

A NEW RECORD AND A REDESCRIPTION OF *TYPHLODROMIPS MONTANUS* (WAINSTEIN, 1962) COMB.N. (ACARI: PHYTOSEIIDAE) FROM THE ALTAI REPUBLIC, RUSSIA

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ABSTRACT: *Typhlodromips montanus* (Wainstein) comb.n. (Acari: Phytoseiidae) is reported for the first time from Russia. It is redescribed and illustrated based on female and male specimens collected from the Altai Republic, Russia. This species was previously placed in the genus *Neoseiulus* Hughes. However, it fits well with the current concept of the genus *Typhlodromips* De Leon, due to the combination of: the presence of macrosetae on Gell, Gelll and Tilll, and fixed digit of chelicera with more than six teeth.

KEY WORDS: Predatory mite, Amblyseiinae, taxonomy, first report, fauna.

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INTRODUCTION

Predatory mites of the family Phytoseiidae (Acari: Mesostigmata) are of great importance due to their potential as biological control agents of other mites that feed on plants, as well as of small soft-bodied insects such as thrips and whiteflies (McMurtry *et al.* 2013). Proper identification of phytoseiid mites is crucial in the implementation of biological control programs because morphologically close phytoseiid species may vary significantly in terms of their feeding habits (Gerson 2014). Systematic studies of this mite family date back to the early 1960s in Russia (Wainstein 1962a; Kolodochka 1978, 2006; Beglyarov 1981). Although many species from Russia have been described, most of the descriptions are poor and lack many morphological details necessary to distinguish different phytoseiid species. In this regard, redescrptions are important since they help avoid taxonomic confusion.

Typhlodromips montanus (Wainstein, 1962b) comb.n. was described from Kazakhstan. The original description is brief: it includes simple illustrations of dorsal and ventral idisoma, chelicera and leg IV, as well as a few setae measurements. In addition, Wainstein (1977) illustrated this species' spermatheca. The description of this species is incomplete: it lacks most of the important morphological details, including the dorsal setae lengths and leg chaetotaxy (Chant and McMurtry 2007; Papadoulis *et al.* 2009). Chant and McMurtry (2007) included this species in the genus *Neoseiulus* Hughes, probably due to the inadequacies mentioned above. However, our examination of the current specimens shows that this species does not fit the definition of *Neoseiulus*. On the contrary, it

is identical to the genus *Typhlodromips* De Leon, as described by Chant and McMurtry (2005).

MATERIALS AND METHODS

Leaves of various plants were collected during our expedition to the Altai Republic, Russia, in July–August 2020. The mites were collected directly from plant leaves using the Discovery V8 stereomicroscope and placed in vials filled with 96% ethanol. Specimens were cleared in lactic acid solution and mounted in Hoyer's medium as suggested by Walter and Krantz (2009). The taxonomic system follows that of Chant and McMurtry (2007). Setal nomenclature for the dorsal idiosoma follows that of Lindquist and Evans (1965), as adapted by Rowell *et al.* (1978). Setal nomenclature for the ventral idiosoma follows that of Chant and Yoshida-Shaul (1991). The chaetotaxy of the palp tibia and tarsus, as well as of the distal part of tarsus I follows that of Jackson (1974), with minor modification by Khaustov (2020). Chaetotaxy of other parts of legs and palps follows that of Evans (1963a, 1963b, 1969). The nomenclature for the dorsal solenostomes and poroids follows that of Athias-Henriot (1975). The nomenclature for the ventral surface of idiosoma follows that of Johnston and Moraza (1991). The terminology of the morphological structures of spermatodactyl follows that of Beard (2001). Measurements are given in micrometers (µm) and presented as a mean, followed by a range in parentheses. Morphological observations, illustrations and measurements were prepared using the Axio Imager A2 compound microscope (Carl Zeiss, Germany), equipped with

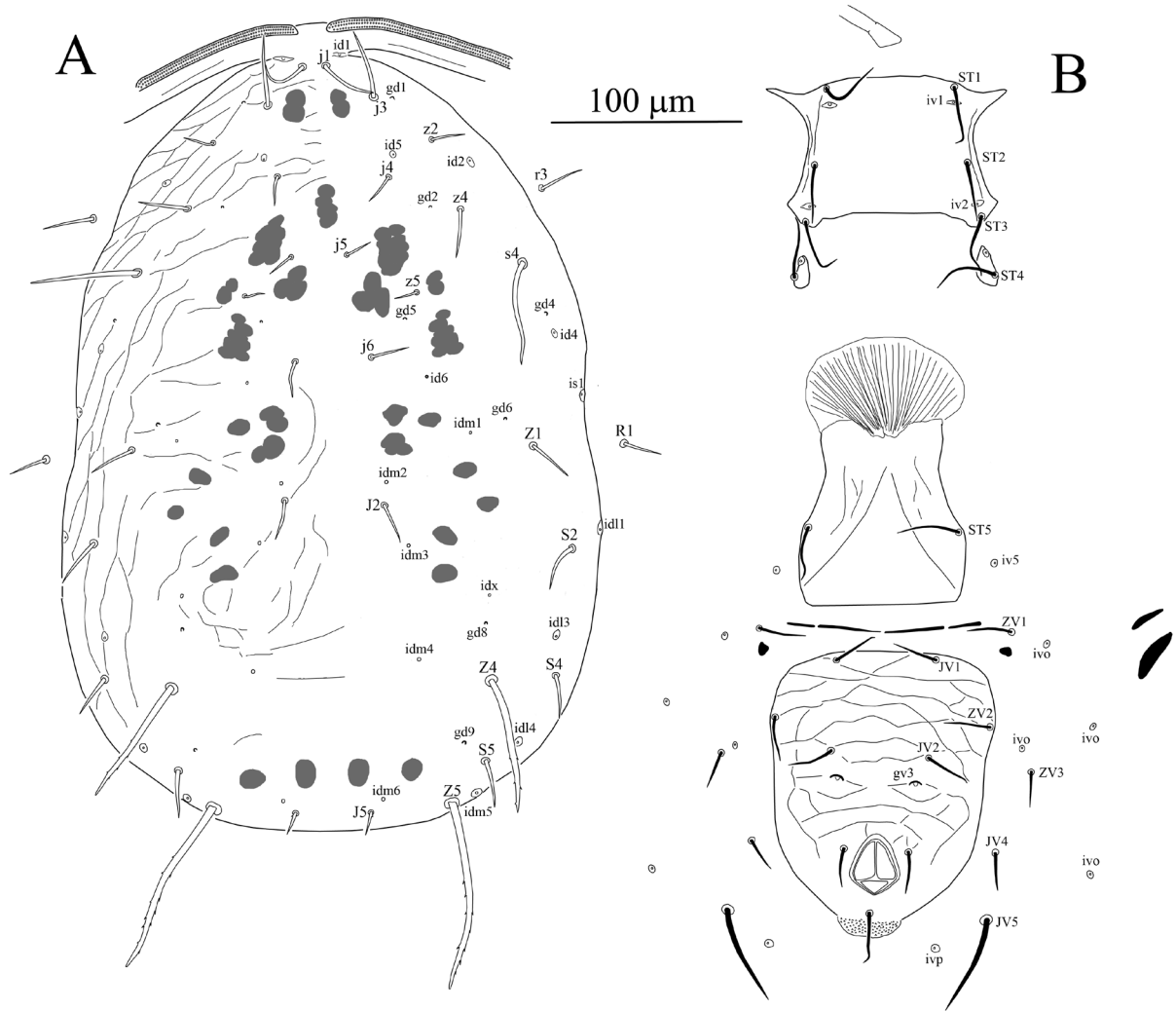


Fig. 1. *Typhlodromips montanus* (Wainstein, 1962) comb.n., female. A—dorsal idiosoma; B—ventral idiosoma.

the differential interference contrast (DIC) and the phase contrast optical systems. Micrographs were taken with the Olympus OM-D Em-10 digital camera. The dorsal shield length was measured along the midline, at level of *j1* setae and *J5* setae. All examined materials have been deposited in the mite collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

SYSTEMATICS

Family **Phytoseiidae** Berlese, 1916
 Subfamily **Amblyseiinae** Muma, 1961
 Tribe **Typhlodromipsini** Chant and McMurtry, 2005
 Genus ***Typhlodromips*** De Leon, 1965

Typhlodromips montanus
(Wainstein) new combination

(Figs. 1–6)

Amblyseius montanus Wainstein, 1962b: 234; Wainstein 1977: 239.

Amblyseius (Amblyseius) montanus Wainstein, in Ehara 1966: 22.

Neoseiulus montanus (Wainstein), in Kolodochka 2006: 233; Chant and McMurtry 2007: 29.

Female (n=5) (Figs. 1–6). **Dorsum** (Fig. 1A). Dorsal setal pattern 10A:9B (*r3* and *R1* off shield). Dorsal shield, sclerotized, with some patches of reticulations with anterolateral and posterolateral scales, with waist at level of seta *R1*. Bearing seven pairs of solenostomes (*gd1*, *gd2*, *gd4*, *gd5*, *gd6*, *gd8* and *gd9*). Sixteen pairs of poroids (sensilla) visible on the shield. Muscle-marks (sigilla) visible mostly on podosoma, length of dorsal shield 385 (380–390), width (distance at level of *s4*) 233 (230–237), width (distance at level of *S4*) 257 (251–273). Dorsal setae smooth, except *J5* (with one small barb), *Z4* and *Z5*, which are serrated and

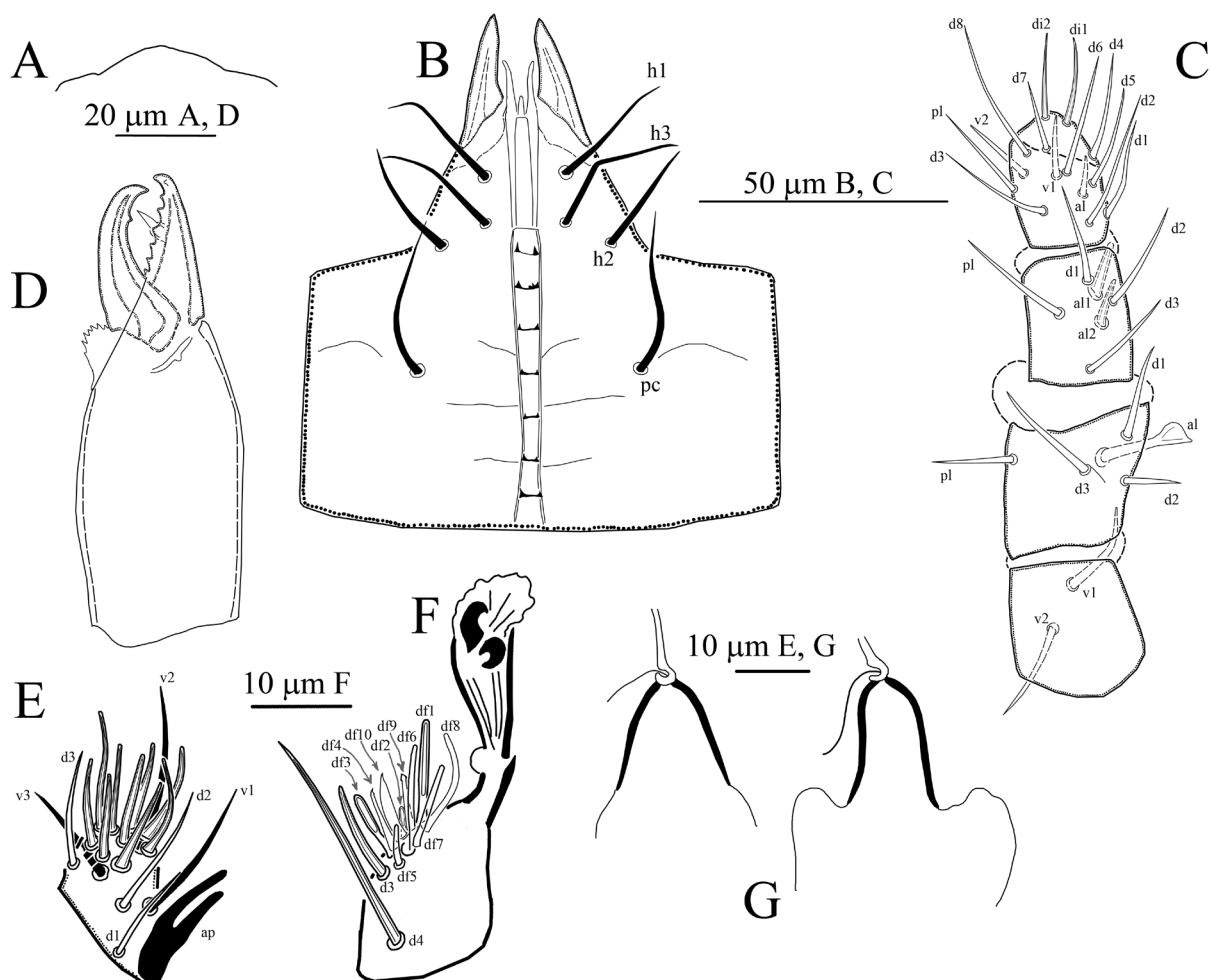


Fig. 2. *Typhlodromips montanus* (Wainstein, 1962) comb. n., female. A—anterior margin of epistom; B—subcapitulum; C—dorsal view of left palp excepting tarsus; D—chelicera; E—dorsal view of left palp tarsus; F—apical sensorial setal cluster area and setae *d3*, *d4* of tarsus I, left leg, dorso-lateral view; G—spermatheca.

somewhat stout. Measurements of dorsal setae as follows: *j1* 27 (25–28), *j3* 37 (35–39), *j4* 15 (13–17), *j5* 13 (11–15), *j6* 19 (16–23), *J2* 20 (18–22), *J5* 11 (10–12), *z2* 19 (17–21), *z4* 23 (22–24), *z5* 11 (10–12), *Z1* 22 (19–24), *Z4* 72 (67–77), *Z5* 99 (92–105), *s4* 55 (52–56), *S2* 24 (21–29), *S4* 22 (21–24), *S5* 23 (20–25), *r3* 21 (18–23) and *R1* 20 (18–21).

Peritreme. Long, and extending to level of setae *j1*.

Venter (Fig. 1B). Ventral setal pattern 14: JV-3:ZV. Sternal shield smooth, lightly sclerotized; with three pairs of setae (*ST1*, *ST2* and *ST3*) and two pairs of pores (*iv1* and *iv2*); length (*ST1–ST3*) 69 (67–71), width (distance between setae *ST2*) 77 (74–80); metasternal setae *ST4* and pair of pores (*iv3*) situated on metasternal shields. Genital shield striated; narrower than ventrianal shield, width at level of genital setae (*ST5*) 79 (74–81), para-genital poroids *iv5* on integument. Ventrianal shield pentagonal, reticulated. Three pairs of pre-anal setae

(*JV1*, *JV2* and *ZV2*); and pair of crescentic solenostomes (*gv3*) posteromesad setae *JV2*, distance between pre-anal pores 36 (31–45). Pair of para-anal (*Pa*) and post-anal setae (*Pst*). Length of ventrianal shield 137 (136–140), width at level of setae *ZV2* 113 (108–126). Setae *ZV1*, *ZV3*, *JV4*, *JV5* and five pairs of poroids on integument surrounding ventrianal shield. Setae *JV5* smooth, much longer than other ventral setae, 55 (52–57) in length.

Gnathosoma (Figs 2A, 2B, 2C, 2E). Anterior margin of epistome rounded and smooth. Hypostomal groove with seven transverse rows of denticles, each row with two or three teeth; subcapitular setae *h1* 25 (24–25), *h2* 24 (23–24) *h3* 26 (25–26), slightly shorter than palp coxal setae (*pc*) 29 (28–29). Chaetotaxy of palps: trochanter with two setae; femur with five setae; genu with six setae; tibia with 14 setae; tarsus with 15 setae.

Chelicera (Fig. 2D). Fixed digit 31 (30–32) long, with seven teeth, six of them prominent and

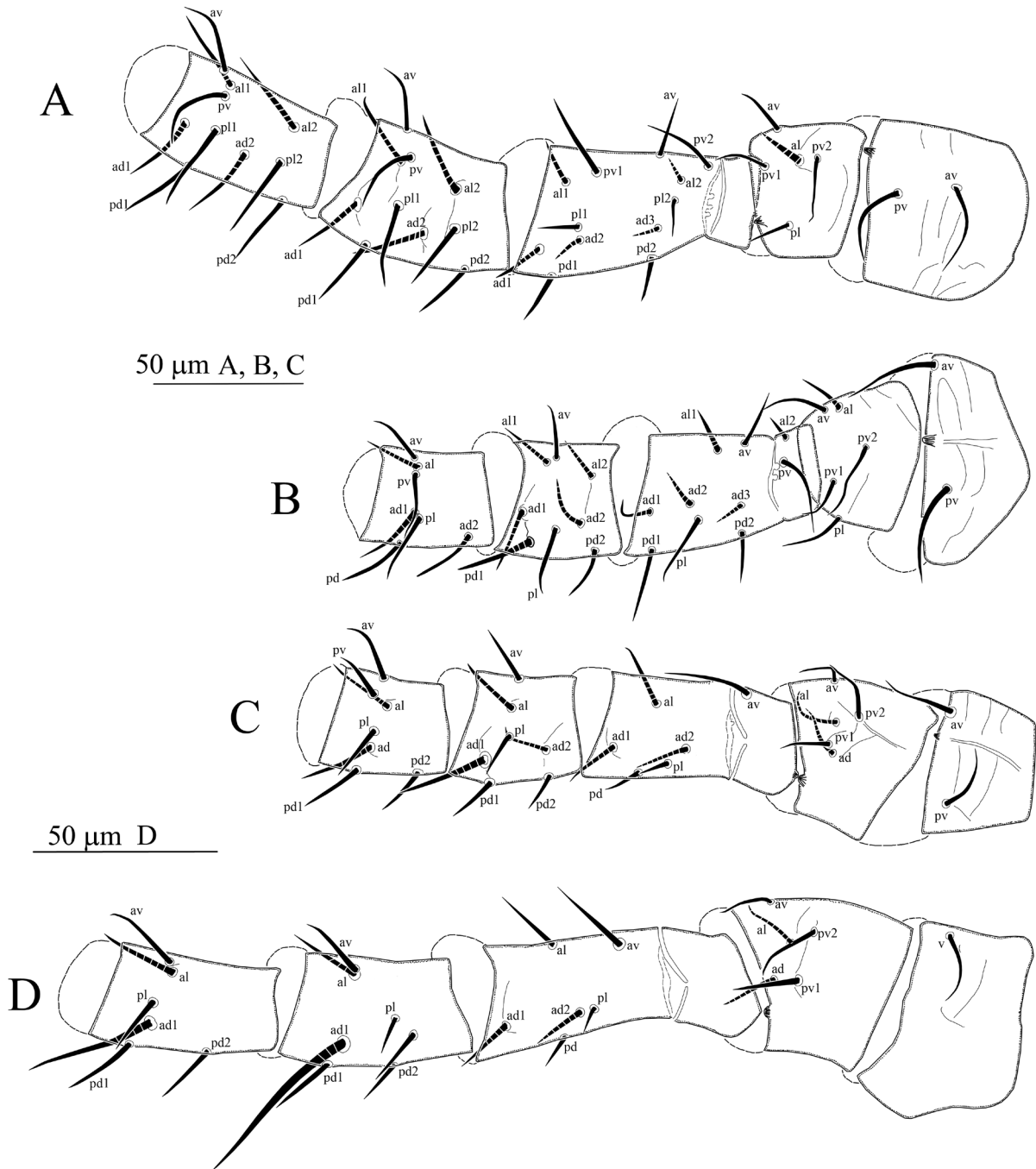


Fig. 3. *Typhlodromips montanus* (Wainstein, 1962) comb.n., female. A—D—left legs I—IV, respectively, except tarsi, ventral aspect.

one off-set tooth (*gabelzhan*), and *pilus dentilis*; movable digit 32 (31–33) long with one tooth.

Spermatheca (Fig. 2G). Atrium c-shaped, attached to calyx without neck. Calyx bell-shaped in most of examined specimens and slightly different (v-shaped) in some specimens, 16 (14–18) in length; major duct long; minor duct visible.

Legs (Figs 2F, 3, 4). Length of legs (base of coxae to base of claws): leg I 399 (396–404); leg II 319 (310–327); leg III 325 (318–331); leg IV

435 (428–442). Chaetotaxy as follows: Leg I: coxa 0 0/1 0/1 0, trochanter 1 0/1 0/2 1, femur 2 3/1 2/2 2, genu 2 2/1 2/1 2, tibia 2 2/1 2/1 2. Leg II: coxa 0 0/1 0/1 0, trochanter 1 0/1 0/2 1, femur 2 3/1 2/1 1, genu 2 2/1 2/0 1, tibia 1 2/1 1/1 1. Leg III: coxa 0 0/1 0/1 0, trochanter 1 1/1 0/2 0, femur 1 2/1 1/0 1, genu 1 2/1 2/0 1, tibia 1 1/1 2/1 1. Leg IV: coxa 0 0/1 0/0 0, trochanter 1 1/1 0/2 0, femur 1 2/1 1/0 1, genu 1 2/0 2/1 1, tibia 1 1/0 2/1 1. Chaetotaxy of tarsi II–IV typical for Phytoseiidae and bears 18

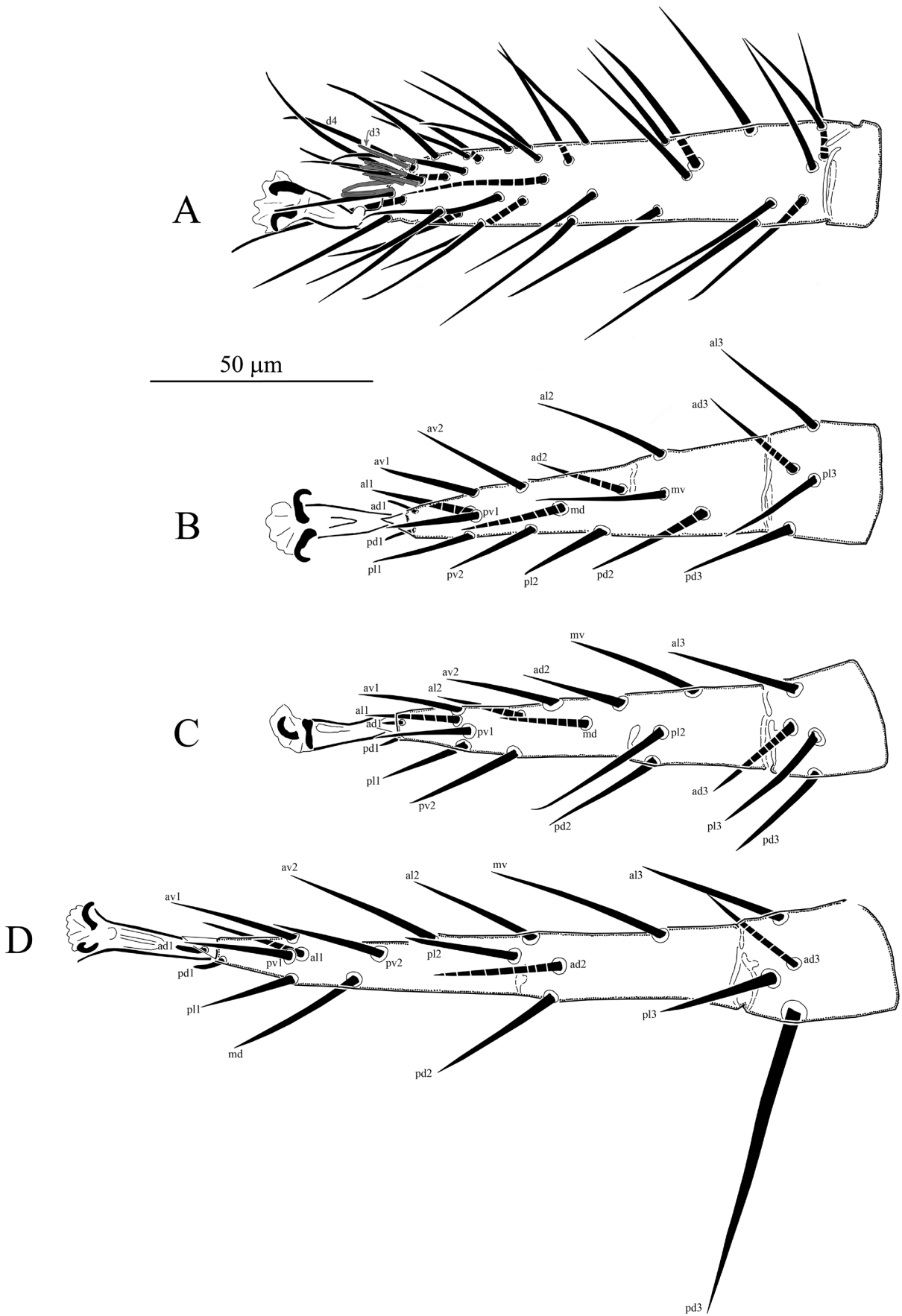


Fig. 4. *Typhlodromips montanus* (Wainstein, 1962) comb.n., female. Left tarsi I-IV respectively: A—dorsal aspect, B—D—ventral aspect.

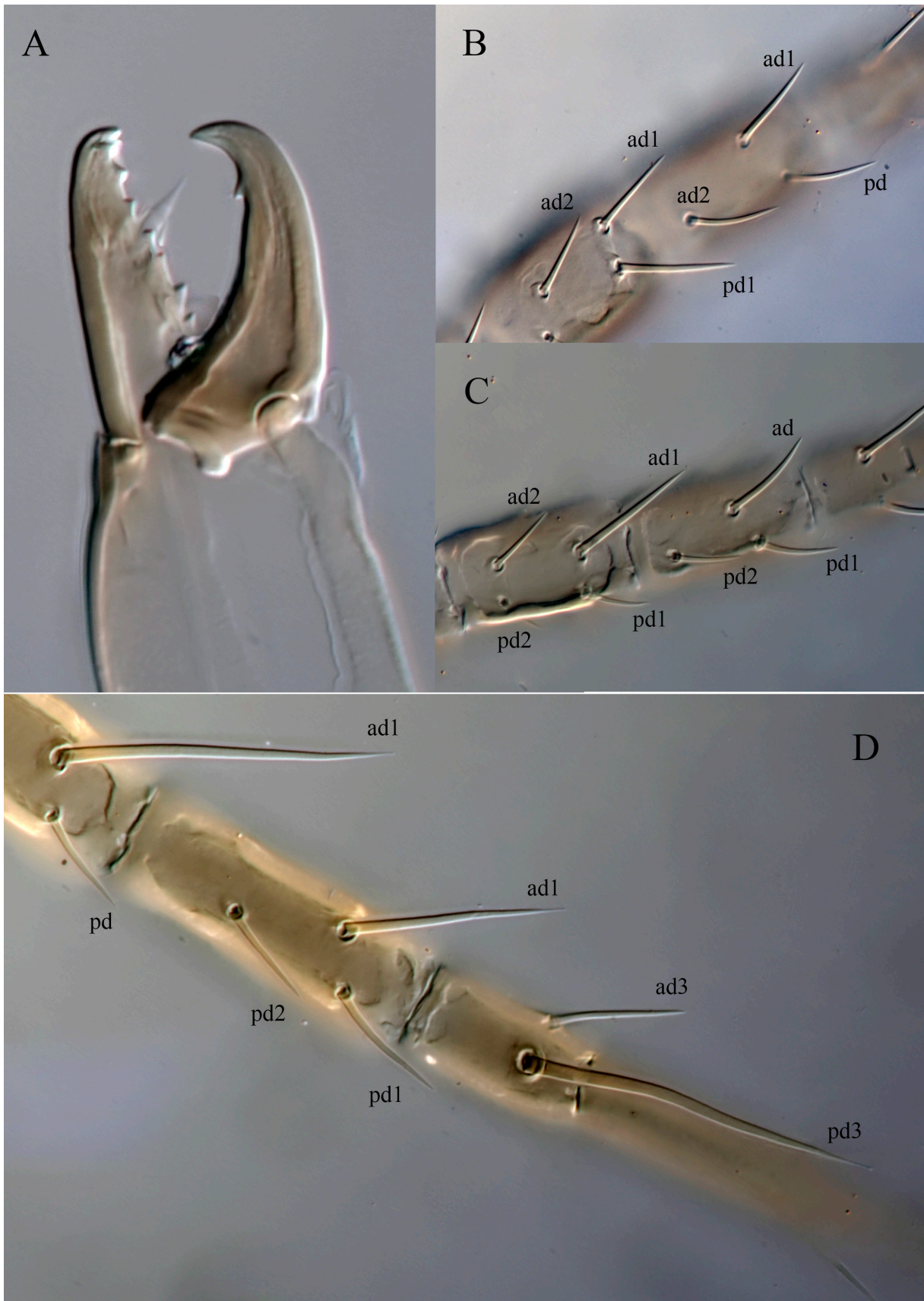


Fig. 6. DIC micrographs of *Typhlodromips montanus* (Wainstein, 1962) comb.n., female. A—chelicera, B—dorsal view of genu and tibia of right leg II, C—dorsal view of genu and tibia of right leg III, D—dorsal view of genu, tibia and basitarsus of right leg IV.

World distribution. Georgia, Kazakhstan, Ukraine (Demite *et al.* 2020, Kolodochka 2006), Russia (this study).

Material examined. 23 females and six males, Ulagan District, Altai Republic, Russia (50°19'N, 87°44'E, 2,321 m a.s.l.), 31 July 2020, V.A. Khaustov coll., from various herbaceous plants.

Remarks. This is the first report of *Typhlodromips montanus* comb.n. from Russia. Morphological characters and measurements of the Russian specimens are very close to those in the original description. It was described based on 120 females collected from the grass and herbaceous plants from the mountains near the town of Alatau, Kazakhstan. However, the original description was poor: it featured only some basic illustrations and a few setae measurements (Wainstein, 1962b). This species was not included in any of the species groups in the most recent revision of the genus *Neoseiulus* Hughes by Chant and McMurtry (2003). Afterwards, Chant and McMurtry (2007) included this species in *Neoseiulus*, despite the fact that it has macrosetae on GeII, GeIII and TiIII, and seven teeth on the fixed digit of chelicera. In our opinion, this species fits well in the *ariri* species group of the genus *Typhlodromips*, due to the characters mentioned above and having a bell-shaped calyx of spermatheca (Chant and McMurtry 2005). In addition, its dorsal shield has some patches of reticulation with anterolateral and posterolateral scales, with a waist at the level of seta *R1*. Most dorsal setae setiform, but setae *Z4* and *Z5* somewhat stout. Setae *z2* and *z4* are shorter than the distances between their bases; seta *z4* is shorter than the distance between its base and that of seta *s4*; and the ratio seta *s4*:*Z1* is about 2.5:1.0. In addition to leg IV, macrosetae are present on leg II and leg III. However, similar to some other species of the *ariri* species group, such as *T. alpicola* (Ehara, 1982) and *T. septentrionalis* (Karg, 1977), seta *s4* is also prominent and somewhat longer than the other anterolateral setae in *T. montanus*.

Furthermore, the geographic distribution of *T. montanus* is far outside of the most other species in the genus *Typhlodromips* and it has been collected only from Georgia, Kazakhstan, Ukraine (Kolodochka 2006) and Russia (this study). Interestingly, if we ignore the ratio setae *s4*:*Z1*, *T. montanus* fits well the definition of the genus *Transeius* by Chant and McMurtry (2004). In particular, it shows a close affinity to several species of *Transeius*: *T. malovi* (Beglyarov, 1981), *T. tuviniensis* (Beglyarov and Meshkov, 1988) and *T. volgini* (Wainstein and Beglyarov, 1971) based on the

shape of the calyx of spermatheca and the shape of the ventrianal shield. It is interesting to note that all of the aforementioned species have the same geographic origin, and they all belong to the *bel-lottii* species subgroup. It seems that molecular analysis is necessary to draw a final conclusion about the generic placement of these species. Molecular analysis would also help clarify the importance of setae *s4*:*Z1* ratio for tribe level systematics.

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