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Article

A new species of *Bakerdania Sasa* (Acari: Heterostigmata: Neopygmephoridae) from Tajikistan

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ABSTRACT

Females of *Bakerdania tadjikistanica* **sp. nov.** (Acari: Heterostigmata: Neopygmephoridae) are described from a soil sample collected from the mountain pasture in Tajikistan. This is the first record of the genus *Bakerdania* and family Neopygmephoridae in Tajikistan.

KEYWORDS: Morphology, Pygmephoroida, soil, Palaearctic, systematics.

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INTRODUCTION

The family Neopygmephoridae Cross, 1965 (Acari: Heterostigmata: Pygmephoroida) is a diverse family of pygmephoroid mites, and currently comprises 30 genera and more than 260 described species (Khaustov and Frolov 2019; Rahiminejad *et al.* 2023). Probably all neopygmephorid mites are fungivorous (Kaliszewski *et al.* 1995).

The genus *Bakerdania* Sasa, 1961, the largest in the family Neopygmephoridae, currently includes more than 100 described species distributed worldwide (Rahiminejad *et al.* 2023). Nothing known about neopygmephorid and other pygmephoroid mites of Tajikistan.

Here we describe females of *Bakerdania tadjikistanica* **sp. nov.** from the soil sample in a mountain pasture in Vahdat District of Tajikistan. This is the first record of the genus *Bakerdania* and the family Neopygmephoridae in Tajikistan.

MATERIAL AND METHODS

Mites were collected from the soil sampled from a mountain pasture in Vahdat District, Tajikistan, using Tullgren-Berlese funnels. All specimens were cleared in lactic acid and mounted on slides in Hoyer's medium. The terminology of the idiosoma and legs follows that of Lindquist (1986); the nomenclature of subcapitular setae and the designation of cheliceral setae follow those of Grandjean (1944, 1947), respectively. The systematics of Pygmephoroida follows that of Khaustov (2004,

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2008a). All measurements are given in micrometers (μm) for the holotype and paratypes (in parentheses). For leg chaetotaxy, the number of solenidia is given in parentheses. Mite morphology was studied using a Carl Zeiss AxioImager A2 compound microscope with phase contrast and differential-interference contrast (DIC) optics. Photomicrographs were taken with a digital camera AxioCam ICc5 (Carl Zeiss, Germany).

All materials are deposited in the mite collection of the Museum of Zoology, Tyumen State University, Tyumen, Russia.

Abbreviations – Ap1-5 – apodemes 1-5; appr – prosternal apodeme; apsej – sejugal apodeme; appo – poststernal apodeme; ags, pgs – anterior and posterior genital sclerites.

Systematics
Family Neopygmephoridae Cross, 1965
Genus *Bakerdania* Sasa, 1961

Type species: *Pygmephorus cultratus* Berlese, 1904, by original designation.

***Bakerdania tadjikistanica* sp. nov. (Figs. 1–6)**

<http://zoobank.org/urn:lsid:zoobank.org:act:6345FDA1-E942-4651-973F-994BAD7740B6>

Diagnosis

Pretarsus IV short; claws on tarsi III and IV subequal in length. Setae *sc2*, *c1*, *d*, *e*, and *f* blunt-tipped, other dorsal setae pointed; setae *e* slightly thickened, with several strong blunt barbs. Setae *h1* distinctly longer than *f*. Setae *ps2* and *ps3* clearly separated. Seta *pl*'' on tarsus IV pointed. Solenidia $\omega 1$ and $\omega 2$ on tarsus I subequal in length.

Description ($n = 3$)

FEMALE. Length of idiosoma 280 (315–325), maximum width 140 (145–150).

Gnathosoma (Figs. 1, 2, 6A, B) – Length of gnathosomal capsule 28, width 22. Gnathosomal capsule with well-developed dorsal median apodeme. All gnathosomal setae smooth and pointed. Length of setae: *cha* 12, *chb* 14, *dFe* 7, *dGe* 10, *m* 11; palpal tibiotarsus with tiny eupathid-like seta and well developed blunt tibial claw distally; palpal solenidion baculiform, almost as long as accessory setigenous structure (*ass*). Subcapitulum with a pair of round alveolar pits *n* in posterior half. Pharyngeal pumps tripartite, joined together and situated on long oesophagus (Fig. 2); pump 1 small, bow-shaped; pumps 2 and 3 oval in shape, pump 2 slightly longer than pump 3; all pumps weakly transversely striated.

Idiosomal dorsum (Figs. 1A, 5A, 6A, C) – Stigmata small, round, located anteromesad bases of setae *v2* and associated with long tracheal trunks typical for the genus. All dorsal sclerites with small puncta (Figs. 6A, C). Trichobothria clavate, weakly barbed, with rounded apex. Setae *v2* smooth, needle-like, other dorsal setae barbed; setae *sc2*, *c1*, *d*, *e*, and *f* blunt-tipped, other dorsal setae pointed; setae *e* slightly thickened, with several strong blunt barbs (Fig. 6C). Cupules *ia* on tergite D not evident; cupules *ih* on tergite H small, round. Bases of setae *e* and *f* clearly separated. Lengths of dorsal setae: *v2* 8 (8), *sc2* 34 (33–37), *c1* 35 (35–38), *c2* 53 (52–57), *d* 33 (32–36), *e* 35 (34–36), *f* 47 (45–50), *h1* 69 (67–70), *h2* 48 (49–50). Distances between setae: *v2*–*v2* 38 (36–40), *sc2*–*sc2* 36 (34–37), *c1*–*c1* 46 (47–50), *c1*–*c2* 31 (28–30), *d*–*d* 25 (25), *e*–*f* 9 (9–10), *f*–*f* 61 (61–65), *h1*–*h1* 30 (30–32), *h1*–*h2* 10 (11).

Idiosomal venter (Figs. 1B, 5B, 6B, D) – All ventral plates with small puncta (Figs. 6B, D). Ap1 well developed and joined with appr; ap2 well developed, joined with appr; apsej well developed and joined with appr; sta represented by a pair of short oblique lines directed from base of setae *2b* to ap2; ap3 weakly developed, linear, not joined with appo; ap4 joined with appo, exceeding bases of setae *3b*; appo well developed; ap 5 absent. All ventral setae pointed; all setae of anterior sternal plate

strongly barbed, setae *3a*, *3b*, *3c*, *4c* and *ps1* weakly barbed, other ventral setae smooth. Bases of setae *ps2* and *ps3* separated. Posterior margin of posterior sternal plate convex in middle part; posterior margin of aggenital plate concave in middle part. Ags bell-like, pgs large, inverted subtriangular. Lengths of ventral setae: *1a* 29 (26–30), *1b* 28 (26–30), *2a* 34 (33–36), *2b* 35 (33–37), *3a* 33 (33–35), *3b* 43 (45), *3c* 30 (22), *4a* 42 (39–43), *4b* 49 (48–52), *4c* 31 (32), *ps1* 17 (15–17), *ps2* 12 (10–12), *ps3* 13 (13–14).

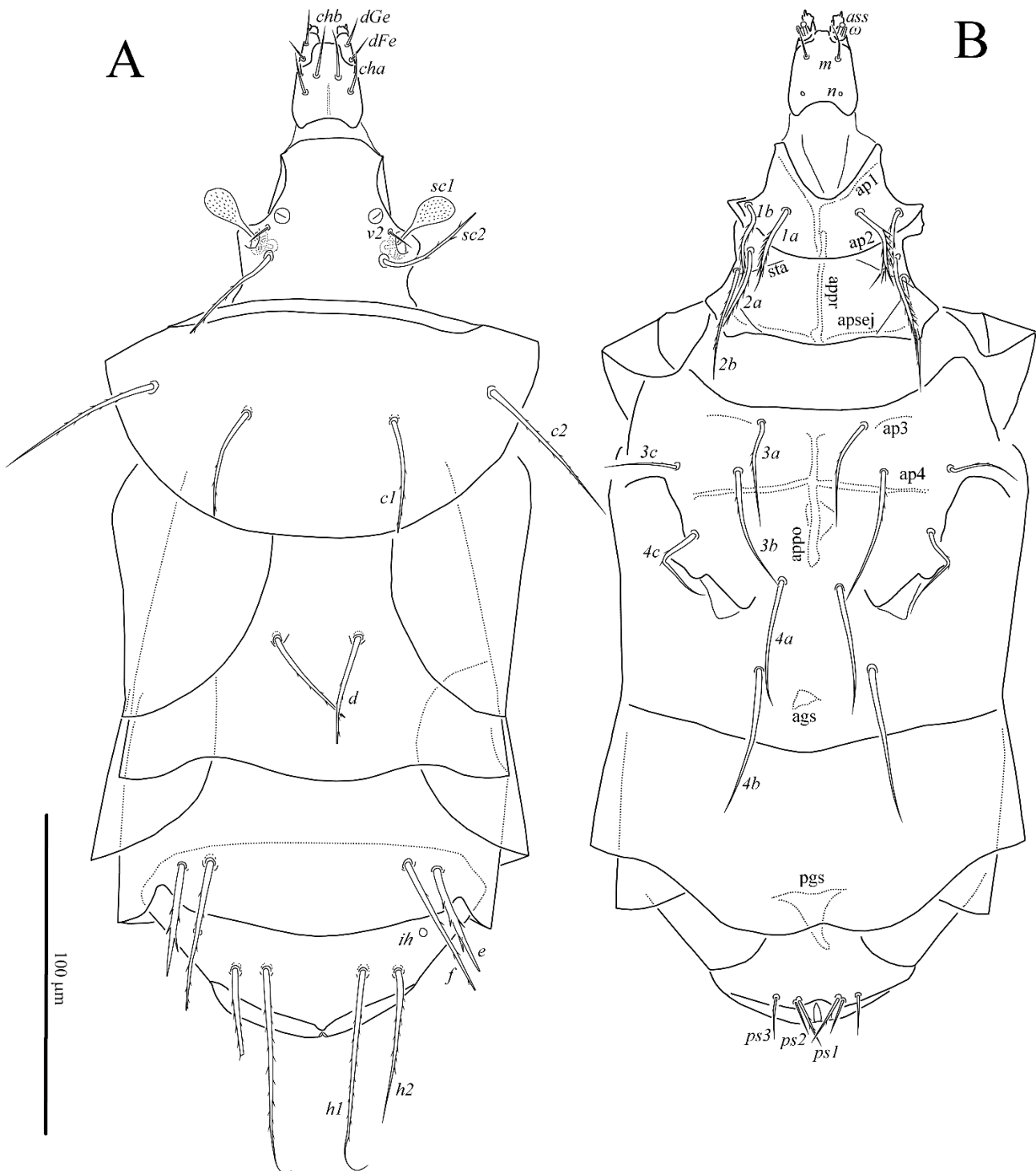
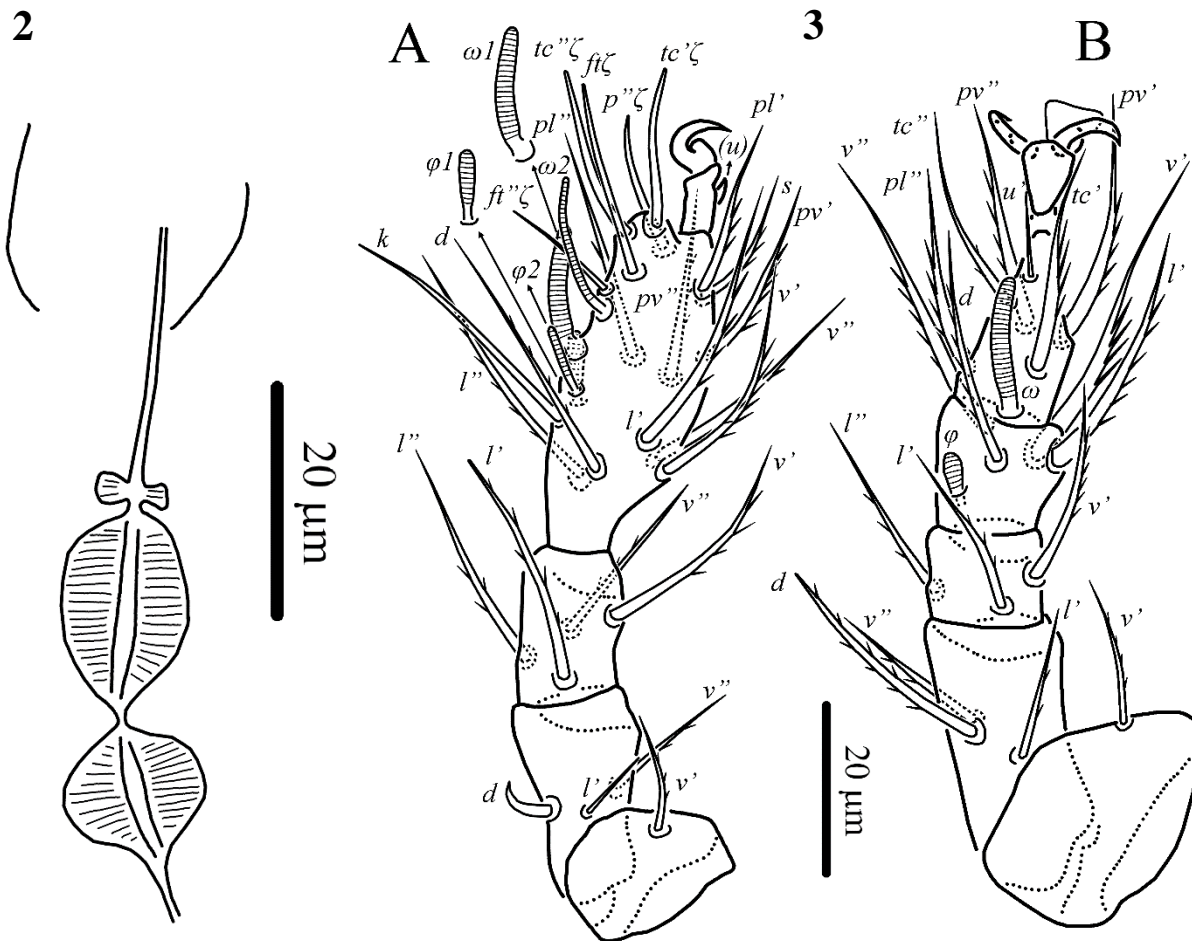


Figure 1. *Bakerdania tadjikistanica* sp. nov. (holotype female) – **A.** Dorsum of body; **B.** Venter of body. Legs omitted.



Figures 2–3. *Bakerdania tadjikistanica* sp. nov. (holotype female) – 2. Pharyngeal pumps; 3. **A.** Left leg I, dorsal aspect; **B.** Left leg II, dorsal aspect.

Legs (Figs. 3, 4) – Leg I (Fig. 3A). Leg setation: Tr 1 (v'), Fe 3 (d, l', v''), Ge 4 (l', l'', v', v''), TiTa 16(4) ($d, l', l'', v', v'', k, tc', tc'', ft', ft'', p'', pl', pl'', pv', pv'', s, \omega 1, \omega 2, \phi 1, \phi 2$). Lengths of solenidia $\omega 1$ 15 (14–15), $\omega 2$ 17 (16–17), $\phi 1$ 9 (8–9), $\phi 2$ 8 (8–9); $\omega 1$ digitiform, $\phi 1$ clavate; $\phi 2$ baculiform; $\omega 2$ uniformly thin and slightly curved. Setae k and eupathidia $ft', ft'', tc', tc'', p''$ blunt-tipped and smooth; seta d of femur hook-shaped; seta v'' of femur weakly blunt-tipped and barbed, other leg setae barbed and pointed. Tarsal claw pointed, situated on long pretarsus; setae (u) modified into spiniform structure located near basal part of claw. Leg II (Fig. 3B). Leg setation: Tr 1 (v'), Fe 3 (d, l', v''), Ge 3 (l', l'', v'), Ti 4(1) (d, l', v', v'', ϕ), Ta 6(1) ($pl'', tc', tc'', pv', pv'', u', \omega$). Solenidium ω 16 (15–16) digitiform, solenidium ϕ 6 (6) clavate. Seta u' of tarsus smooth, other leg setae barbed; seta d of femur weakly blunt-tipped, other leg setae pointed. Tarsal claws curved and thickened basally; empodium flipper-shaped. Leg III (Fig. 4A). Leg setation: Tr 1 (v'), Fe 2 (d, v'), Ge 2 (l', v'), Ti 4(1) (d, l', v', v'', ϕ), Ta 6 ($pl'', tc', tc'', pv', pv'', u'$). Solenidium ϕ 5 (5) clavate. Seta u' of tarsus smooth, other leg setae barbed; seta d of femur weakly blunt-tipped, other leg setae pointed. Tarsal claws and empodium as on tarsus II. Leg IV (Fig. 4B). Leg setation: Tr 1 (v'), Fe 2 (d, v'), Ge 1 (v'), Ti 4(1) (d, l', v', v'', ϕ), Ta 6 ($pl'', tc', tc'', u', pv', pv''$). Solenidium ϕ 3 (3) tiny, weakly clavate. All setae barbed; setae d of femur and v'' of tibia weakly blunt-tipped, other leg setae pointed. Tarsus IV short, with short pretarsus; tarsal claws as long as on tarsi II and III, without basal thickenings; empodium as on tarsi II and III; femur IV shorter than combined length of tibia and tarsus. Trochanter with short dorsal spiniform projection.

Male and larva unknown.

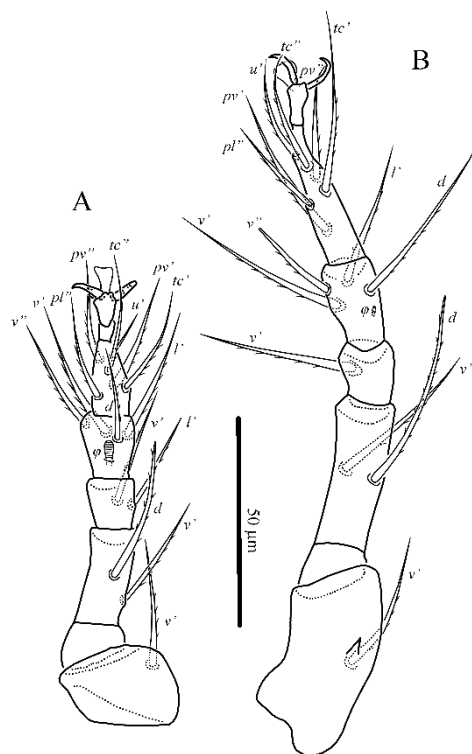


Figure 4. *Bakerdania tadjikistanica* sp. nov. (holotype female) – **A.** Left leg III, dorsal aspect; **B.** Left leg IV, dorsal aspect.



Figure 5. Phase contrast micrographs of *Bakerdania tadjikistanica* sp. nov. (holotype female) – **A.** Dorsum of body; **B.** Venter of body.

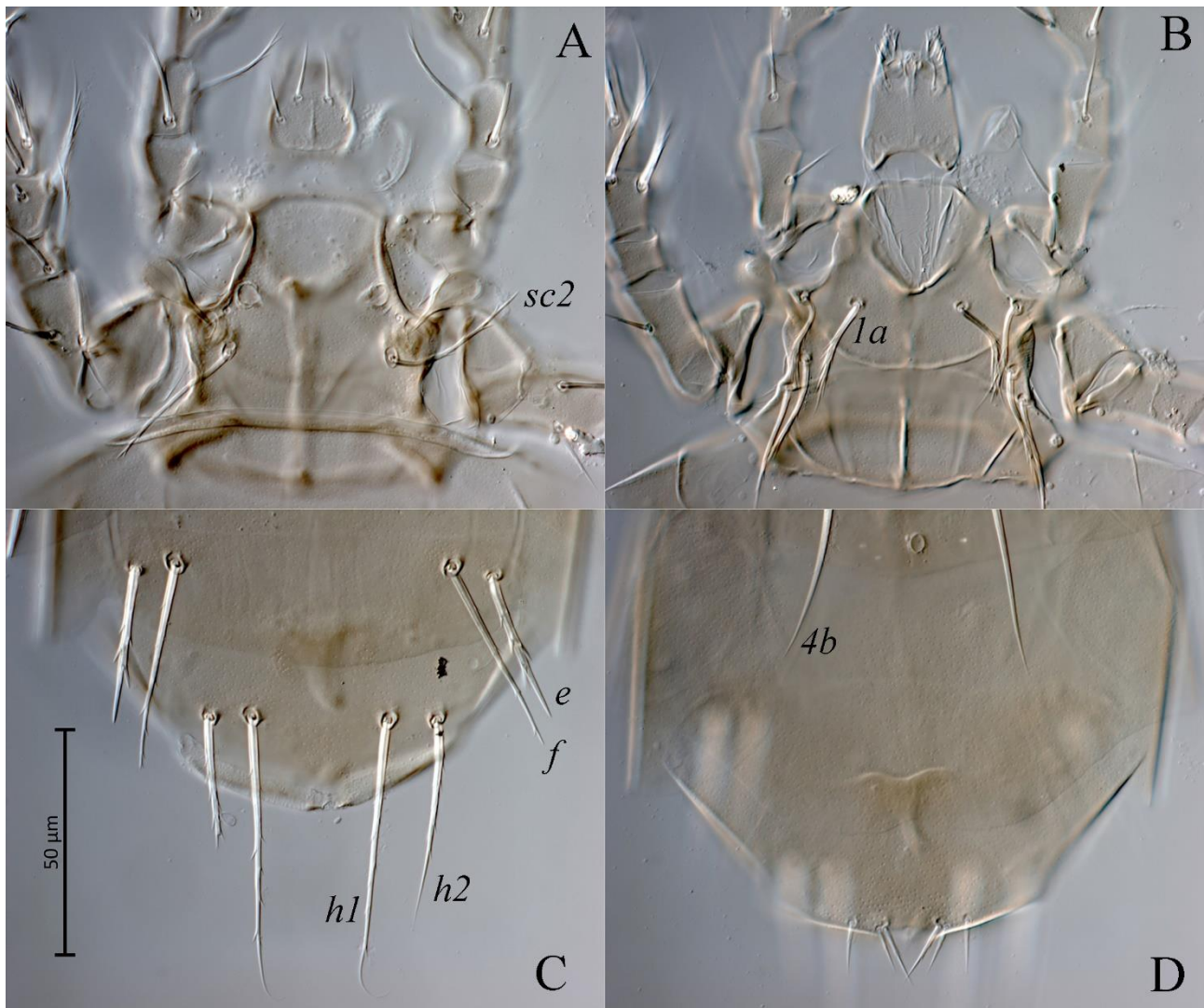


Figure 6. DIC micrographs of *Bakerdania tajikistanica* sp. nov. (holotype female) – **A.** Proterosoma, dorsal aspect; **B.** Proterosoma, ventral aspect; **C.** Opisthosoma, dorsal aspect; **D.** Opisthosoma, ventral aspect.

Type material

Holotype female, Tajikistan, Vahdat District, 2360 m a.s.l., 26 May 2022, soil in mountain pasture, 38° 51' 40.5" N, 69° 00' 14.2" E, coll. A.A. Khaustov; paratypes: 2 females, same data.

Differential diagnosis

The new species is most similar to *Bakerdania plinthos* Mahunka, described from Tunisia (Mahunka 1978), in having claws on tarsus IV as long as on tarsi II and III; tarsus IV relatively short, pretarsus not elongate; bases of setae *ps2* and *ps3* separated and in having similar length and shape of idiosomal setae. The new species differs from *B. plinthos* in having alveoli of setae *e* and *f* clearly separated (alveoli of setae *e* and *f* contiguous in *B. plinthos*) and in having solenidia $\omega 1$ and $\omega 2$ of tibiotarsus I subequal in length (solenidion $\omega 1$ about 1.5 times longer than $\omega 2$ in *B. plinthos*). The new species is also similar to *Bakerdania taymyrica* Khaustov, 2008 in having similar shape of dorsal idiosomal setae. The new species differs from *B. taymyrica* in having setae *ps3* clearly separated from *ps2* (*ps2* and [*s3* contiguous in *B. taymyrica*); setae *e* with several strong barbs (setae *e* smooth in *B. taymyrica*); and setae *h1* distinctly longer than *f* (setae *f* and *h1* subequal in length in *B. taymyrica*).

Etymology

The name of the new species *tadjikistanica* refers to its geographical distribution in Tajikistan.

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REFERENCES

- Berlese, A. (1904) Acari nuovi. Manipulus III. *Redia*, 2: 10–32.
- Cross, E.A. (1965) The generic relationships of the family Pyemotidae (Acarina, Trombidiformes). *The University of Kansas Science Bulletin*, 45: 29–215. DOI: [10.11158/saa.19.3.10](https://doi.org/10.11158/saa.19.3.10)
- Grandjean, F. (1944) Observations sur les Acariens de la famille des Stigmaeidae. *Archives des Sciences Physiques et Naturelles*, 26: 103–131.
- Grandjean, F. (1947) L'origine pileuse des mors et la chaetotaxie de la mandibule chez les Acariens actinochitineux. *Comptes rendus des Séances de l'Académie des Sciences*, 224: 1251–1254.
- Kaliszewski, M., Athias-Binche, F. & Lindquist, E.E. (1995) Parasitism and parasitoidism in Tarsonemina (Acari: Heterostigmata) and evolutionary considerations. *Advances in Parasitology*, 35: 335–367. DOI: [10.1016/S0065-308X\(08\)60074-3](https://doi.org/10.1016/S0065-308X(08)60074-3)
- Khaustov, A.A. (2004) Mites of the family Neopygmephoridae Cross, 1965 stat. n. and their position in Heterostigmata. In: Balashov, Y.S. (Ed.), *VIII Russian Acarological Meeting*. Nov. 30–Dec. 2, 2004. Zoological Institute of RAS, St.-Petersburg, Russia, p. 137.
- Khaustov, A.A. (2008a) *Mites of the family Scutacaridae of Eastern Palaearctic*. Kiev, Akadem-periodyka, 291 pp.
- Khaustov, A.A. (2008b) Four new species of mites of the genus *Bakerdania* (Heterostigmata, Pygmephoridae) from Russia. *Zoologicheskii Zhurnal*, 87: 1197–1204.
- Khaustov, A.A. & Frolov, A.V. (2019) A new genus and two new species of Neopygmephoridae (Acari: Pygmephoridae) phoretic on scarab beetles. *Acarina*, 27(2): 209–220. DOI: [10.21684/0132-8077-2019-27-2-209-220](https://doi.org/10.21684/0132-8077-2019-27-2-209-220)
- Lindquist, E.E. (1986) The world genera of Tarsonemidae (Acari: Heterostigmata): a morphological, phylogenetic, and systematic revision, with a reclassification of family-group taxa in the Heterostigmata. *Memoirs of the Entomological Society of Canada*, 118: 1–517. DOI: [10.4039/entm118136fv](https://doi.org/10.4039/entm118136fv)
- Mahunka, S. (1978) Beiträge zur Kenntnis der Tarsonemiden-Fauna (Acari: Tarsonemida) Tunesiens. *Parasitologia Hungarica*, 11: 113–125.
- Rahiminejad, V., Nadimi, A. & Afshari, A. (2023) A catalog of heterostigmatic mites (Acari: Trombidiformes) of Iran. *Persian Journal of Acarology*, 12(2): 259–313. DOI: [10.22073/pja.v12i2.78237](https://doi.org/10.22073/pja.v12i2.78237)
- Sasa, M. (1961) New mites of the genus *Pygmephorus* from small mammals in Japan (Acarina: Pyemotidae). *Japanese Journal of Experimental Medicine*, 31: 191–208.

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گونه جدیدی از *Bakerdania Sasa* (Acari: Heterostigmata: Neopygmephoridae) از تاجیکستان

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چکیده

ماده‌های (*Bakerdania*) (Acari: Heterostigmata: Neopygmephoridae) *Bakerdania tadjikistanica* sp. nov. از نمونه خاک جمع‌آوری شده از مرتعی کوهستانی در تاجیکستان توصیف می‌شود. این نخستین گزارش از جنس *Bakerdania* و خانواده Neopygmephoridae در تاجیکستان است.

واژگان کلیدی: ریخت‌شناسی، Pygmephoroida، خاک، پالئارکتیک، رده‌بندی.

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