

Contribution to the fauna of Tydeidae (Acari: Prostigmata) from Western Siberia, Russia

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Original research

ABSTRACT

The fauna of Tydeidae of Western Siberia is reviewed. A total of 27 species from eight genera were found in Tyumen and Kurgan Regions. Two species, *Lorryia sibiriensis* **n. sp.** and *L. speciosa* **n. sp.** are described as new for science; *Lorryia evansi* Baker is recorded from Russia for the first time and redescribed based on materials from Tyumen Region; *Lorryia paravarsoviensis* (Momen and Lundqvist), *L. subularoides* Kaźmierski, *L. arkadiensis* Panou and Emmanouel, *L. argutus* (Kuznetsov and Petrov) **n. comb.**, *L. serpettae* (Momen and Lundqvist) **n. comb.**, *L. szeptyckii* (Kaźmierski) **n. comb.**, *L. filiformis* (Momen and Lundqvist), *L. grandinsignia* Kaźmierski, *Nudilorryia obsequens* Kaźmierski, *Paralorryia formosa* (André), *Calotydeus edwardbakeri* (Kaźmierski), *Tydeus nieuwkerkeni* André, *T. spathulatus* Oudemans and *Metalorryia delicata* (Kuznetsov) are recorded in Russia for the first time. After examination of the holotype of *Paralorryia formosa* Livshitz this species is moved to *Nudilorryia*. Morphological characters separating two closely related species, *Lorryia catenulata* (Thor) and *L. polita* Kuznetsov, are also provided.

Keywords Tydeoidea; Tydeinae; systematics; morphology; Palearctic; mites; Asia

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Introduction

The family Tydeidae is a diverse group of mites distributed worldwide and currently includes about 31 genera and more than 300 species (Silva *et al.* 2016; Kaźmierski *et al.* 2018; André 2021; Khaustov 2022). Most tydeid mites are fungivorous, however some species are predators of small arthropods, phytophagous and scavengers (Walter *et al.* 2009). The scientific history of tydeid mites and current state of knowledge in taxonomy are discussed in Kaźmierski (1998), Silva *et al.* (2016) and André (2021). The tydeid mites of Asian Russia are almost completely unstudied with only two papers describing three new species of *Lorryia* sensu Kaźmierski, 1989 (Kaźmierski 2008) and a new genus and species, *Andreloorryia hajiyanbari* Khaustov, 2022 (Khaustov 2022). In addition, Kaźmierski (2000) reported *Lorryia woolleyi* and *L. maga* from Tuva Republic in Russia.

This study provides a review of Tydeidae collected in Tyumen and Kurgan Regions of Western Siberia, Russia.

Material and methods

Mites were extracted from various samples (soil, litter, bark of trees, etc.) using Berlese funnels. All mites were mounted in Hoyer's medium. Mite morphology was studied using a Carl Zeiss AxioImager A2 compound microscope with phase contrast and differential interference contrast

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(DIC) illumination. Notation applied to the body and leg setae follow the system of Grandjean, overviewed by Kethley (1990) and André (1981b), respectively; palpal setation follows André (1981a). The diagnosis of the genus *Lorryia* follows Kaźmierski (1989). Photomicrographs were taken with an AxioCam ICc5 digital camera. For SEM microscopy several alcohol-preserved mites were dried in a JFD 320 freeze drying device (JEOL, Japan), dusted with gold and scanned with a JEOL-JSM-6510LV and TESCAN Mira3 LMU SEM microscopes. All measurements are given in micrometers (μm) for the holotype and for five paratypes (in parentheses).

Additional materials examined for the comparison with collected species:

1. *Lorryia polygonata* Kulczycki, 1992: four females, Ukraine, Kharkov Region, Lozovaya District, Novoivanovka village, on bark of apple tree, 4 July 1993, coll. A.A. Khaustov.
2. *Lorryia polita* Kuznetsov, 1975: female holotype, Georgia, vicinity of Tbilisi, in moss, 17 March 1959, coll. L.A. Gomelauri.
3. *Paralorryia formosa* Livshitz, 1972: female holotype, Crimea, Sevastopol (Khersones), on *Ephedra distachya* L., 29 April 1968, coll. I.Z. Livshitz.

Systematics

Family Tydeidae

Subfamily Tydeinae

Genus *Lorryia* Oudemans, 1925 sensu Kaźmierski, 1989

Type species: *Lorryia superba* Oudemans, 1925, by original designation.

Lorryia sibiriensis n. sp.

Zoobank: A6FED4F0-35C4-4A9E-8701-1B58A77292CF

(Figs 1–8)

Description

Female — (Figs 1–3, 5–7, 8A–C). Body ovate (Figs 5A, 7). Length of idiosoma 355 (315–360), maximum width 270 (235–270).

Idiosomal dorsum – (Figs 1A, 5, 7A, 8A). Dorsal ornamentation type “*Lorryia*”; reticulation forms discrete areas divided by striated integument as illustrated on Figs 1A, 5A and 7A; reticulation meshes irregular in shape (Figs 5C, 8A); cross-ties “Y”-shaped, rarely “X”-shaped, frames of meshes with rare “I”-shaped costulae oriented longitudinally (Fig. 5D). Dorsal hysterosomal setae subequal in length and shape, curved, weakly blunt-tipped and weakly barbed (Fig. 5D); setae *vi*, *ve* and *sce* with more attenuate tips than hysterosomal setae; trichobothria smooth, whip-like, about three times longer than other dorsal setae. Only cupuli *ia* hardly discernible inside polygonal cells, other cupuli not evident. Lengths of setae: *vi* 17 (16–18), *ve* 20 (20–21), *sci* 65 (60–70), *sce* 23 (21–23), *c1* 21 (20–22), *c2* 22 (21–23), *d* 23 (21–23), *e* 21 (20–23), *fl* 23 (22–24), *f2* 23 (22–24), *h1* 23 (20–23), *h2* 23 (22–24), *ps1* 20 (19–21).

Idiosomal venter – (Figs 1B, 6A, B, 7B, 8B, C). Ventral surface mostly striated; striae between setae *3a* and *4a* more or less “V”-shaped (Fig. 8B); some striae mesad bases of setae *g2–g4* without tubercles (Fig. 6A). Coxal organ small, ovate (Fig. 6B). Ventral setae smooth and pointed, except *ps1* with same shape as dorsal setae; in female holotype seta *ps1* unpaired (Fig. 7B). Six pairs of genital setae (Fig. 6A). Two pairs of round genital papillae clearly visible inside progenital chamber (Fig. 8C).

Gnathosoma – (Figs 2, 6C). Gnathosoma usually completely covered by idiosoma. Cheliceral stylets 16 (16–17), longer than palptarsus 10 (10–11) and combined length of palptarsus

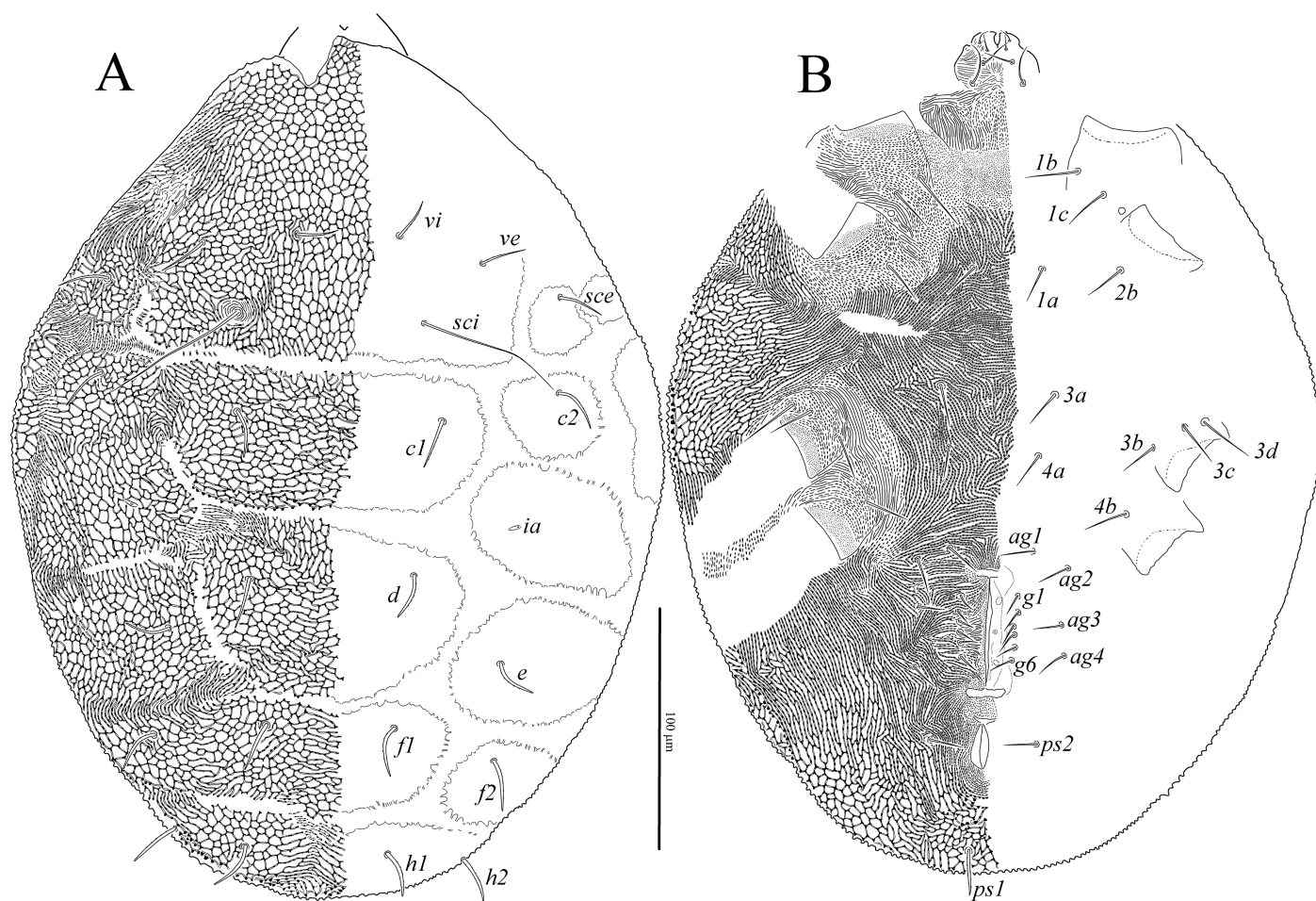


Figure 1 *Lorryia sibiriensis* n. sp., female, (holotype): A – dorsum of body, B – venter of body. Legs omitted.

and eupathidium (*p*) 14 (14–15). Palpal terminal eupathidium very short, thick in basal part and slightly narrowed distally, with rounded tip; seta *d* bifurcates distally; seta *acm* blunt-tipped. All palpal setae smooth. Subcapitulum (Figs 2B, 6C) with smooth and pointed subcapitular setae (*sc1*, *sc2*) and two pairs of short smooth and pointed adoral setae (*or1*, *or2*). Gnathosomal supracoxal setae *ep* rod-like.

Legs – (Figs 3, 6D). Empodia with small empodial hooks; tarsal claws serrate (Fig. 6D). Leg I (Figs 3A, 6D). Setae (*p*), (*tc*) and *ft*'' of tarsus eupathid-like, smooth and longitudinally striated (Fig. 6D); setae *d* of femur, (*l*) of genu and *d* of tibia similar to dorsal idiosomal setae, other setae pointed and weakly barbed. Solenidium ω 8 (7–8) baculiform; famulus *k* on tibia multibranched distally. Leg supracoxal seta (*el*) rod-like, located dorsally near trochanter. Leg II (Fig. 3B). Setae *d* of femur, (*l*) of genu, *d* and *v*' of tibia similar to dorsal idiosomal setae, other leg setae pointed and weakly barbed. Solenidium ω 5 (4–5) baculiform. Leg III (Fig. 3C). Setae *d* of femur, *l*' of genu and *d* of tibia similar to dorsal idiosomal setae, other leg setae pointed and weakly barbed. Leg IV (Fig. 3D). Setae *l*' of genu and *d* of tibia similar to dorsal idiosomal setae, other leg setae pointed and weakly barbed.

Male — Similar to female and differs only in having longitudinal slit-like genital opening and four pairs of short and barbed eugenital setae (Figs 4, 8D). Two pairs of round genital papillae clearly visible inside progenital chamber (Fig. 8D).

Larva, protonymph, deutonymph and tritonymph unknown.

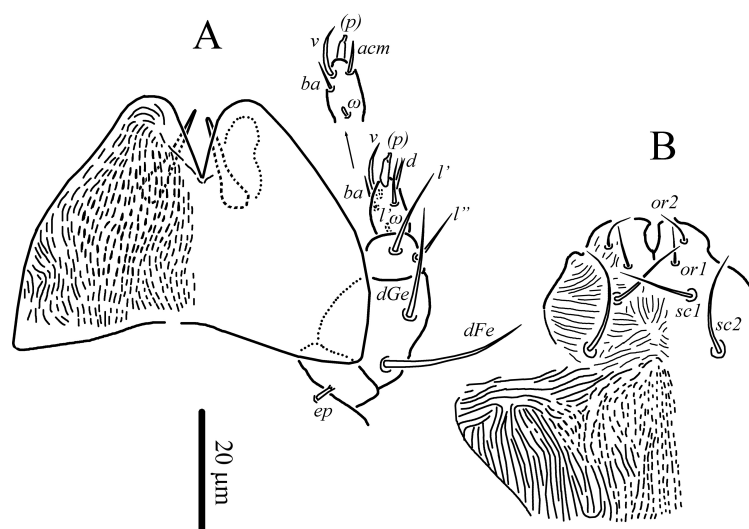


Figure 2 *Lorryia sibiriensis* n. sp., female, (holotype): A– gnathosoma in dorsal view, B – subcapitulum.

Type material

Female holotype, slide ZISP T-Tyd-002, **Russia**, Tyumen Region, city of Tyumen, 57°09'N 65°27'E, in moss on bark of birch *Betula pendula*, 07 May 2014, collected by A.A. Khaustov; paratypes: 3 females, 5 males, same data; 31 female, 1 male, same locality and habitat, 12 May 2019; 1 female, 6 males, **Russia**, Tyumen Region, Tyumen District, vicinity of Malinovka village, 57°05'N 65°03'E, in moss on bark of aspen *Populus tremula* L., collected by A.A. Khaustov.

Type deposition

The holotype, one female and one male paratype are deposited in the acarological collection of Zoological Institute of RAS, Saint Petersburg, Russia; other paratypes are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

Etymology

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

Differential diagnosis

The new species closely resembles *L. catenulata* (Thor, 1931) and *L. polita* Kuznetsov, 1975a in having ornamentation type “*Lorryia*” with discrete areas separated by striate cuticle and in having a very short palptarsus. The new species differs from both *L. catenulata* and *L. polita* in having irregular reticulate meshes (vs. regular, similar in shape in *L. catenulata* and *L. polita*), cross-ties “Y” or “X”-shaped, with their ends and “I”-shaped costulae directed along frames of meshes (vs. cross-ties “Y”-shaped, their ends and “I”-shaped costulae directed transversely from frames of meshes in *L. catenulata* and *L. polita*), and in having more blunted dorsal idiosomal setae (pointed in *L. catenulata* and *L. polita*).

Lorryia speciosa n. sp.

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(Figs 9–13)

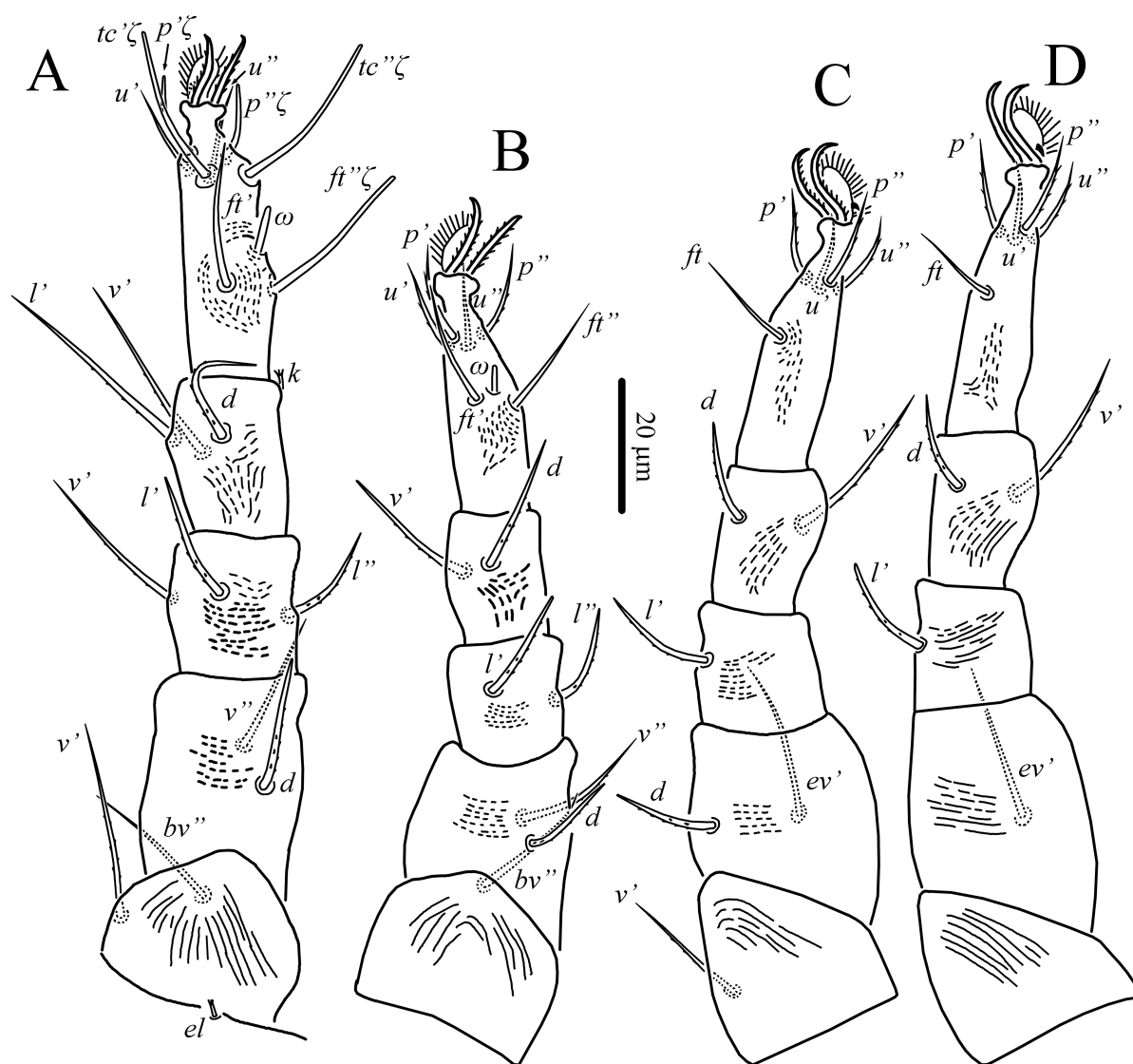


Figure 3 *Lorryia sibiriensis* n. sp., female, (holotype): A–D – right legs I–IV, respectively, dorsal aspect.

Description

Male — (Figs 9–12, 13F). Body ovate (Fig. 12). Length of idiosoma 355 (335–355), maximum width 235 (225–235).

Idiosomal dorsum – (Figs 9A, 12, 13A). Dorsal ornamentation type “mountains” on hysterosomal dorsum and reticulated on prodorsum; reticulation without distinct discrete areas; with transverse depressions anteriad setae *fl* and *hl*. Striae between “mountains” with semioval lobes. Dorsal hysterosomal setae subequal in length and shape, curved, distinctly blunt-tipped and weakly barbed (Fig. 13A); trichobothria smooth, whip-like, about two times longer than other dorsal setae. Cupuli well visible, ovoid in shape. Lengths of setae: *vi* 28 (26–28), *ve* 28 (26–28), *sci* 62 (56–62), *sce* 32 (31–35), *cl* 31 (30–34), *c2* 32 (32–34), *d* 33 (33–36), *e* 35 (32–35), *fl* 34 (34–35), *f2* 35 (33–36), *hl* 33 (31–34), *h2* 33 (33–36), *psl* 27 (27–28).

Idiosomal venter – (Figs 9B, 13F). Ventral surface mostly striated; striae between setae *3a* and *4a* “V”-shaped (Fig. 13B). Coxal organ small, ovate (Fig. 13C). Ventral setae smooth and pointed, except *psl* with same shape as dorsal setae. Six pairs of genital setae, four pairs of



Figure 4 *Lorryia sibiriensis* n. sp., male: genital area

eugenital setae. Two pairs of round genital papillae clearly visible inside progenital chamber (Fig. 13F).

Gnathosoma – (Figs 10, 13C). Gnathosoma usually completely covered by idiosoma. Cheliceral stylets 22 (22–23) with short, posteriorly diffuse basal part and long narrow distal part (Fig. 13C), subequal in length with palptarsus 22 (22–23) and shorter than combined length of palptarsus and eupathidium (*p*) 29 (29–30). Palpal terminal eupathidium with “T”-shaped projection distally; seta *d* unusually deeply bifurcated from its base, one of its projections weakly blunt-tipped and with subterminal barbs; seta *acm* blunt-tipped. All palpal setae smooth. Subcapitulum (Fig. 13C) with smooth and pointed subcapitular setae (*sc1*, *sc2*) and two pairs of short smooth and pointed adoral setae (*or1*, *or2*). Gnathosomal supracoxal setae *ep* rod-like.

Legs – (Fig. 11). Empodia with empodial hooks; tarsal claws serrate. Leg I (Fig. 11A). Setae (*p*), (*tc*) and *ft*'' of tarsus eupathid-like, smooth; setae *d* of femur, (*l*) of genu and *d* of tibia similar to dorsal idiosomal setae, other setae pointed and weakly barbed. Solenidion ω 9 (8–9) baculiform; famulus *k* on tibia multibranched distally. Leg supracoxal seta (*el*) rod-like, located dorsally near trochanter. Leg II (Fig. 11B). Setae *d* of femur, (*l*) of genu, and *d* of tibia similar to dorsal idiosomal setae, other leg setae pointed and weakly barbed. Solenidion ω 5 (5) baculiform. Leg III (Fig. 11C). Setae *d* of femur, *l*' of genu and *d* of tibia similar to dorsal idiosomal setae; seta *v*' of trochanter blunt-tipped, other leg setae pointed and weakly barbed. Leg IV (Fig. 11D). Setae *l*' of genu and *d* of tibia similar to dorsal idiosomal setae, other leg setae pointed and weakly barbed.

Female — Similar to male and differs only in having different shape of genital aperture (Fig. 13D) and lacking eugenital setae. Two pairs of round genital papillae clearly visible inside progenital chamber (Fig. 13E).

Larva, protonymph, deutonymph and tritonymph unknown.

Type material

Male holotype, slide ZISP T-Tyd-003, **Russia**, Kurgan Region, Petuknovsky District, vicinity of lake Medvezh'ye, 55°10'N 67°55'E, soil in steppe, 14 October 2022, collected by A.A. Khaustov; paratypes: 7 females, 4 males, same data.

Type deposition

The holotype, four female and one male paratypes are deposited in the acarological collection of Zoological Institute of RAS, Saint Petersburg, Russia; other paratypes are deposited in the

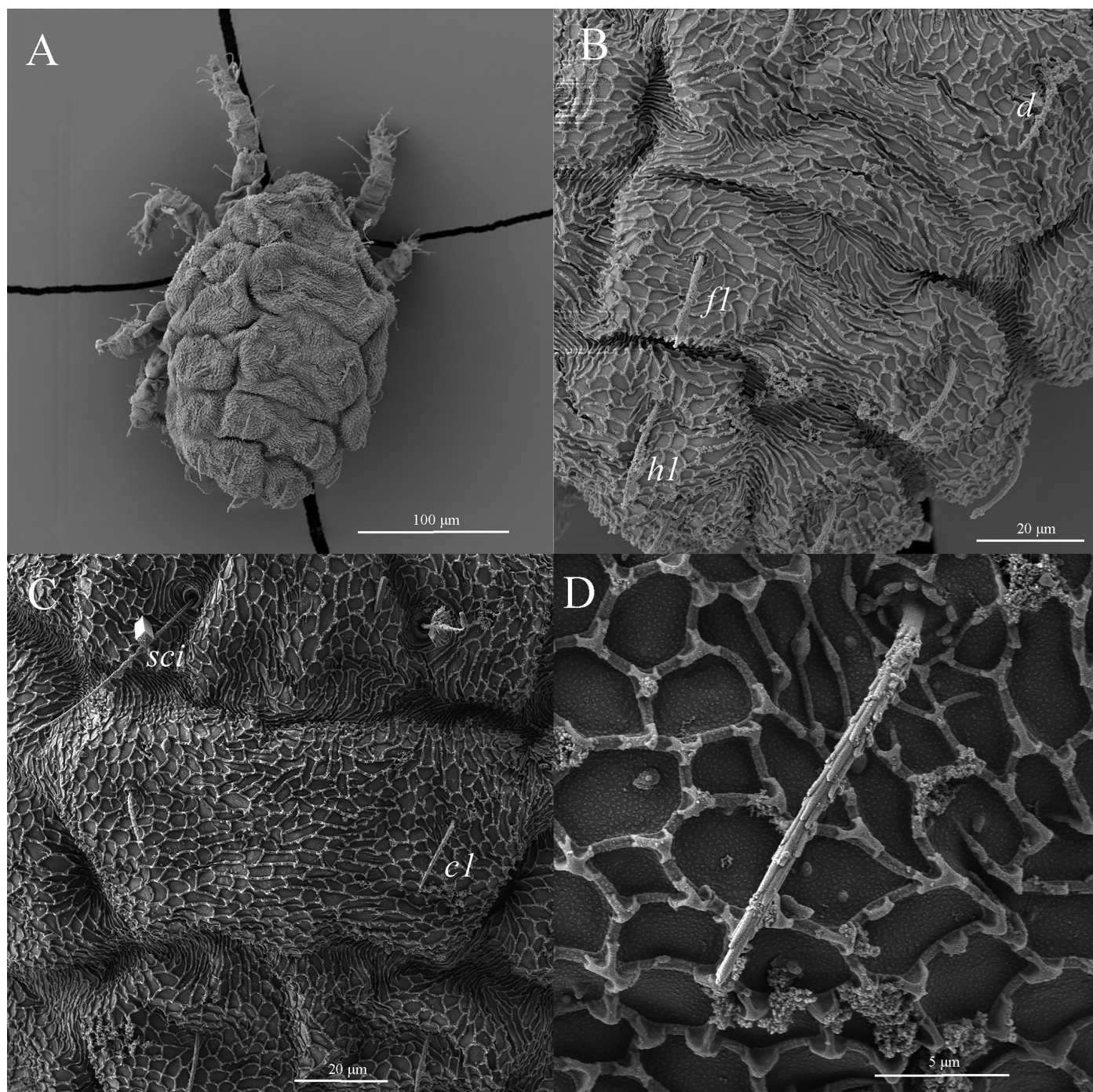


Figure 5 SEM micrographs of *Lorryia sibiriensis* n. sp., female: A – general view dorsally, B – opisthosoma, dorsal aspect; C – reticulate area A(c1); D – seta *cl*.

collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

Etymology

The name of the new species is derived from Latin *speciosus* meaning *beautiful* and refers to the very impressive ornamentation of dorsal idiosoma.

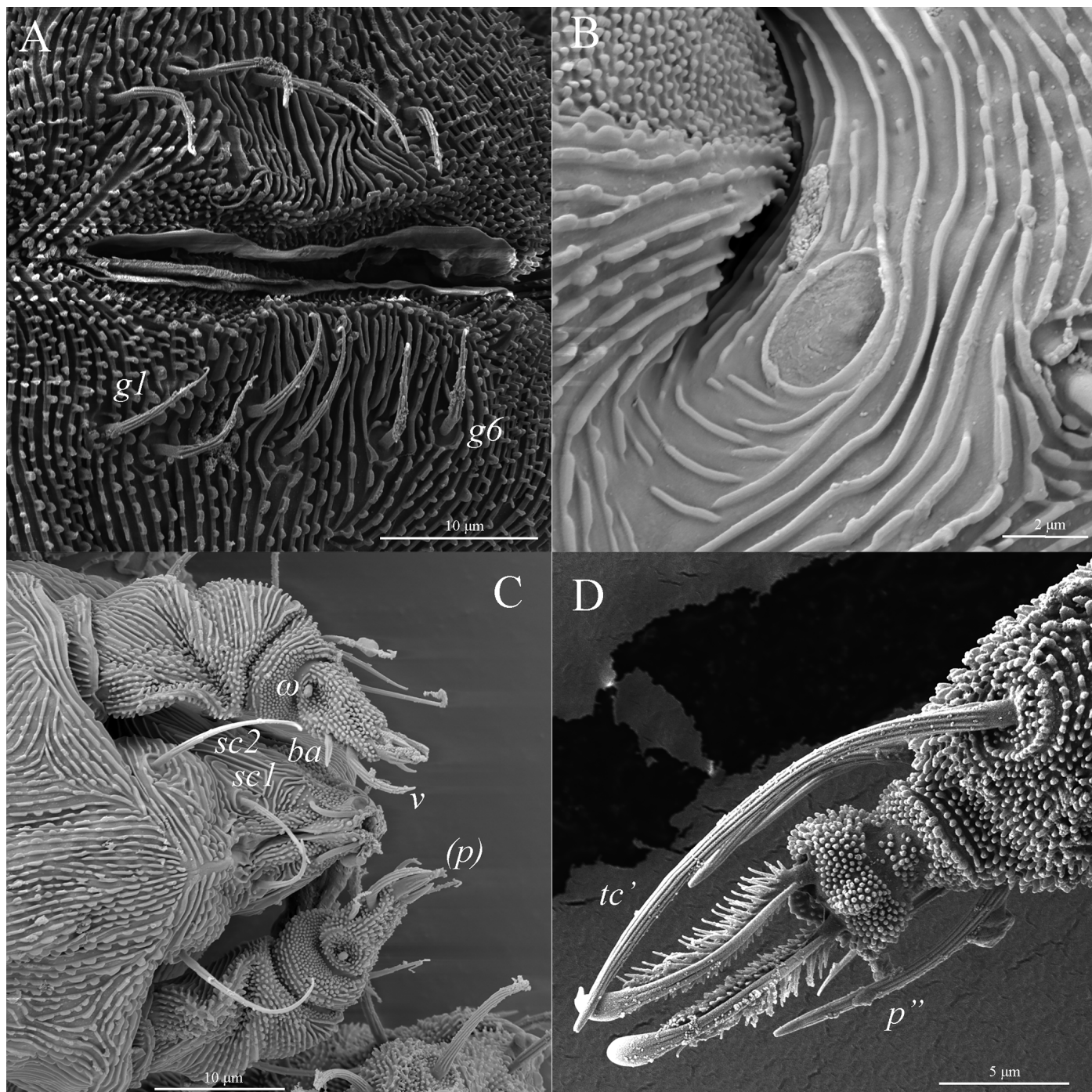


Figure 6 SEM micrographs of *Lorryia sibiriensis* n. sp., female: A – genital area, B – coxal organ; C – gnathosoma in ventral view; D – distal part of tarsus I, dorsal aspect.

Differential diagnosis

The new species strongly resembles *L. danhidalgoi* Kazmierski, 1998 in having ornamentation type “mountains” and lacking discrete reticulate areas on idiosomal dorsum. The new species differs from *L. danhidalgoi* in having distinctly blunt-tipped dorsal idiosomal setae (vs. pointed in *L. danhidalgoi*), “O”-shaped coxal organ (vs. “8”-shaped in *L. danhidalgoi*), and in having unusual seta *d* of palptarsus divided from its base (vs. seta *d* of palptarsus divided only distally

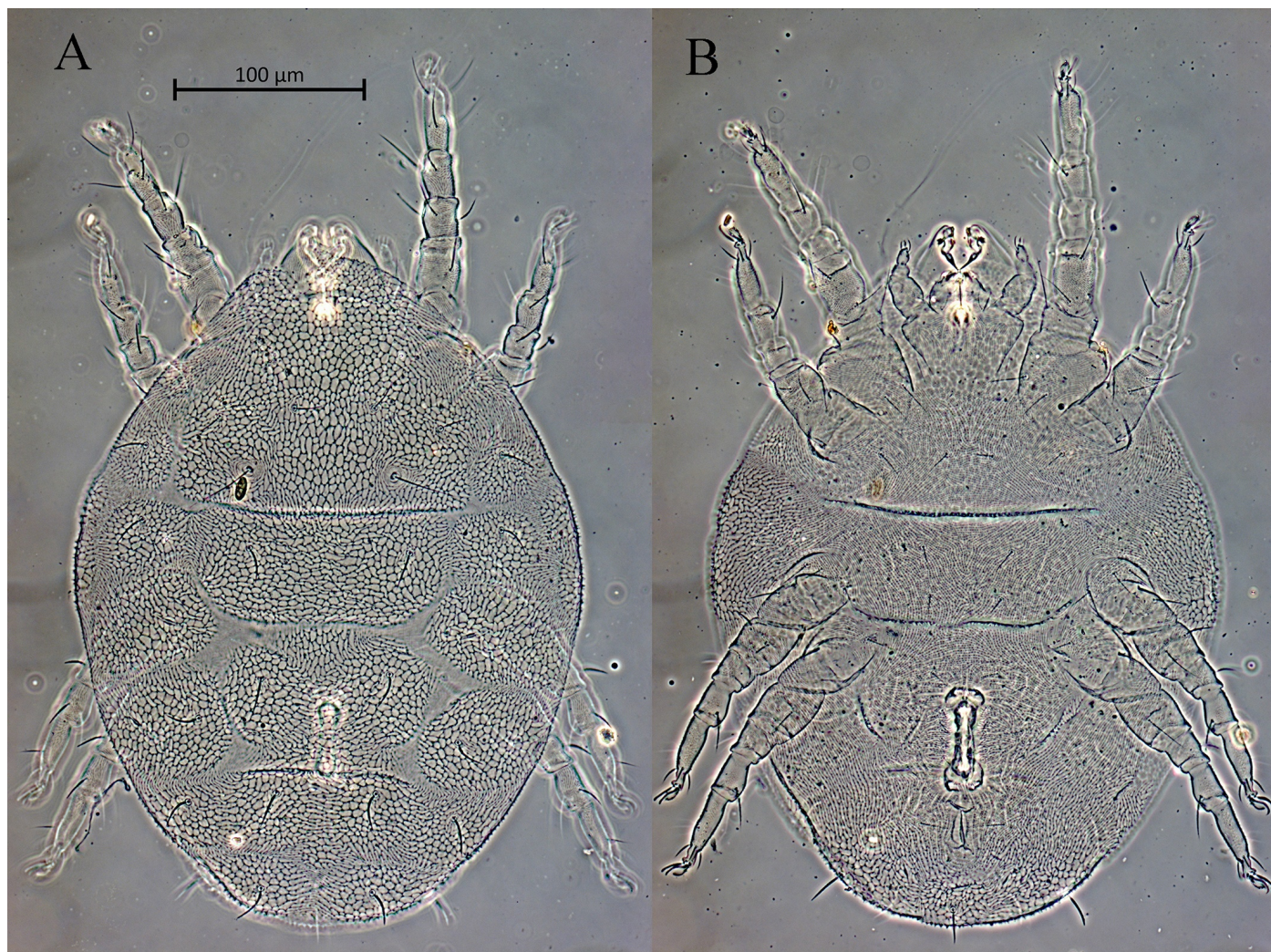


Figure 7 Phase contrast micrographs of *Lorryia sibiriensis* n. sp., female, (holotype): A – general view dorsally, B – general view ventrally.

in *L. danhidalgovi*).

***Lorryia evansi* Baker, 1968**

Lorryia evansi Baker, 1968a, 992, Fig. 16.

Brachytydeus evansi: Silva *et al.* 2016, 14.

(Figs 14–19)

Redescription

Female — (Figs 14–18, 19A, B). Body ovate (Figs 14A, 17A, 18). Length of idiosoma 255–310, maximum width 185–215.

Idiosomal dorsum – (Figs 14A, 17A–D, 18, 19A). Dorsal ornamentation type “Lorryia”; reticulation forms discrete areas divided by striated integument as illustrated on Figs 14A, 17A and 18; reticulation meshes regular in shape (Figs 17A–D); cross-ties triangular, rarely quadrangular in shape, frames of meshes with rare “I”-shaped transversely aligned costulae. Dorsal hysterosomal setae subequal in length and shape, slightly curved, blunt-tipped, smooth or with very small serration on dorsal surface of setae; setae *h1*, *h2* and *ps1* slightly thicker and more blunt than other dorsal setae; trichobothria smooth, weakly blunt-tipped (sometimes

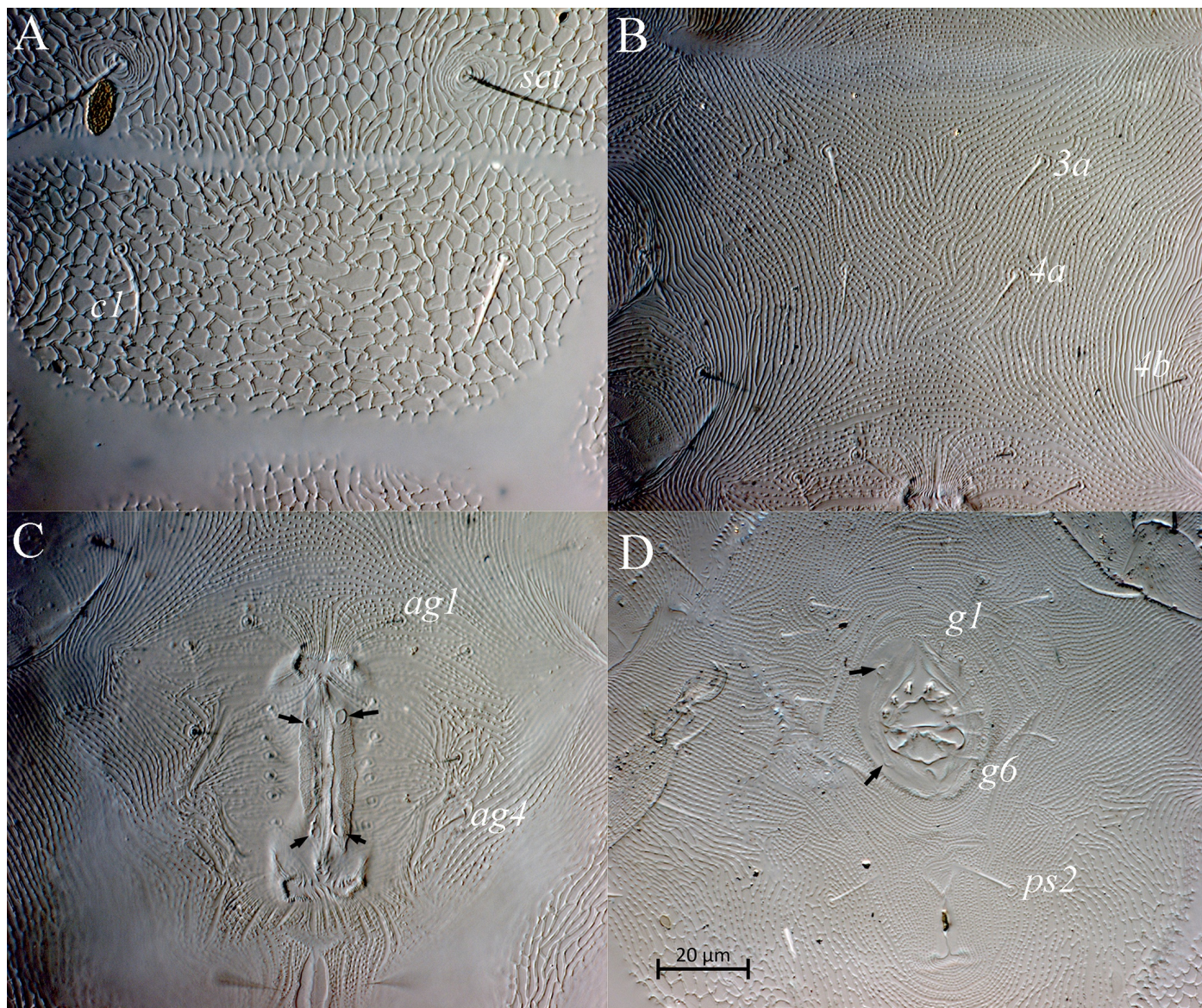


Figure 8 DIC micrographs of *Lorryia sibiriensis* n. sp., female (A-C) and male (D): A – reticulate area A(c1), B – metapodosomal venter; C – progenital chamber of female with well-developed genital papillae (arrowed); D – progenital chamber of male with well-developed genital papillae (arrowed).

pointed), about two times longer than other dorsal setae. All cupuli ovoid. Lengths of setae: *vi* 27–30, *ve* 30–34, *sci* 45–59, *sce* 32–34, *cl* 29–34, *c2* 31–36, *d* 28–32, *e* 31–34, *fl* 31–33, *f2* 30–34, *h1* 28–32, *h2* 31–33, *ps1* 22–28.

Idiosomal venter – (Figs 14B, 19B). Ventral surface mostly striated; striae between setae *3a* and *4a* longitudinally parallel (Fig. 19B). Coxal organ “8”-shaped. Ventral setae smooth and pointed, except *ps1* which of the same shape as dorsal setae. Six pairs of genital setae. Genital papillae not evident.

Gnathosoma – (Figs 15, 17E). Gnathosoma usually completely covered by idiosoma or distal part of chelicerae visible from above. Cheliceral stylets 18–20 subequal in length with palptarsus 17–19 and shorter than combined length of palptarsus and eupathidium (*p*) 25–27. Palpal terminal eupathidium with “T”-shaped tip; seta *d* bifurcates distally; seta *acm* blunt-tipped. All palpal setae smooth. Subcapitulum (Fig. 17E) with smooth and pointed subcapitular

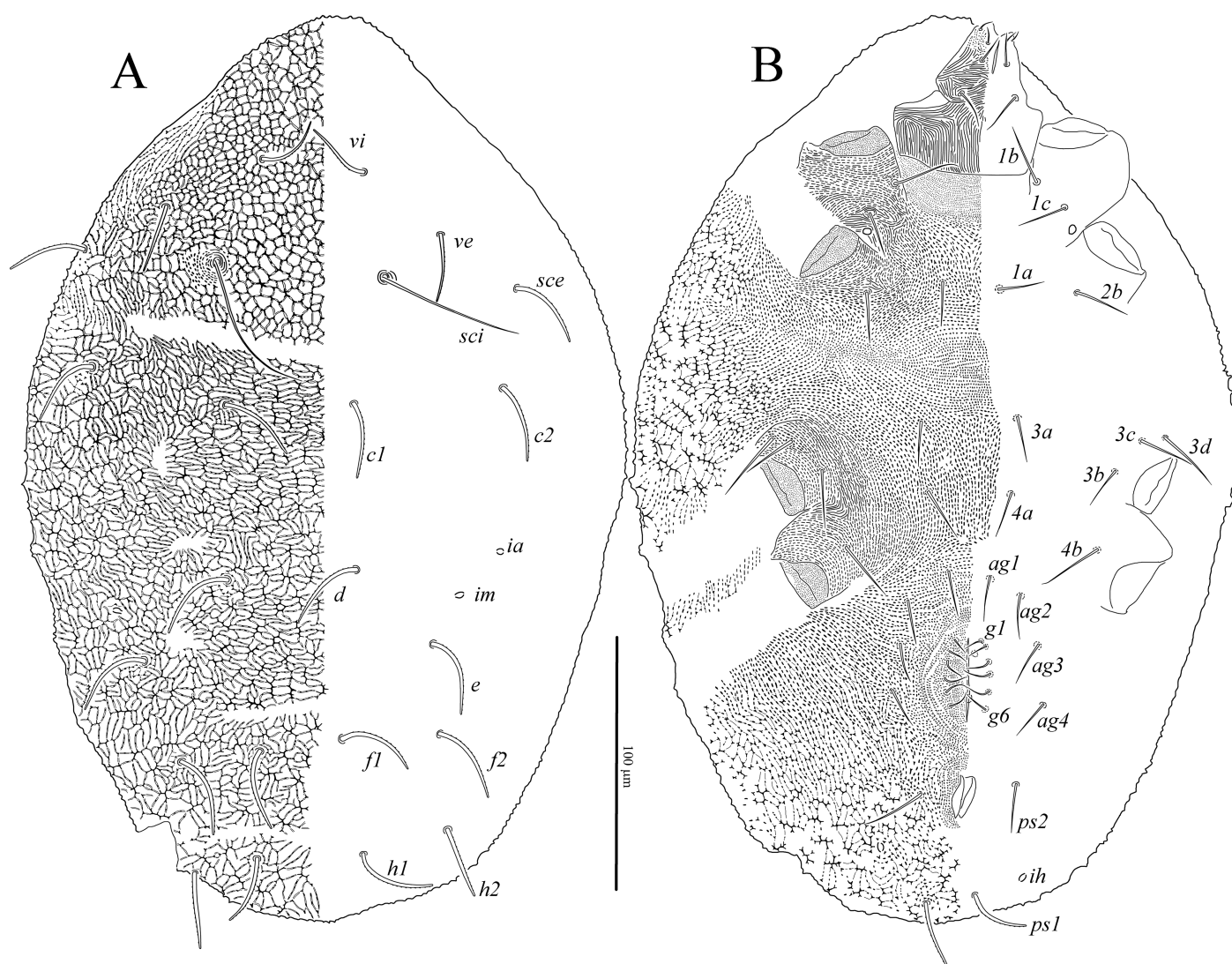


Figure 9 *Lorryia speciosa* n. sp., male, (holotype): A – dorsum of body, B – venter of body. Legs omitted.

setae (*sc1*, *sc2*) and two pairs of short smooth and pointed adoral setae (*or1*, *or2*). Gnathosomal supracoxal setae *ep* rod-like.

Legs – (Figs 16, 17F). Empodia with small empodial hooks; tarsal claws serrate (Fig. 17F). Leg I (Figs 16A, 17F). Setae (*p*), (*tc*) and *ft*'' of tarsus eupathid-like, smooth and longitudinally striated (Fig. 17F); setae *d* of femur, (*l*) of genu and *d* of tibia similar to dorsal idiosomal setae, other setae pointed and weakly barbed. Solenidion ω 8 baculiform; famulus *k* on tibia multibranched distally. Leg supracoxal seta (*el*) rod-like, located dorsally near trochanter. Leg II (Fig. 16B). Setae *d* of femur, (*l*) of genu, and *d* of tibia similar to dorsal idiosomal setae, other leg setae pointed and weakly barbed. Solenidion ω 3–4 baculiform. Leg III (Fig. 16C). Setae *d* of femur, *l*' of genu and *d* of tibia similar to dorsal idiosomal setae, other leg setae pointed and weakly barbed. Leg IV (Fig. 16D). Setae *l*' of genu and *d* of tibia similar to dorsal idiosomal setae, other leg setae pointed and weakly barbed.

Male similar to female and differs only in having longitudinal slit-like genital opening (Fig. 19C) and four pairs of short and barbed eugenital setae.

Larva, protonymph, deutonymph and tritonymph unknown.

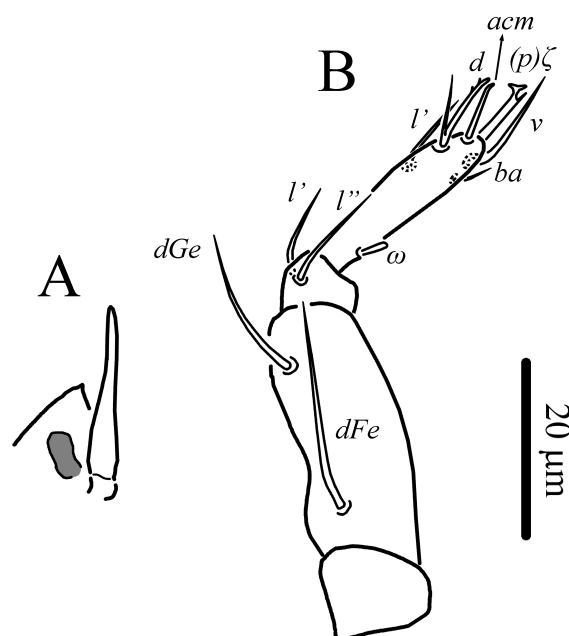


Figure 10 *Lorryia speciosa* n. sp., male, (holotype): A – distal part of chelicera, B – right palp.

Material examined

Sixteen females, 3 males, **Russia**, Tyumen Region, vicinity of Uspenka village, 57°03'N 65°03'E, in rotting bark of unknown tree, 07 May 2019, collected by A.A. Khaustov.

Remarks

Lorryia evansi was described from quarantine in USA (New York) on cut flowers imported from the Netherlands (Baker 1968a). This species is very similar to *L. polygonata* Kulczyck1, 1992 described from Ukraine. According to keys provided by Kaźmierski (1998) and Silva *et al.* (2016), *L. evansi* differs from *L. polygonata* only by smooth or rough dorsal idiosomal setae, while in *L. polygonata* dorsal idiosomal setae clearly serrated. I examined several specimens of *L. polygonata* collected by me on apple bark in Ukraine. In fact, the dorsal setae in *L. polygonata* are smooth or rough, not clearly serrated. In the original description of *L. polygonata* the author also mentioned that most of the setae are smooth or just have few very small barbs apically. However, *L. polygonata* can be distinguished from *L. evansi* by distinctly thicker setae *f2*, *h1*, *h2*, and *ps1*; setae *f2* clearly thicker and more blunt than *f2* (Fig. 19D); in contrast to subequal in width and shape of setae *f1* and *f2* in *L. evansi* (Fig. 19A).

Lorryia catenulata (Thor, 1931)

Retetydeus catenulatus Thor, 1931, 91

Lorryia catenulata: Baker 1968a, 1001

Tydeus catenulata: Momen and Lundqvist 1995, 43

Brachytydeus catenulata: Silva *et al.* 2016, 12

Brachytydeus catenulatus: André 2021

(Figs 20, 21A, B)

This species originally was described from Norway (Thor 1931). Baker (1968a) redescribed it based on specimens from Ireland. Kaźmierski (1980) redescribed it based on materials from Poland. Kuznetsov and Petrov (1984) recorded this species in Latvia. According to Kuznetsov

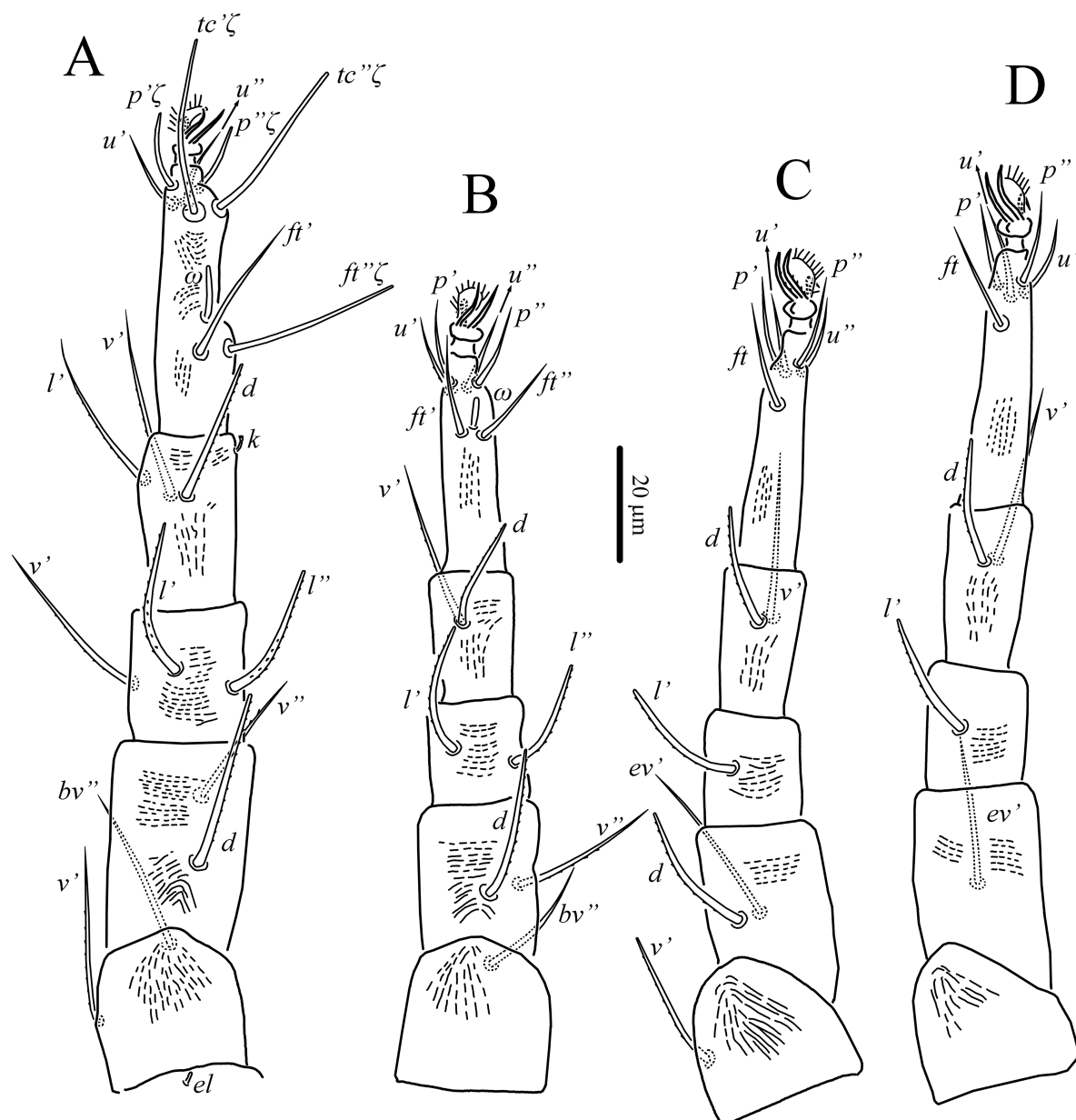


Figure 11 *Lorryia speciosa* n. sp., male, (holotype): A–D – right legs I–IV, respectively, dorsal aspect.

and Petrov (1984) this species also was recorded in European Russia (Voronezh Region), Georgia and Ukraine. Momen and Lundqvist (1995) reported it from Sweden. Kaźmierski *et al.* (2018) noted that this species prefers such habitats as moss covering shady rocks in dark needle forests.

Kuznetsov and Petrov (1984) provided an illustration of *L. catenulata* which, in fact, repeat the illustration of *L. polita* Kuznetsov, 1975a, a closely related species described from Georgia. Most likely, they consider *L. polita* as a suspected junior synonym of *L. catenulata*. According to the key of Kaźmierski (1998) *L. polita* can be distinguished from *L. catenulata* in having separate reticulated area A[c2]0[e1] between setae *c2* and *e*. In fact, in the original description of Thor (1931) this area is clearly depicted as well as in redescription of Baker (1968a). My specimens from Western Siberia fully correspond to the description of Thor (1931), especially

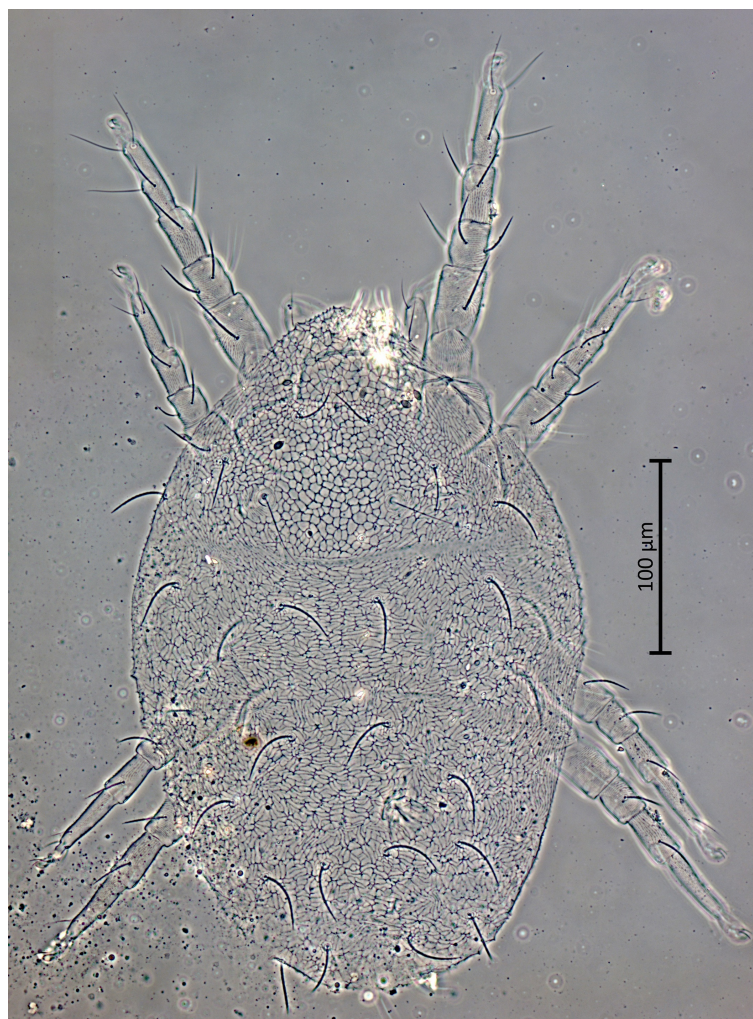


Figure 12 Phase contrast micrograph of *Lorryia speciosa* n. sp., male, (holotype): general view dorsally.

in having an anterior invagination (poorly developed in some specimens) in the reticulate area A[c2]0[e1] (Figs 20A, 22A). For the separation or possible synonymy of *L. polita*, I examined the holotype of this species (Figs. 21C, D, 22C, D). Both species are very similar, however, the reticulate area A[c2]0[e1] in *L. polita* is hardly discernible on the left side and is clearly separated from area Ac2 on the right side of the holotype (Fig. 22D). Therefore, the use of this character for the separation of *L. polita* and *L. catenulata* is problematic. The study of palpal setae revealed some minor differences between *L. polita* and *L. catenulata*. In *L. catenulata* seta *ba* of the palptarsus is very short and blunt-tipped, distinctly shorter than seta *acm* and seta *v* is pointed (Fig. 21A, B); in *L. polita* seta *ba* is unusually long and thin, pointed, subequal in length with *acm*, and seta *v* is clearly blunt-tipped (Fig 21C, D). There are no differences in the shape of dorsal idiosomal setae and structure of reticulate areas on the idiosoma. In *L. catenulata*, the dorsal idiosomal setae are weakly barbed and pointed (Fig. 20C, D), and in *L. polita* the dorsal idiosomal setae not so strongly barbed as in the original description. Another character, which could be used for the separation of *L. polita* from *L. catenulata*, is the shape of striae between ventral setae 3*a* and 4*a*. In *L. catenulata* striae form a “V”-shaped ornament (Fig. 22B), while in *L. polita* striae are parallel (Fig. 22C).

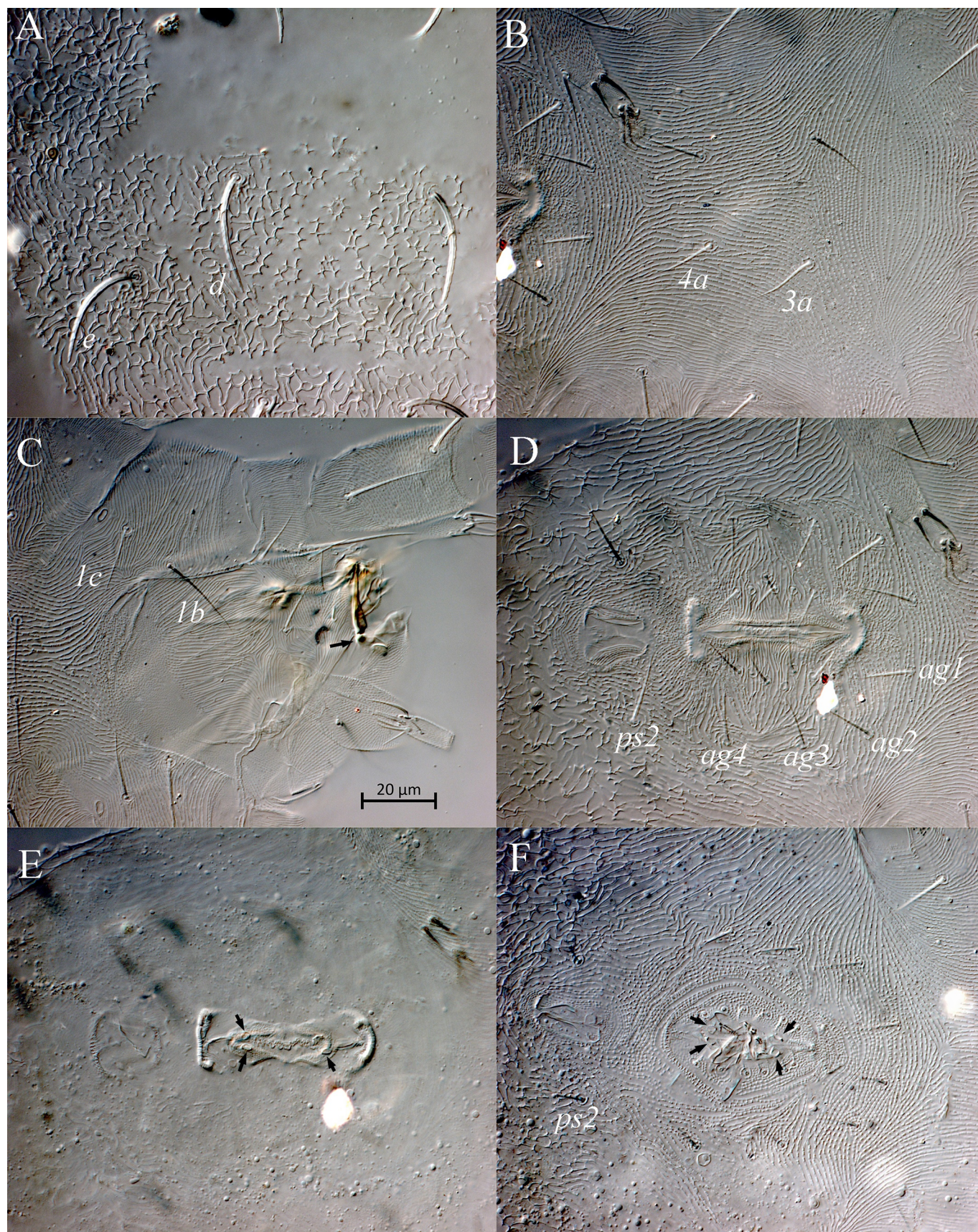


Figure 13 DIC micrographs of *Lorryia speciosa* n. sp., female (A–E) and male (F): A – dorsal setae and ornamentation type “mountains”; B – metapodosomal venter; C – gnathosoma in ventral view, arrow points to short basal part of cheliceral stylet; D – ano-genital area of female; E – progenital chamber of female with well-developed genital papillae (arrowed); F – progenital chamber of male with well-developed genital papillae (arrowed).

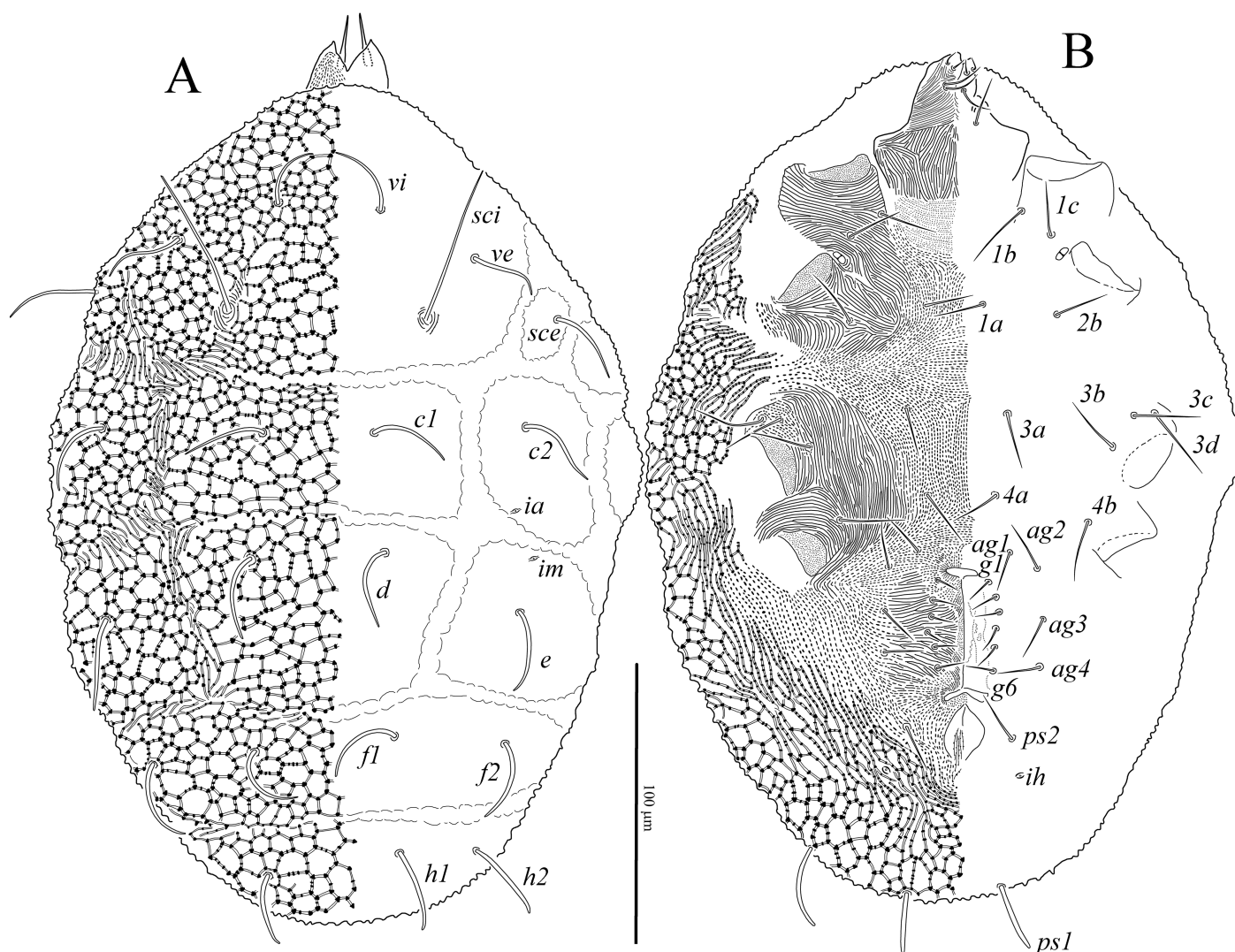


Figure 14 *Lorryia evansi* Baker, 1968, female: A – dorsum of body, B – venter of body. Legs omitted.

Material examined

Fifteen females, 6 males, **Russia**, Tyumen Region, city of Tyumen, 57°09'N 65°27'E, in moss on soil in the mixed forest, 23 June 2019, collected by A.A. Khaustov.

Lorryia reticulata Oudemans, 1928

Tydeus reticulatus Oudemans, 1928, 380

Tydeus reticulata: Baker 1947, 227

Lorryia reticulata: Oudemans 1929, 481

Brachytydeus reticulata: Silva *et al.* 2016, 23

Brachytydeus reticulatus: André 2021

Lorryia bedfordiensis: synonymy by Kaźmierski (1998), 300

Lorryia polaris: synonymy by Kaźmierski (1998), 300

This is one of the most widespread species of Tydeidae and probably cosmopolitan

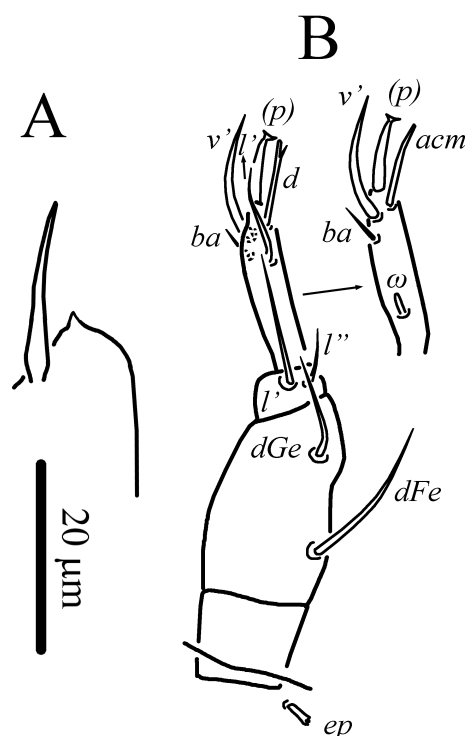


Figure 15 *Lorryia evansi* Baker, 1968, female: A – distal part of chelicera, B – right palp.

(Kaźmierski 1998). In Russia, it was recorded in European part (Kuznetsov and Petrov 1984).

Mondin *et al.* (2016) consider *L. reticulata* as suspected junior synonym of *L. superba* (type species of *Lorryia*) and Kaźmierski *et al.* (2018) consider *L. reticulata* as a junior synonym of *L. superba*. However, André (2005) described the history of *L. superba* and noted that type specimen of this species is lost. Therefore, the synonymy of *L. reticulata* and *L. superba* still not clear.

Material examined

One female, 1 male, 5 TN, **Russia**, Tyumen Region, vicinity of Uspenka village, 57°03'N 65°03'E, in rotting bark of spruce, 08 May 2019, collected by A.A. Khaustov; 2 females, **Russia**, Tyumen Region, Tyumen District, city of Tyumen, 57°09'N 65°27'E, in rotting bark of dead spruce, 15 June 2019, collected by A.A. Khaustov; 2 females, same locality and date, in tree hole of birch.

Lorryia argutus (Kuznetsov and Petrov, 1979) n. comb.

Tydeus argutus Kuznetsov and Petrov, 1979, 131

This species was described from Latvia (Kuznetsov and Petrov 1979; 1984). Unfortunately, this species was not mentioned in the catalogue of Tydeidae (Silva *et al.* 2016) and in the latest online database (André 2021). It was originally placed in the genus *Tydeus*, but according to modern taxonomy of Tydeidae it should be placed in the genus *Lorryia* sensu Kaźmierski (1989).

This is the first record of *L. argutus* from Russia.

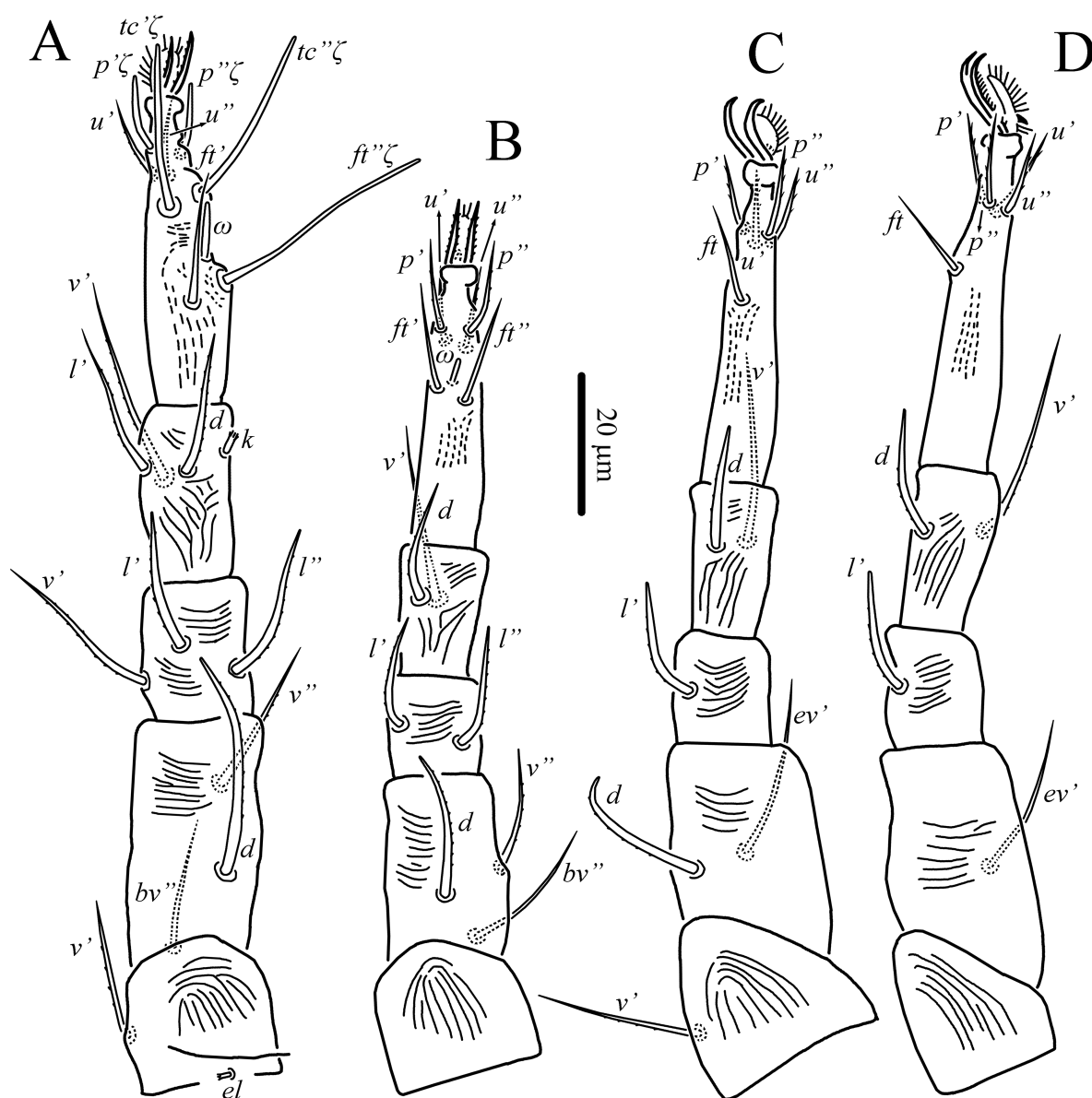


Figure 16 *Lorryia evansi* Baker, 1968, female: A–D – right legs I–IV, respectively, dorsal aspect.

Material examined

Two females, 3 males, **Russia**, Tyumen Region, vicinity of Uspenka village, 57°03'N 65°03'E, in moss on soil, 02 October 2017, collected by A.A. Khaustov.

Lorryia obstinata (Livshitz, 1973)

Tydeus obstinatus Livshitz, 1973, 49

Lorryia obstinata: Kaźmierski 1998, 336

Brachytydeus obstinata: Silva *et al.* 2016, 20

Brachytydeus obstinatus: André 2021

This species was described from Crimea (Kuznetsov and Livshitz 1973a). It was also

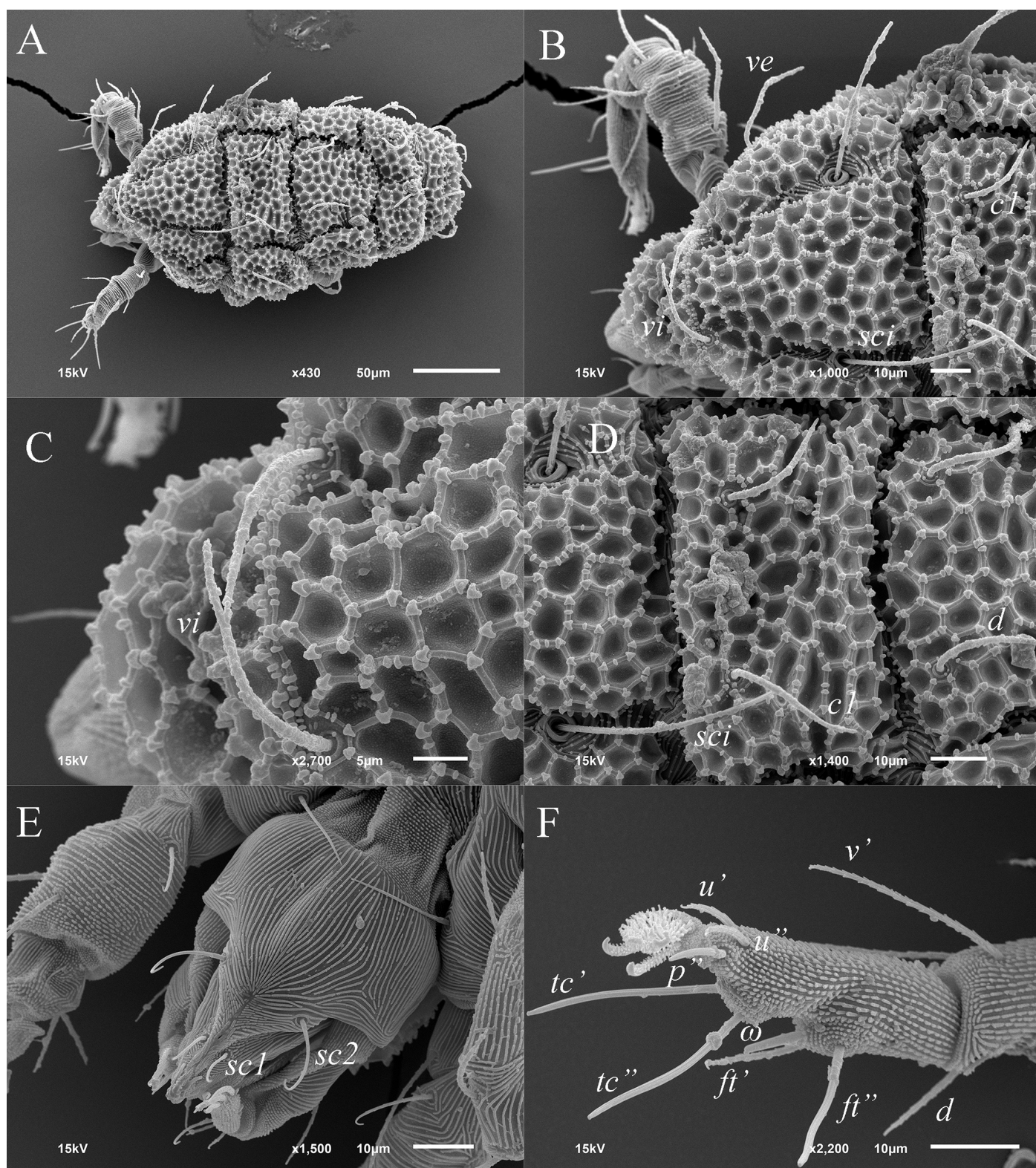


Figure 17 SEM micrographs of *Lorryia evansi* Baker, 1968, female: A – general view dorsally, B – prodorsum; C – anterior part of prodorsum; D – reticulate area A(c1); E – gnathosoma in ventral view; F – tarsus I, paraxial aspect.



Figure 18 Phase contrast micrograph of *Lorryia evansi* Baker, 1968, female: general view dorsally.

recorded from Latvia and Lithuania (Kuznetsov and Petrov 1984), Poland (Kaźmierski *et al.* 2018), Iran (Sadeghi *et al.* 2012), Sweden (Momen and Lundqvist 2005).

Material examined

One female, **Russia**, Tyumen Region, vicinity of Uspenka village, 57°03'N 65°03'E, in rotting grass on the field, 18 October 2017, collected by A.A. Khaustov; 1 female, **Russia**, Tyumen Region, Berdyuzhsky District, vicinity of lake Solenoe, 55°42'35.0"N 68°42'49.0"E, soil in steppe, 20 June 2020, collected by A.A. Khaustov.

Lorryia arkadiensis Panou and Emmanouel, 1995

Lorryia arkadiensis Panou and Emmanouel, 1995a, 217

Brachytydeus arkadiensis: Silva *et al.* 2016, 10

This species was described from Greece (Panou and Emmanouel 1995a). It was also recorded from Poland (Kaźmierski 1998; Laniecki *et al.* 2021).

This is the first record of *L. arkadiensis* in Russia.

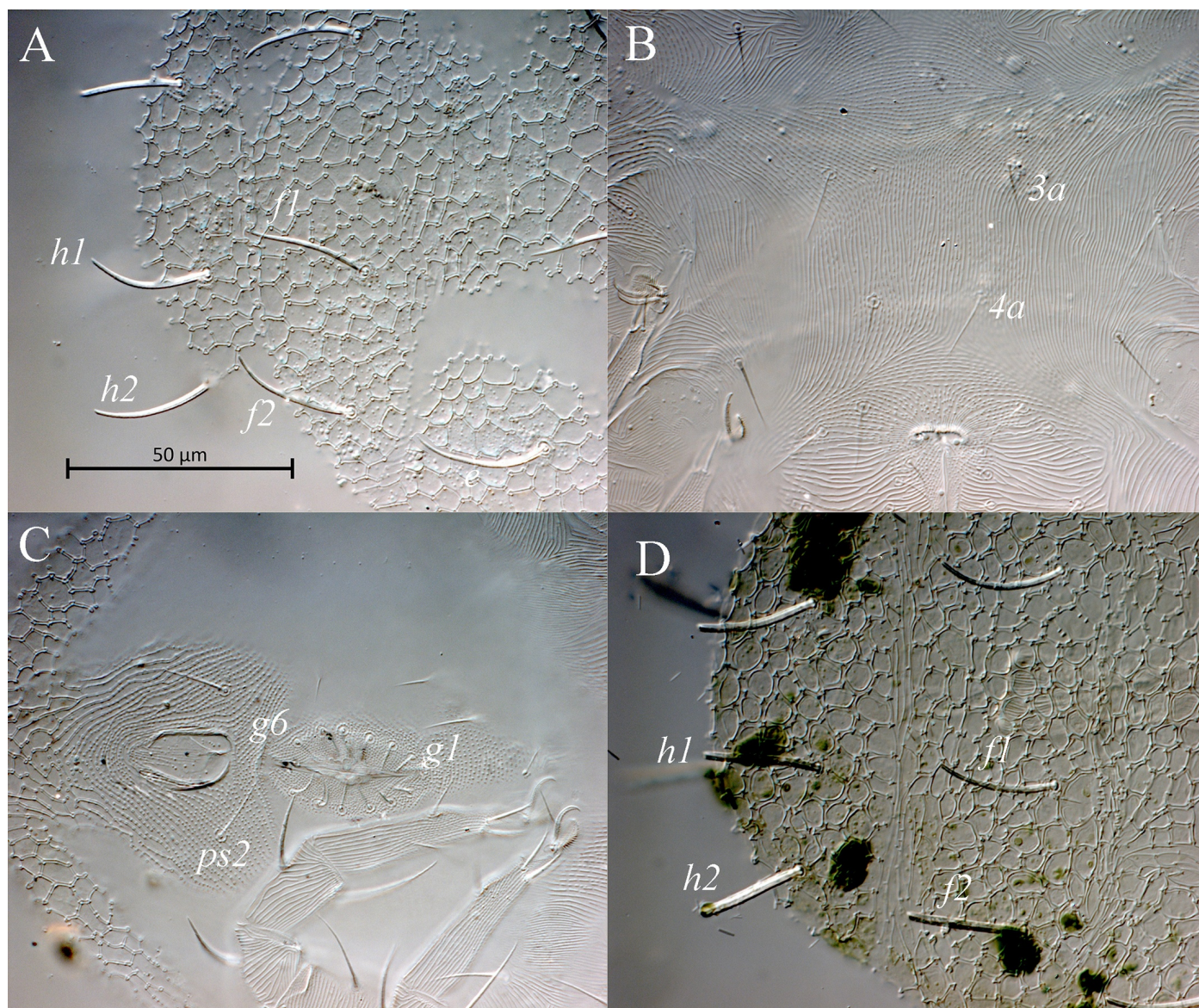


Figure 19 DIC micrographs of *Lorryia evansi* Baker, 1968, female (A–B), male (C) and *L. polygonata* Kulezycski, 1992 (D) female: A – opisthosoma in dorsal view; B – metapodosomal venter; C – ano-genital area; D – opisthosoma in dorsal view.

Material examined

Seven females, 3 males, **Russia**, Tyumen Region, vicinity of Uspenka village, 57°03'N 65°03'E, in moss on the edge of the pine forest, 6 May 2019, collected by A.A. Khaustov; 3 females, **Russia**, Tyumen Region, city of Tyumen, 57°09'N 65°27'E, in soil, 04 May 2019, collected by A.A. Khaustov.

Lorryia filiformis (Momen and Lundqvist, 1996)

Tydeus filiformis Momen and Lundqvist, 1996, 89

Lorryia fusiformis: Kaźmierski 1998, 327

Brachytydeus fusiformis: Kaźmierski 2009, 80.

This species was described from Sweden (Momen and Lundqvist 1996). It was also recorded and redescribed from Poland (Kaźmierski 2009).

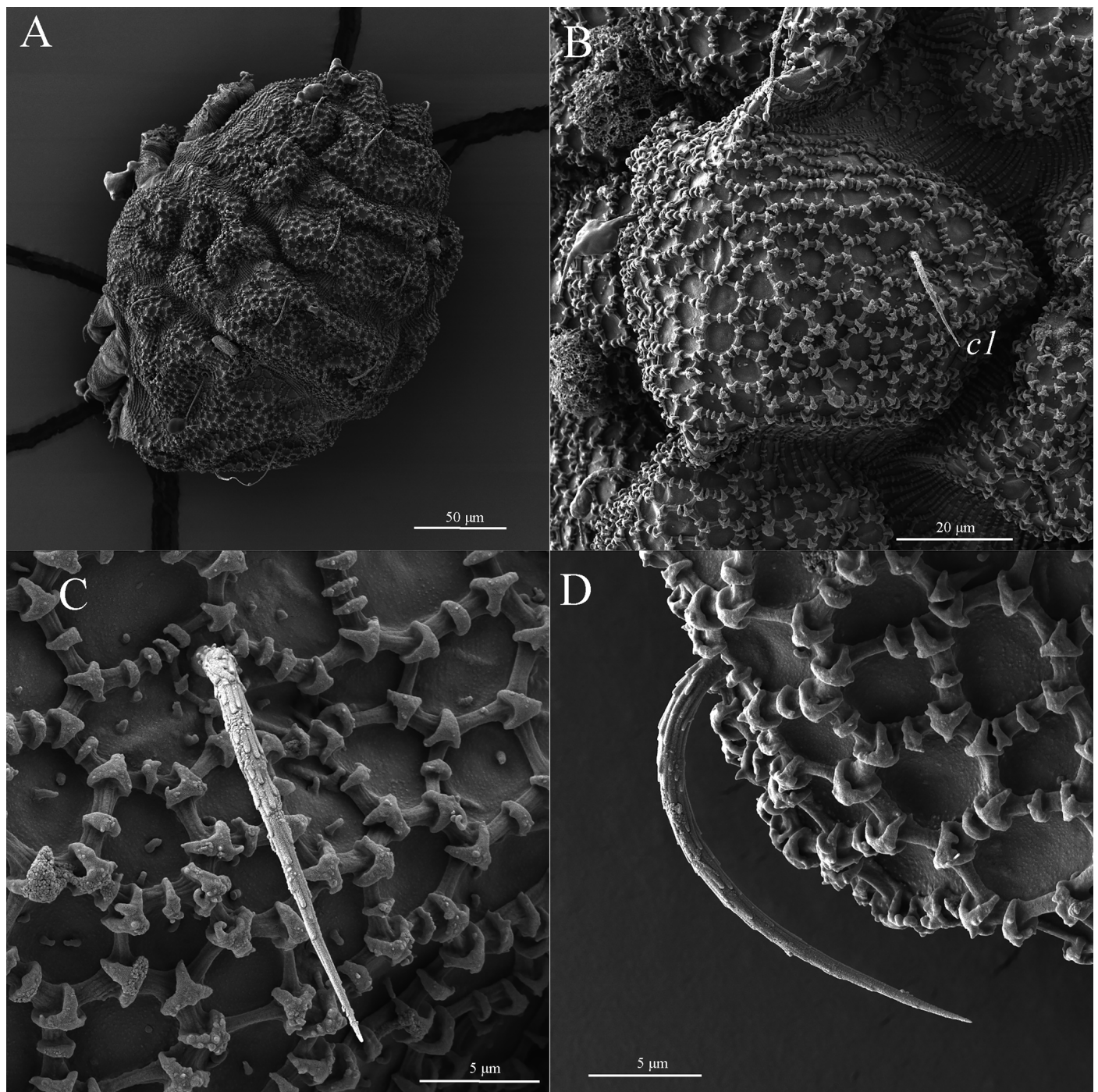


Figure 20 SEM micrographs of *Lorryia catenulata* (Thor, 1931), female: A – general view dorsally, B – reticulate area A(c1); C – seta *c1*; D – seta *f2*.

This is the first record of *L. fusiformis* in Russia.

Material examined

Three females, **Russia**, Tyumen Region, vicinity of Uspenka village, 57°03'N 65°03'E, on bark of pine, 24 June 2019, collected by A.A. Khaustov; 3 females, same locality, on bark of spruce, 2 May 2019.

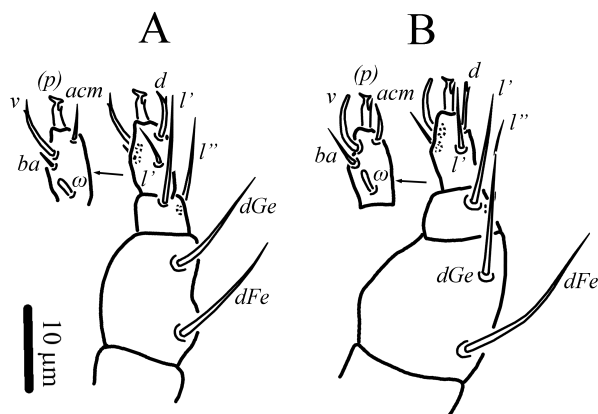


Figure 21 Right palps of females *Lorryia catenulata* (Thor, 1931) (A) and *L. polita* Kuznetsov, 1975 (B) (holotype).

***Lorryia szeptyckii* (Kaźmierski, 2009) n. comb.**

Brachytydeus szeptyckii Kaźmierski, 2009, 80

This species was described from Poland (Kaźmierski 2009).

It was originally placed in the genus *Brachytydeus*, but according to modern taxonomy of Tydeidae it should be placed in the genus *Lorryia* sensu Kaźmierski (1989).

This is the first record of *L. szeptyckii* from Russia.

Material examined

Two females, 4 males, **Russia**, Kurgan Region, Zverinogolovskiy District, vicinity of settlement Zverinogolovskoe, 54°26'28.7"N 64°51'21.9"E, in grassy soil, 20 September 2019, collected by A.A. Khaustov.

***Lorryia serpettae* (Momen and Lundqvist, 2005) n. comb.**

Tydeus serpettae Momen and Lundqvist, 2005, 233

Brachytydeus serpettae: Silva *et al.* 2016, 25

This species was described from Sweden (Momen and Lundqvist 2005). It was originally placed in the genus *Tydeus*, but according to modern taxonomy of Tydeidae it should be placed in the genus *Lorryia* sensu Kaźmierski (1989).

This is the first record of *L. serpettae* from Russia.

Material examined

Three females, 2 males, **Russia**, Tyumen Region, city of Tyumen, 57°09'N 65°27'E, on bark of apple tree, 12 May 2019, collected by A.A. Khaustov.

***Lorryia grandinsignia* Kaźmierski, 1991**

Lorryia grandinsignia Kaźmierski, 1991, 339

Brachytydeus grandinsignia: Silva *et al.* 2016, 16

Brachytydeus grandinsignius: André 2021

This species was described from Poland (Kaźmierski 1991).

This is the first record of *L. grandinsignia* from Russia.

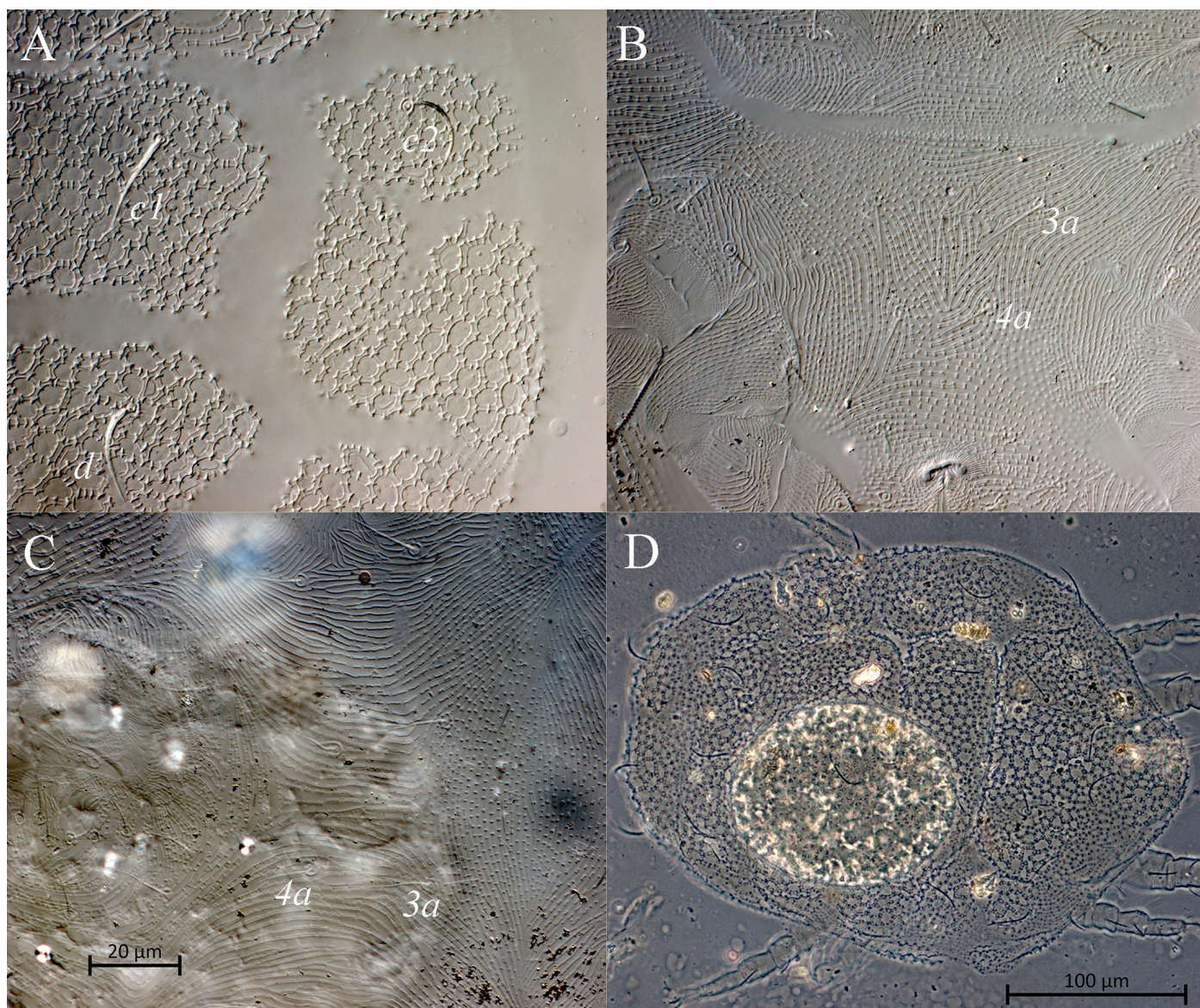


Figure 22 DIC (A–C) and phase contrast (D), micrographs of *Lorryia catenulata* (Thor, 1931) (A–B) and *L. polita* Kuznetsov, 1975 (C–D) (holotype): A – lateral part of metapodosomal dorsum; B, C – metapodosomal venter; D – general view dorsally.

Material examined

Two females, **Russia**, Kurgan Region, Zverinogolovskiy District, vicinity of settlement Zverinogolovskoe, 54°26'28.7"N 64°51'21.9"E, in grassy soil, 20 September 2019, collected by A.A. Khaustov.

Lorryia mirabilis (Kuznetsov, 1973)

Tydeus (*Eotydeus*) *mirabilis* Kuznetsov, 1973a, 1578

Eotydeus mirabilis: André 1980, 113

Lorryia mirabilis: Kaźmierski 1989, 301

Lorryia mirabila: Kaźmierski 1998, 336

Brachytydeus mirabila: Silva *et al.* 2016, 19

Eotydeus mirabilis: André 2021

Tydeus unguis Karg, 1975: synonymy by Kaźmierski 1998, 336

This species was described from Crimea (Kuznetsov 1973a). It was also recorded from Poland (Błoszyk *et al.* 1994), Germany and Sweden (as *Tydeus unguis*) (Karg 1975; Momen and Lundqvist 1996).

Material examined

Two females, **Russia**, Tyumen Region, vicinity of lake Kuchak, 57°21'N 66°02'E, in moss, 04 July 2014, collected by A.A. Khaustov.

Lorryia subularoides Kaźmierski, 1989

Lorryia subularoides Kaźmierski, 1989, 293

Brachytydeus subularoides: Silva *et al.* 2016, 26

This species was described from Poland and Czech Republic (Kaźmierski 1989). It was also recorded from Iran (Darbemamieh *et al.* 2021).

This is the first record of *L. subularoides* in Russia.

Material examined

Two females, **Russia**, Tyumen Region, vicinity of Uspenka village, 57°03'N 65°03'E, in rotting log, 02 May 2019, collected by A.A. Khaustov.

Lorryia paravarsoviensis (Momen and Lundqvist, 1996)

Tydeus paravarsoviensis Momen and Lundqvist, 1996, 86

Lorryia paravarsoviensis: Kaźmierski 1998, 326

Brachytydeus paravarsoviensis: Silva *et al.* 2016, 22

This species was described from Sweden (Momen and Lundqvist 1996).

This is the first record of *L. paravarsoviensis* in Russia.

Material examined

Two females, **Russia**, Tyumen Region, vicinity of lake Kuchak, 57°21'N 66°02'E, in rotting log, 31 May 2014, collected by A.A. Khaustov; 3 females, **Russia**, Tyumen Region, city of Tyumen, 57°09'N 65°27'E, in forest litter, 09 June 2019, collected by A.A. Khaustov.

Lorryia maga (Kuznetsov, 1973)

Paralorryia maga Kuznetsov, 1973, 604

Venilia maga: Kuznetsov 1979, 1413

Tydeus maga: Momen and Lundqvist 1995, 53

Lorryia maga: Kaźmierski 1998, 334

Kuznetsovia maga: Kammerer 2006, 269

Brachytydeus maga: Silva *et al.* 2016, 18

Brachytydeus magus: André 2021

This species was described from Crimea (Kuznetsov and Livshitz 1973b). It was also recorded in Sweden (Momen and Lundqvist 1995), Poland (Laniecki *et al.* 2021), Iran (Akbari *et al.* 2015) and Siberia (Kaźmierski 2000). Ueckermann *et al.* (2019) redescribed this species based on materials from Turkey.

Material examined

One female, **Russia**, Tyumen Region, vicinity of lake Kuchak, 57°21'N 66°02'E, moss on soil in pine forest, 31 May 2014, collected by A.A. Khaustov; 2 females, 2 males, 2 TN, **Russia**, Kurgan Region, Petuknovsky District, vicinity of lake Medvezh'ye, 55°10'N 67°55'E, soil in steppe, 14 October 2022, collected by A.A. Khaustov.

***Lorryia opifera* (Kuznetsov, 1973)**

Paralorryia opifera Kuznetsov, 1973, 16

Lorryia opifera: Kaźmierski 1998, 333

Brachytydeus opifera: Silva *et al.* 2016, 21

Brachytydeus opiferus: André 2021

This species was described from Crimea (Kuznetsov and Livshitz 1973c). It was also recorded in Poland (Kaźmierski 2000; Laniecki *et al.* 2021).

Material examined

Two males, **Russia**, Tyumen Region, vicinity of Uspenka village, 57°03'N 65°03'E, in soil, 08 May 2019, collected by A.A. Khaustov.

***Lorryia livshitzii* (Kuznetsov, 1974)**

Paralorryia livshitzii Kuznetsov, 1974, 1092

Lorryia livshitzii: Kaźmierski 1998, 333

Brachytydeus livshitzii: Silva *et al.* 2016, 17

This species was described from Lipetsk region of Russia (Kuznetsov 1974). It was also recorded from Poland (Kaźmierski 2000), Iran (Akbari *et al.* 2015) and Turkey (Ueckermann *et al.* 2019).

Material examined

Two females, **Russia**, Kurgan Region, Petuknovsky District, vicinity of lake Medvezh'ye, 55°10'N 67°55'E, soil in steppe, 14 October 2022, collected by A.A. Khaustov; 1 female, **Russia**, city of Tyumen, 57°09'N 65°33'E, moss on bark of poplar, 13 April 2020, collected by A.A. Khaustov.

***Lorryia woolleyi* (Baker, 1968b)**

Paralorryia woolleyi Baker, 1968b, 1103

Lorryia woolleyi: Kaźmierski 1998, 332

Brachytydeus woolleyi: Silva *et al.* 2016, 15

This species was described from the USA (Baker 1968b). It was also recorded in Poland, Bulgaria, Russia (including Siberia) (Kaźmierski 2000; Kaźmierski *et al.* 2018), and Iran (Akbari *et al.* 2015).

Material examined

Nineteen females, **Russia**, city of Tyumen, 57°09'N 65°33'E, moss on bark of poplar, 13 April 2020, collected by A.A. Khaustov.

Genus *Calotydeus* Oudemans, 1937

Type species: *Calotydeus croceus* (Linnaeus) sensu Oudemans, 1928, by original designation

***Calotydeus edwardbakeri* (Kaźmierski, 1989)**

Pseudolorryia edwardbakeri Kaźmierski, 1989

Calotydeus edwardbakeri: André 2005, 995

This species was described from Poland (Kaźmierski 1989).

This is the first record of *C. edwardbakeri* in Russia.

Material examined

Two females, 1 TN, **Russia**, Tyumen Region, vicinity of Uspenka village, 57°03'N 65°03'E, in soil, 02 October 2017, collected by A.A. Khaustov; 4 females, same locality, on the bark of pine, 26 May 2019.

Genus *Kuznetsovydides* André, 2021

Type species: *Tydides ulter* Kuznetsov, 1975, by original designation

Kuznetsovydides ulter (Kuznetsov, 1975b)

Tydides ulter Kuznetsov, 1975b, 1255

Kuznetsovydides ulter: André 2021, 1030

This species was described from Crimea (Kuznetsov 1975b). It was also recorded in Poland, Slovakia and Hungary (Kaźmierski 2000).

Material examined

Three male, **Russia**, Kurgan Region, Zverinogolovskiy District, vicinity of settlement Zverinogolovskoe, 54°26'N 64°51'E, in grassy soil, 20 September 2019, collected by A.A. Khaustov.

Genus *Metalorryia* André, 1980

Type species: *Lorryia armaghensis* Baker, 1968a, by original designation

Metalorryia delicata (Kuznetsov, 1971)

Lorryia delicata Kuznetsov, 1971, 1745

Metalorryia delicata: Panou and Emmanouel 1995b, 211

Lorryia cristata Karg, 1975, synonymy by Kaźmierski 1998, 346

This species was described from Georgia (Kuznetsov 1971). It was also recorded in Germany (as *Lorryia cristata*) (Karg 1975), Greece (Panou and Emmanouel 1995b), and Poland (Kaźmierski 1998).

This is the first record of *M. delicata* in Russia.

Material examined

One female, **Russia**, Tyumen Region, Berdyuzhsky District, vicinity of lake Solenoe, 55°42'35.0"N 68°42'49.0"E, soil in steppe, 20 June 2020, collected by A.A. Khaustov.

Genus *Neoapolorryia* El-Bagoury and Momen, 1990

Type species: *Neoapolorryia aegyptica* El-Bagoury and Momen, 1990, by original designation

Neoapolorryia regia (Kuznetsov, 1973b)

Lorryia regia Kuznetsov, 1973b, 773

Neoapolorryia regia: Kaźmierski 1998, 351

This species was described from Crimea (Kuznetsov 1973b). It was also recorded in Poland (Kaźmierski 1998).

Material examined

One female, 1 TN, **Russia**, Kurgan Region, Petuknovsky District, vicinity of lake Medvezh'ye, 55°10'N 67°55'E, soil in steppe, 14 October 2022, collected by A.A. Khaustov.

Genus *Nudilorryia* Kaźmierski, 1996

Type species: *Nudilorryia paraferula* Kaźmierski, 1996, by original designation

Nudilorryia obsequens Kaźmierski, 1996

Nudilorryia obsequens Kaźmierski, 1996, 207

This species was described from Germany (Kaźmierski 1996).

This is the first record of *N. obsequens* in Russia.

Material examined

Three females, **Russia**, Tyumen Region, vicinity of lake Kuchak, 57°21'N 66°02'E, in nest of *Formica rufa*, 04 July 2014, collected by A.A. Khaustov.

Genus *Paralorryia* Baker, 1965

Type species: *Lorryia cumbrensis* Baker, 1944, by original designation

Paralorryia formosa (André, 1984)

Homeotydeus formosa Andre, 1984

Paralorryia formosa: Kaźmierski 1989, 292

This species was described from Belgium (André 1984).

This is the first record of *P. formosa* in Russia.

Material examined

One female, **Russia**, city of Tyumen, 57°09'N 65°27'E, bark of dead birch, 31 May 2020, collected by A.A. Khaustov; 1 female, 1 male, Russia, Tyumen Region, Nizhnetavdinskiy District, vicinity of Tyunevo village, 57°22'N 65°41'E, on bark of linden *Tilia cordata*, 31 May 2020, collected by A.A. Khaustov.

Remarks

Paralorryia formosa (André) is very similar morphologically to *Paralorryia formosa* Livshitz, 1972. In the original description of *P. formosa* Livshitz the leg chaetotaxy is not described and its taxonomic position is not clear. I examined the holotype of *P. formosa* Livshitz and found that, besides striation type “*Paralorryia*”, it differs from *P. formosa* (André) in having two setae on femur III and according to the modern system of Tydeidae *P. formosa* Livshitz should be placed in the genus *Nudilorryia* Kaźmierski, 1996, i. e. *Nudilorryia formosa* (Livshitz, 1972) **n. comb.**

Genus *Tydeus* Koch, 1836

Type species: *Tydeus spathulatus* Oudemans, 1928, designated by ICZN (2008)

Tydeus spathulatus Oudemans, 1928

For synonymy, see André (2021)

This species was described from Italy (André 2005). It was also reported from Hungary (Tempfli *et al.* 2015).

This is the first record of *T. spathulatus* in Russia.

Material examined

One male, **Russia**, Tyumen Region, Tyumen District, vicinity of Malinovka village, 57°05'N 65°03'E, in moss on bark of aspen *Populus tremula*, collected by A.A. Khaustov.

***Tydeus nieuwkerkeni* André, 2005**

Tydeus nieuwkerkeni André, 2005, 993

This species was described from the Netherlands (André 2005).

This is the first record of *T. nieuwkerkeni* in Russia.

Material examined

Two females, **Russia**, Tyumen Region, vicinity of lake Kuchak, 57°21'N 66°02'E, on undetermined plant, 31 July 2018, collected by A.A. Khaustov.

Discussion

The present research revealed a diverse fauna of Tydeidae in Western Siberia. However, there are many still undescribed and unidentified species in my collection, which will be described and reported later. Most of these new species were collected in the Altai Mountains.

During this study, I found well-developed genital papillae in adults of several species of Tydeidae, including *Lorryia sibiriensis* n. sp., *L. speciosa* n. sp., *L. polita* and *L. catenulata*. According to André (1981a) genital papillae (acetabula) in adults of Tydeidae are present, but hardly discernible. Moreover, I have never seen illustrations of the genital papillae in adults of Tydeidae in any publication. The presence of well-developed genital papillae potentially could be used in taxonomy of Tydeidae, probably in separation of species groups, etc. However, more detailed research of previously described species is necessary.

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