

## A new species of the genus *Rhinoppia* (Acari, Oribatida, Oppiidae) from Turkey

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(Received 28 October 2015; accepted 13 November 2015; published online 04 March 2016)

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**ABSTRACT** — A new species of oribatid mite of the family Oppiidae, *Rhinoppia (Rhinoppia) alidagiensis n. sp.* is described from soil and litter in Kayseri Province, Turkey. The new species differs from the other species of *Rhinoppia (Rhinoppia)* by the shape of rostrum, sensillus, body dimensions and number of genital setae.

**KEYWORDS** — Acari; Oribatida; *Rhinoppia*; taxonomy; new species; Turkey

### INTRODUCTION

The number of species and subspecies of oribatid mites in the world is 9910 (Subías, 2004, updated 2015). In Turkey, however, the number of the identified species of oribatid mites is 143 (Özkan *et al.*, 1994; Erman *et al.*, 2007). The number of these taxa can be at least 4-5 times through further studies to be undertaken in Turkey, due to habitat heterogeneity, based on comparison with the fauna of the other countries in the Palaearctic region.

The genus *Rhinoppia* was erected by Balogh (1983), with the type species, *Oppia nasuta* Moritz, 1965. So far, 39 species and 4 subspecies of *Rhinoppia* are known (Subías, 2004, updated 2015). Of these, nine species namely: *R. (R.) artvinensis* Toluk and Ayyıldız, 2008, *R. (R.) tasdemiri* Toluk and Ayyıldız, 2008, *R. (R.) elifae* Toluk, Ayyıldız and Subías, 2009, *R. (R.) emarginata* Toluk and Ayyıldız, 2009, *R. (R.) exobothridialis* Toluk and Ayyıldız, 2009, *R. (R.) obsoleta* (Paoli, 1908), *R. (R.) mahunkai* Toluk, Ayyıldız and Subías, 2009, *R. (R.) trilobata* (Khanbekjan and

Gordeeva, 1991) and *R. (R.) subpectinata* (Oudemans, 1900) have been found in Turkey prior to this study (Ayyıldız, 1988 ; Erman *et al.*, 2007; Toluk and Ayyıldız, 2008, 2009; Toluk *et al.*, 2009).

The genus *Rhinoppia* can be characterized by the following features: Rostrum smooth or incised; costulae absent or reduced to the bothridial costulae that exist between the bothridia and the interlamellar setae; interbothridial tubercles present; sensilli fusiform or pectinate; notogastral cristae absent; anterior edge of notogaster without humeral process; ten pairs of notogastral setae; setae *c2* present; genital plates with six pairs of setae, exceptionally with five pairs; lyrifissures *iad* paraanal in position (Toluk and Ayyıldız, 2009). As a result of the present study, one species, *Rhinoppia (Rhinoppia) alidagiensis n. sp.* proved to be new to science.

## MATERIALS AND METHODS

All specimens were collected from soil and litter using a standard Berlese-Tullgren funnel extractor. For microscopic study, mite specimens were cleared in 80 % lactic acid and mounted on microscopic slides in modified Hoyer's medium. Drawings were made with the aid of a camera lucida attached to the compound microscope. Examined materials were transferred into 70 % ethanol with glycerol (up to 5 %) for the preservation.

The specimens to be studied using the SEM were cleaned by soaking in Terg-a-zyme solution for 6–12 h, followed by brief (1–2 s) submersion in an ultrasonic bath. They were dried using critical point method, mounted on Al-stubs, and gold-coated in a Polaron sputter coater apparatus.

Measurements and description are based on specimens mounted in temporary cavity slides and on permanent slides. The terminology used in this paper follows Grandjean (see Travé and Vachon, 1975), Balogh (1983), and Subías and Balogh (1989) as well as those by Norton and Behan-Pelletier (2009).

### *Rhinoppia (Rhinoppia) alidagiensis n. sp. (Figures 1-4)*

**Diagnosis** — Rostrum tridentate. Lamellar and interlamellar setae smooth. Bothridial setae fusiform, distal half being distinctly expanded, with short setae unilaterally. Notogaster elongate oval. Six pairs of genital setae fine and short.

**Measurements** — Body length: 308 – 336 (holotype: 332)  $\mu\text{m}$ , body width: 118 – 140 (holotype: 134)  $\mu\text{m}$  ( $n=13$ ).

**Prodorsum** (Figures 1A, 2A-D) — Rostrum tridentate; separated by 2 deep incisions; dents rounded. Rostral setae (*ro*) smooth, 20  $\mu\text{m}$  in length. Lamellar setae (*le*) thin, smooth, 10  $\mu\text{m}$  in length. Interlamellar setae (*in*) thick, 12  $\mu\text{m}$  in length. Lamellar setae nearer to interlamellar than to rostral setae. Distance between *le-le* shorter than that of *in-in*. Bothridia cup shaped, with laterally-oriented opening. Sensilli fusiform, distal half distinctly expanded, pectinate unilaterally.

**Notogaster** (Figures 1A, 2A) — Elongate oval, longer than wide, ratio 2:1. Ten pairs of smooth notogastral setae present. Setae *c2* 20  $\mu\text{m}$  long. Setae *la*, *lm*, and *lp* about 20, 12, and 4  $\mu\text{m}$  long, respectively. Setae of *p* series 12  $\mu\text{m}$  long.

**Ventral side** (Figure 1B) — Length of subcapitulum 72  $\mu\text{m}$ , width 48  $\mu\text{m}$ . Setae *h* 2  $\mu\text{m}$  in length. Distance between *h-h* 16  $\mu\text{m}$ . Prodorsum widest at level of pedotectum I. Epimeral borders easily visible and strongly chitinized. Polygonal network ornamented at epimeres 1, 2 and 3+4. Epimeral setal formula 3-1-3-3. Genital plates 36  $\mu\text{m}$  in length, 40  $\mu\text{m}$  in width, with six pairs of setae. Anal plates 52  $\mu\text{m}$  in length, 48  $\mu\text{m}$  in width, with two pairs of setae. Distance between genital and anal plates 66  $\mu\text{m}$ . One pair of aggenital, three pairs of adanal setae. Lyrifissures *iad* paraanally, adanal setae *ad1* postanally, *ad2* paraanally, *ad3* preanally situated.

**Legs** (Figures 3-4) — Formula of leg setation (trochanter to tarsus): I (1-5-2+1-4+2-20+2); II (1-4-1+1-4+1-15+2); III (1-3-1+1-3+1-12); IV (1-2-1+1-3+1-10). Structure and setation of legs as shown in Figs. 3 and 4.

**Etymology** — The specific name *alidagiensis* is named after the locality, Ali Mountain (Ali Dağı), Kayseri, Turkey where the new species was found.

**Type material** — Holotype (female ZMEU: 266) and six paratypes (all females, ZMEU: 267-272), soil, 38°40.1'N, 35°32.46'E, 1450 m. a.s.l., five paratypes (all females, ZMEU: 273-277), 38°40.1'N, 35°32.46'E, 1740 m. a.s.l., two of them were mounted on aluminum stubs and gold-coated for scanning electron microscopy, 5 Apr. 2010, Ali Mountain, Kayseri, Turkey. Holotype and eleven paratypes are deposited in the Acarological Collection of the Zoological Museum, Erciyes University, Kayseri, Turkey (ZMEU); all specimens are preserved in 70 % ethanol.

**Remarks** — Among the known species of the subgenus *Rhinoppia* (*Rhinoppia*), the new species with tridentate rostrum resembles *R. (R.) vera* (Michelčíč, 1956), *R. (R.) nasuta* (Moritz, 1965), *R. (R.) tridentata* Subías and Minguez, 1985, *R. (R.) ordunensis* (Iturroundobeitia and Saloña, 1988), *R. (R.) centrotentata* Gordeeva and Niemi, 1990, *R. (R.) pinsapi* (Arillo and Subías, 1996), *R. (R.) samaina* Mahunka,

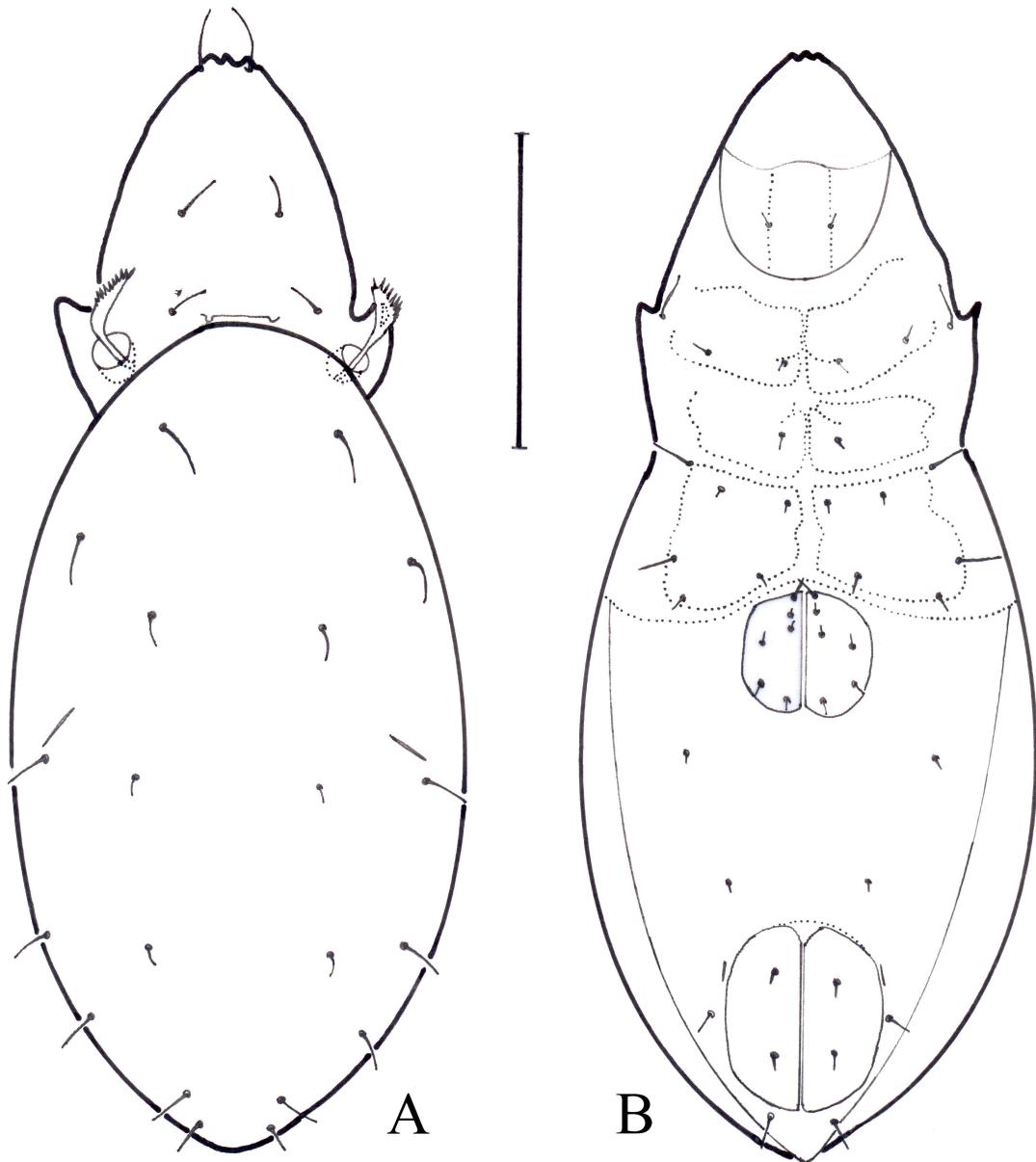


FIGURE 1: *Rhinoppia (Rhinoppia) alidagiensis* n. sp.: A – Dorsal view; B – Ventral view (scale bar for all figures = 100 µm).

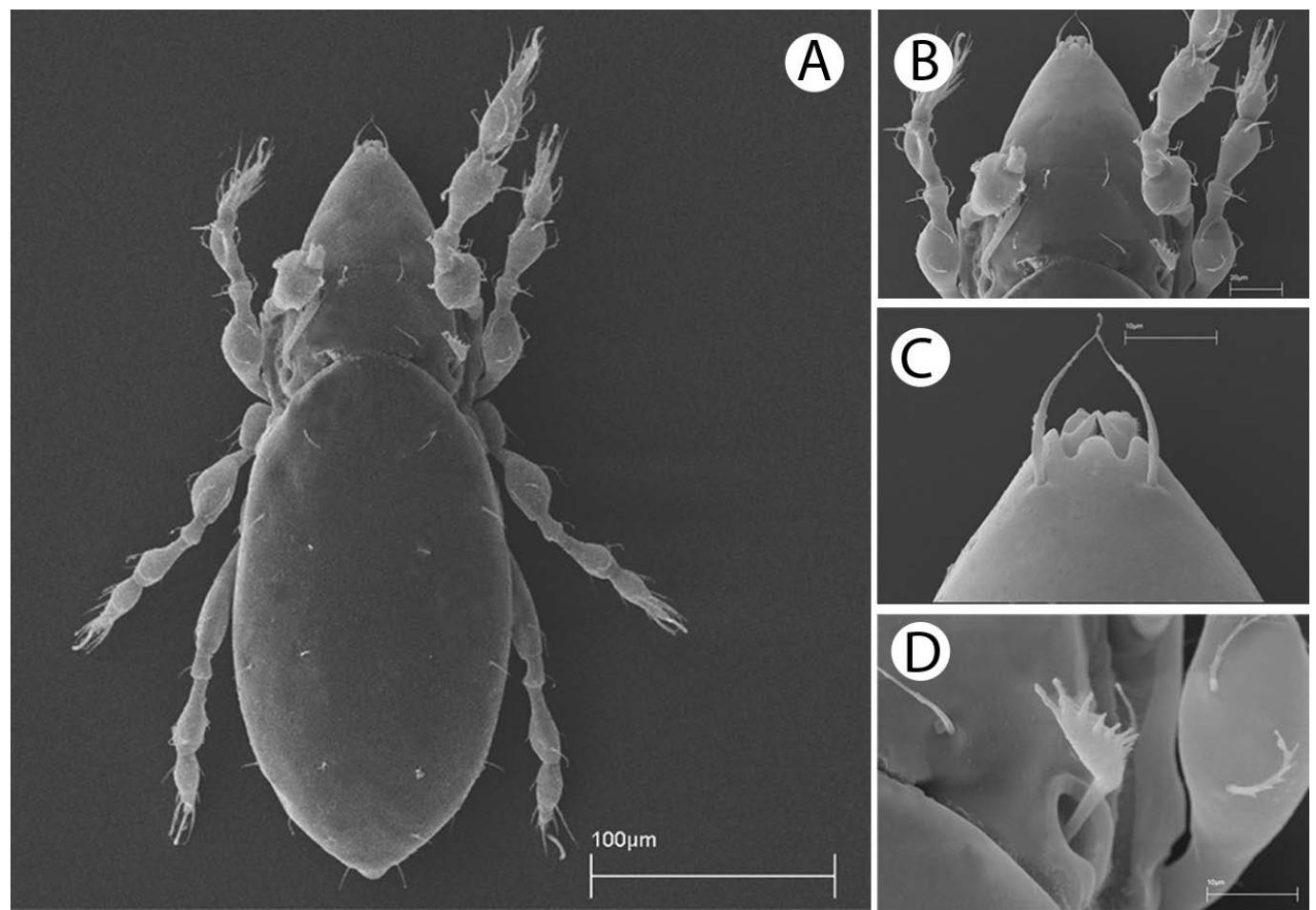


FIGURE 2: *Rhinoppia (Rhinoppia) alidagiensis* n. sp.: A – Dorsal view; B – Prodorsum; C – Rostrum; D – Sensillus.

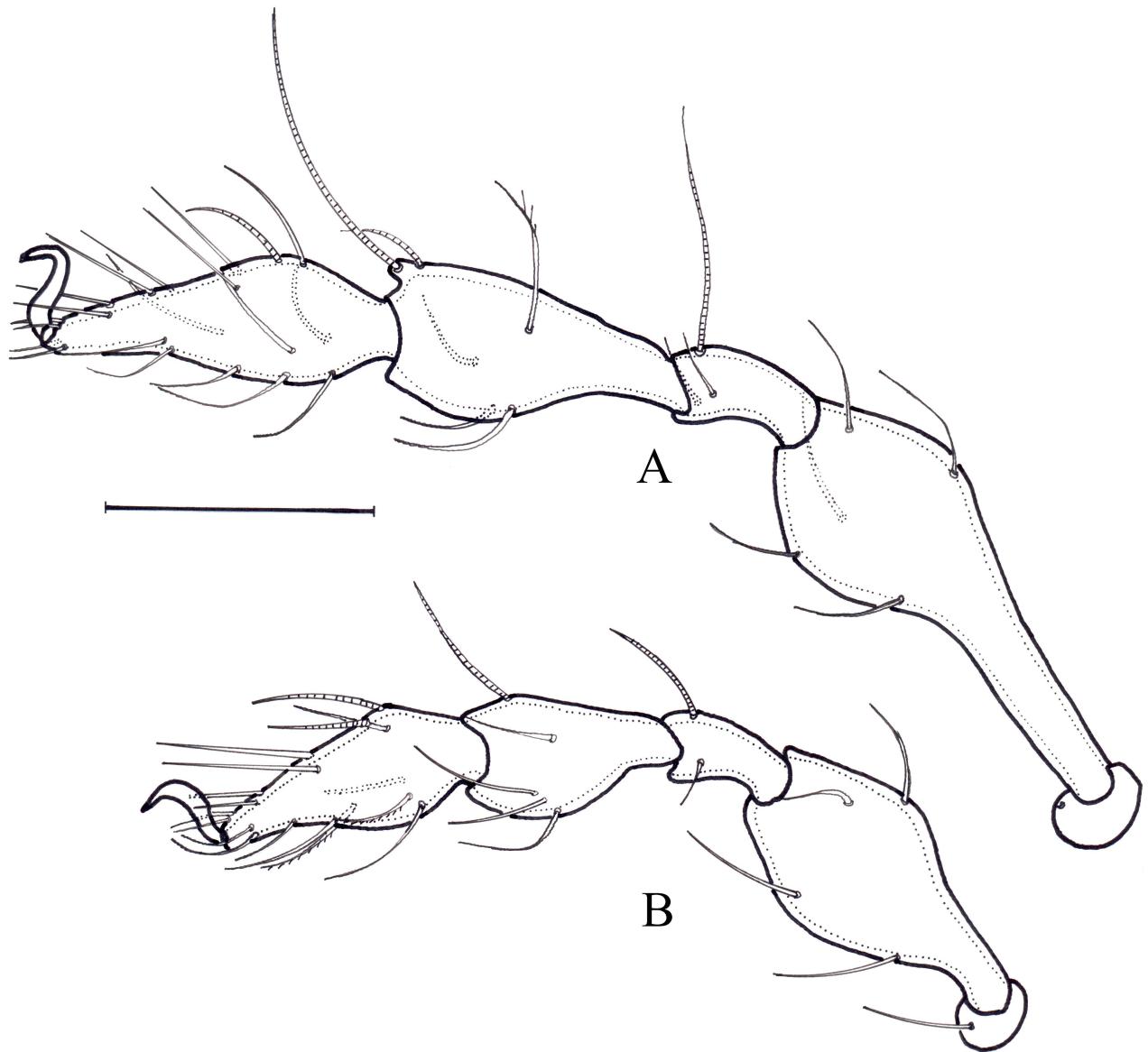


FIGURE 3: *Rhinoppia (Rhinoppia) alidagiensis* n. sp.: A – Leg I; B – Leg II (scale bar for all figures = 40 µm).

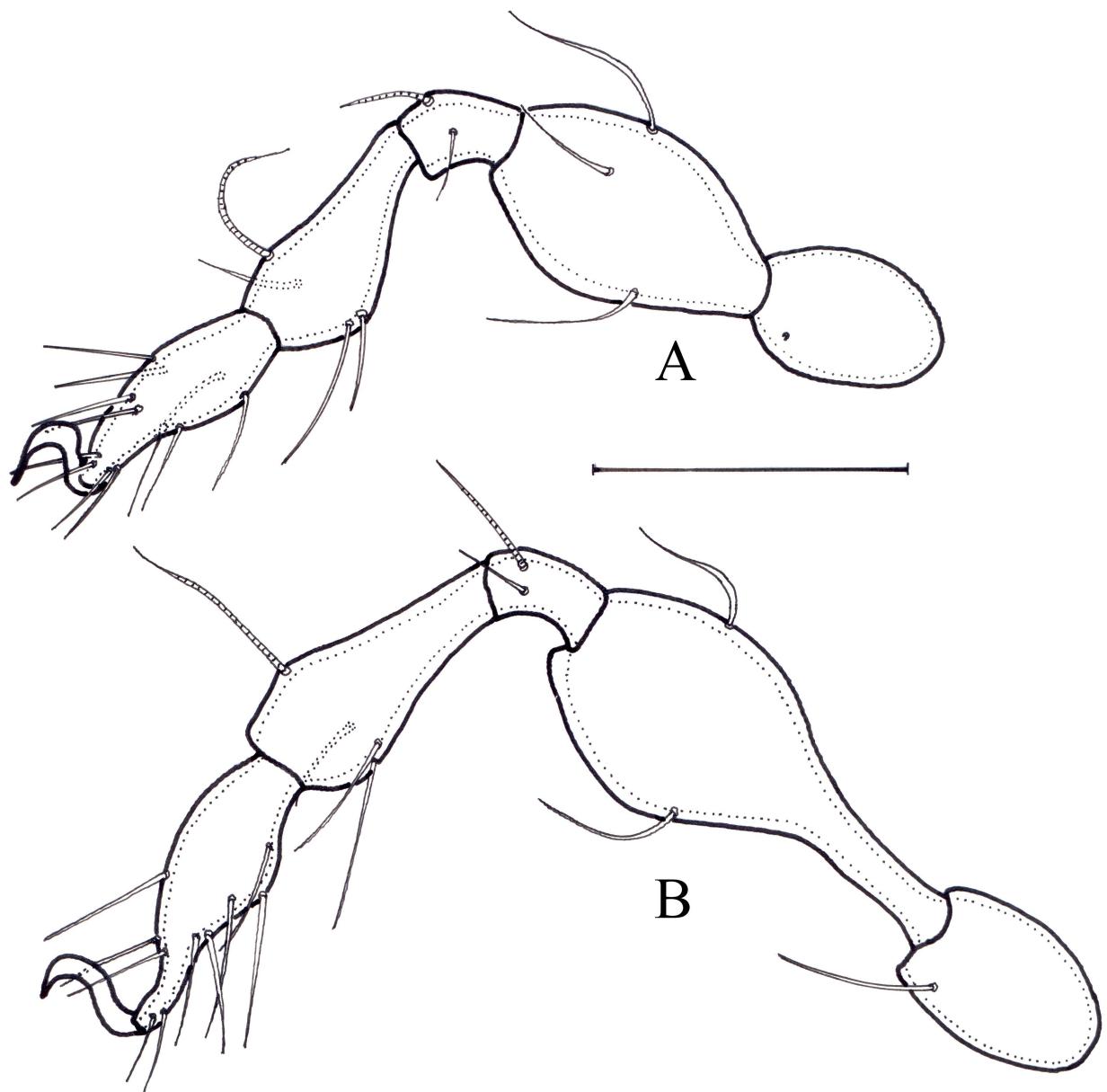


FIGURE 4: *Rhinoppia (Rhinoppia) alidagiensis* n. sp.: A – Leg III; B – Leg IV (scale bar for all figures = 40  $\mu$ m).

TABLE 1: Diagnostic characters of *Rhinoppia (Rhinoppia) alidagiensis n. sp.* and other closely related species.

Species	Body measurement ( $\mu\text{m}$ )	Characters				
		Rostrum	Sensillus	Ratio of prodorsal setae ( $ro, le, in$ )	Location of setae <i>la</i> and <i>lm</i>	Genital setae
<i>R. (R.) centrodentata</i> Gordeeva & Niemi, 1990	382 x 181	Dents rounded, median dent longer than lateral ones and prolonged anteriorly	Pectinate, six long cilia unilaterally, cilia proximal setae longer than distal ones	$ro>in>le$	Setae <i>la</i> arise before the <i>lm</i>	Six pairs
<i>R. (R.) tridentata</i> Subías & Minguez, 1985	240 x 130	Dents sharped, median dent longer than lateral ones	Pectinate, seven long cilia unilaterally, cilia proximal setae longer than distal ones.	$ro>le>in$	Setae <i>la</i> arise before the <i>lm</i>	Six pairs
<i>R. (R.) samaina</i> Mahunka, 2001	265-295 x 137-158	Dents sharped, median dent longer than lateral ones	Pectinate, eight cilia unilaterally, cilia equal in length	$ro>le>in$	Setae <i>la</i> arise before the <i>lm</i>	Six pairs
<i>R. (R.) pinsapi</i> (Arillo & Subías, 1996)	294-338 x 162-175	Dents sharped, median dent longer than lateral ones	Pectinate, five cilia unilaterally	$ro>in>le$	Setae <i>la</i> and <i>lm</i> approximately at the same transverse level.	Six pairs
<i>R. (R.) ordunensis</i> (Iturrondobeitia & Saloña, 1988)	260-280 x 152-168	Dents sharped, median dent longer than lateral ones	Pectinate, 3-10 cilia unilaterally	$in>le>ro$	Setae <i>la</i> arise before the <i>lm</i>	Five pairs
<i>R. (R.) elifae</i> Toluk, Ayyıldız & Subías, 2009	284-324 x 128-160	Median and lateral dents equal in size, tapering	Pectinate, seven long cilia unilaterally, proximal cilia longer than distal ones	$ro>le>in$	Setae <i>la</i> arise before the <i>lm</i>	Five pairs
<i>R. (R.) epilata</i> (Miko, 2006)	300	Dents rounded or median dent sharply ended, median dent longer than lateral ones	Pectinate, five cilia unilaterally, cilia equal in length	$ro>le>in$	Setae <i>la</i> arise before setae <i>lm</i>	Six pairs
<i>R. (R.) undulata</i> (Mahunka & Mahunka-Papp, 2010)	352-380 x 104-116	Rostral part wide, without apex, slightly concave or undulate medially	Head wide, bearing unilaterally 7-8 long and thick cilia	$ro>le=in$	Setae <i>lm</i> arise before the <i>la</i>	Six pairs
<i>R. (R.) vera</i> (Mihelčić, 1956)	360 x 165	Median dent longer than lateral ones, like nose prolonged anteriorly	Clavate, with six cilia at equal length	$ro>le=in$	Setae <i>lm</i> arise before the <i>la</i>	Six pairs
<i>R. (R.) nasuta</i> (Moritz, 1965)	291 (277-309) x 173 (163-185)	Median dent longer than lateral ones, like nose prolonged anteriorly	Fusiform, with six cilia	$ro>le>in$	Setae <i>la</i> arise before the <i>lm</i>	Six pairs
<i>R. (R.) alidagiensis n. sp.</i>	332 (308-336) x 134 (118-140)	Dents rounded, length of median dent equal to lateral ones	Fusiform, with eight cilia	$ro>in>le$	Setae <i>la</i> arise before the <i>lm</i>	Six pairs

2001, *R. (R.) epilata* (Miko, 2006), *R. (R.) elifae* Toluk, Ayyıldız and Subías, 2009 and *R. (R.) undulata* (Mahunka and Mahunka-Papp, 2010) (Mihelčić, 1956; Moritz, 1965; Subías and Minguez, 1985; Iturrondobeitia and Saloña, 1988; Gordeeva and Niemi, 1990; Khanbekian and Gordeeva, 1991; Arillo and Subías, 1996; Mahunka, 2001; Miko, 2006; Toluk, Ayyıldız and Subías, 2009; Mahunka and Mahunka-Papp, 2010). The differentiating characters of these species are given in Table 1.

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