, 1969; Bochkov, Fain, 2001].

The relationships of the new species with bees are, probably, not obligate. This species, like other representatives of the genus group *Cheletacarus*, has the habitus of the typical free-living predator inhabiting foliage of bushes or trees [Volgin, 1969; Bochkov, Fain, 2001]. Its legs are relatively long, the gnathosoma occupies terminal position, and dorsal setae of the body are not modified into scale-like structures. Probably, these mites sometimes use bees for dispersal in new habitats, like *Ch. lepidopterorum* spreads on butterflies.

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