

## CONTRIBUTION TO THE SYSTEMATICS OF THE GENUS *ARCHIDISPUS* (ACARI: SCUTACARIDAE) OF RUSSIA

**Alexander A. Khaustov\* and Vladimir A. Khaustov**

X-BIO Institute, University of Tyumen, Tyumen, Russia

\*Corresponding author, e-mail: alex1973khaustov@gmail.com

**ABSTRACT:** The mite species *Archidispus reductus* sp.n. (Acari: Heterostigmata: Scutacaridae) is described based on phoretic females collected from wet forest litter in the Carbon Measurement Test Area located in the Tyumenskaya Oblast, Russia (Western Siberia). The poorly known species *Archidispus posietis* (Sevastianov, 1974) is redescribed based on the type materials.

**KEY WORD:** mite, Heterostigmata, Pygmephoroida, Western Siberia

**DOI:** 10.21684/0132-8077-2026-34-1-29-40

### INTRODUCTION

The family Scutacaridae is the most specious group in the superfamily Pygmephoroida: currently, it comprises 25 genera and more than 800 species (Zhang *et al.* 2011; Khaustov *et al.* 2017). All scutacarids are probably fungivorous (Khaustov 2008). Most scutacarid species are associated with various arthropods, such as spiders (Ebermann and Goloboff 2002; Baumann 2018), hooded tickspiders (Ebermann and Palacios-Vargas 1988), as well numerous insects, especially various beetles, flies, bees and termites (Khaustov 2008; Khaustov *et al.* 2017). However, most scutacarids are phoretic on various ants (Khaustov and Tolstikov 2016; Baumann 2018).

The genus *Archidispus* Karafiat is one of the largest in the family and currently comprises 92 described species (Khaustov 2008; Kurosa 2009; Hajiqanbar and Khaustov 2014; Katlav *et al.* 2016; Khadem-Safdarkhani *et al.* 2022; Faizi *et al.* 2025). This genus is characterized by female dimorphism (the presence of morphologically different phoretic and non-phoretic forms) (Ebermann 1991a, b). Six species are described based on non-phoretic females, while five species are described based on two morphs (Baumann 2018). The rest of the species are described based on phoretic females only. Most species of *Archidispus* are phoretic on various beetles of the families Carabidae and (rarely) Staphylinidae (Baumann 2018). In Western Siberia, only myrmecophilous Scutacaridae have been well studied (Khaustov and Tolstikov 2016). Other groups of Scutacaridae, including the genus *Archidispus*, have not been studied. During the study of soil-inhabiting mites in the Carbon Measurement Test Area in the Tyumenskaya Oblast, Russia (Western Siberia), we found a remarkable new species of *Archidispus*.

The species *Archidispus posietis* (Sevastianov) was described from the Primorsky Krai, Russia (Sevastianov 1974). The original description is very incomplete and inadequate, and the species has not been collected or redescribed since. At our request, in 2018, Dr. Vyacheslav Trach brought the type material of this species from the collection of I.I. Mechnikov National University (Odessa, Ukraine) to the University of Tyumen. The single type slide contained 11 phoretic females of *A. posietis*. We remounted them and placed each specimen on a separate slide. Five specimens, including the holotype, were returned to I.I. Mechnikov National University. Six paratypes are currently deposited in the mite collection of the University of Tyumen, Russia. The redescription provided below is based on these paratypes.

### MATERIALS AND METHODS

The specimens of *Archidispus reductus* sp.n. were collected from wet forest litter in the Carbon Measurement Test Area (Tyumenskaya Oblast, Russia), using the Berlese funnels. All specimens were cleared in lactic acid and mounted in Hoyer's medium. The terminology of the idiosoma and legs follows Lindquist (1986); the nomenclature for the subcapitular setae and the designation of cheliceral setae follow Grandjean (1944, 1947), respectively. The taxonomic system of Pygmephoroida follows Khaustov (2004, 2008). All measurements for the holotype and the paratype (in parentheses) are in micrometers (µm). 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) optical sys-

tems. Photomicrographs were taken with an AxioCam ICc5 digital camera. Figures herein contain images assembled from multiple focal planes using the Helicon Focus 7.7.5 software, using algorithm B, with a subsequent manual addition of significant details from individual focal planes.

**Abbreviations:** ap1–ap4—apodemes 1–4, appr—prosternal apodeme, appo—poststernal apodeme, apsej—sejugal apodeme, Tr—trochanter, Fe—femur, Ge—genu, Ti—tibia, Ta—tarsus, TiTa—tibiotarsus.

**SYSTEMATICS**

Family **Scutacaridae Oudemans, 1916**

Genus ***Archidispus* Karafiat, 1959**

Type species: *Imparipes (Archidispus) minor* Karafiat, 1959, by original designation

***Archidispus reductus* sp.n.**

(Figs. 1–6)

**Description.** *Phoretic female:* length of idiosoma 260 (260–280), width of tergite C 200 (200–205).

*Gnathosoma* (Fig. 2). Gnathosomal capsule almost as wide as long; dorsally with two pairs of pointed and weakly barbed cheliceral setae *chl* and *ch2*; subcapitulum with one pair of pointed and smooth subcapitular setae *m* and a pair of round pits *n* posteriorly; palps compressed to gnathosomal capsule, dorsally with two smooth and pointed setae *dGe* and *dFe*, ventrally with one conspicuous solenidion  $\omega$  along with accessory setigenous structure (*ass*), palps terminated with small tibial claw. Dorsal median apodeme present. Pharyngeal pumps transversely striated; pump 1 bow-shaped, slightly separated from large pump 2; pump 3 adjacent to pump 2 (Fig. 2B). One pair of very thin trachea-like structures located inside gnathosoma.

*Idiosomal dorsum* (Figs. 1A, 2A, 5A, 6A). All sclerites with tiny dimples (Fig. 6A). Prodorsum separated by soft cuticle into anterior and posterior parts and completely covered by tergite C; anterior part with a pair of elongate stigmata associated with long tracheal trunks; posterior part with two pairs of needle-like setae *v2* and *sc2*, a pair of clavate and weakly barbed trichobothria *sc1*

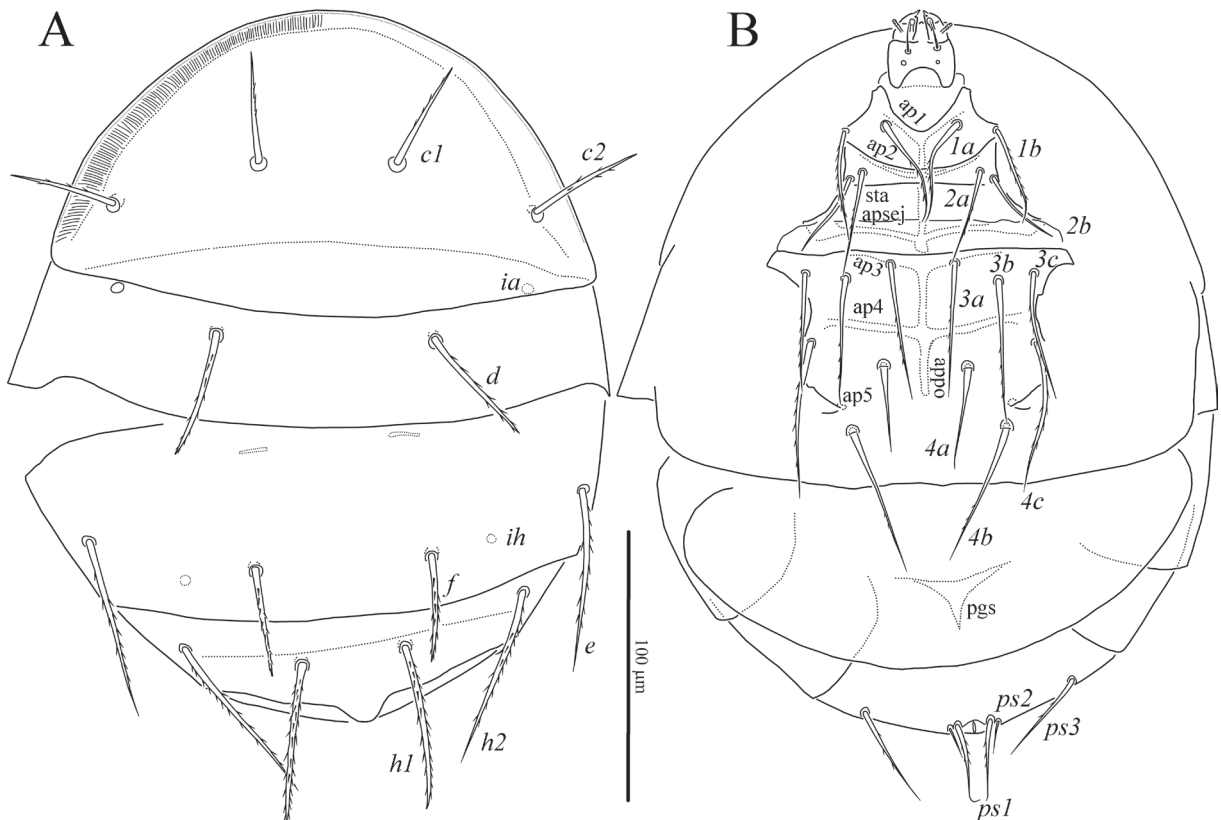


Fig. 1. *Archidispus reductus* sp.n., phoretic female: A—dorsum of body; B—venter of body.

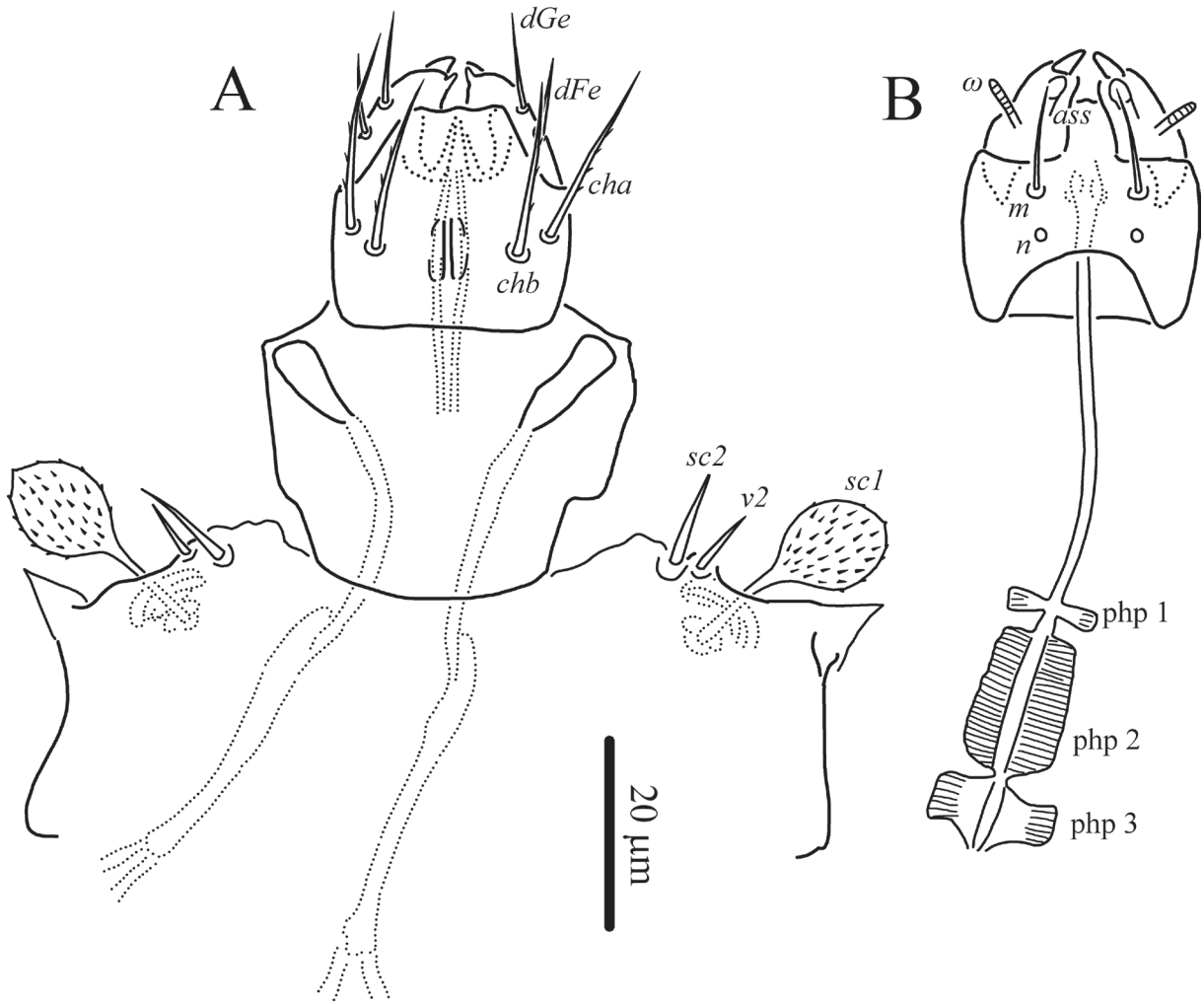


Fig. 2. *Archidispus reductus* sp.n., phoretic female: A—proterosoma, dorsal aspect; B—gnathosoma and pharyngeal pumps, ventral aspect.

and a pair of weakly sclerotized lateral propodosomal spines (Fig. 2A). Cupules *ia* and *ih* visible on tergites D and H, respectively; all dorsal setae setiform and distinctly barbed; setae *e* and *h2* pointed, other dorsal setae blunt-tipped; setae *c1* and *c2* without alveolar canal; setae *c1* located antieriad imaginary line connecting bases of setae *c2*. Lengths of dorsal setae: *v2* 7 (7–8), *sc2* 12 (11–13), *c1* 40 (38–41), *c2* 47 (42–47), *d* 47 (46–48), *e* 74 (66–75), *f* 40 (39–40), *h1* 62 (60–64), *h2* 68 (66–68); distances between dorsal setae: *c1*–*c1* 51 (47–51), *c2*–*c2* 155 (150–160), *c1*–*c2* 55 (54–57), *d*–*d* 80 (78–81), *e*–*e* 180 (175–180), *f*–*f* 64 (60–64), *e*–*f* 61 (59–61), *h1*–*h1* 38 (36–38), *h2*–*h2* 125 (123–127), *h1*–*h2* 48 (46–48).

*Idiosomal venter* (Figs. 1B, 5B, 6B–D). Apodemes 1, 2 and sejugal well developed and joined with prosternal apodeme; secondary transverse apodeme crossing prosternal apodeme pos-

terior to apodeme 2; apodemes 3 and 4 well developed, apodemes 4 long, reaching to trochanters III; apodemes 5 short, vestigial. Posterior margin of posterior sternal plate almost straight; posterior margin of aggenital plate rounded. Setae *2b* blunt-tipped, other ventral setae pointed; setae *4a* and *4b* thickened basally, other setae not modified; setae *2b* with very small barbs, setae *4b* with several barbs in distal half, setae *4a* and *ps2* smooth, other setae distinctly barbed. Setae *3b* located distinctly antieriad apodemes 4. Lengths of ventral setae: *1a* 43 (42–45), *1b* 44 (42–46), *2a* 42 (38–43), *2b* 31 (29–31), *3a* 51 (46–51), *3b* 53 (52–54), *3c* 50 (49–52), *4a* 39 (30–39), *4b* 61 (59–62), *4c* 55 (54–60), *ps1* 33 (31–34), *ps2* 12 (11–12), *ps3* 40 (39–41).

*Legs* (Figs. 3, 4), leg I (Fig. 3A): setal formula: Tr 1(*v'*)–Fe 2(*d, l'*)–Ge 4(*l', l'', v', v''*)–1TiTa 6(4) (*d, l', l'', v', v'', k, p'', tc', tc'', ft', ft'', s, pv', pv''*,

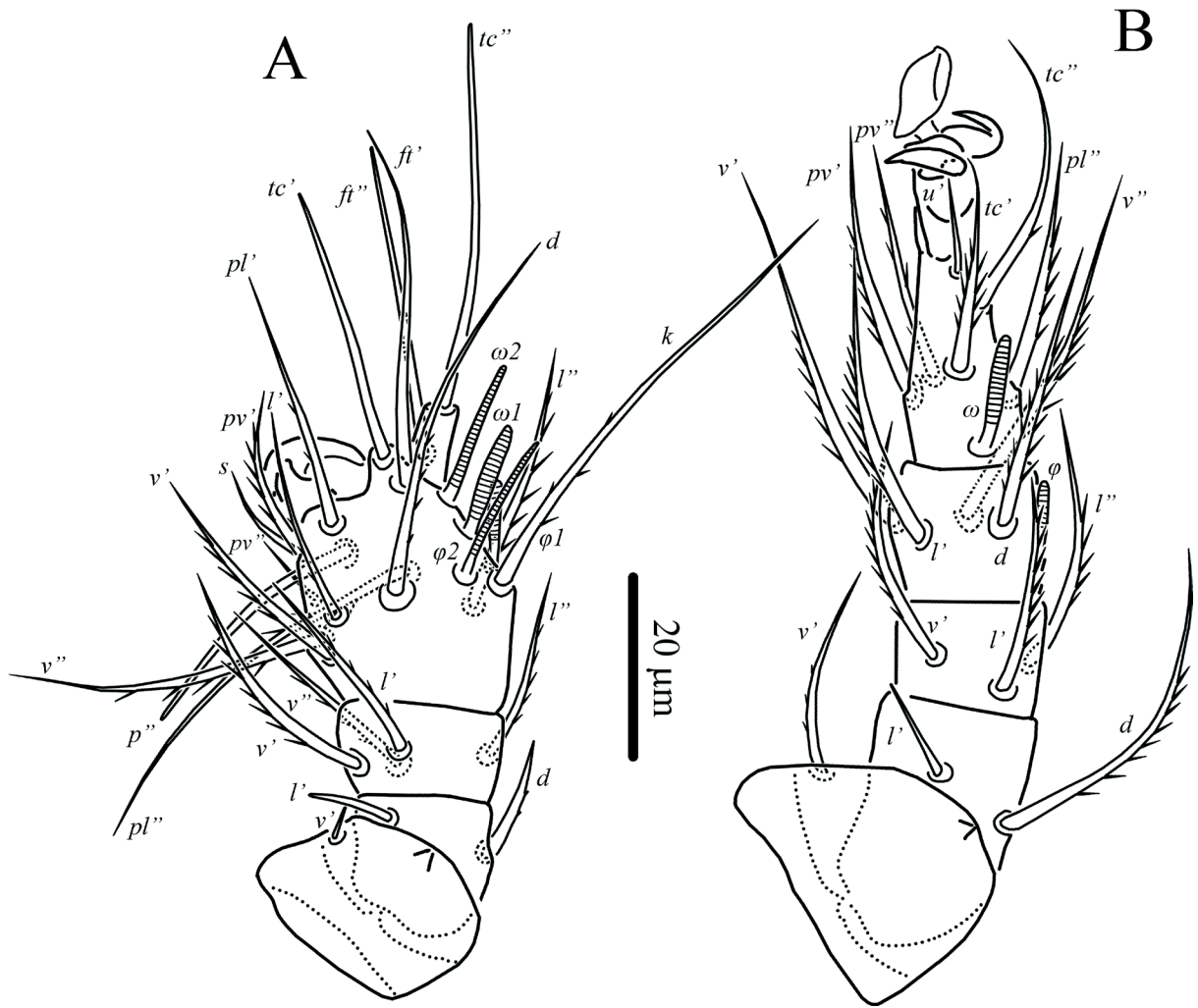


Fig. 3. *Archidispus reductus* sp.n., phoretic female: A—right leg I, dorsal aspect; B—right leg II, dorsal aspect.

$pl'$ ,  $pl''$ ,  $\phi 1$ ,  $\phi 2$ ,  $\omega 1$ ,  $\omega 2$ ); shorter than other legs; with one large ventrodiscal claw. Setae  $p''$ ,  $tc'$ ,  $tc''$ ,  $ft'$  and  $ft''$  blunt-tipped eupathid-like, setae  $v'$  of trochanter,  $d$  and  $l'$  of femur blunt-tipped, other setae pointed; setae  $tc'$  and  $ft''$  located on long pinnaculum; seta  $tc'$  situated on short pinnaculum; setae  $v'$  of trochanter,  $l'$  of femur,  $s$  and  $pv''$  of tibiotarsus smooth, other setae (except eupathidia) barbed. Seta  $v''$  of femur absent. Solenidium  $\omega 1$  15 (14–15) digitiform; solenidia  $\omega 2$  18 (17–18) and  $\phi 2$  21 (21–22) homomorph, uniformly thin; solenidium  $\phi 1$  10 (10–11) digitiform.

Leg II (Fig. 3B). Setal formula: Tr 1( $v'$ )–Fe 2( $d, l'$ )–Ge 3 ( $l', l'', v'$ )–Ti 4(1)( $d, l', v', v'', \phi$ )–Ta 6(1)( $pl'', tc', tc'', u', pv', pv'', \omega$ ); with one pair of padded claws and empodium. Setae  $l'$  of femur and  $u'$  of tarsus smooth, weakly blunt-tipped, other leg setae pointed and barbed. Seta  $v''$  of femur absent. Solenidia  $\omega$  13 (13–14) and  $\phi$  10 (9–10) digitiform.

Leg III (Fig. 4A); setal formula: Tr 1( $v'$ )–Fe 2( $d, v'$ )–Ge 2( $l', v'$ )–Ti 4(1)( $d, l', v', v'', \phi$ )–Ta 6( $pl'', tc', tc'', u', pv', pv''$ ); with one pair of padded claws and empodium. Solenidium  $\phi$  9 (9–10) digitiform. All setae pointed and barbed.

Leg IV (Fig. 4B); setal formula: Tr 1( $v'$ )–Fe 2( $d, v'$ )–Ge 1( $v'$ )–Ti 3(1)( $d, l', v', \phi$ )–Ta 6( $pl'', tc', tc'', u', pv', pv''$ ); with one pair of small claws and small empodium. Solenidium  $\phi$  14 (14–15) baculiform. Setae  $pl''$  and  $u'$  of tarsus smooth, other setae barbed; seta  $d$  of femur blunt-tipped, other setae pointed. Seta  $pl''$  located close to  $tc'$ . Length of pretarsus 20 (20–21), length of tarsus 48 (48–49).

*Male, non-phoretic female and larva unknown.*

**Type material.** Female holotype, slide ZISP T-Sc-1, Russia, Tyumenskaya Oblast, vicinities of Lake Kuchak, 57°21'N 66°02' E, in forest litter, 15 October 2025, coll. V. A. Khaustov; paratypes: 10 females, same data.

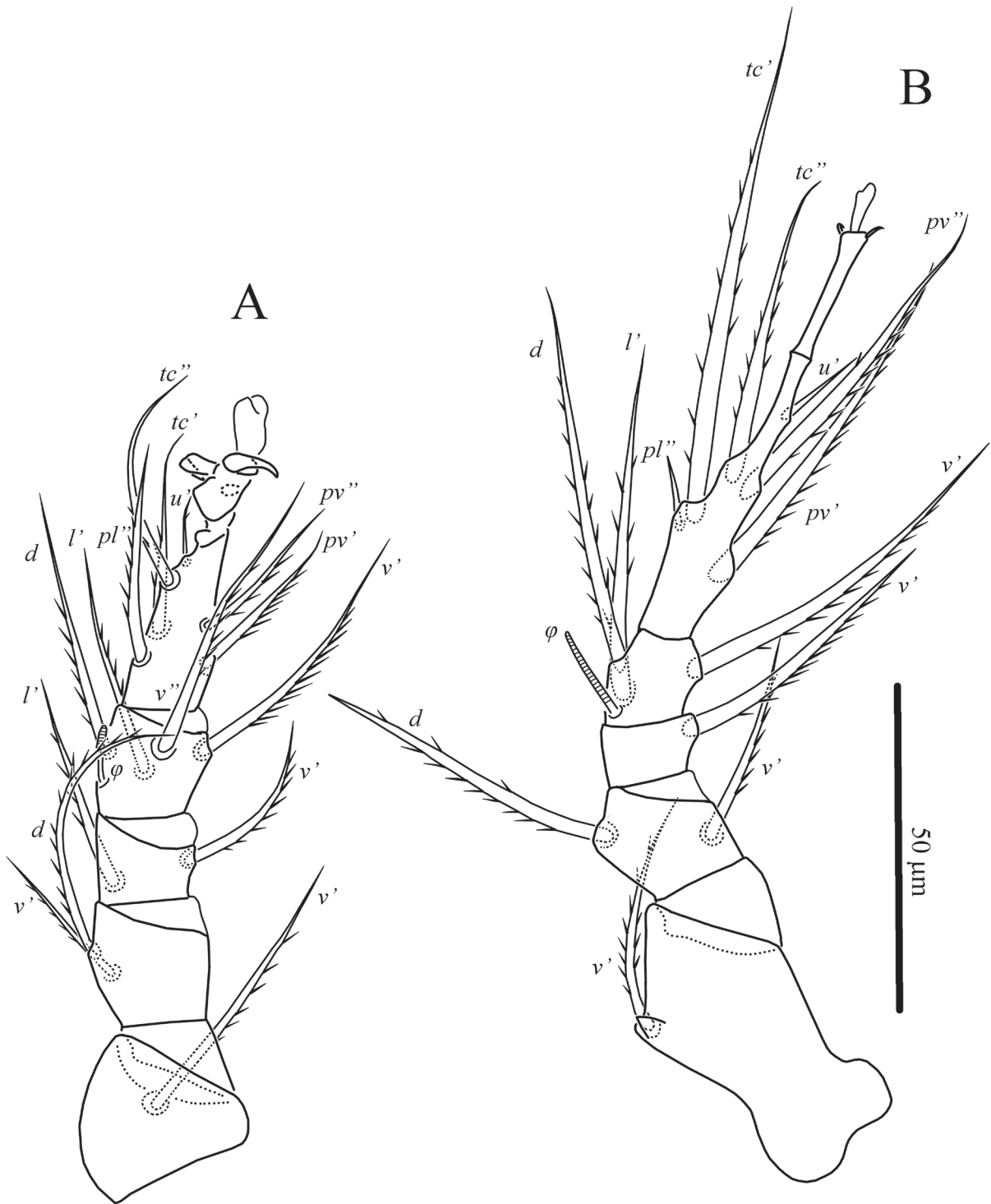


Fig. 4. *Archidispus reductus* sp.n., phoretic female: A—right leg III, dorsal aspect; B—right leg IV, dorsal aspect.

**Type deposition.** The holotype and one female paratype are deposited in the acarological collection of the Zoological Institute of the Russian Academy of Sciences (RAS), St. Petersburg, Russia; other paratypes are deposited in the collection of the University of Tyumen Museum of Zoology, Tyumen, Russia.

**Etymology.** The name of the new species is derived from Latin *reductus*, meaning *reduced* and refers to the unusual reduction of seta *v''* on femora I and II.

**Differential diagnosis.** The new species is unique among the genus *Archidispus* in the absence of seta *v''* on femora I and II (vs. present in other

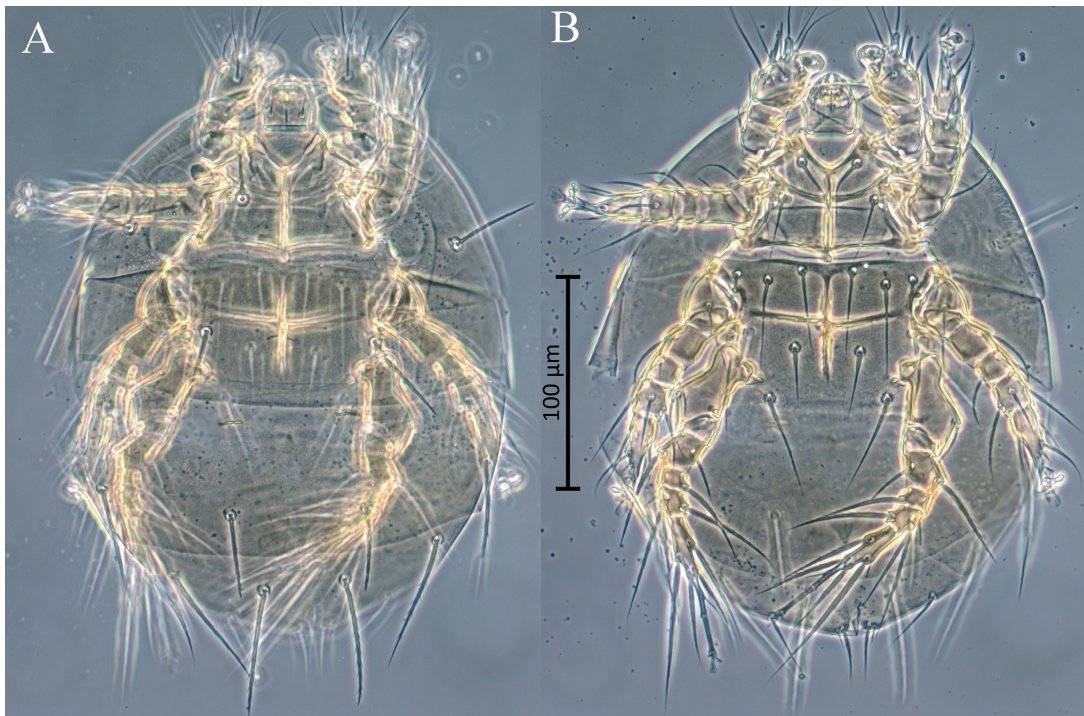


Fig. 5. Phase contrast micrographs of *Archidispus reductus* sp.n., phoretic female (holotype): A—general view dorsally; B—general view ventrally.

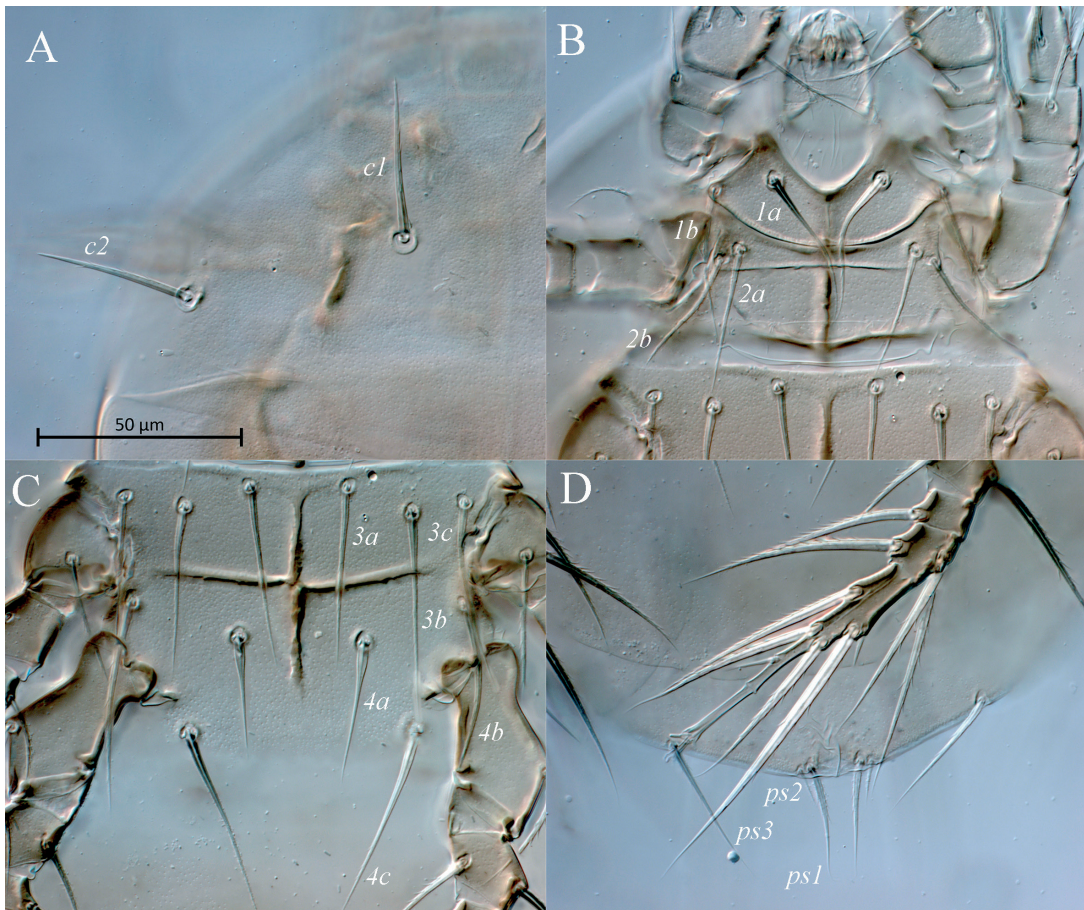


Fig. 6. DIC micrographs of *Archidispus reductus* sp.n., phoretic female (holotype): A—setae *c1* and *c2*; B—proterosoma, ventral aspect; C—metapodosoma, ventral aspect; D—opisthosoma, ventral aspect.

species). The new species is most similar to *A. nabukoae* Kurosa, 1991 described from Japan (Kurosa 1991) in having setae *3b* not modified and located distinctly anteriorly to apodemes 4, apodemes 4 long and reaching to bases of trochanters III, secondary transverse apodeme well developed and setae *4b* weakly barbed distally. The new species differs from *A. nabukoae* in having longer 30–39 (vs. 20–24 in *A. nabukoae*) and gradually tapering (vs. thick in basal half and abruptly tapering in distal half in *A. nabukoae*) setae *4a*; shorter setae *f39–40* (vs. setae *f49–56* in *A. nabukoae*); and seta *d* of femur IV blunt-tipped (vs. seta *d* of femur IV pointed in *A. nabukoae*).

***Archidispus posietis* (Sevastianov, 1974)**

*Imparipes posietis* Sevastianov, 1974, 21, Fig. 5.

*Imparipes posjetis* (sic): Sevastianov (1978), 53

*Archidispus posietis*: Khaustov (2008), 48

(Figs. 7–12)

**Redescription.** *Phoretic female*: length of idiosoma 285–350, width of tergite C 270–285.

*Gnathosoma* (Fig. 8). Similar to that of *A. reductus* sp.n.

*Idiosomal dorsum* (Figs. 7A, 8A, 11). All sclerites with tiny dimples. Prodorsum (Fig. 8A) similar to that of *A. reductus* sp.n. Cupules *ia* and *ih* visible on tergites D and H, respectively; all dorsal setae setiform and distinctly barbed; setae *e* and *h2* pointed, other dorsal setae blunt-tipped; setae *c1* with long alveolar canal; setae *c1* located on imaginary line connecting bases of setae *c2*. Lengths of dorsal setae: *v2* 8–9, *sc2* 12–13, *c1* 47–53, *c2* 45–50, *d* 74–84, *e* 100–115, *f* 83–90, *h1* 99–105, *h2* 125–130; distances between dorsal setae: *c1–c1* 77–82, *c2–c2* 205–215, *c1–c2* 63–70, *d–d* 170–180, *e–e* 220–235, *f–f* 84–91, *e–f* 71–74, *h1–h1* 50–56, *h2–h2* 165–175, *h1–h2* 56–63.

*Idiosomal venter* (Figs. 7B, 12). Apodemes 1, 2 and sejugal well developed and joined with prosternal apodeme; secondary transverse apodeme crossing prosternal apodeme posterior to apodeme 2; apodemes 3 and 4 well developed, apodemes 4 exceeding beyond bases of setae *3b* and slightly curved anteriorly laterad setae *3b*; apodemes 5 short, vestigial. Posterior margin of posterior sternal plate almost straight; Posterior margin of aggenital plate rounded. Setae *2b* blunt-tipped, other ventral setae pointed; setae *3b*, *4a* and *4b* thickened basally, other setae not modified; setae *2b* with very small barbs, setae *3b*, *4a* and *4b*

smooth, other setae distinctly barbed. Setae *3b* located touching apodemes 4. Lengths of ventral setae: *1a* 58–61, *1b* 55–57, *2a* 57–60, *2b* 44–45, *3a* 47–51, *3b* 31–39, *3c* 60–70, *4a* 34–37, *4b* 58–61, *4c* 87–91, *ps1* 67–70, *ps2* 55–59, *ps3* 84–88.

*Legs* (Figs. 9, 10), leg I (Fig. 9A): setal formula: Tr 1(*v'*)–Fe 3(*d*, *l'*, *v''*)–Ge 4(*l'*, *l''*, *v'*, *v''*)–1TiTa 6(4) (*d*, *l'*, *l''*, *v'*, *v''*, *k*, *p''*, *tc'*, *tc''*, *ft'*, *ft''*, *s*, *pv'*, *pv''*, *pl'*, *pl''*,  $\phi 1$ ,  $\phi 2$ ,  $\omega 1$ ,  $\omega 2$ ); shorter than other legs; with one large ventrodorsal claw. Setae *p''*, *tc'*, *tc''*, *ft'* and *ft''* blunt-tipped eupathid-like, setae *v'* of trochanter, *d* and *l'* of femur blunt-tipped, other setae pointed; setae *tc'* and *ft''* located on long pinnaculum; seta *tc'* situated on short pinnaculum; setae *v'* of trochanter, *d*, *l'*, *v''* of femur, *s* and *pv''* of tibiotarsus smooth, other setae (except eupathidia) barbed. Solenidion  $\omega 1$  14–15 digitiform; solenidia  $\omega 2$  18–23 and  $\phi 2$  14–15 homomorph, uniformly thin; solenidion  $\phi 1$  12–13 digitiform.

Leg II (Fig. 9B). Setal formula: Tr 1(*v'*)–Fe 3(*d*, *l'*, *v''*)–Ge 3 (*l'*, *l''*, *v'*)–Ti 4(1)(*d*, *l'*, *v'*, *v''*,  $\phi$ )–Ta 6(1)(*pl''*, *tc'*, *tc''*, *u'*, *pv'*, *pv''*,  $\omega$ ); with one pair of padded claws and empodium. All setae barbed; setae *v''* of femur and *u'* of tarsus weakly blunt-tipped, other leg setae pointed. Solenidia  $\omega$  13–14 and  $\phi$  10–11 digitiform.

Leg III (Fig. 10A); setal formula: Tr 1(*v'*)–Fe 2(*d*, *v'*)–Ge 2(*l'*, *v'*)–Ti 4(1)(*d*, *l'*, *v'*, *v''*,  $\phi$ )–Ta 6(*pl''*, *tc'*, *tc''*, *u'*, *pv'*, *pv''*); with one pair of padded claws and empodium. Solenidion  $\phi$  9–10 digitiform. All setae pointed and barbed.

Leg IV (Fig. 10B); setal formula: Tr 1(*v'*)–Fe 2(*d*, *v'*)–Ge 1(*v'*)–Ti 3(1)(*d*, *l'*, *v'*,  $\phi$ )–Ta 6(*pl''*, *tc'*, *tc''*, *u'*, *pv'*, *pv''*); with one pair of small claws and small empodium. Solenidion  $\phi$  10–11 baculiform. Setae *pl''* and *u'* of tarsus smooth, other setae barbed; setae *d* of femur and *d* of tibia blunt-tipped, other setae pointed. Seta *pl''* located close to *tc'*. Length of pretarsus 35–38, length of tarsus 72–75.

*Male, non-phoretic female and larva* unknown.

**Material examined.** Six female paratypes, Russia, Primorsky Krai, vicinities of the Posyet settlement, in an oak tree stump, 16 May 1965, coll. A.D. Petrova.

**Remarks.** The phoretic female of *A. posietis* is very similar to *A. pseudocurtonoti* Khaustov, 2008, described from Belorussia (Khaustov 2008) in general appearance. It can be distinguished from *A. pseudocurtonoti* by distinctly longer dorsal and most of ventral idiosomal setae, as well as by much larger body size (width of tergite C 270–285 vs. 205 in *A. pseudocurtonoti*). *Archidispus posietis*

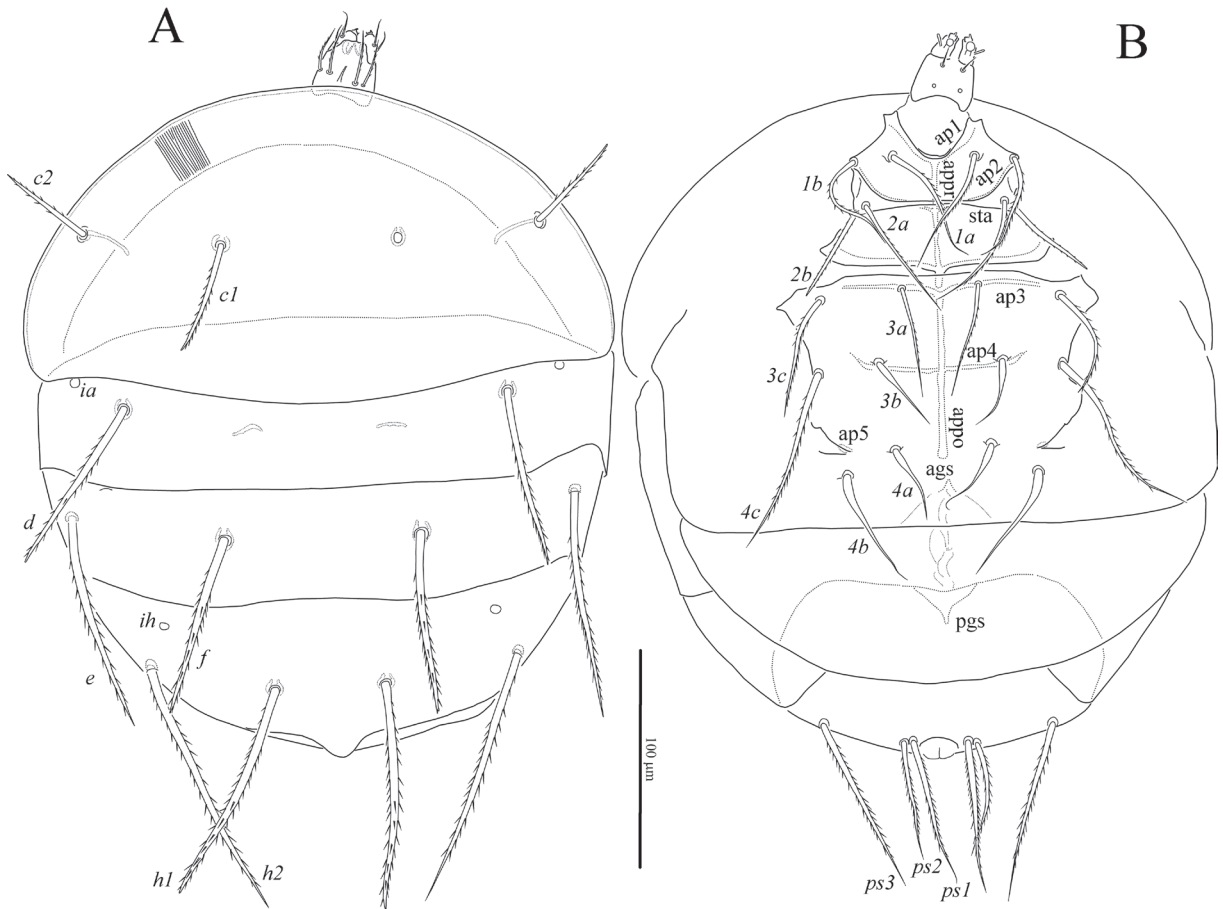


Fig. 7. *Archidispus posietis* (Sevastianov, 1974), phoretic female: A—dorsum of body; B—venter of body.

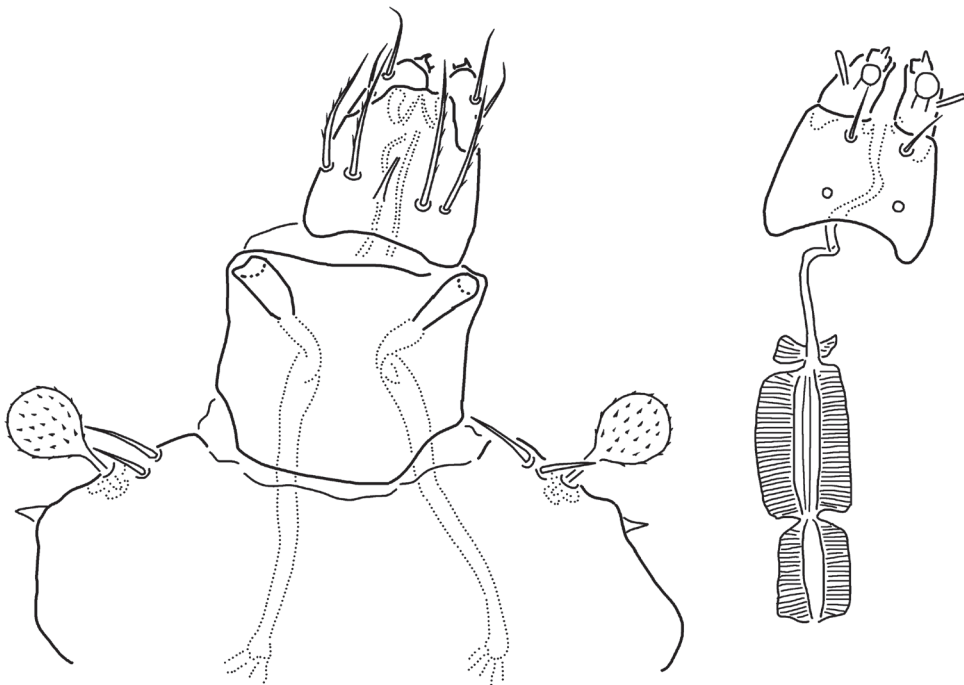


Fig. 8. *Archidispus posietis* (Sevastianov, 1974), phoretic female: A—proterosoma, dorsal aspect; B—gnathosoma and pharyngeal pumps, ventral aspect.

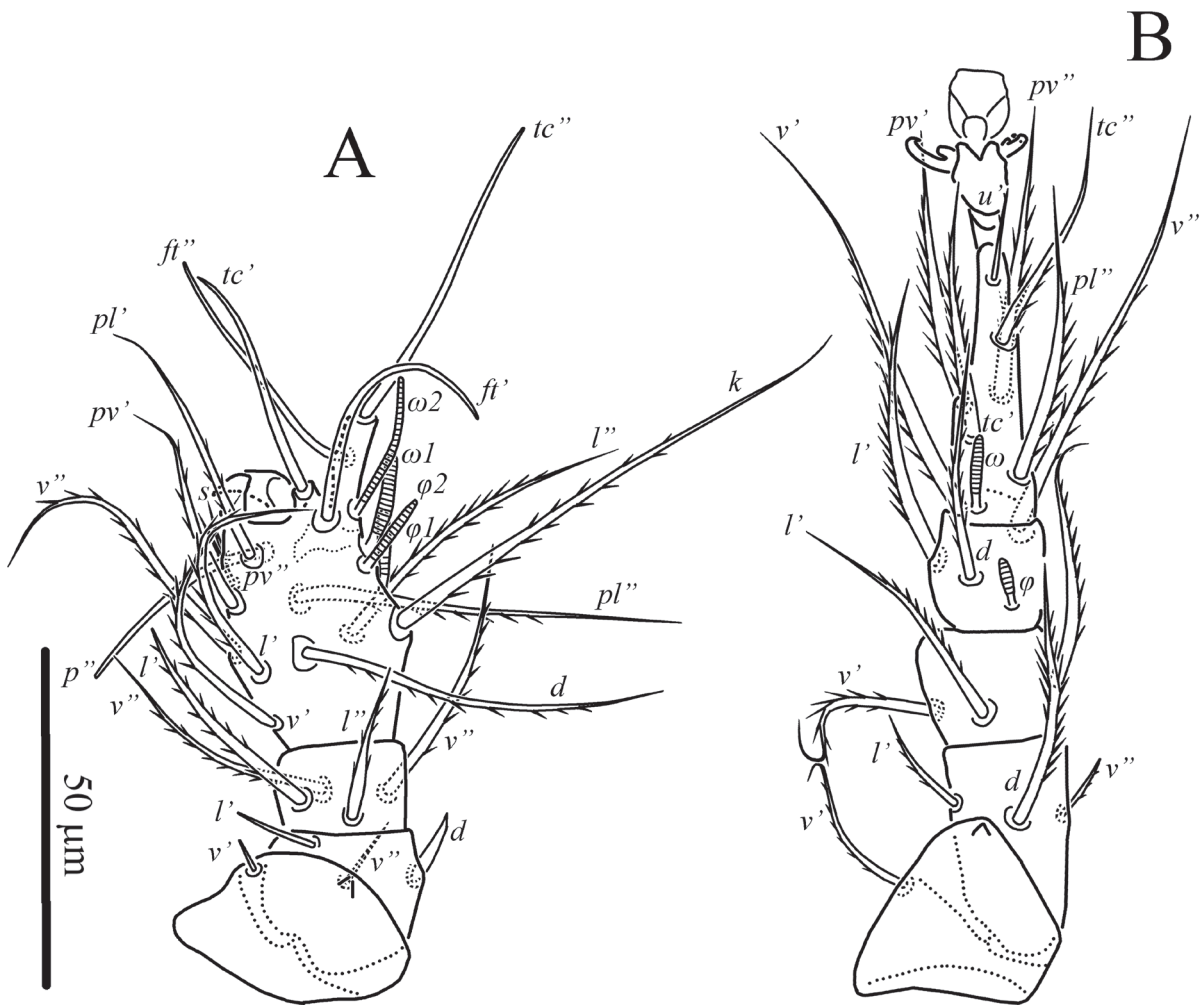


Fig. 9. *Archidispus posietis* (Sevastianov, 1974), phoretic female: A—right leg I, dorsal aspect; B—right leg II, dorsal aspect.

also differs from *A. pseudocurtonoti* in having setae *4b* shorter than *ps1* (vs. setae *4b* longer than *ps1* in *A. pseudocurtonoti*).

#### ACKNOWLEDGEMENTS

The study was supported by the Ministry of Science and Higher Education of the Russian Federation within the framework of the Carbon Measurement Test Area in the Tyumenskaya Oblast (FEWZ-2024-0016). The authors are sincerely grateful to late Dr. V.A. Trach (I.I. Mechnikov National University, Odessa, Ukraine) for loaning the type materials of *Archidispus posietis*.

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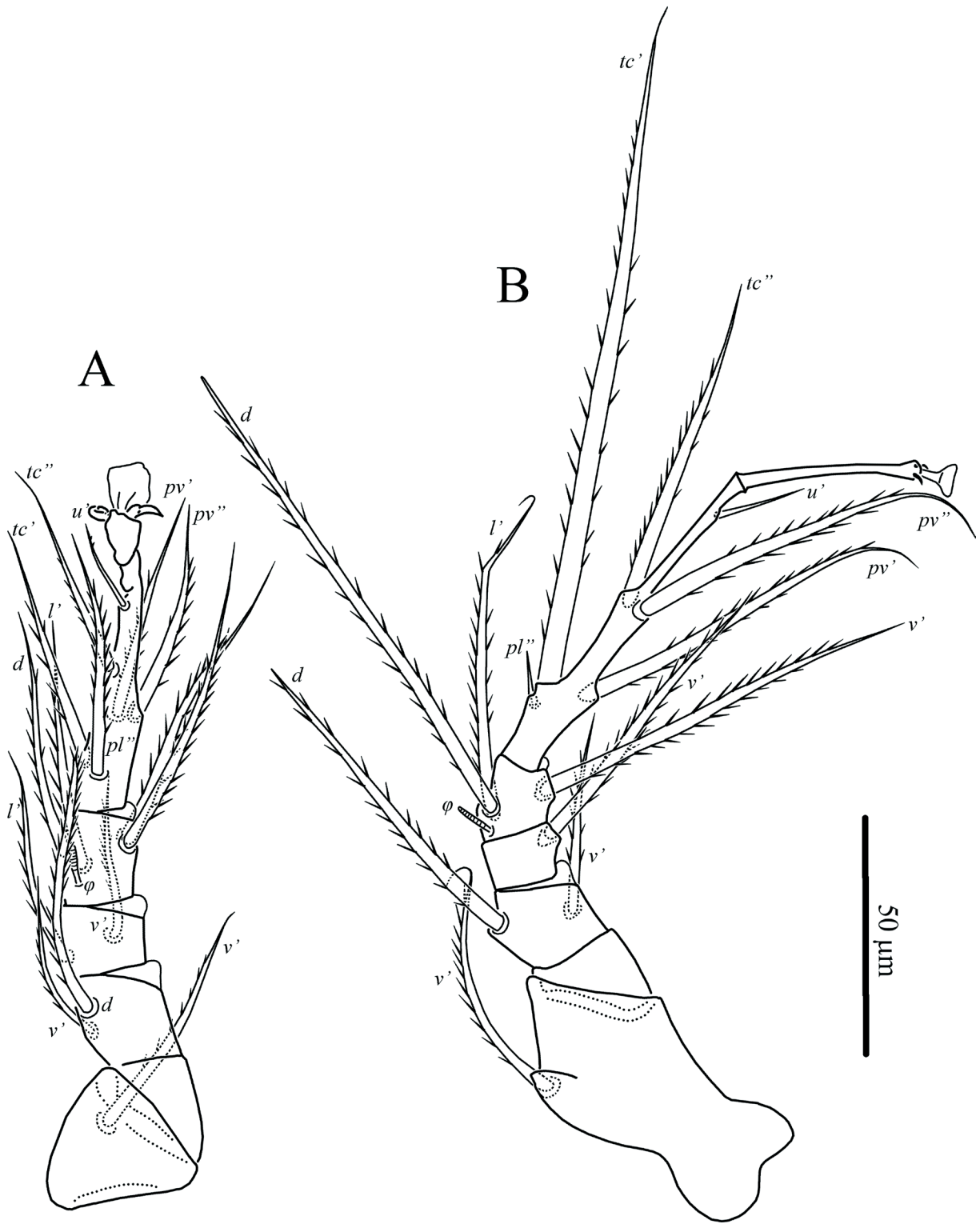


Fig. 10. *Archidispus posietis* (Sevastianov, 1974), phoretic female: A—right leg III, dorsal aspect; B—right leg IV, dorsal aspect.

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Fig. 11. Phase contrast micrographs of *Archidispus posietis* (Sevastianov, 1974), phoretic female: general view dorsally.



Fig. 12. Phase contrast micrographs of *Archidispus posietis* (Sevastianov, 1974), phoretic female: general view ventrally.

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