

NEW RECORDS OF THE GENUS *SCUTACARUS* (ACARI: HETEROSTIGMATINA: SCUTACARIDAE) FROM ANT NESTS IN WESTERN SIBERIA, RUSSIA

A.A. Khaustov

Tyumen State University, Tyumen, Russia; e-mail: alex1973khaustov@gmail.com

ABSTRACT: Two species of the genus *Scutacarus* Gros, 1845 (Acari: Scutacaridae): *S. pygmephoroides* Mahunka, 1966 and *S. kassaii* Mahunka, 1965 are recorded for the first time in Russia and redescribed based on specimens from Western Siberia. *Scutacarus pygmephoroides* was collected in nest of *Formica rufibarbis*; *S. kassaii* was collected in nests of *Lasius niger* and *Myrmica ruginodis*.

KEY WORDS: Acari, Heterostigmata, Scutacaridae, systematics, redescription, ants

INTRODUCTION

The cosmopolitan family Scutacaridae is the largest in the superfamily Pygmephoroida and includes 24 genera and more than 800 species (Zhang et al. 2011). Probably all scutacarid mites are fungivorous. The mite genus *Scutacarus* Gros, 1845 (Acari: Pygmephoroida) is the largest within the family Scutacaridae and includes more than 400 described species in the world fauna and about 170 species in the Palaearctic region. Until now 70 species of *Scutacarus* were recorded from Russia (Khaustov 2008).

During a study of myrmecophilous acariform mites in Western Siberia, two species of the genus *Scutacarus*: *S. pygmephoroides* Mahunka, 1966 and *S. kassaii* Mahunka, 1965 were recorded for the first time in Russia. The aim of this paper is to redescribe *S. pygmephoroides* Mahunka, 1966 and *S. kassaii* Mahunka, 1965 and discuss details of their morphology.

MATERIALS AND METHODS

Mites were collected from ant nests using Berlese funnels and mounted in Hoyer's medium. The terminology of idiosoma and legs follows Lindquist (1986); the nomenclature of subcapitular setae and the designation of cheliceral setae follow Grandjean (1944, 1947), respectively. Systematics of Pygmephoroida follows Khaustov (2004, 2008). All measurements are given in micrometers (μm). For leg chaetotaxy the number of solenidia is given in parentheses. Mite morphology was studied using a Carl Zeiss Axio Imager A2 compound microscope with phase and DIC contrast optics. The studied material was deposited in the acarological collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

SYSTEMATICS

Family Scutacaridae Oudemans, 1916 Genus *Scutacarus* Gros, 1845

Type species: *Scutacarus femoris* Gros, 1845, by monotypy.

Scutacarus pygmephoroides Mahunka, 1966 Figs 1–4

Scutacarus pygmephoroides Mahunka, 1966, p. 9, Figs 9, 10, 15.

Redescription. Female (Figs 1–4). Body oval. Length of idiosoma 245–250, width 160–165. Gnathosoma (Figs 1, 2). Gnathosomal capsule semioval, slightly longer than its width. Dorsally with 2 pairs of distinctly barbed, subequal setae (*cha*, *chb*). A pair of short smooth postpalpal setae situated anterolaterally to setae *cha*. Dorsal median apodeme well-developed. Ventral gnathosoma with 1 pair of subcapitular setae *m* and 1 pair of round pits situated posteromedially to bases of *m*. Palps with setae *dFe* and *dGe* dorsolateral, setae *dGe* slightly longer than *dFe*. Ventrally with large accessory setigenous structure and small solenidion. Palps terminated with a small tibial claw; palptarsus with a tiny peg-like setigenous structure. Pharyngeal pumps as on Fig. 2A.

Idiosomal dorsum (Fig. 1A). Anterior part of prodorsum usually not covered by tergite C and bearing pair of oval stigmata. Posterior part of prodorsum with 1 pair of distinctly barbed clavate trichobothria *sc*₁, 1 pair of flattened and barbed setae *sc*₂ and 1 pair of spine-like and weakly barbed setae *v*₂ (Fig. 2B). All dorsal plates smooth. All dorsal setae sparsely barbed. Setae *c*₂ pointed, other dorsal setae blunt-ended. One pair of pore-like structures situated posteromedially to setae *c*₁ on tergite C. Cupules *ia* on tergite D and *ih* on tergite H small, round. Bases of setae *c*₁ and *c*₂ with short

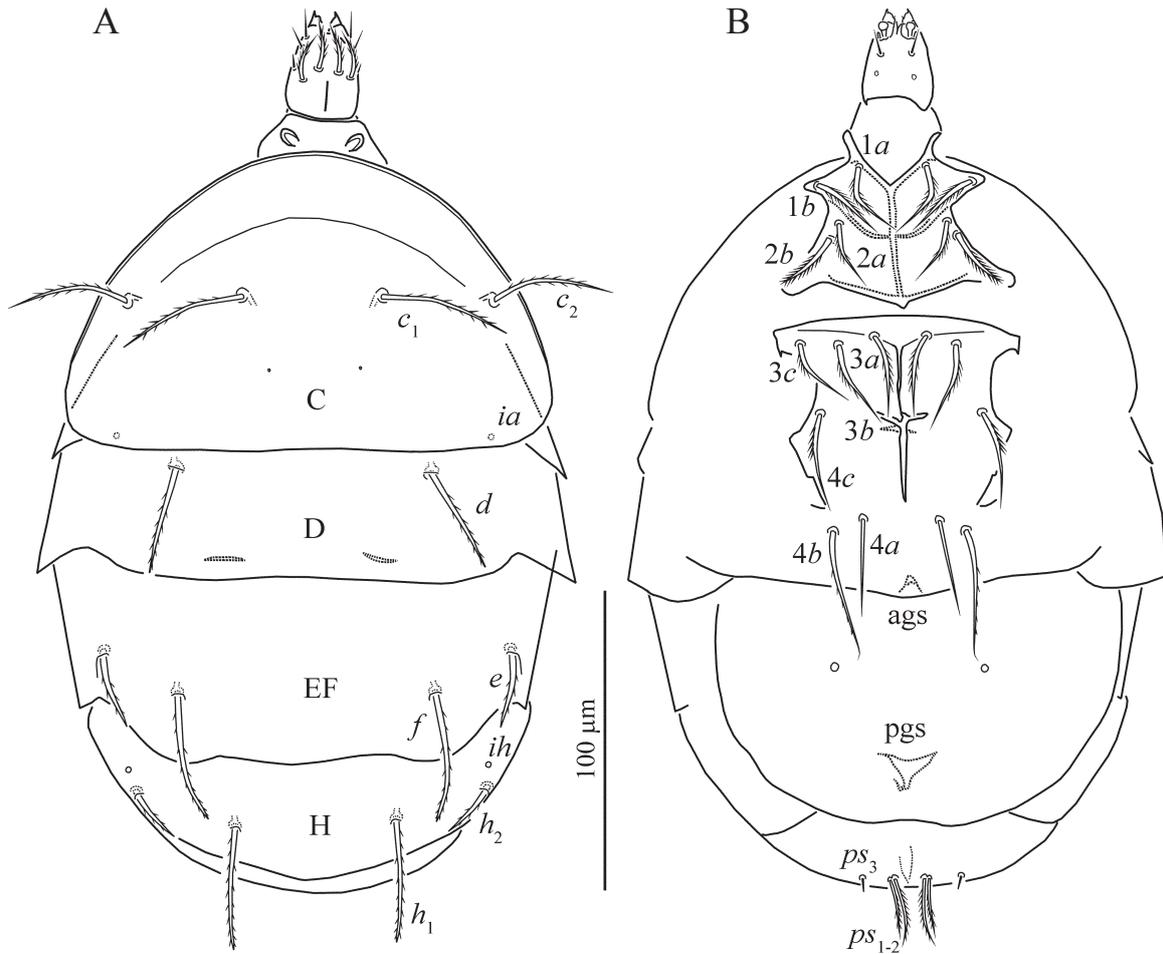


Fig. 1. *Scutacarus pygmephoroides* Mahunka, 1966, female: A — idiosomal dorsum, B — idiosomal venter.

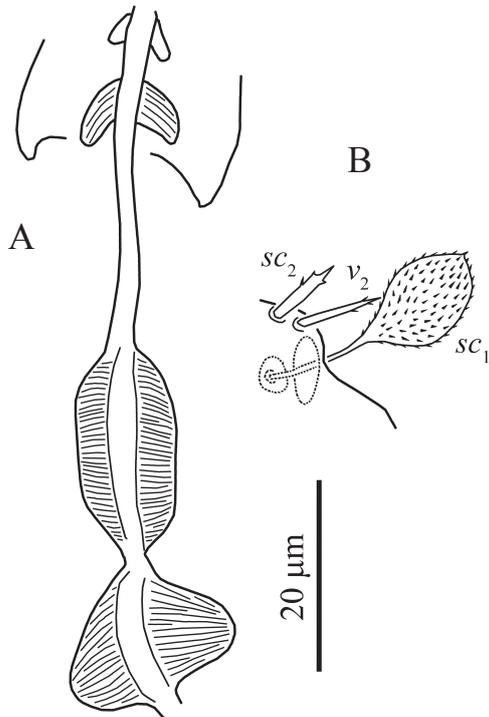


Fig. 2. *Scutacarus pygmephoroides* Mahunka, 1966, female: A — pharyngeal pumps, B — prodorsal setae.

alveolar canals. Length of dorsal setae: c_1 46–49, c_2 46–49, d 36–40, e 25–28, f 41–43, h_1 40–43, h_2 19–22. Distances between setae: c_1 – c_1 47–48, d – d 85–88, f – f 79–86, h_1 – h_1 51–54. Idiosomal venter (Fig. 1B). Setae 1a, 1b, 2a, 2b, 3a, 3b, 3c, 4c, ps_{1-2} strongly barbed; setae 4a and ps_3 smooth; 4b weakly barbed. Apodemes 1, 2 and sejugal apodeme well-developed and joined with prosternal apodeme; apodemes 3 diffuse; apodemes 4 short, apodemes 5 absent. Posterior margin of posterior sternal plate convex in middle part. Posterior margin of aggenital plate weakly concave. Anterior genital sclerite (ags) small, bell-like, posterior genital sclerite (pgs) triangular. One pair of round pits situated on aggenital plate. Length of ventral setae: 1a 28–30, 1b 28–30, 2a 24–28, 2b 20–23, 3a 31–34, 3b 32–34, 3c 27–30, 4a 33–36, 4b 47–49, 4c 36–38, ps_1 23–24, ps_2 20–21, ps_3 5–6. Legs (Figs 3, 4). Leg I (Fig. 3A) slightly shorter than leg II. Setal formula: 1–3–4–16(4). Tibiotarsus not thickened, with thin sickle-like terminal claw situated on short pretarsus. Length of solenidia ω_1 9–10 > ω_2 5–6 < φ_1 7–8 > φ_2 4–5; ω_2 and φ_2 baculiform, φ_1 clavate,

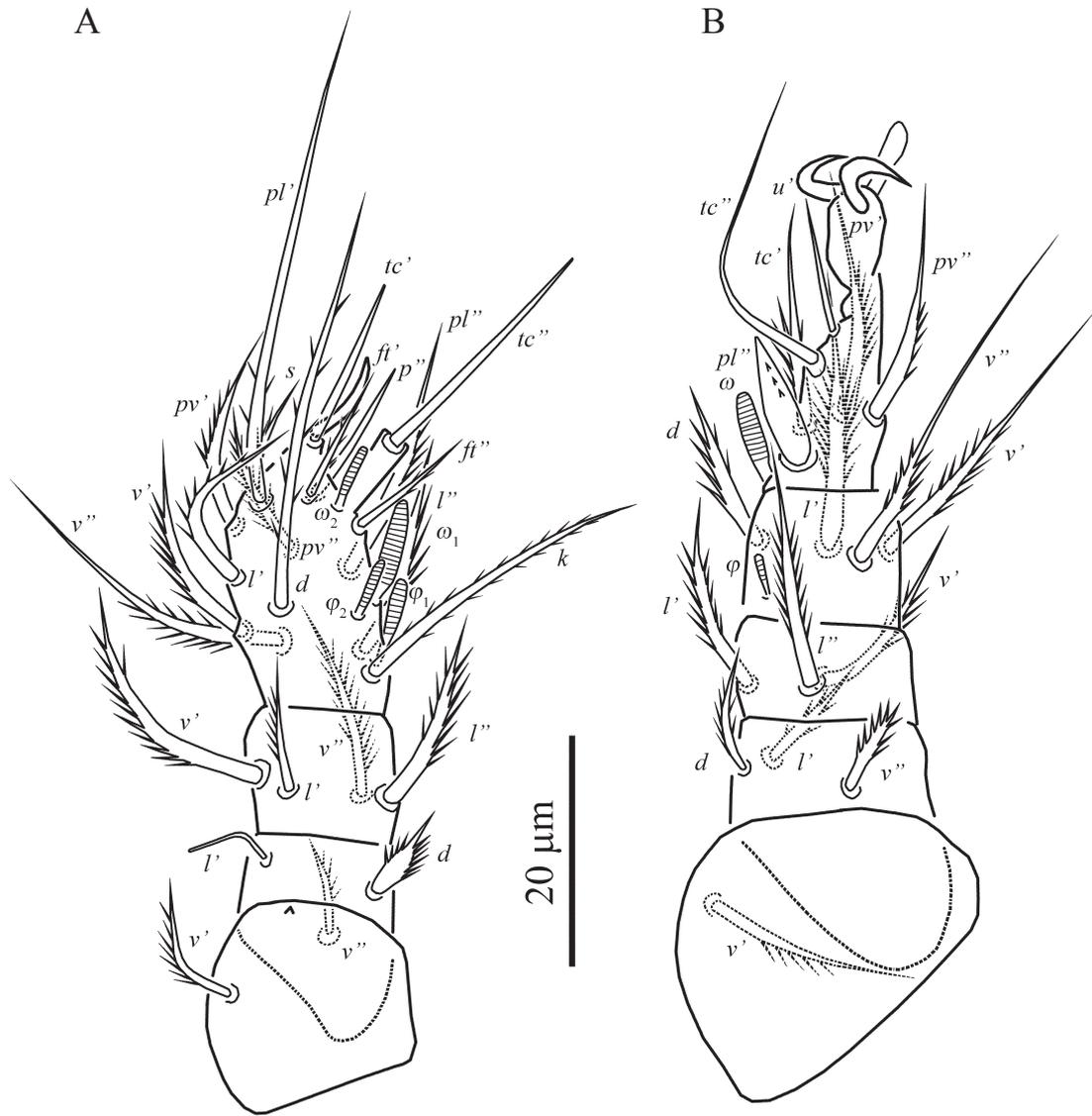


Fig. 3. *Scutacarus pygmephoroides* Mahunka, 1966, female: A — leg I, B — leg II.

ω_1 finger-shaped. Eupathidium tc' situated on small protuberance, tc'' on well-developed pinaculum. Setae (ft) not eupathidium-like, weakly barbed. Setae dFe broadened, flattened and barbed. Setae $l'Fe$ smooth, blunt-ended. Leg II (Fig. 3B). Setal formula: 1–3–3–4(1)–6(1). Tarsus with simple sickle-like claws and relatively small empodium. Solenidion ω (8–9) finger-shaped, solenidion ϕ weakly clavate. Setae pl'' spine-like, weakly barbed. Setae tc'' and u' smooth, other setae on leg segments strongly barbed. Leg III (Fig. 4A). Setal formula: 1–2–2–4(1)–6. Claws of same shape as on tarsus II. Solenidion ϕ weakly clavate. Setae pl'' spine-like, weakly barbed. Setae tc'' and u' smooth, other setae on leg segments strongly barbed. Leg IV (Fig. 4B). Setal formula: 1–2–1–6. Tibiotarsus about 1.5 times longer than its width. Setae dFe distinctly blunt-ended, other setae

pointed. Trochanter with well-developed dorsal spine-like process.

Male and larva unknown.

Material examined. Fourteen females, Russia: Tyumen Province, Tyumen region, vicinity of Tyumen, 57°09'55" N, 65°27'32" E, in the nest of the ant *Formica rufibarbis* Fabricius, 1793, 26 June 2014, coll. A.A. Khaustov.

Distribution and habitats. This species was described from Mongolia from the nest of a bumblebee (Mahunka 1966). It was also recorded from Hungary from ant nest and litter under poplar (Mahunka 1986). I found it in the nest of ants *Formica rufibarbis* in Western Siberia. It is a new species for the fauna of Russia.

Remarks. Among 14 studied females only 2 have paired setae $3c$, 2 other specimens have complete absence of setae $3c$, and other 10 specimens

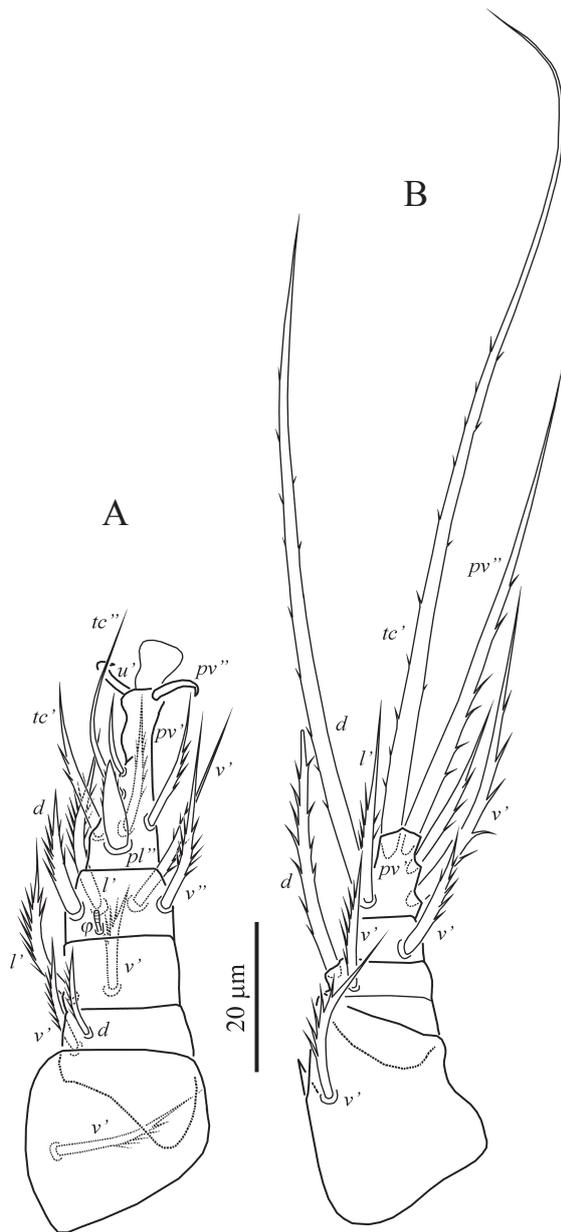


Fig. 4. *Scutacarus pygmephoroides* Mahunka, 1966, female: A — leg III, B — leg IV.

have asymmetrically reduced seta 3c as illustrated on Fig. 1B. Such unusual variability of presence/absence of setae on poststernal plate is unknown for any other scutacarid species.

Scutacarus kassaii Mahunka, 1965

Figs 5–6

Scutacarus kassaii Mahunka, 1965, p. 144, Figs 7–9.

Redescription. Female (Figs 5–6). Body oval. Length of idiosoma 190–240, width 130–160. Gnathosoma similar with that of *S. pygmephoroides* but dorsal cheliceral setae not so strongly barbed.

Idiosomal dorsum (Fig. 5A). Prodorsum completely covered by tergite C. Stigmata round. Setae sc_2 and v_2 spine-like and subequal. Trichobothria capitate and barbed. All dorsal plates smooth. All dorsal setae blunt-ended and sparsely barbed. One pair of pore-like structures situated posteromedially to setae c_1 on tergite C. Cupules *ia* on tergite D and *ih* on tergite H small, round. Bases of setae c_1 and c_2 with short alveolar canals. Length of dorsal setae: c_1 26–32, c_2 25–28, d 25–29, e 22–25, f 24–28, h_1 22–26, h_2 21–27. Distances between setae: c_1-c_1 42–50, $d-d$ 74–83, $f-f$ 58–65, h_1-h_1 33–37. Idiosomal venter (Fig. 5B). Setae 4a and ps_3 smooth, other ventral setae sparsely barbed. Apodemes 1, 2 and sejugal apodeme well-developed and joined with prosternal apodeme; apodemes 3 diffuse; apodemes 4 short, apodemes 5 absent. Posterior margin of posterior sternal plate slightly convex in middle part. Posterior margin of aggenital plate straight. Anterior and posterior genital sclerites similar in shape and size, triangular. One pair of round pits situated on aggenital plate. Length of ventral setae: 1a 26–31, 1b 20–25, 2a 25–28, 2b 17–21, 3a 26–30, 3b 32–37, 3c 34–39, 4a 25–32, 4b 60–71, 4c 43–47, ps_1 20–22, ps_2 18–19, ps_3 6–8. Legs (Figs 6, 7). Leg chaetotaxy as in *S. pygmephoroides*. Leg I (Fig. 6A) slightly shorter than leg II. Tibiotarsus massive, with large terminal claw situated on short pretarsus. Length of solenidia ω_1 8–9 > ω_2 5–6 < ϕ_1 7–8 > ϕ_2 4–6; ω_2 and ϕ_2 baculiform, ϕ_1 clavate, ω_1 finger-shaped. Eupathidium *tc'* situated on small protuberance, *tc''* on well-developed pinaculum. Setae (*ft*) not eupathidium-like, weakly barbed. Setae *dFe* broadened, flattened and barbed. Setae *l'Fe* and *v''Fe* smooth, blunt-ended. Leg II (Fig. 6B). Tarsus with thickened basally sickle-like claws and large flipper-like empodium. Solenidion ω (7–8) finger-shaped, solenidion ϕ weakly clavate. Setae *pl''* spine-like, weakly barbed. Setae *tc''*, *l'Fe* and *v''Fe* smooth, other setae on leg segments barbed. Leg III (Fig. 6C). Claws of same shape as on tarsus II. Solenidion ϕ weakly clavate. Setae *pl''* spine-like, weakly barbed. Setae *tc''* and *v'Fe* smooth, other setae on leg segments barbed. Leg IV (Fig. 6D). Tibiotarsus only slightly longer than its width. Setae *dFe* distinctly blunt-ended, other setae pointed. Trochanter with small dorsal spine-like process.

Male and larva unknown.

Material examined. Thirty one females, Russia: Tyumen Province, Tyumen region, vicinity of settlement Reshetnikovo, 57°17'00.2" N,

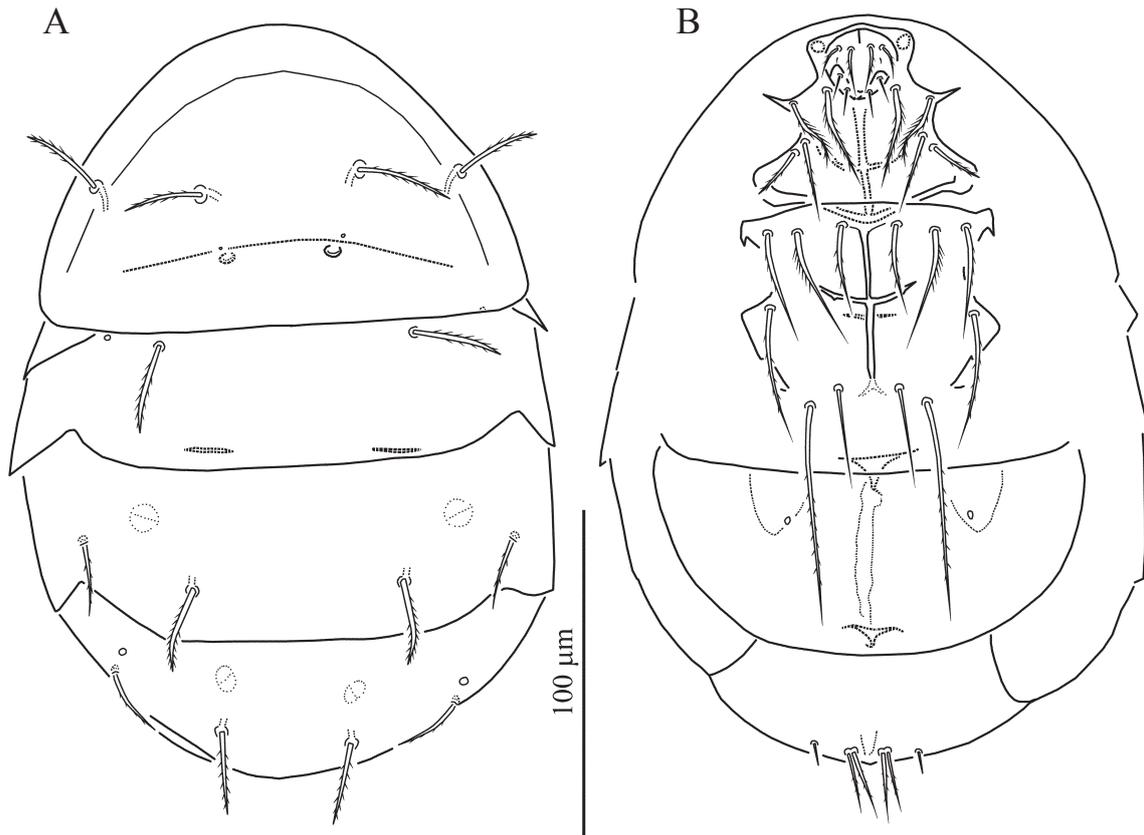


Fig. 5. *Scutacarus kassaii* Mahunka, 1965, female: A — idiosomal dorsum, B — idiosomal venter.

65°24'32.5" E, in the nest of *Lasius niger* (Linnaeus, 1758), 25 September 2014, coll. T.A. Tarakanov; 8 females, Russia, Tyumen Province, Tyumen region, vicinity of settlement Narimanovo, 57°21'56" N, 65°08'21" E, in the nest of *Myrmica ruginodis* Nylander, 30 July 2014, coll. V.A. Stolbov.

Distribution and habitats. This species was described (Mahunka 1965) from soil and recorded from ant nests (Mahunka 1986) in Hungary. It was also reported from the Czech Republic from ants *Camponotus vagus* Scopoli, 1763 (Mahunka 1967) and from Ukraine from nests of small mammals (Sklyar and Sevastianov 1997). Here, I report it in nests of ants *Lasius niger* and *Myrmica ruginodis* in Western Siberia. It is a new species for the fauna of Russia.

DISCUSSION

Both species of *Scutacarus*, which are redescribed in this paper, have remarkable barbed setae (*fi*) on tibiotarsus of leg I. In all other known mites of the superfamily Pygmephoroidae these setae always smooth, eupathidium-like. I consider barbed setae (*fi*) as apomorphic character state because in all early derivative pygmephoroid mites these setae are smooth. Potentially this character

state could be used for creation of a species-group within the genus *Scutacarus*. Unfortunately such “weak” character is rarely reported in many known scutacarid species. Another unusual character state found in both redescribed species is the distinctly barbed setae *2b*. In other *Scutacarus*-species this pair of setae is usually thickened, sabre-like, rarely thin and smooth.

ACKNOWLEDGEMENTS

The author thanks Dr. A.V. Tolstikov (Tyumen State University, Tyumen, Russia) for valuable comments on the manuscript. I also thank Dr. V.A. Stolbov and T.A. Tarakanov (Tyumen State University) for collecting myrmecophilous mites.

This research was supported by the Ministry of Education and Science of the Russian Federation, project title “Myrmecophilous Acariform Mites (Acariformes) of the South of Western Siberia”, cooperative agreement No. 6.1933.2014/K (2014–2016).

REFERENCES

- Grandjean, F. 1944. Observations sur les Acariens de la famille des Stigmaeidae. *Archives des Sciences physiques et naturelles*, 26: 103–131.

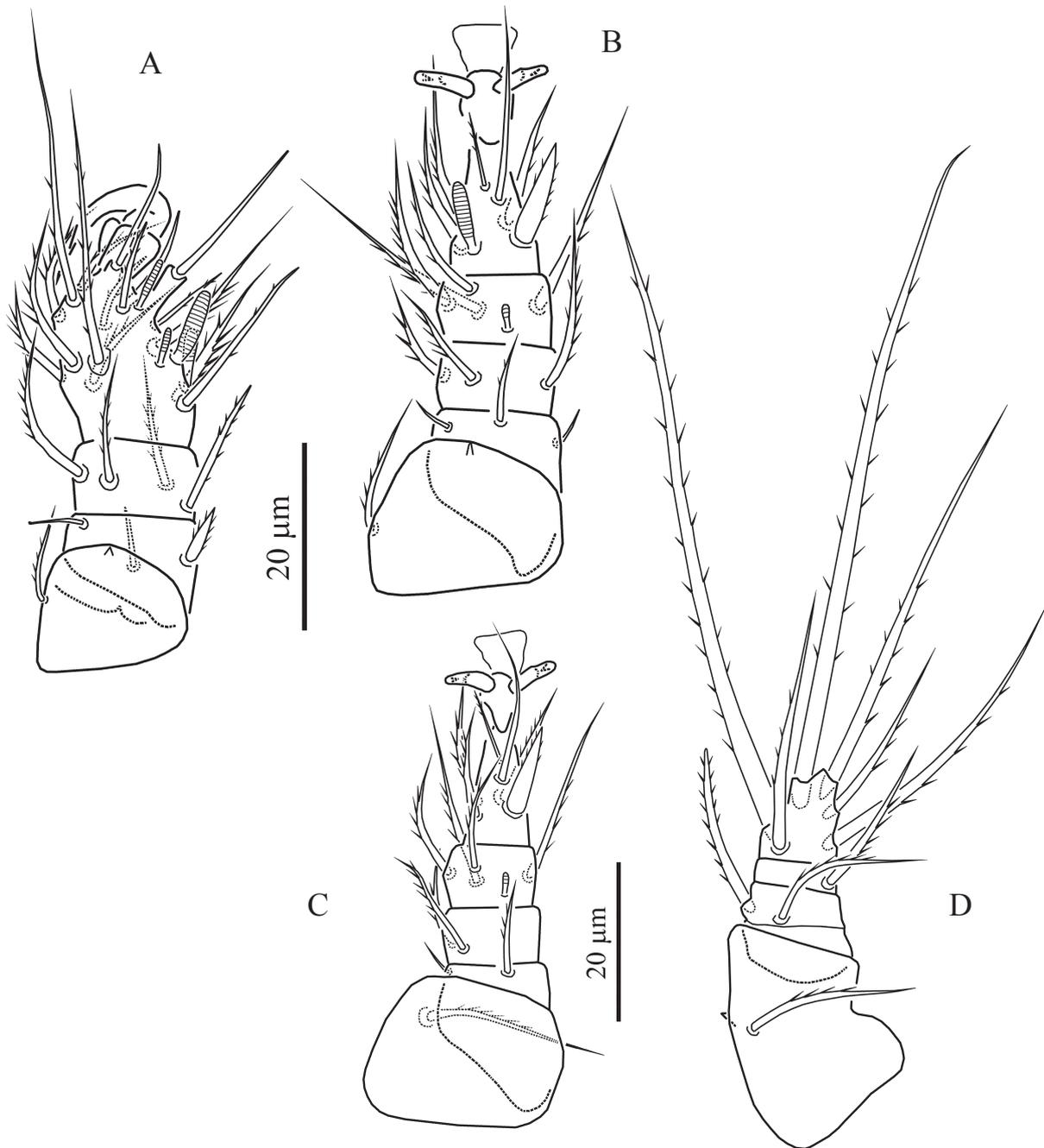


Fig. 6. *Scutacarus kassai* Mahunka, 1965, female: A — leg I, B — leg II, C — leg III, D — leg IV.

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.

Khaustov, A.A. 2004. [Mites of the family Neopygmephoridae Cross, 1965 stat. n. and their position in Heterostigmata]. In: Y.S. Balashov (Ed.). VIII Russian Acarological Conference, St.-Petersburg. Zoological Institute of RAS, St.-Petersburg, p. 137. [in Russian]

Khaustov, A.A. 2008. *Mites of the family Scutacaridae of Eastern Palearctic*. Akademperiodyka, Kiev, 291 pp.

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 Heterostigmata. *Memoirs of Entomological Society of Canada*, 136: 1–517.

Mahunka, S. 1965. Die Tarsonemini (Acari) Fauna Ungarischer Dauerwiesen und Hutweiden. *Acta Zoologica Academiae Scientiarum Hungaricae*, 11: 137–151.

Mahunka, S. 1966. 83. Acari: Pyemotidae and Scutacaridae. Ergebnisse der zoologischen Forschungen von Dr. Z. Kaszab in der Mongolei. *Reichenbachia*, 9: 1–13.

- Mahunka, S. 1967. Beiträge zur Kenntnis der Tschechoslowakischen Tarsonemini-Fauna. *Věstník Československé společnosti zoologické*, 31: 240–244.
- Mahunka, S. 1986. Tarsonemids of the Kiskunság National park (Acari). *The fauna of the Kiskunság National park*, 1: 435–455.
- Sklyar, V.E. and Sevastianov, V.D. 1997. [Mites of the cohort Tarsonemina in the rodent nest microhabitats of the Donetsk Azov Sea area]. *Věstník zoologii*, 31: 45–49. [in Russian]
- Zhang, Z.-Q., Fan, Q.-H., Pesic, V., Smit, H., Bochkov, A.V., Khaustov, A.A., Baker, A., Wohltmann, A., Wen, T.-H., Amrine, J.W., Beron, P., Lin, J.-Z., Gabrys, G., and Husband, R. 2011. Order Trombidiformes Reuter, 1909. In: Zhang, Z.-Q. (ed.) *Animal biodiversity: an outline of higher-level classification and survey of taxonomic richness*. *Zootaxa*, 3148: 129–138.