

FIRST RECORD OF THE GENUS *NEOMICRODISPUS* (ACARI: MICRODISPIDAE) FROM RUSSIA WITH THE DESCRIPTION OF A NEW SPECIES AND A KEY TO WORLD GENERA OF THE FAMILY MICRODISPIDAE

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ABSTRACT: *Neomicrodispus sibiriensis* sp.n. (Acari: Microdispidae), collected from a decaying tree stump in Western Siberia, Russia, is described. After studying the type material for *Neomicrodispus iranicus* Hajiqaanbar et Hosseinaveh, 2014, the diagnosis of the genus *Neomicrodispus* Hajiqaanbar et Hosseinaveh, 2014 was modified. In addition, a key to the world genera of the family Microdispidae is provided.

KEY WORDS: Mites, Heterostigmata, systematics, Western Siberia, SEM microscopy.

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INTRODUCTION

The family Microdispidae Cross, 1965, which currently includes 27 genera and more than 120 species, is the least diverse and the least studied family of pygmephoroid mites (Khaustov 2017; Khaustov *et al.* 2018; Khaustov and Ermilov 2018; Khaustov and Frolov 2018; Azhari *et al.* 2018). Most microdispid mites are fungivorous, but some species are parasitoids of insects (Kaliszewski *et al.* 1995). Many microdispid species are incompletely described, and their taxonomic position is unclear (Khaustov 2017). A lack of a key to the genera of the family Microdispidae causes problems with the correct placement of many species in their proper genera. The previous key to the genera of the family Microdispidae was published by Mahunka (1970). Since that time, many microdispid genera have been described or redefined (Mahunka 1972, 1975, 1977a, b, 1978; Kaliszewski and Rack 1986; Mahunka and Mahunka-Papp 1994; Khaustov 2006, 2009, 2014; 2017; Hajiqaanbar and Hosseinaveh 2014; Khaustov and Tolstikov 2015; Khaustov and Minor 2016; Khaustov and Zelalem 2017; Azhari *et al.* 2018; Khaustov *et al.* 2018; Khaustov and Ermilov 2018). In this paper, I provide a key to the world genera of Microdispidae.

During my study of heterostigmatic mites of Western Siberia, I recorded a new species *Neomicrodispus sibiriensis* sp.n. that belongs to a rare genus. After studying the type material of *Neomicrodispus iranicus* Hajiqaanbar et Hosseinaveh, 2014, I concluded that the original description of *Neomicrodispus iranicus* lacks some important taxonomic characters. Consequently, this paper contains a modified diagnosis of the genus *Neomicrodispus*.

MATERIAL AND METHODS

The mites were collected from samples taken from a decaying tree stump, using Berlese funnels and mounted in Hoyer's medium. The holotype and one paratype of *Neomicrodispus iranicus* were loaned from the collection of Tarbiat Modares University (Tehran, Iran). Mite morphology was studied using a Carl Zeiss AxioImager A2 compound microscope, equipped with a phase contrast and DIC objectives. For SEM microscopy, alcohol-preserved mites were freeze-dried in JFD 320 (JEOL, Japan), coated in gold, and then scanned with the aid of a JEOL JSM-6510LV SEM microscope.

The terminology of the idiosoma and legs follows that of Lindquist (1986); the nomenclature of subcapitular setae and the designation of cheliceral setae follow Grandjean (1944, 1947), respectively. The taxonomic system of Pygmephoroidae follows that of Khaustov (2004, 2008). All measurements for the holotype and five paratypes (in parentheses) are provided in micrometers (μm). For leg chaetotaxy, the number of solenidia is provided in parentheses.

RESULTS

Family **Microdispidae** Cross, 1965

Genus ***Neomicrodispus*** Hajiqaanbar et Hosseinaveh, 2014

Type species: *Neomicrodispus iranicus* Hajiqaanbar et Hosseinaveh, 2014, by original designation.

Diagnosis. As in Hajiqaanbar and Hosseinaveh (2014), with the following modifications.

Gnathosoma. Postpalpal setae (*pp*) present.

Idiosomal venter. Setae *4a* present or absent.

Legs. Setation of tibiotarsus I – 15(3) (*d*, *l'*, *l''*, *v'*, *v''*, *k*, *tc'*, *tc''*, *ft'*, *ft''*, *p''*, *pl'*, *pl''*, *pv'*, *pv''*, ω_1 , φ_1 , φ_2). Tibia IV without solenidion.

***Neomicrodispus sibiriensis* sp.n.**

(Figs. 1–4)

Description. Female (Figs. 1–4). Length of idiosoma 175 (165–175), width 110 (100–110).

Gnathosoma. Length of gnathosoma 22 (22–23), width 13 (12–14). Dorsal median apodeme absent. Cheliceral setae *cha* 13 (12–13) weakly barbed and pointed (Figs. 4B–D). Postpalpal setae (*pp*) needle-like, located laterally to bases of *cha* (Fig. 4D). Setae *dFe* and *dGe*, smooth, pointed, subequal. Subcapitular setae *m* 8 (8–9) smooth and pointed. Accessory setigenous structure (*ass*) short, cylindrical. Subcapitulum with oval pits in posterior part. Pharyngeal pump I small, bow-shaped, smooth, distinctly separated from large subrectangular and transversely striated pump II; pharyngeal pump III small, smooth, located just behind pump II.

Idiosomal dorsum (Fig. 1A). Prodorsum only slightly covered by anterior part of tergite C. All dorsal shields with numerous very small round dimples. All dorsal hysterosomal setae sparsely barbed and pointed. Trichobothria with long stem, clavate, weakly barbed, with two short apical projections. Cupules *ia* and *ih* small, round. Posterior parts of tergites C, D, EF and lateral plates with row of u-shaped elevations. Tergite C with two pairs of oval porous areas medially to setae c_1 and one pair laterally to c_1 ; tergite EF with one pair of round porous areas just anterior to bases of setae *e*; tergite H with one pair of porous areas medially to setae h_1 . Posterior margin of tergite H with short and wide u-shaped projection. Lengths of dorsal setae: *sc*₂ 26 (24–29), c_1 38 (34–39), c_2 37 (34–38), *d* 40 (40–43), *e* 38 (37–39), *f* 42 (41–46), h_1 35 (35–37), h_2 23 (23–25). Distances between setae: sc_2 – sc_2 36 (35–37), c_1 – c_1 45 (42–46), c_1 – c_2 22 (21–23), *d*–*d* 21 (20–22), *e*–*f* 21 (19–22), *f*–*f* 23 (21–23), h_1 – h_1 35 (33–35), h_1 – h_2 11 (10–11).

Idiosomal venter (Figs. 1B, 4A, B, E). Apodemes 1 (*ap1*), apodemes 2 (*ap2*) and sejugal apodeme (*apsej*) well developed and joined with prosternal apodeme (*appr*); apodemes 3 (*ap3*) weak, linear, joined with poststernal apodeme (*appo*); apodemes 4 (*ap4*) well developed, reaching beyond bases of setae *3b*. Apodemes 5 absent. Ventral plates with

numerous very small round dimples. All ventral setae pointed. Setae *3b*, *4a* and *4b* smooth; setae *3a*, *3c*, *4c* and ps_{1-3} with few weak barbs; other ventral setae distinctly barbed. Posterior part of poststernal plate and aggenital plate with u-shaped elevations. Posterior margin of posterior sternal plate weakly convex in middle part. Posterior margin of aggenital plate almost straight. Anterior (*ags*) and posterior (*pgs*) genital sclerites small, bell-like. Lengths of ventral setae: *1a* 21 (21–23), *1b* 18 (18–20), *2a* 28 (24–29), *2b* 30 (30–32), *3a* 24 (24–25), *3b* 30 (25–30), *3c* 22 (22–23), *4a* 27 (27–30), *4b* 44 (44–46), *4c* 35 (35–37), ps_1 13 (11–13), ps_2 12 (11–12), ps_3 13 (12–13).

Legs (Figs. 2, 3, 4F). Leg I (Figs. 2A, 4F). Lengths of solenidia ω_1 9 (9–10), φ_1 6 (6), φ_2 6 (6); φ_1 clavate, ω_1 finger-shaped, φ_2 uniformly thin. Setae *l'* of femur and *k* of tibiotarsus blunt-ended; other leg setae (except eupathidia) pointed. Seta *v'* of trochanter smooth; other leg setae (except eupathidia) barbed. Leg II (Fig. 2B). Tarsus with claws distinctly thickened in basal part and with flipper-like empodium. Solenidion ω 7 (7–8) finger-shaped, solenidion φ 3 (3) weakly clavate. All leg setae pointed and barbed. Leg III (Fig. 3A). Claws and empodium as on tarsus II. Solenidion φ 2 (2) weakly clavate. All leg setae pointed and barbed. Leg IV (Fig. 3B). Tarsus with simple hooked claws and small empodium. All leg setae pointed and barbed.

Male and larva unknown.

Differential diagnosis. The new species can be distinguished from *N. iranicus* by the presence of setae *4a* (absent in *N. iranicus*) and distinctly longer dorsal hysterosomal setae.

Type material. Female holotype, slide ZISP T-Mcd-002, Russia, Tyumen Region, vicinities of lake Kuchak, 57°21' N, 66°03' E, in a decaying stump, 1 August 2018, coll. A.A. Khaustov; paratypes: 8 females, same data; 2 females, same locality, 26 September 2018.

Type deposition. The holotype and two paratypes are deposited in the collection of the Zoological Institute of Russian Academy of Sciences (St. Petersburg, Russia), other paratypes in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

Etymology. The name of the new species refers to its distribution in Siberia.

***Neomicrodispus iranicus*
Hajiqanbar et Hosseinaveh, 2014**

Neomicrodispus iranicus Hajiqanbar et Hosseinaveh, 2014, p. 2, Figs. 1–5.

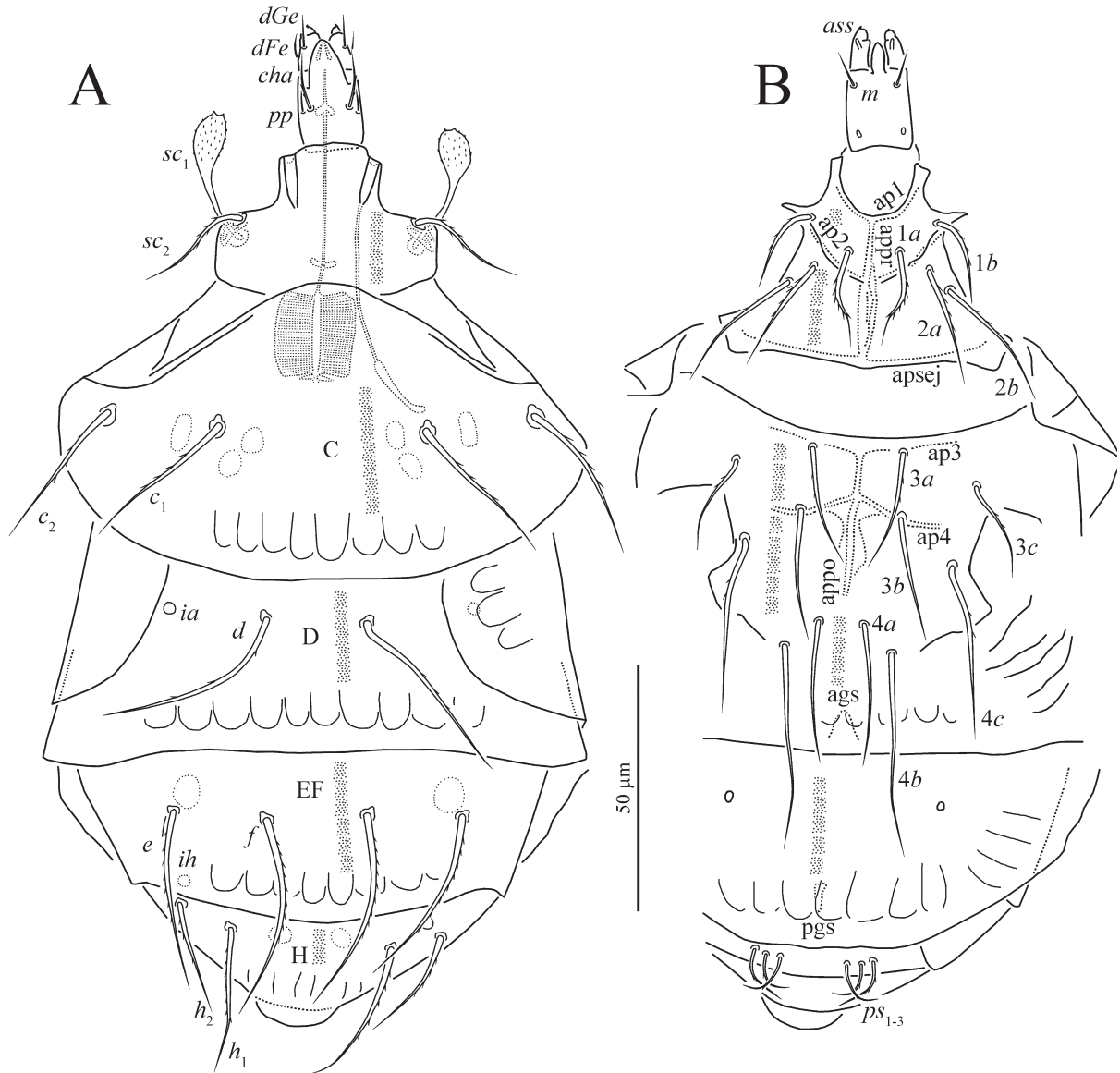


Fig. 1. *Neomicrodispus sibiriensis* sp.n., female: A—dorsum of the body, B—venter of the body. Legs omitted.

Material examined. Female holotype (VR20100715) and one paratype found in a vial containing the beetle *Oryctes nasicornis* (Coleoptera: Scarabaeidae) and ethyl alcohol 75%. The host beetle was collected in Naharkhoran forest, Golestan Region, northern Iran, 36.46° N, 54.27° E, altitude 450 m., coll. V. Rahiminejad, 15 July 2010.

Remarks. Examination of the type material of this species revealed that it has the same setation of leg I as *N. sibiriensis* sp.n. In the original description, only four eupathidia were depicted on tibiotarsus I. In fact, five eupathidia are present. Post-palpal setae are present (vs. absent in the original description). Trichobothria are barbed, with two short apical projections (vs. smooth and without projections in the original description). Setae *e* and

*h*₂ are weakly barbed (vs. smooth in the original description). Tibia IV is without solenidion, but with pore-like structure, visible on its typical insertion point (vs. with solenidion in the original description).

Key to world genera of Microdispidae

(based on females)

1. Tibiotarsus I with claw..... 2
- Tibiotarsus I without claw..... 6
2. Body round, gnathosoma very long, beak-like...
..... *Perperipes* Cross, 1965
- Body oval, gnathosoma not beak-like..... 3
3. Tarsus IV with pretarsus, claws and empodium... 4
- Tarsus IV without pretarsus, claws and empodium..
..... *Proreductodispus* Khaustov et Tolstikov, 2015

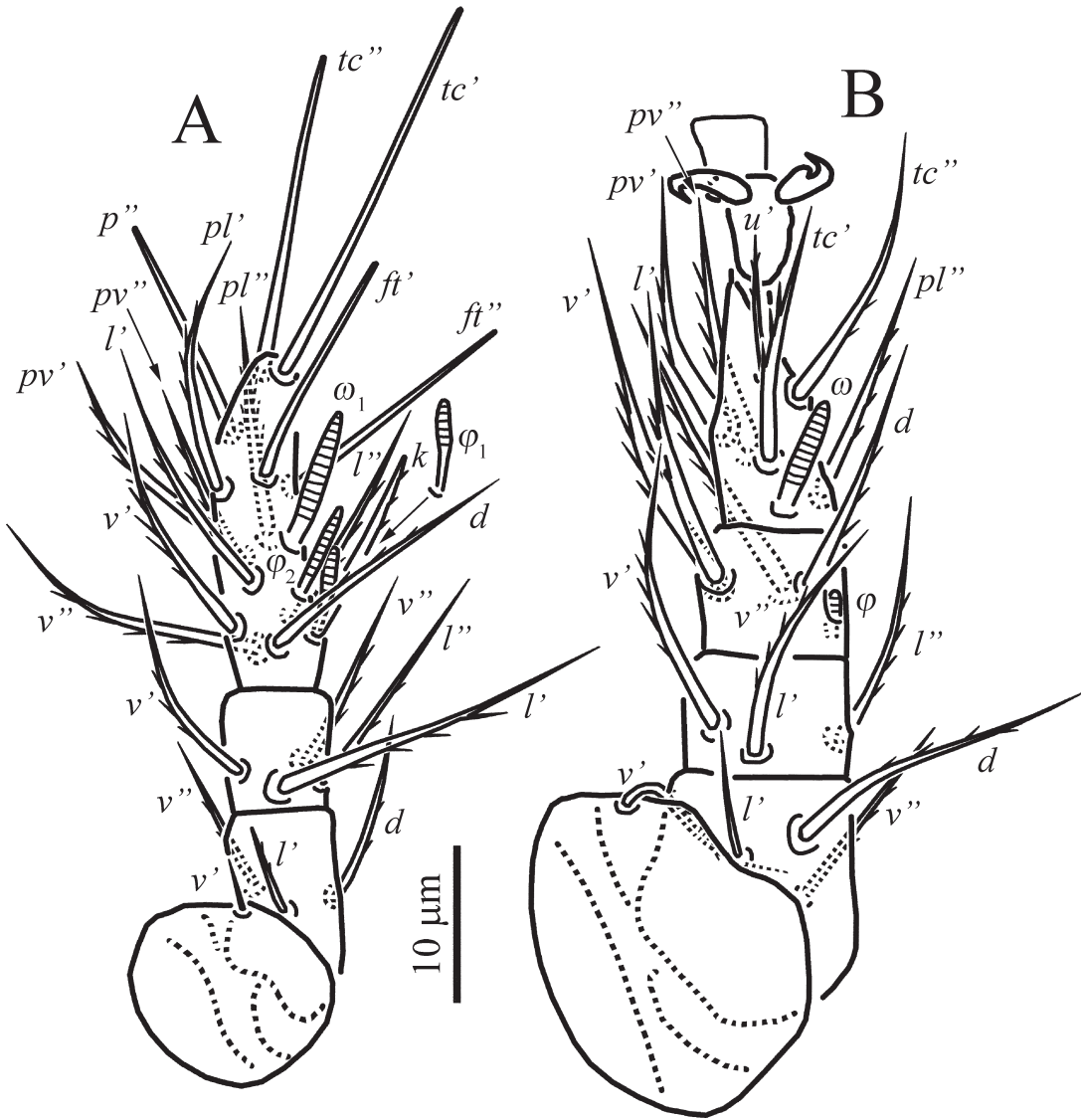


Fig. 2. *Neomicrodispus sibiriensis* sp.n., female: A—right leg I in dorsal view, B—right leg II in dorsal view.

4. Posterior margin of posterior sternal plate with three large lobes (tripartite)..... 5
 — Posterior margin of posterior sternal plate without lobes*Unguidispus* Mahunka, 1970
 5. Legs I distinctly shorter and thinner than legs II, seta *tc'* present on tarsus III, tibia IV with seta *v''*..
*Myrmecodispus* Cross, 1965
 — Legs I and II subequal in length and width, seta *tc'* absent on tarsus III, tibia IV without seta *v''*..
*Afrodispus* Khaustov, 2017
 6. Gnathosomal capsule elongate, palps distinct.. 7
 — Gnathosomal very wide, about twice wider than length, palps indistinct.....*Peponocara* Cross, 1965
 7. Tarsus IV without pretarsus, claws and empodium 8
 — Tarsus IV with pretarsus, claws and empodium 9

8. Dorsal hysterosomal setae not modified
 *Reductodispus* Mahunka, 1977
 — Dorsal hysterosomal setae *d*, *e* and *f* modified, wide and tube-like
 *Tubulodispus* Mahunka, 1975
 9. Gnathosoma usually not beak-like, if distinctly narrowed distally than setae *pl''* and *tc'* on tarsi II and III not modified 10
 — Gnathosoma very long, beak-like, setae *pl''* and *tc'* on tarsi II and III strongly widened, blunt-ended*Glyphidomastax* Cross, 1965
 10. Trichobothria present 11
 — Trichobothria absent
*Ethiodispus* Khaustov, 2017
 11. Femur I with two setae, femur II with one seta, genua III and IV without setae, seta *pl''* on tarsi II–IV absent..... 12

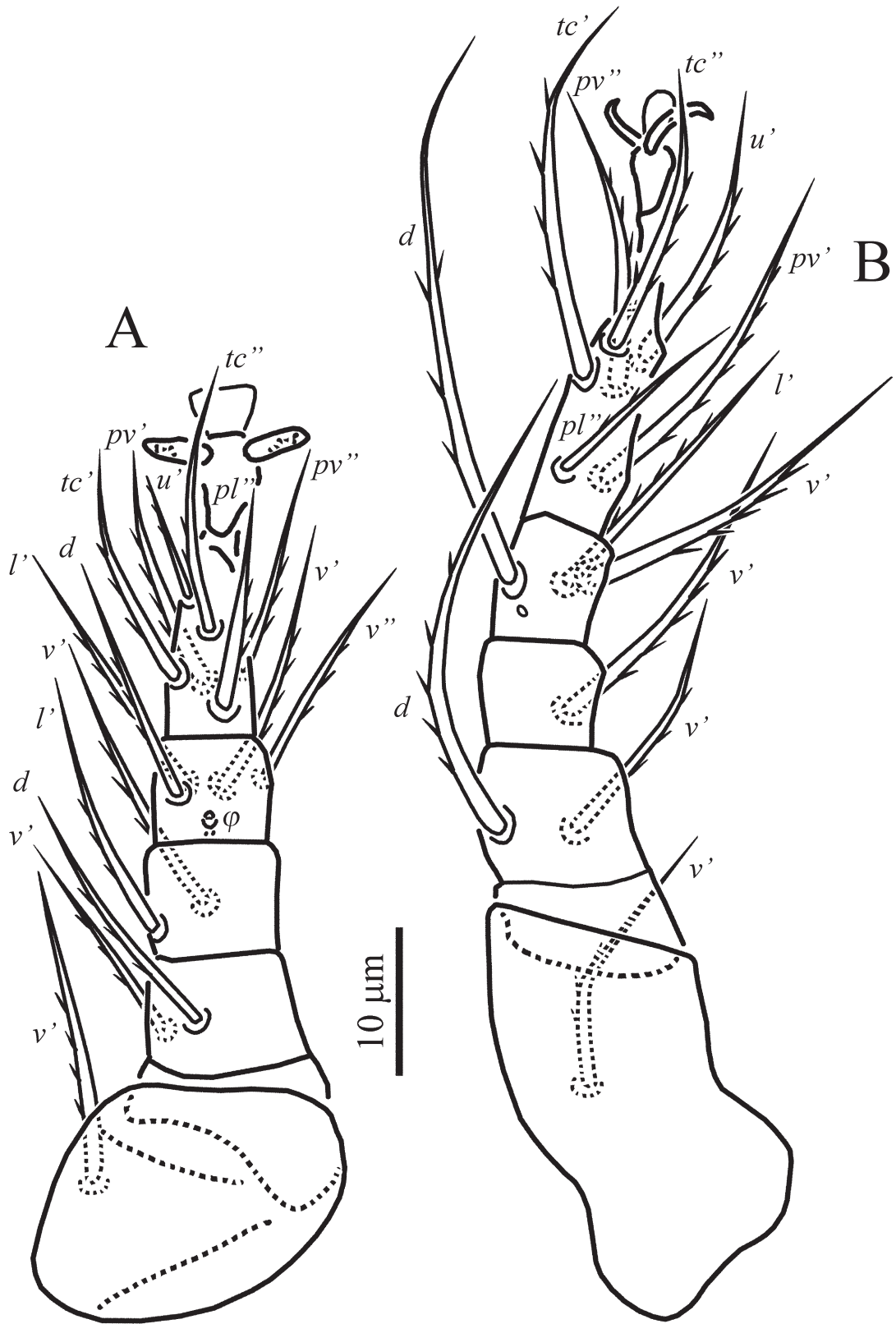


Fig. 3. *Neomicrodispus sibiriensis* sp.n., female: A—right leg III in dorsal view, B—right leg IV in dorsal view.

— Femur I usually with three setae, femur II with three setae, genua III and IV with setae, seta *pl''* on tarsi II-IV present..... 13

12. Tarsi II and III with setae *u'*.....
 *Phyllodispus* Mahunka, 1970

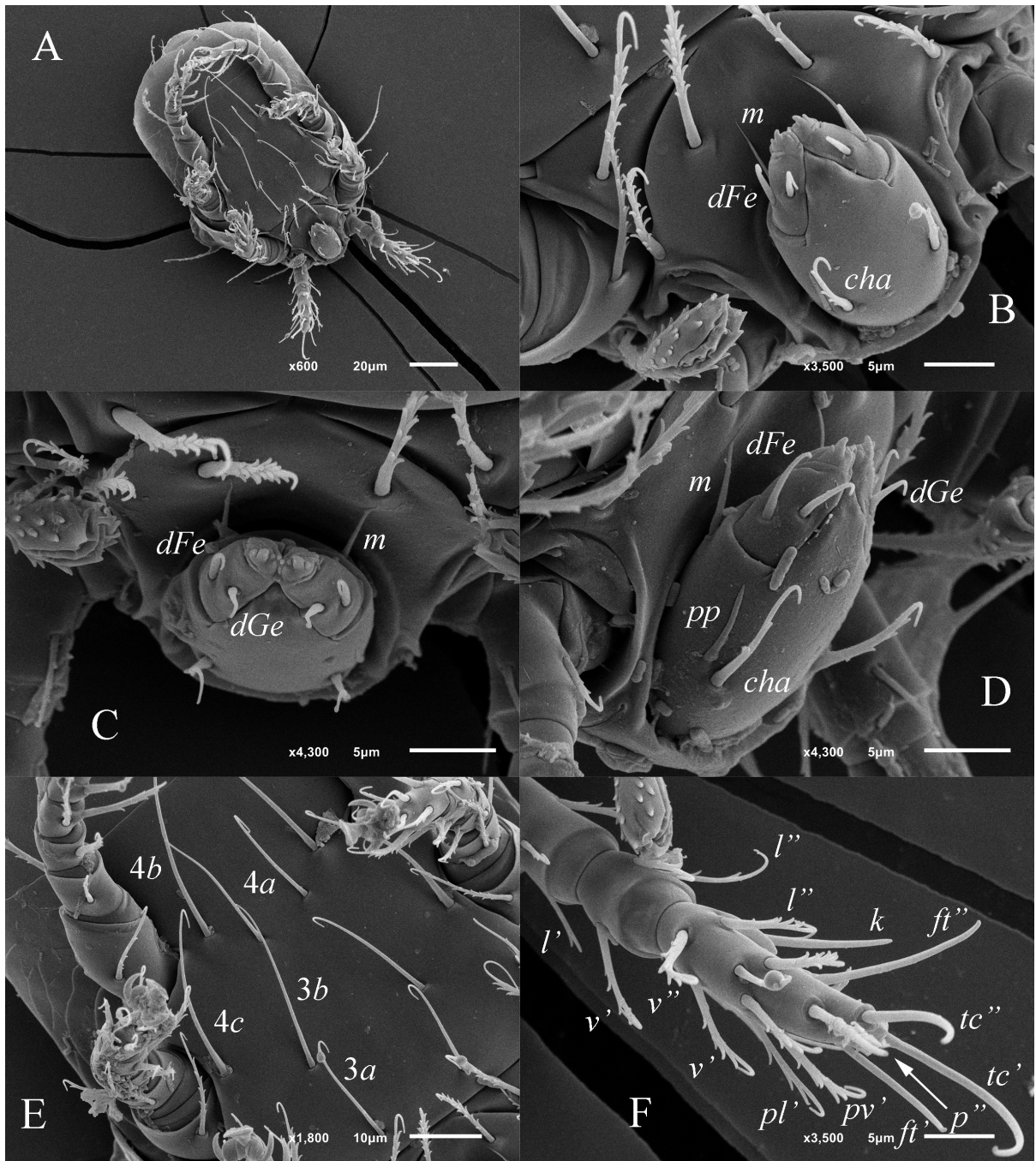


Fig. 4. SEM micrographs of *Neomicrodispus sibiriensis* sp.n., female: A—body in ventral view, B—prosoma in ventral view, C—gnathosoma in frontal view, D—gnathosoma in dorsolateral view, E—posterior sternal plate, F—leg I in ventral view.

— Tarsi II and III without setae *u'*
 *Paraphyllodispus* Khaustov et Minor, 2016
 13. Eupathidium *ft'* absent on tibiotarsus I 14
 — Eupathidium *ft'* present on tibiotarsus I 17
 14. Eupathidium *ft''* present on tibiotarsus I 15
 — Eupathidium *ft''* absent on tibiotarsus I
 *Microdispus* Paoli, 1911
 15. Tibia IV with three setae 16
 — Tibia IV with four setae
 *Paramicrodispus* Khaustov, 2009

16. Setae *h*₁ always modified (leaf-like, strongly expanded and flattened), most of dorsal setae usually strongly barbed, sometimes ventral setae *4a* and *4b* modified, flattened and expanded), eupathidium *ft''* well developed
 *Cochlodispus* Mahunka, 1972
 — Setae *h*₁ only slightly thickened, most of dorsal setae usually weakly barbed, ventral setae *4a* and *4b* not modified, eupathidium *ft''* very short
 *Pseudomicrodispus* Khaustov, 2017

17. Genu IV with four setae 18
 — Genu IV with three setae
 ... *Neomicrodispus* Hajiqanbar et Hosseinaveh, 2014
18. Body oval or elongate, dorsal hysterosomal setae not modified 19
 — Body almost round, at least setae *f* and *h*₁ flattened, widened and lanceolate
 *Scutodispus* Mahunka et Mahunka-Papp, 1994
19. Posterior margin of posterior sternal plate entire or at least with very weak median lobe 20
 — Posterior margin of posterior sternal plate distinctly tripartite, with large median lobe 23
20. Gnathosoma no more than two times longer than wide 21
 — Gnathosoma more than two times longer than wide *Rostrodispus* Mahunka, 1969
21. Legs I and II subequal in length, palptibia without triangular dorsal projection. Not associated with ants 22
 — Legs I distinctly shorter and thinner than leg II, palptibia with triangular dorsal projection. Associated with ants *Caesarodispus* Mahunka, 1977
22. Lateral margins of tergite C form distinct angle *Rhombomicrodispus* Khaustov, 2017
 — Lateral margins of tergite C rounded
 *Promicrodispus* Khaustov, 2017
23. Pharyngeal pump III oval, much larger than pump I 24
 — Pharyngeal pump III vestigial, subequal with pump I 25
24. Gnathosoma about 1.5-2 times longer than wide, seta *tc*' on tarsus IV not situated on protuberance *Premicrodispus* Cross, 1965
 — Gnathosoma about three times longer than wide, seta *tc*' on tarsus IV situated on protuberance
 *Vietodispus* Mahunka, 1975
25. Anterior margin of tergite C with large semioval lobe 26
 — Anterior margin of tergite C without lobe
 *Punicodoxa* Mahunka, 1978
26. Setae (*pv*) on tibiotarsus I absent, gnathosoma about two times longer than wide, claws on tarsi II and III with thickened bases *Parapunicodoxa* Khaustov, Hugo-Coetzee et Ermilov, 2018
 — Setae (*pv*) on tibiotarsus I present, gnathosoma as long as wide, claws on tarsi II and III simple...
 *Dolichodispus* Khaustov, 2006

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