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A new species of the genus *Tuckerella* (Acari: Trombidiformes: Tuckerellidae) from Iran

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ABSTRACT

A new mite species *Tuckerella parsi* n. sp. (Prostigmata: Tuckerellidae) from *Tamarix aphylla* (Tamaricaceae) is described from Iran. The description of the adult female, adult male, female tritonymph and protonymph and also leg setal designations for this family are provided.

Keywords Taxonomy, Peacock mites, new species, Tetranychosida, *Tamarix aphylla*

Zoobank <http://zoobank.org/90556659-7015-4D66-92E3-37C7E6C58D1A>

Introduction

The Tuckerellidae, or peacock mites, is a relatively small family of the Tetranychosida, with just one genus and 28 species (Krantz & Walter, 2009). These attractive mites are orange to red in color, ornamented with rows of white, palmate, oval or circular setae and have a row of 4 to 7 pairs of long, whip-like caudal setae (Meyer & Ueckermann, 1997). Tuckerellid species are described from the following eight zoogeographic regions: Oriental (11 species), Eastern Palearctic (four species), Nearctic (three species), Australian (three species), Afrotropical (two species), Pacific Islands (two species), Neotropical (two species) and Western Palearctic (one species). To date, three species were recorded from Iran: *T. flabellifera* Miller, 1964, *T. hypoterra* McDaniel & Morihara, 1975 and *T. japonica* Ehara, 1975. According to Beyzavi *et al.* (2013), Kamali (1989) was the first to report tuckerellids from Iran namely, *Tuckerella* sp. near *knorri* Baker & Tuttle, 1975 (Beyzavi *et al.* 2013).

Herein, we describe the first new species from Iran, *Tuckerella parsi* n. sp. from *Tamarix aphylla* (Tamaricaceae).

Materials and methods

Leaves and twigs infested with mites were collected, placed into plastic bags and transferred to the laboratory. Samples were washed in a solution of a commercial detergent (5%). This solution was filtered by overlapping two sieves with different mesh sizes (16 Mesh; 400 Mesh). Mites retained on the smaller mesh sieve were washed with 70% ethanol into a petri dish. Peacock mites were collected from the ethanol solution under a stereomicroscope, cleared with lactic acid (at 45°C in oven for two days) and mounted in Hoyer's medium.

The terminology and abbreviations used for the descriptions of the new species follow those of Lindquist (1985). Leg chaetotaxy also follows Quiros-Gonzalez & Baker (1984), as improved upon by Lindquist (1985), and is presented on the figures; setal counts include all phaneres, *i.e.*, solenidia and eupathidia are included. Measurements were performed using a DINO-EYE® soft imaging system and are given in micrometers (µm) for the holotype and as a range for paratypes in parentheses. The drawings were made by using a drawing tube attached to an Olympus® Phase Contrast Research Microscope.

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Abbreviations

ACASI: Acarological Collection, Acarological Society of Iran (ASI), Department of Plant Protection, Faculty of Agriculture, University of Tehran, Karaj, Iran

SBUC: Collection of the Acarology Laboratory, Shahid Bahonar University of Kerman, Kerman, Iran

Results

Genus *Tuckerella* Womersley, 1940

Diagnosis as of Beard & Walter, 2005

Tuckerella parsi Khadem & Asadi n. sp. (Figs. 1 – 11)

Zoobank: [ED651AFF-6777-4930-83FB-51501768C3BA](https://doi.org/10.24349/ED651AFF-6777-4930-83FB-51501768C3BA)

Type material examined — Holotype female (SBUC) and three female paratypes (SBUC), five female tritonymphs (4 SBUC, 1 ACASI), five protonymphs (4 SBUC, 1 ACASI), four males (3 SBUC, 1 ACASI) ex *Tamarix aphylla* (Tamaricaceae), Iran: Kerman Province, Manujan, 27°19'N 57°29'E, 18 October 2014, coll. H. Khadem Safdarkhani.

Diagnosis

Adult female: Rostrum very long, passing base of tarsi I, prodorsum and most dorsal hysterosoma covered with closed cells; prodorsal setae palmate (*v1* dissimilar to other prodorsal setae) with rounded tips and prodorsal setae *v1* longer than *v2*; setal row H with six pairs of flagellate setae and two pairs of short palmate setae (*h1* shorter than *h6*); setae *h3* shorter than other flagellate setae; opisthosomal setae *f1* and *f2* subequal; *c4* about two thirds the length of distance between *c4-sc2*; femur and genu of leg III each with three setae (two ventral and one dorsal). All setae on tarsi I – IV except setae *p* ♂ and both *ft* barbed.

Description

FEMALE (Figs. 1–3)(n=4). Body oval, orange in color, length (*vi-h1*) 271 (268 – 273), width (*c5-c5*) 186 (185 – 191).

Gnathosoma — Rostrum long, passing base of tarsi I, with long ventral setae *m*. Palp setal formula: 0–0–1–3–4, genual seta barbed, tibial setae slender, tarsus with two eupathidia, one solenidion and one tactile seta (Fig. 1C). Peritreme anastomosed distally (Fig. 1E).

Dorsum (Fig. 1A) — Dorsal shields covered with cells forming reticulate pattern. Dorsal setae expanded, leaf-like, toothed margins, except setae *vi* smooth, without barbules. Hysterosomal setae, *c1–7*, *d1–5*, *e1–4*, *h1* and *h6*, subcircular, subrectangular. Lengths of dorsal setae: *vi* 45 (43 – 48), *ve* 32 (32 – 34), *sci* 37 (35 – 38), *sce* 42 (43 – 47), *c1* 47 (44 – 47), *c2* 45 (44 – 46), *c3* 42 (41 – 44), *c4* 39 (38 – 41), *c5* 39 (39 – 42), *c6* 39 (37 – 40), *c7* 39 (38 – 40), *d1* 34 (33 – 37), *d2* 32 (30 – 33), *d3* 37 (35 – 38), *d4* 58 (56 – 59), *d5* 61 (59 – 62), *e1* 29 (28 – 30), *e2* 32 (31 – 34), *e3* 63 (60 – 64), *e4* 55 (54 – 58), *f1* 28 (27 – 28), *f2* 28 (27 – 29); posterior margin of opisthosoma with six pairs of long flagellate setae (*h2*, *h3*, *h4*, *h5*, *h7*, *h8*) and two pairs of expanded setae (*h1* and *h6*), same as dorsal setae; lengths: *h1* 42 (40 – 43), *h2* 358 (353 – 361), *h3* 229 (225 – 234), *h4* 351 (346 – 354), *h5* 316 (312 – 319), *h6* 53 (51 – 56), *h7* 337 (334 – 341), *h8* 297 (294 – 302).

Venter (Fig. 1B) — Ventral striae pattern: longitudinal striae laterad setae *1a* but smooth medially, band of transverse striae between seta *1a* and *3a*; longitudinal striae on both sides of body between coxa II and III, smooth around setae *3a* and *4a*; striae on rest of venter up to genital plate transverse, striae on pregenital area surrounding setae *ag1* longitudinal to oblique, genital and pseudanal region smooth. Pregenital setae two pairs (*ag1–2*), genital setae four

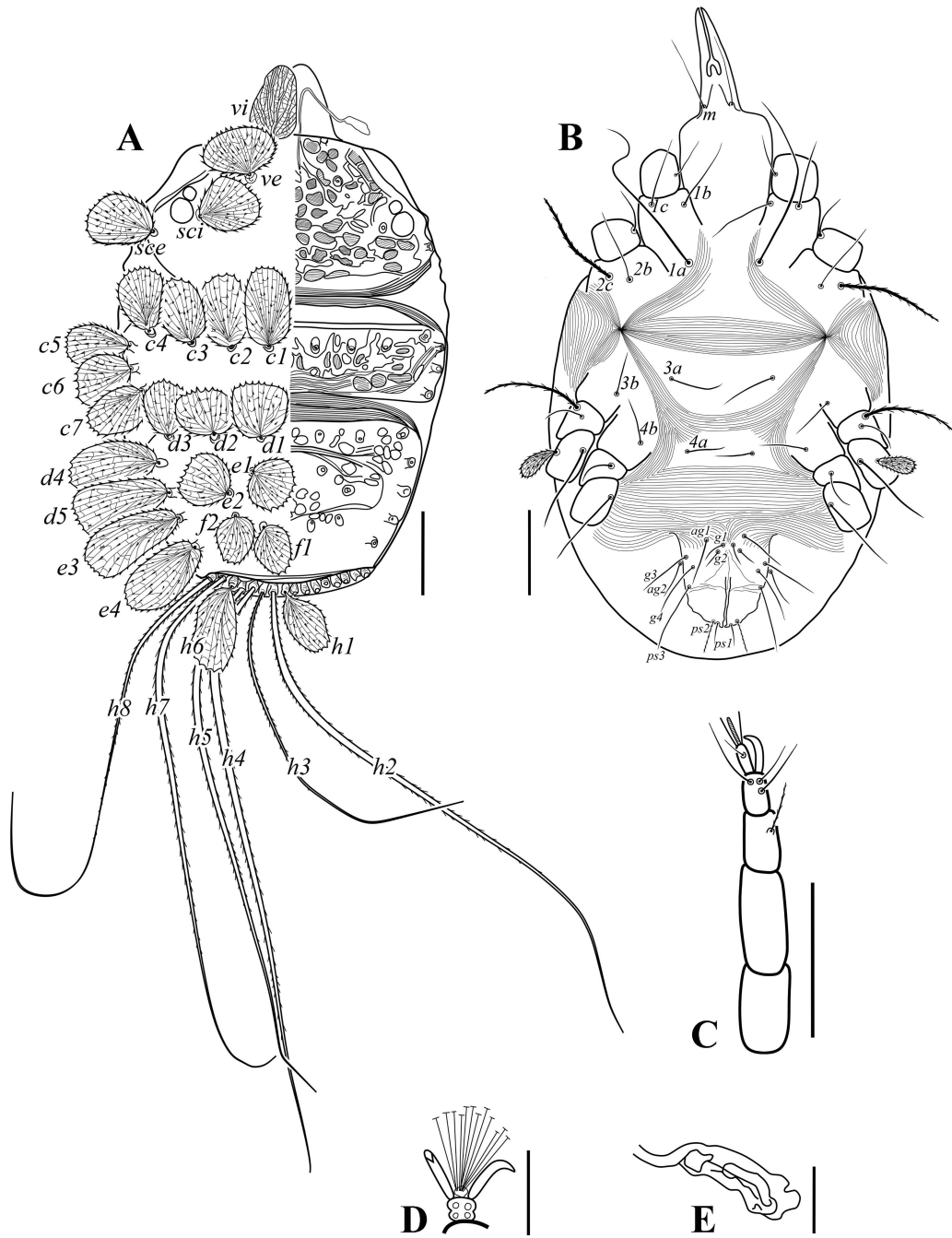


Figure 1 *Tuckerella parsi* n. sp. (female): A – dorsum; B – venter; C – palp, scale bar 50 μ m; D – pretarsus, scale bar 20 μ m; E – end of peritreme, scale bar 10 μ m.

pairs (*gl*–*4*) and pseudanal setae three pairs (*psl*–*3*), pregenital, genital and anal plate difficult to discern. Setae *la* more than two and four times as long as *3a* and *4a*, respectively; setae *2c* thick, barbed; setae *ps2* barbed, all other setae smooth. Length of ventral setae: *la* 86 (83 – 87), *lb* 27 (29 – 31), *lc* 25 (25 – 28), *2b* 40 (38 – 41), *2c* 67 (66 – 70), *3a* 30 (28 – 30), *3b* 22 (22 – 24), *3c* 5 (5 – 6), *4a* 18 (17 – 19), *4b* 18 (18 – 20), *4c* 6 (5 – 6), *agl* 19 (19 – 20), *ag2* 18 (17 – 19), *gl* 12 (11 – 12), *g2* 11 (10 – 11), *g3* 23 (22 – 24), *g4* 23 (22 – 25), *ps1* 11 (11 – 12), *ps2* 16 (15 – 17), *ps3* 33 (32 – 35).

Legs (Figs. 1D, 2A–D, 3A–D) — Tarsal claws claw-like and empodium pad-like with tenent hairs. Setation of legs I – IV: coxae 2(*lb,lc*) – 2(*2b,2c*) – 1(*3b*) – 1(*4b*); trochanters 1(*v'*) – 1(*v'*) – 1(*v'*) – 1(*v'*); femora 7(*d, v', v'', v'l, bv'', l', l''*) – 7(*d, v', v'', v'l, bv'', l', l''*) – 3(*ev', d, l'*) – 1(*ev'*); genua 7(*d, v', v'', l', l'', l'l, l''l*) – 6(*d, v', v'', l', l'', l'l*) – 3(*d, v', l'*) – 2(*d, v'*); tibiae 8(*d, v', v'', l', l'', l'l, l''l, φ*) – 5(*d, v', v'', l', l''*) – 5(*d, v', v'', l', l''*) – 4(*d, v', v'', l''*); tarsi 14(*pv', l'l, pl', pl'', ft', ft'', ω', ω'', u', u'', p'ζ, p''ζ, tc', tc''*) – 11(*pv', pl'', ft', ft'', ω'', u', u'', p'ζ, p''ζ, tc', tc''*) – 7(*pv', ft', ft'', u', u'', tc', tc''*) – 7(*pv', ft', ft'', u', u'', tc', tc''*).

MALE (Figs. 4–6)(*n*=4). Body oval, length (*vi*–*hl*) 232 (226 – 233), width (*c5*–*c5*) 149 (149 – 156). Gnathosoma and palps similar to female, (Fig. 4C).

Dorsum (Fig. 4A) — Sculpturing and setation similar to female, except setae *hl* much smaller. Lengths of dorsal setae: *vi* 35 (34 – 38), *ve* 34 (35 – 37), *sci* 31 (32 – 34), *sce* 34 (33 – 36), *c1* 40 (39 – 41), *c2* 37 (35 – 38), *c3* 35 (35 – 37), *c4* 32 (30 – 33), *c5* 35 (33 – 36), *c6* 34 (34 – 37), *c7* 33 (32 – 35), *d1* 28 (27 – 29), *d2* 31 (29 – 32), *d3* 32 (31 – 33), *d4* 46 (44 – 47), *d5* 50 (49 – 52), *e1* 28 (28 – 30), *e2* 31 (30 – 32), *e3* 57 (56 – 59), *e4* 46 (44 – 47), *fl* 28 (26 – 29), *f2* 27 (25 – 27); posterior margin of opisthosomal setae same as female. Their lengths as follows: *h1* 23 (22 – 23), *h2* 295 (289 – 297), *h3* 248 (241 – 247), *h4* 275 (268 – 276), *h5* 282 (279 – 287), *h6* 25 (24 – 25), *h7* 268 (262 – 269), *h8* 252 (246 – 254).

Venter (Fig. 4B) — Ventral striae pattern similar to female, except lacking striae laterad setae *la* and band of transverse striae between setae *3a* and *4a*. Pregenital setae two pairs (*agl*–*2*), genital setae one pair (*g2*) and pseudanal setae three pairs (*psl*–*3*). Setae *2c* stout, barbed all other setae smooth. Length of ventral setae: *la* 64 (62 – 66), *lb* 20 (18 – 21), *lc* 19 (20 – 22), *2b* 17 (16 – 19), *2c* 48 (45 – 49), *3a* 17 (16 – 19), *3b* 14 (12 – 15), *3c* 8 (8 – 9) *4a* 18 (17 – 18), *4b* 17 (16 – 18), *4c* 8 (8 – 9), *agl* 13 (12 – 13), *ag2* 15 (12 – 14), *g2* 11 (10 – 11), *ps1* 8 (7 – 8), *ps2* 9 (8 – 9), *ps3* 11 (10 – 12). Setae *la* more than three times as long as *3a* and *4a*. Aedeagus (Fig. 4D) short, thick.

Legs (Figs. 4E, 5A–D, 6A–D) — Tarsal claws claw-like and empodium with tenent hairs. Setal formula (coxa to tarsus) the same as female, but tarsus III and IV with one extra solenidion.

FEMALE TRITONYMPH (Figs. 7A–C, 8–9)(*n*=5). Body length (*vi*–*hl*) 255 (248 – 257), width (*c5*–*c5*) 169 (170 – 174). Gnathosoma and palps: rostrum same as female (Fig. 7B).

Dorsum — Cuticle pattern same as female. Lengths of dorsal setae: *vi* 47 (48 – 51), *ve* 33 (32 – 35), *sci* 30 (30 – 32), *sce* 32 (30 – 33), *c1* 19 (18 – 21), *c2* 21 (20 – 21), *c3* 25 (24 – 27), *c4* 34 (32 – 35), *c5* 44 (43 – 46), *c6* 49 (49 – 52), *c7* 49 (50 – 52), *d1* 32 (31 – 34), *d2* 31 (30 – 32), *d3* 31 (30 – 33), *d4* 48 (46 – 49), *d5* 54 (53 – 57), *e1* 22 (21 – 24), *e2* 23 (24 – 27), *e3* 47 (47 – 50), *e4* 49 (48 – 51), *fl* 28 (26 – 29), *f2* 27 (25 – 29); posterior margin of opisthosomal setae same as female, their lengths as follows: *h1* 33 (32 – 34), *h2* 297 (291 – 298), *h3* 205 (195 – 204), *h4* 257 (251 – 259), *h5* 285 (279 – 288), *h6* 44 (43 – 47), *h7* 283 (278 – 285), *h8* 292 (284 – 291).

Venter (Fig. 7A) — Ventral striae pattern the same as female except lacking smooth area around *3a* (covered with transverse striae around *3a* in female) and setae *la* (two times and four times) longer than *3a* and *4a*, respectively. Pregenital setae two pairs (*agl*–*2*), genital setae two pairs (*gl*–*2*) and pseudanal setae three pairs (*psl*–*3*). Setae *2c* stout, barbed; all other setae smooth. Length of ventral setae: *la* 76 (75 – 78), *lb* 31 (32 – 35), *lc* 27 (26 – 28), *2b* 33 (32 – 35), *2c* 44 (42 – 46), *3a* 23 (23 – 24), *3b* 21 (20 – 22), *4a* 27 (25 – 28), *4b* 22 (22 – 24),

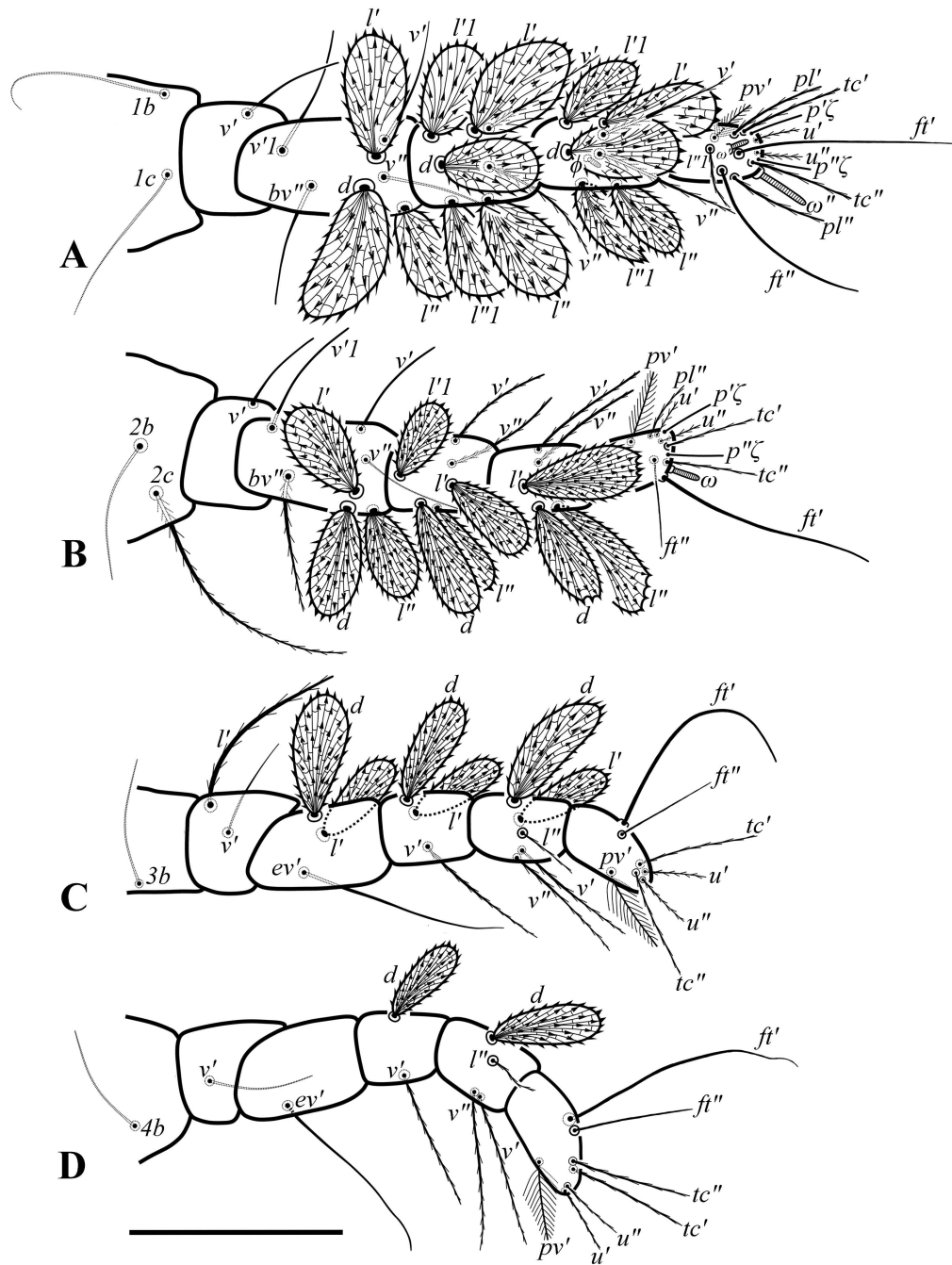


Figure 2 *Tuckerella parsi* n. sp. (female): right legs I – IV, scale bar 50 μ m.

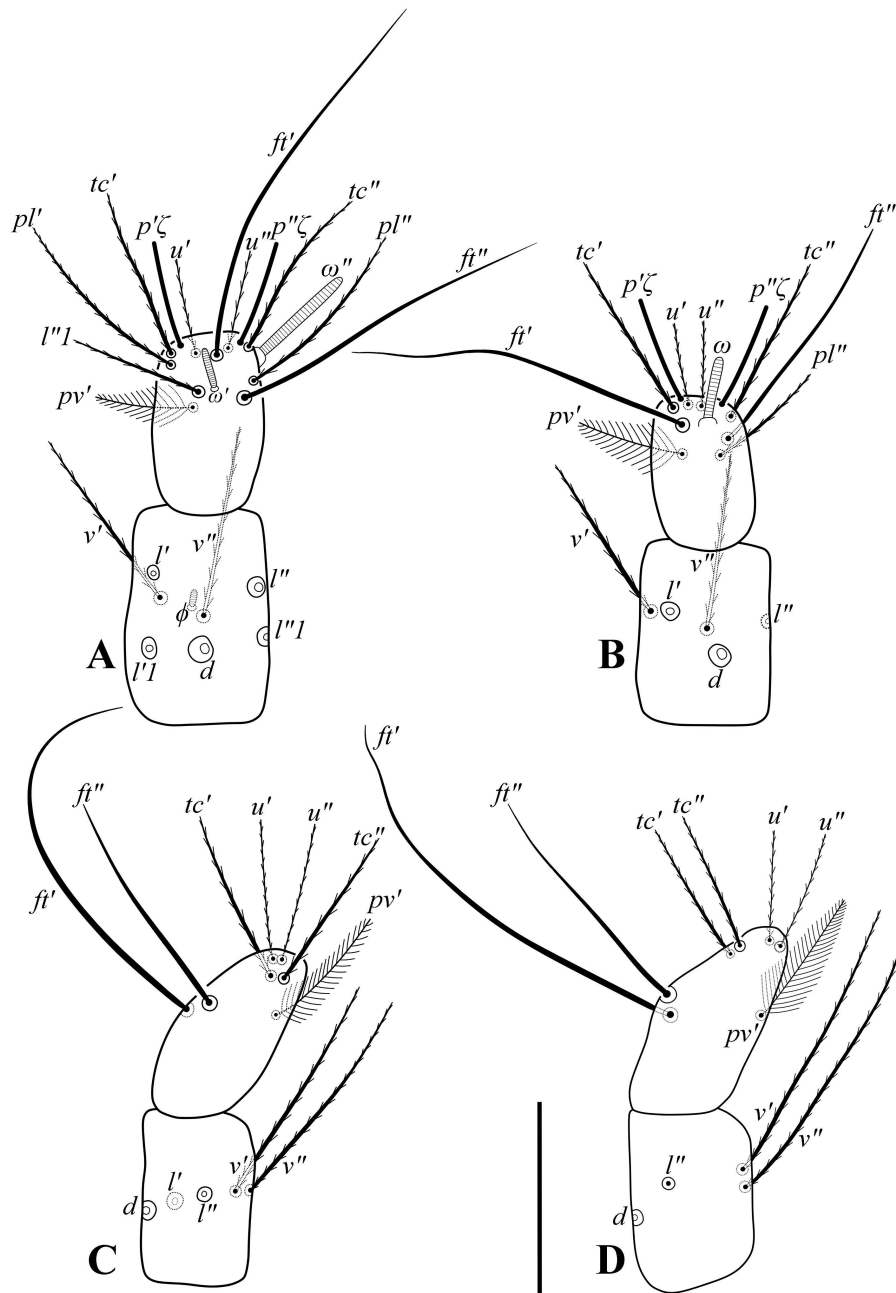


Figure 3 *Tuckerella parsi* n. sp. (female): tibia & tarsi, right legs I – IV, scale bar 50 μ m.

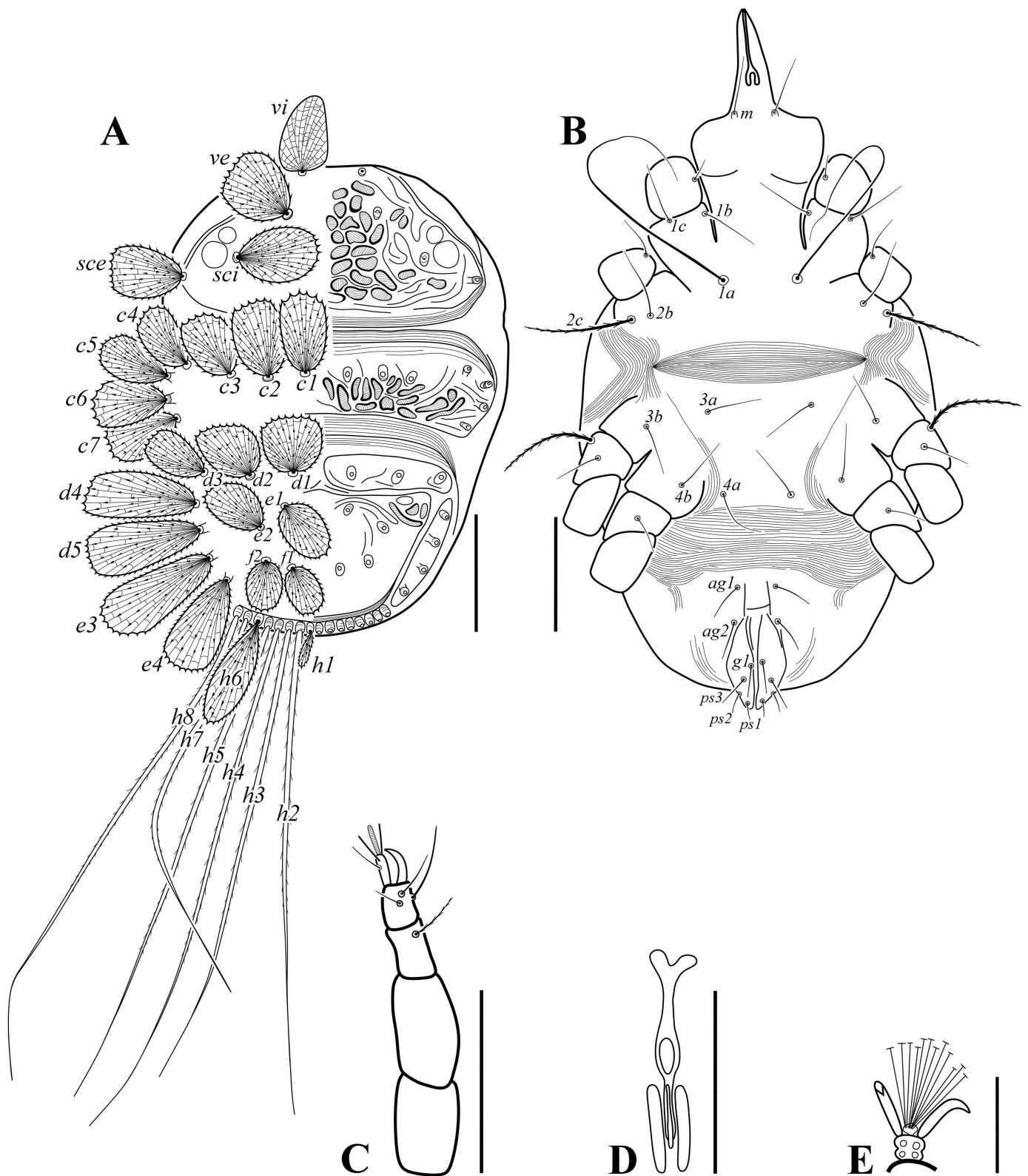


Figure 4 *Tuckerella parsi* n. sp. (male): A – dorsum, B – venter, C – palp, D – aedeagus, scale bar 50 μ m; E – pretarsus, scale bar 20 μ m.

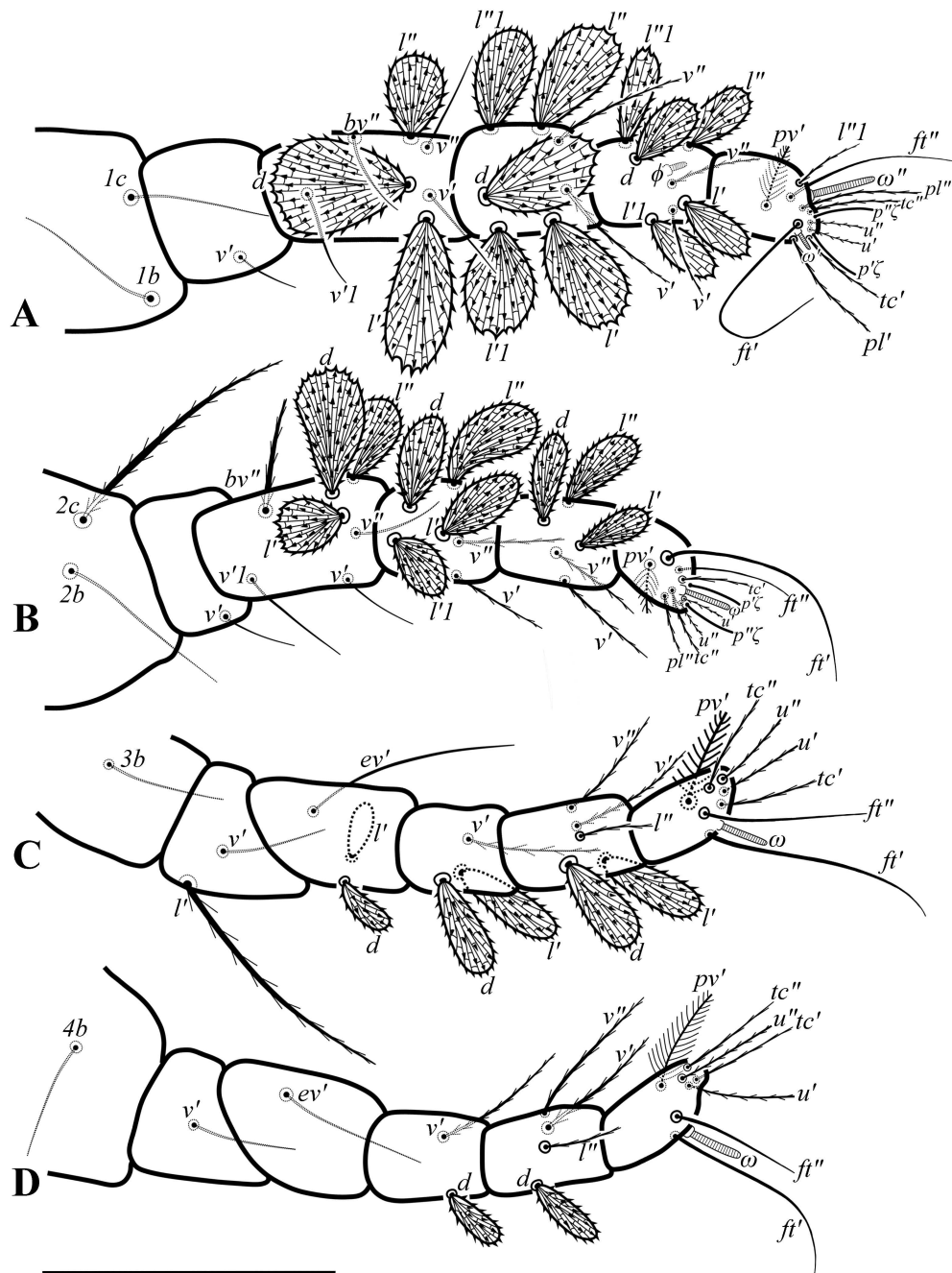


Figure 5 *Tuckerella parsi* n. sp. (male): left legs I – IV, scale bar 50 μ m.

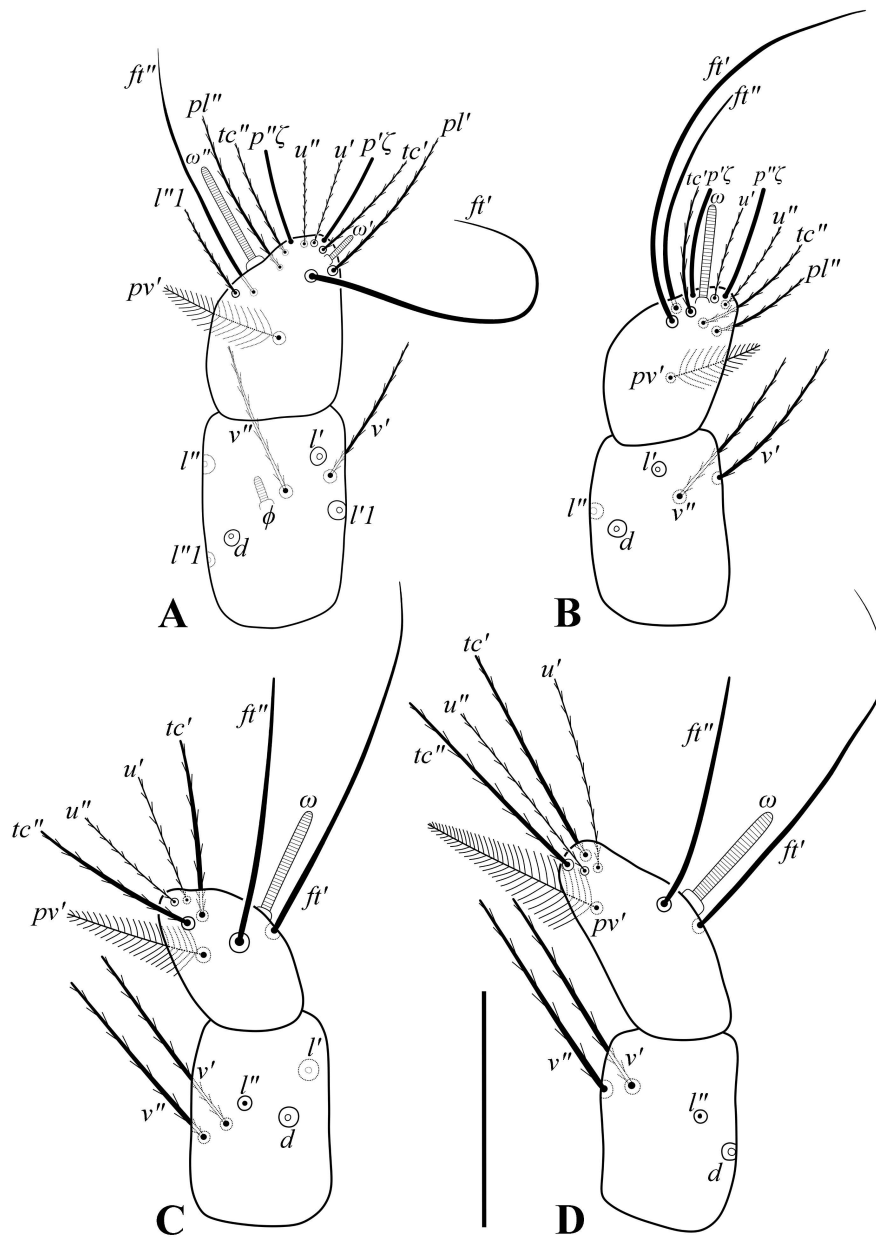


Figure 6 *Tuckerella parsi* n. sp. (male): tibia & tarsi, left legs I – IV, scale bar 50 μ m.

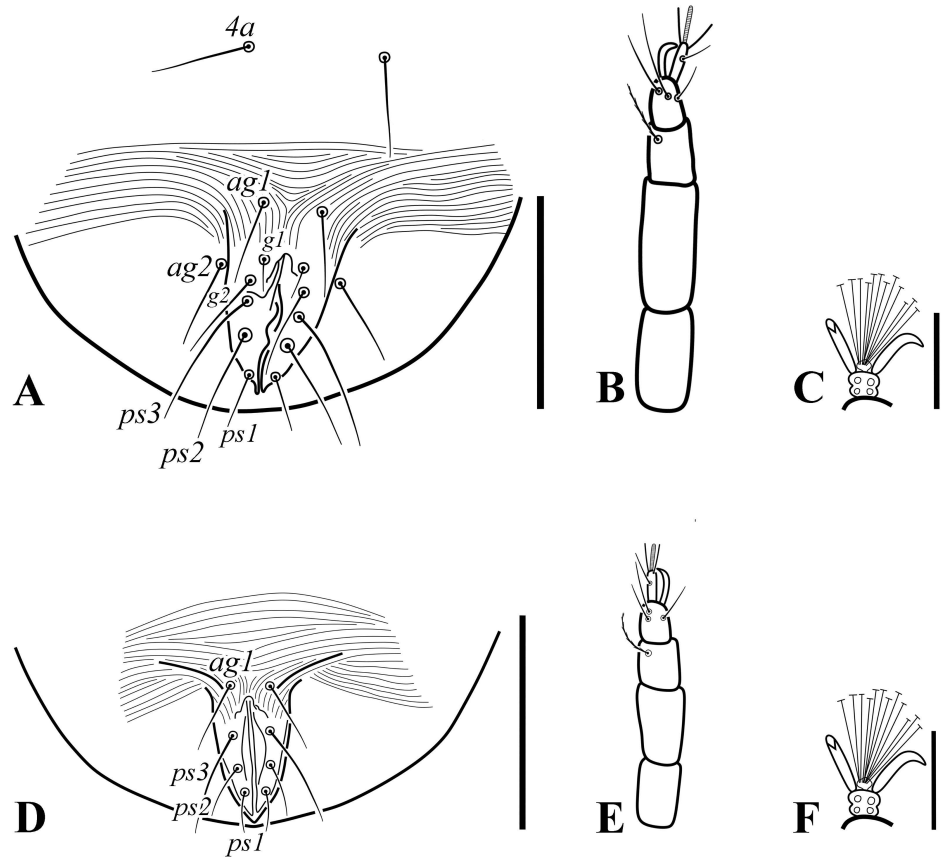


Figure 7 *Tuckerella parsi* n. sp. (tritonymph): A – end of venter, B – palp, scale bar 50 µm; C – pretarsus, scale bar 20 µm; (protonymph): D – end of venter, E – palp, scale bar 50 µm; F – pretarsus, scale bar 20 µm.

agl 19 (19 – 20), *ag2* 21 (22 – 25), *g1* 9 (9 – 10), *g2* 26 (24 – 27), *ps1* 19 (18 – 20), *ps2* 27 (25 – 28), *ps3* 30 (28 – 31).

Legs (Figs. 7C, 8A–D, 9A–D) — Tarsal claws, empodium, and setal count the same as female.

PROTONYMPH (Figs. 7D–F, 10–11)(n=5). Body length (*vi–hl*) 178 (174 – 179), width (*c5–c5*) 136 (135 – 140). Gnathosoma and palp same as female. (Fig. 7E).

Dorsum — Cuticle pattern same as female. Lengths of dorsal setae: *vi* 38 (36 – 41), *ve* 24 (22 – 25), *sci* 25 (24 – 25), *sce* 31 (29 – 31), *c1* 22 (21 – 24), *c2* 24 (24 – 26), *c3* 20 (21 – 22), *c4* 19 (18 – 21), *c5* 32 (30 – 33), *c6* 37 (35 – 37), *c7* 40 (41 – 43), *d1* 20 (18 – 21), *d2* 18 (17 – 20), *d3* 23 (20 – 22), *d4* 33 (32 – 35), *d5* 39 (37 – 40), *e1* 19 (17 – 19), *e2* 20 (20 – 21), *e3* 34 (33 – 35), *e4* 32 (32 – 33), *f1* 18 (17 – 19), *f2* 17 (17 – 18); posterior margin of opisthosomal setae same as female, lengths as follows: *h1* 24 (23 – 26), *h2* 214 (202 – 209), *h3* 115 (112 – 116), *h4* 161 (151 – 159), *h5* 188 (182 – 190), *h6* 34 (33 – 36), *h7* 163 (155 – 163), *h8* 190 (185 – 192).

Venter (Fig. 7D) — Ventral striae pattern: the same as female. Pregenital setae one pair (*agl*), pseudanal setae three pairs (*ps1–3*), setae *2b*, *4b*, *4a*, *ag2*, *g1*, *g2*, *g3* and *g4* absent. Setae *2c* stout, barbed; all other setae smooth. Length of ventral setae: *1a* 61 (56 – 60), *1b* 22 (22 – 23), *1c* 20 (18 – 21), *2c* 30 (28 – 32), *3a* 21 (21 – 23), *3b* 15 (12 – 14), *agl* 18 (13 – 16), *ps1* 12 (11 – 12), *ps2* 16 (15 – 17), *ps3* 28 (26 – 29). Setae *1a* more than two times as long as

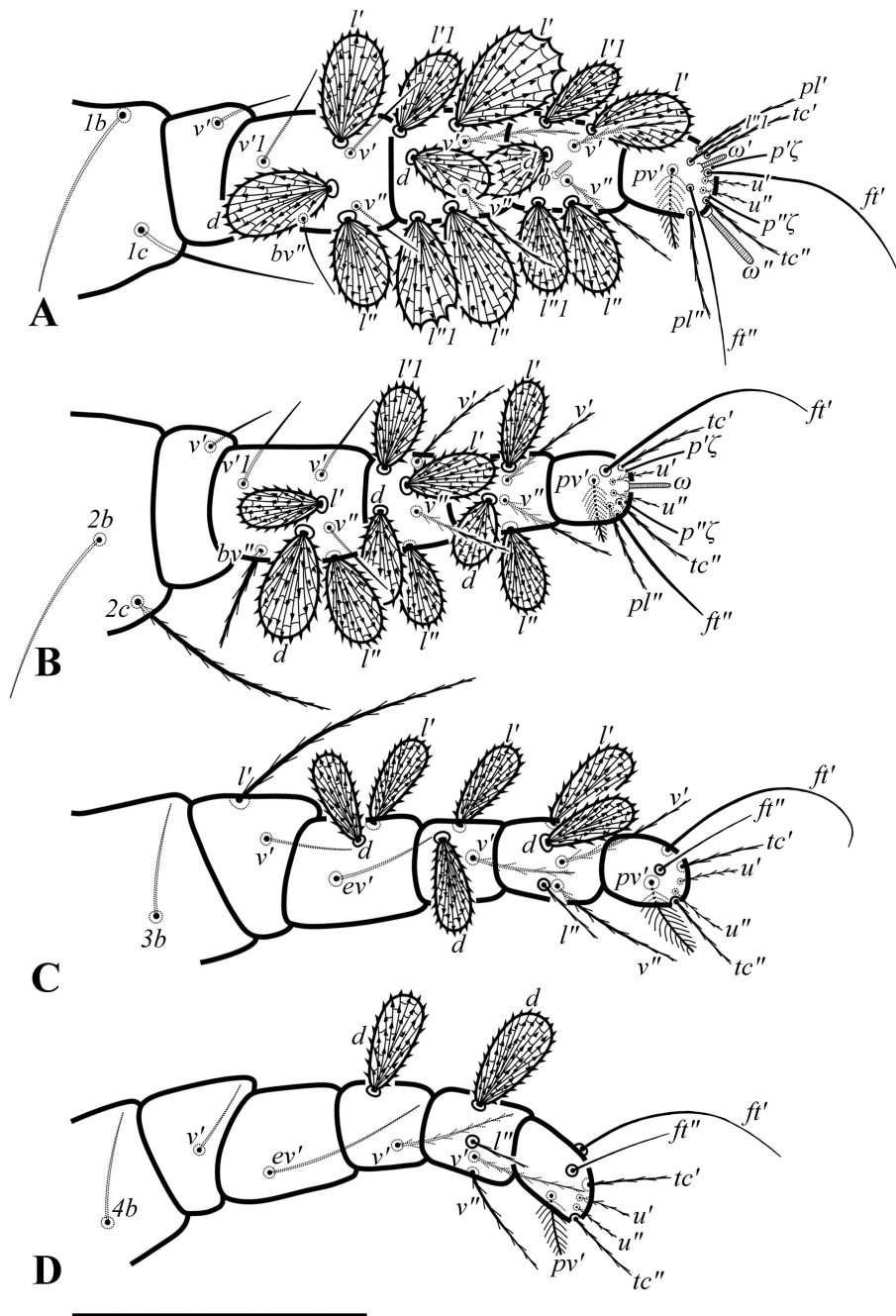


Figure 8 *Tuckerella parsi* n. sp. (tritonymph): right legs I – IV, scale bar 50 μ m.

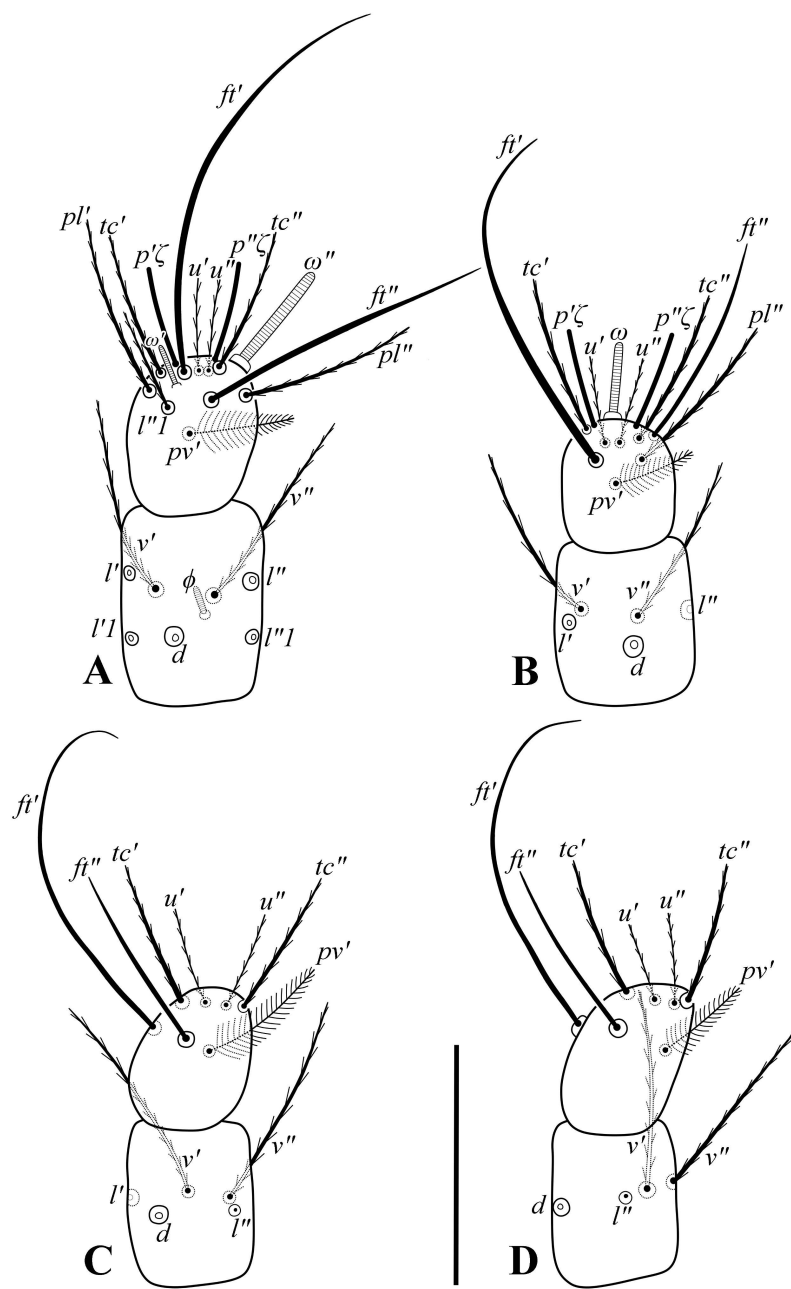


Figure 9 *Tuckerella parsi* n. sp. (tritonymph): tibia & tarsi, right legs I – IV, scale bar 50 μ m.

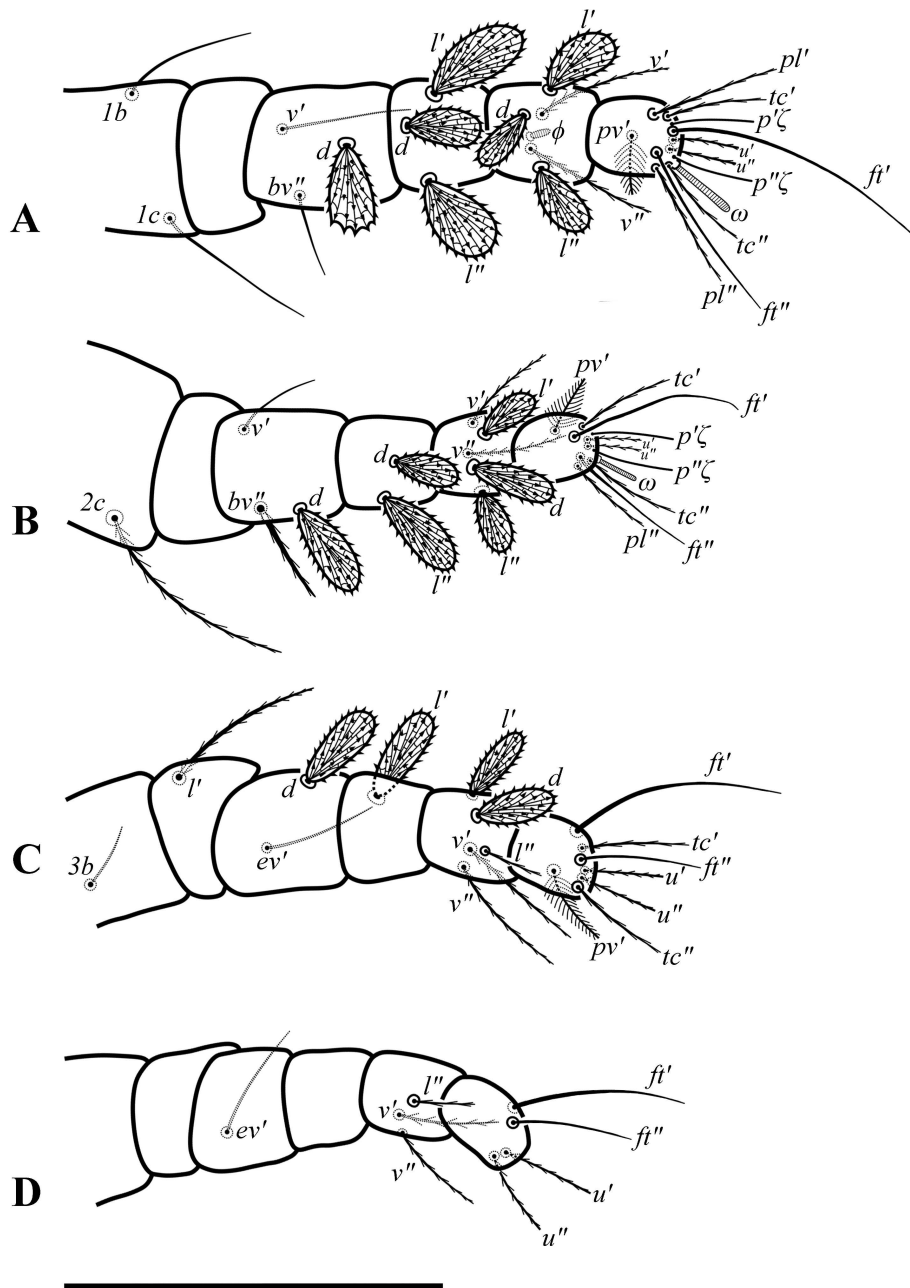


Figure 10 *Tuckerella parsi* n. sp. (protonymph): right legs I – IV, scale bar 50 μ m.

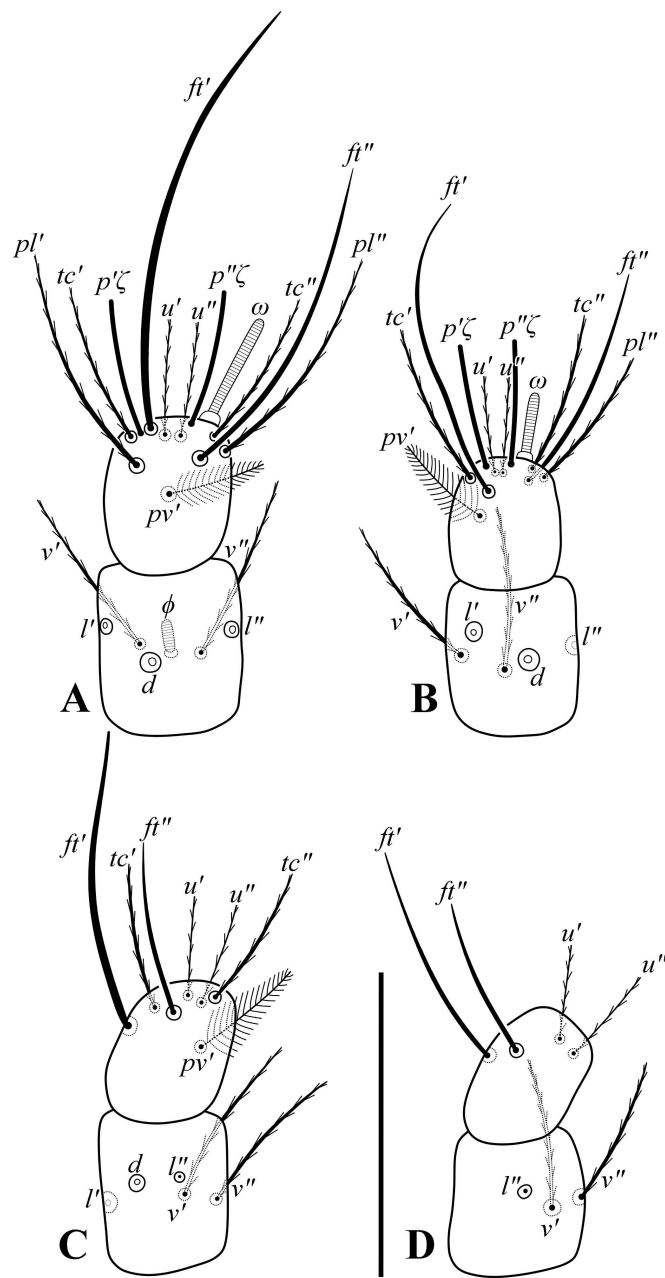


Figure 11 *Tuckerella parsi* n. sp. (protonymph): tibia & tarsi, right legs, scale bar 50 μ m.

3a.

Legs (Figs. 7F, 10A–D, 11A–D) — Tarsal claws claw-like and empodium with tenent hairs.

Setation of legs I–IV: coxae 2(*1b, 1c*)–1(*2c*)–1(*3b*)–0; trochanters 0–0–1(*l'*)–0; femora 3(*d, v', bv''*)–3(*d, v', bv''*)–2(*ev', d*)–1(*ev'*); genua 3(*d, l', l''*)–2(*d, l''*)–1(*l'*)–0; tibiae 6(*d, v', v'', l', l'', φ*)–5(*d, v', v'', l', l''*)–5(*d, v', v'', l', l''*)–3(*v', v'', l''*); tarsi 12(*pv', pl', pl'', ft', ft'', ω'', u', u'', p'ζ, p''ζ, tc', tc''*)–11(*pv', pl'', ft', ft'', ω'', u', u'', p'ζ, p''ζ, tc', tc''*)–7(*pv', ft', ft'', u', u'', tc', tc''*)–4(*ft', ft'', u', u''*).

Remarks

This species resembles *T. channabasavannai* Mallik & Kumar, 1992, *T. equalis* Chaudhri, 1971, *T. indica* Prasad, 1973 and *T. knorri* Baker & Tuttle, 1975 due to the following character states: six pairs of flagellate caudal setae on opisthosoma, dorsal pattern reticulated, setae *fl*–2 with rounded tips and subequal in length in female, and prodorsal setae *vi* and *ve* of different lengths. *Tuckerella parsi* differs from *T. channabasavannai* by having: subequal *e4* and *h6* (*e4* massive compared to *h6* in *T. channabasavannai*), setae *h1* smaller than *h6* (subequal in *T. channabasavannai*), large *d1*–3, *e1*–2, *fl*–2, *h1* (much smaller in *T. channabasavannai*), solenidion Ta I ω' much smaller than ω'' (subequal in *T. channabasavannai*), and solenidion Ti I ϕ very small (much longer, almost reaching tarsus in *T. channabasavannai*). We also note an error in the key of Meyer & Ueckermann (1997): in couplet 19, *T. channabasavannai* has solenidia of subequal length, differing by only a few micrometres, so should instead key to *T. equalis* Chaudhri, 1971. These species are remarkably similar and it seems likely that *T. channabasavannai* is a junior synonym of *T. equalis*. The same may apply to *T. indica*, which is also remarkably similar to these two species. Neither Prasad (1973) nor Mallik & Kumar (1992) compared their species to that of Chaudhri (1971).

Tuckerella parsi is most similar to *T. knorri* by also having the proximal solenidion on tarsus I much shorter than the distal solenidion. It differs by having: setae *h6* large and subequal with setae *e4* in *T. parsi* (setae *h1* small, much smaller than *e4* in *T. knorri*); setae *h1* smaller than *h6*, but broad and palmate (setae *h1* the same size as *h6*, as a short thickened seta in *T. knorri*); and generally many setae are larger in *T. parsi* than in *T. knorri* (for example, setae *c1*–4 are elongate versus orbicular in *T. knorri*).

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