

THREE NEW SPECIES OF THE FAMILY OPPIIDAE
(ACARI, ORIBATIDA) FROM TURKEY

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Three new species of oribatid mites, *Multioppia (Multioppia) turcica* sp. n., *Rhinoppia mahunkai* sp. n. and *Rhinoppia elifae* sp. n. found in the decaying debris, soil and litter under *Pinus nigra* and *Quercus* spp. collected from Yozgat Pine Grove National Park in Turkey are described and illustrated. Type materials presently kept in the Acarological Collection of the Zoological Museum, Erciyes University, Kayseri, Turkey.

Key words: Acari, Oribatida, Oppiidae, *Multioppia*, *Rhinoppia*, Turkey

INTRODUCTION

Yozgat Pine Grove National Park is located within the borders of the Municipality of Yozgat, in central part of Turkey. The national park is covered by black pine trees and oaks in places. There is no report on the soil inhabiting mite fauna of the national park. During the study of the oribatid material collected from the national park, three new oppiid species belonging to two genera, *Multioppia* HAMMER, 1961 and *Rhinoppia* BALOGH, 1983, were found.

The genus *Multioppia* was described in 1961 by HAMMER, with the type species *Multioppia radiata* HAMMER, 1961. The genus has a cosmopolitan distribution and it comprises of three subgenera, namely *Multioppia (Multioppia)* HAMMER, 1961, *Multioppia (Furculoppia)* BALOGH, 1983 and *Multioppia (Multilanceoppia)* SUBÍAS, 1989 (SUBÍAS & BALOGH 1989, SUBÍAS 2007). The nominal subgenus *Multioppia (Multioppia)* studied here is included itself 36 species and 3 subspecies (SUBÍAS 2007), and this subgenus can be characterized by the following features: costula absent, sensillus pectinate or fusiform, unilaterally ciliate, crista absent, setae c_2 absent, 12 pairs of notogastral setae, five pairs of genital setae, fissurae *iad* in paraanal position.

The genus *Rhinoppia* was described by BALOGH (1983), with the type species, *Oppia nasuta* MORITZ, 1965. The genus has also a cosmopolitan distribution and comprised 27 species (SUBÍAS 2007). The genus can be characterized by the following features: bothridial costula present or absent, sensillus pectinate or fusiform, crista absent, setae c_2 present, ten pairs of notogastral setae, five or six

pairs of genital setae, fissurae *iad* in paraanal position (BALOGH 1983, SUBÍAS and MINGUEZ 1985, WEIGMANN 2006).

This work describes three new species on the basis of the materials collected from Yozgat Pine Grove National Park in Turkey.

MATERIALS AND METHODS

The techniques used in the collecting, extraction and preparation of the examined oribatid mites follows that proposed by BALOGH and MAHUNKA (1983). Terminology follows GRANDJEAN (see TRAVÉ & VACHON 1975), BALOGH (1983) and SUBÍAS and BALOGH (1989). All measurements are given in micrometers (μm). The type material is deposited in the Acarological Collection of the Zoological Museum, Erciyes University, Kayseri, Turkey.

DESCRIPTIONS OF NEW SPECIES

Multioppia HAMMER, 1961

The main characteristics of the genus *Multioppia* are the following: Sensilli pectinate or fusiform, lamellar line present or absent, interlamellar region with three pairs of areola in two longitudinal rows, notogaster with twelve pairs of setae, genital setae numbering five pairs, aggenital setae one pair, anal setae two pairs, adanal setae three pairs, lyrifissures *iad* in paraanal position.

Type species: *Multioppia radiata* HAMMER, 1961

***Multioppia (Multioppia) turcica* sp. n.**

(Figs 1–9)

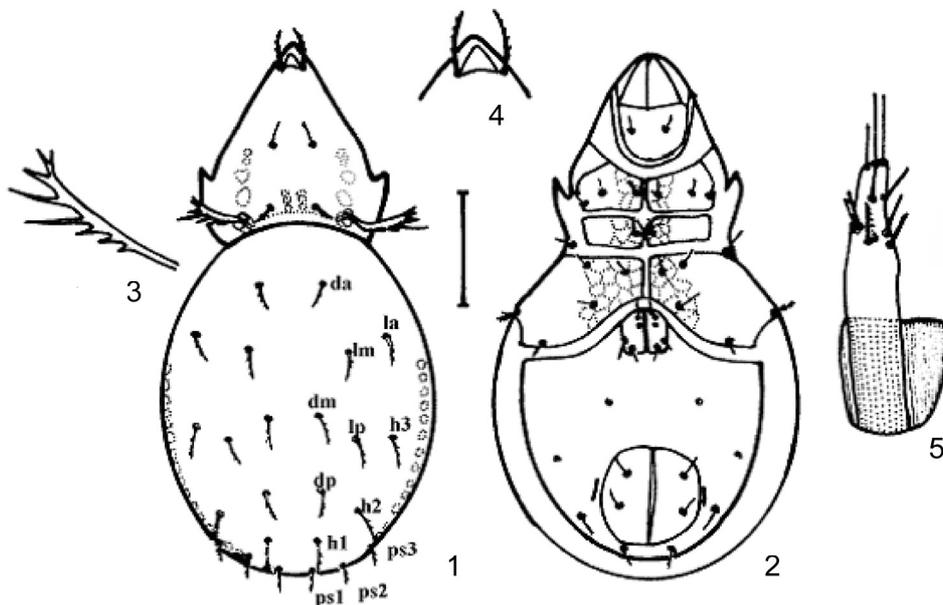
Diagnosis: Protuberance between rostral setae present; lamellar line absent; sensilli unilaterally pectinate, with eight branches; notogaster with twelve pairs of thin, sparsely barbed setae; genital setae five pairs.

Measurements – Body length: 504–532 (holotype: 504), body width: 260–304 (holotype: 260). Totally five specimens were measured.

Prodorsum (Figs 1, 3, 4): Rostrum rounded. Rostral setae (*ro*) 56 in length, arising on the dorsolateral sides of the rostrum, unilaterally barbed. There is a protuberance between rostral setae. Lamellar setae (*le*) 22 in length, smooth. A few tubercles situated on each side of prodorsum anterior to bothridia. Distance between lamellar and interlamellar setae shorter than that between rostral and lamellar setae. Interlamellar setae (*in*) 12 in length, unilaterally barbed; between these setae there are three pairs of areola in two longitudinal rows. Sensilli (*ss*) 80 in length, pectinate, with eight branches.

Table 1. The characters differentiating *Multioppia (M.) turcica* sp. n., *M. (M.) glabra* (MIHELČIČ, 1955) and *M. (M.) tenue* MAHUNKA et MAHUNKA-PAPP, 1999.

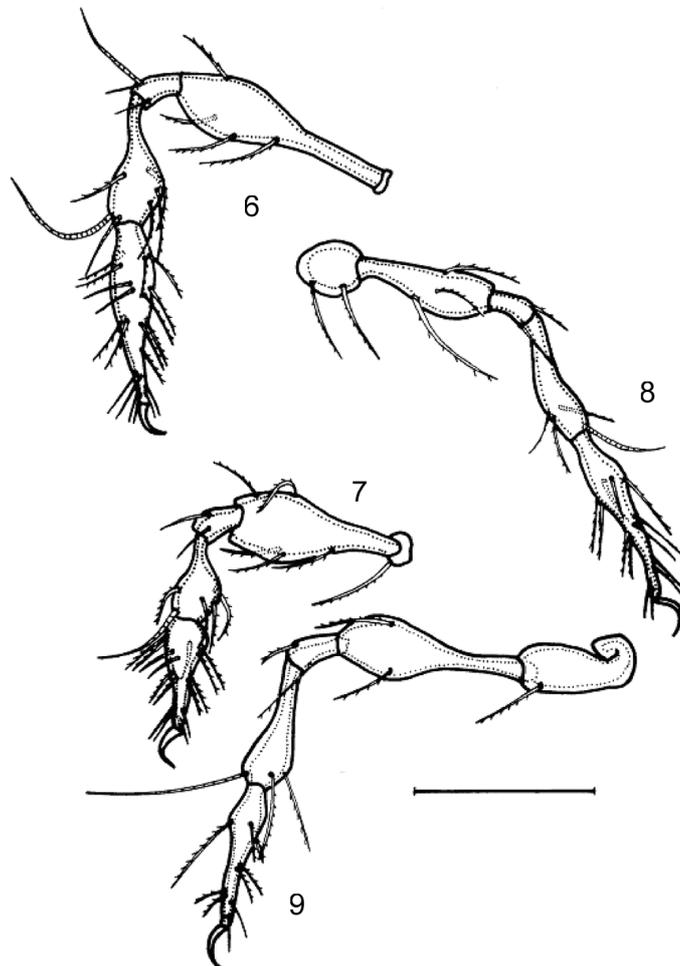
Characters	<i>M. (M.) turcica</i> sp. n.	<i>M. (M.) glabra</i>	<i>M. (M.) tenue</i>
Presence of protuberance between rostral setae	present	absent	absent
Lamellar line	absent	present	present
Location of setae <i>le</i>	close to interlamellar setae rather than rostral setae	close to rostral setae rather than interlamellar setae	close to interlamellar setae rather than rostral setae
Shape of sensilli	unilaterally pectinate, with eight branches	unilaterally pectinate, with six-eight branches	unilaterally ciliate and bilaterally barbed
Body measurements	512 (504–532) / 279 (260–304)	360 / 190 (MIHELČIČ 1955), 394–422 / 204–229 (MORITZ 1971)	363–418 / 176–198.
Shape of notogastral setae	barbed	smooth	barbed
Location of setae <i>lp</i> and <i>h</i> ₃	setae <i>lp</i> level with setae <i>h</i> ₃	setae <i>lp</i> arise before the setae <i>h</i> ₃	setae <i>lp</i> level with setae <i>h</i> ₃

**Figs 1–5.** *Multioppia (Multioppia) turcica* sp. n.: 1 = dorsal view, 2 = ventral view, 3 = sensillus, 4 = rostrum and rostral setae, 5 = ovipositor (scale for 1 and 2 = 100 μ m, 3–5 = 50 μ m)

Notogaster (Fig. 1): Oval, twelve pairs of notogastral setae thin, sparsely barbed, 24 in length. Along the lateral margins of notogaster present a number of muscle sigillae.

Ventral plate (Figs 2, 5): Length of infracapitulum 100, width 72. Setae *h* 11 in length. Distance between setae *h* and *h* 22 in length. Pedotectum I (*pd*₁) narrowed anteriorly. Epimeral borders easily visible and well sclerotized. Epimeral regions with internal muscle sigilla. Apodemata *apo*₁, *apo*₂, *apo*₃, and *apo*₄ well developed. Epimeral setal formula 3–1–3–3. Genital plate 38 in length, 36 in width, with five pairs of setae; anal plate 48 in length, 48 in width, with two pairs of setae. Lyrifissures *iad* situated in paraanal position. Adanal setae *ad*₁ in postanal, *ad*₂ in paraanal and *ad*₃ in preanal positions. The shape of the ovipositor is as given in Fig. 5.

Legs: All legs monodactylous; setation of leg segments is given in Figs 6–9.



Figs 6–9. *Multioppia (Multioppia) turcica* sp. n.: 6 = leg I, 7 = leg II, 8 = leg III, 9 = leg IV (scale for all figures = 100 μ m)

Material examined: Holotype and nine paratypes, soil under *Pinus nigra*, N 39°48.163', E 34°48.682', 1546 m, 5 Mar. 2006; one paratype, soil and litter under *Pinus nigra*, N 39°48.255', E 34°48.578', 1484 m, 19 Jan. 2006; four paratypes, soil under *Quercus* spp., N 39°48.410', E 34°49.136', 1404 m, 1 Dec. 2006, Yozgat, Turkey.

Etymology: The specific name, "*turcica*" is named after the locality, Turkey, where the present new species was found.

Remarks: *Multioppia* (*M.*) *turcica* sp. n. is close morphologically to *M.* (*M.*) *glabra* (MIHELČIČ, 1955) and *M.* (*M.*) *tenue* MAHUNKA and MAHUNKA-PAPP, 1999 by the shape of sensilli. The characters differentiating these species are listed in Table 1.

Rhinoppia BALOGH, 1983

The main characteristics of the genus *Rhinoppia* are the following: Rostrum round or dentate, bothridial costula present or absent, sensilli pectinate or fusiform, crista absent, notogaster with ten pairs of setae, setae c_2 present, genital setae numbering five or six pairs, aggenital setae one pair, anal setae two pairs, adanal setae three pairs, lyrifissures *iad* in paraanal position.

Type species: *Oppia nasuta* MORITZ, 1965

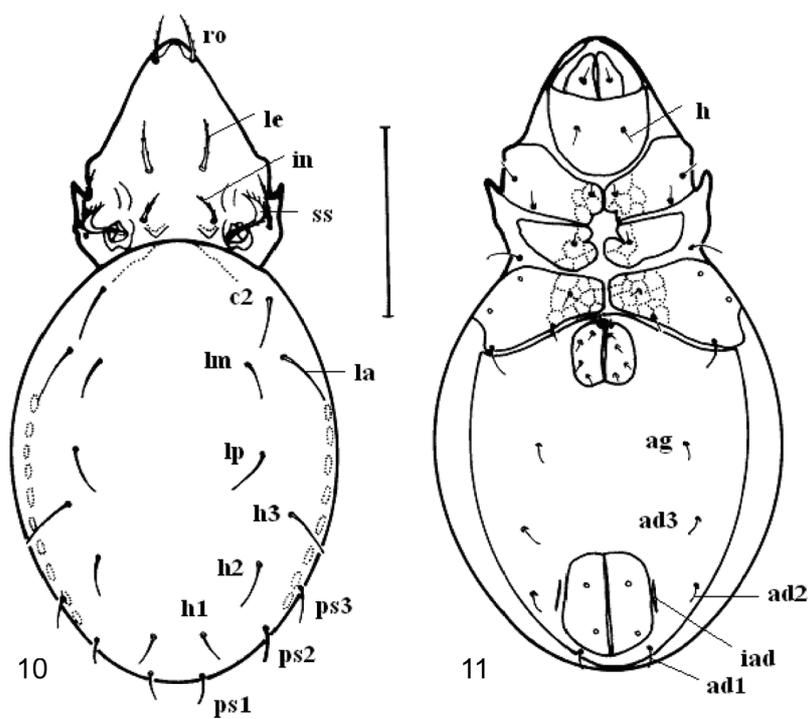
***Rhinoppia mahunkai* sp. n.**

(Figs 10–15)

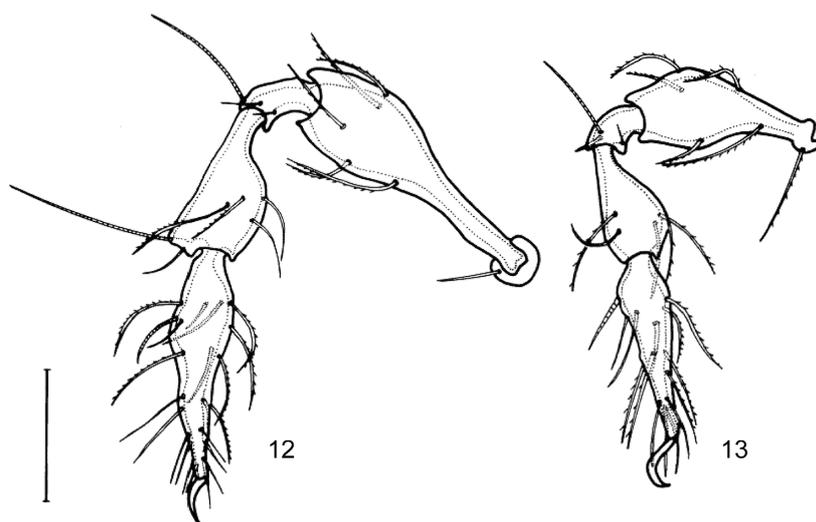
Diagnosis: Rostrum round; protuberance between rostral setae present; bothridial costula present; sensilli pectinate; all prodorsal setae barbed; notogaster with ten pairs of long and thick setae; genital setae five pairs.

Measurements – Body length: 324–352 (holotype: 328), body width: 163–200 (holotype: 163). Seven specimens were measured.

Prodorsum (Fig. 10): Rostrum rounded, rostral setae 22 in length arising on the dorsal surface of rostrum, unilaterally barbed. There is a protuberance between rostral setae. Lamellar setae 22 in length, thick, unilaterally barbed. Distance between rostral setae shorter than that between lamellar setae. Interlamellar setae thick and unilaterally barbed. Distance between lamellar and interlamellar setae shorter than that between rostral and lamellar setae. Distance between lamellar setae shorter than between interlamellar setae. Exobothridial setae (*ex*) 30 in length, unilaterally barbed. Anterior to bothridia longitudinally situated bothridial costulae and they are short, not reaching insertion of lamellar setae. Bothridia cup shaped, with the laterally-oriented opening. Sensilli pectinate, with long stalk and their distal half being dilated, with short setae unilaterally. Ratio of the length of prodorsal setae: $in < ro = le < ex$.



Figs 10–11. *Rhinoppia mahunkai* sp. n.: 10 = dorsal view, 11 = ventral view (scale for both figures = 100 μ m)



Figs 12–13. *Rhinoppia mahunkai* sp. n.: 12 = leg I, 13 = leg II (scale for both figures = 40 μ m)

Table 2. The characters differentiating *Rhinoppia mahunkai* sp. n. and *R. parapectinata* (RYABININ, 1987).

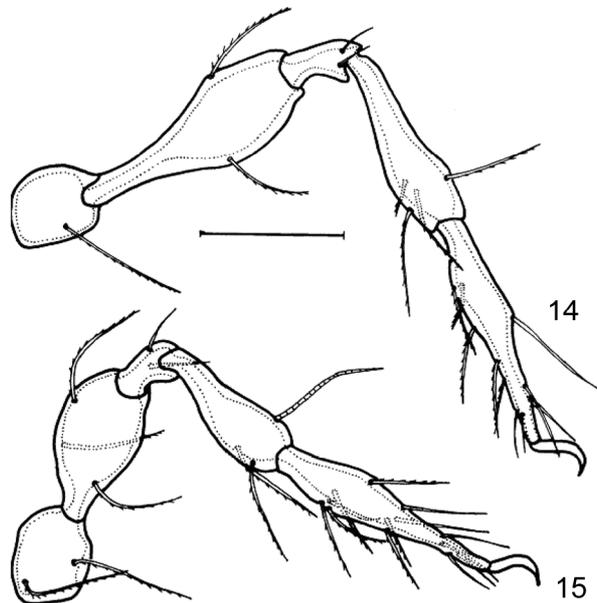
Characters	<i>R. mahunkai</i> sp. n	<i>R. parapectinata</i>
Shape of prodorsal setae	barbed	smooth
Presence of protuberance between rostral setae	present	absent
Length of lamellar and interlamellar setae	long	short
Shape of notogastral setae	long and thick	short and thin

Notogaster (Fig. 10): Oval. Ten pairs of smooth, long notogastral setae; ps_1 , ps_2 and ps_3 shorter than the other setae. A number of muscle sigillae present along lateral margins of notogaster.

Ventral side (Fig. 11): Length of infracapitulum 74, width 48. Setae h 10 in length. Distance between h and h_{22} in length. Pedotectum I (pd_1) narrowed anteriorly. Epimeral borders easily visible and well sclerotized. Apodemata apo_1 , apo_2 , apo_{3j} and apo_4 well developed. Epimeral regions with internal muscle sigilla. Epimeral setal formula 3–1–3–3. Genital plate 28 in length, 32 in width, with five pairs of setae. Anal plate 50 in length, 44 in width, with two pairs of setae. One pair of aggenital and three pairs of adanal setae. Distance between genital and anal plates 82. Lyrifissures iad situated in paraanal position. Adanal setae ad_1 in postanal, ad_2 in paraanal and ad_3 in preanal positions.

Legs: All legs monodactylous. Setation of leg segments is given in Figs 12–15.

Material examined: Holotype and six paratypes, decaying debris, soil and litter under *Pinus nigra*, N 39°48.376', E 034°48.862', 1507 m, 31 May 2005; four paratypes, as for the previous sample, N 39°48.372', E 034°48.871', 1497 m, 31 May 2005; three paratypes, soil and litter under *Pinus nigra*, N 39°48.252', E 034°48.584', 1502 m, 19 Jan. 2006; five paratypes, soil under *Pinus nigra* and

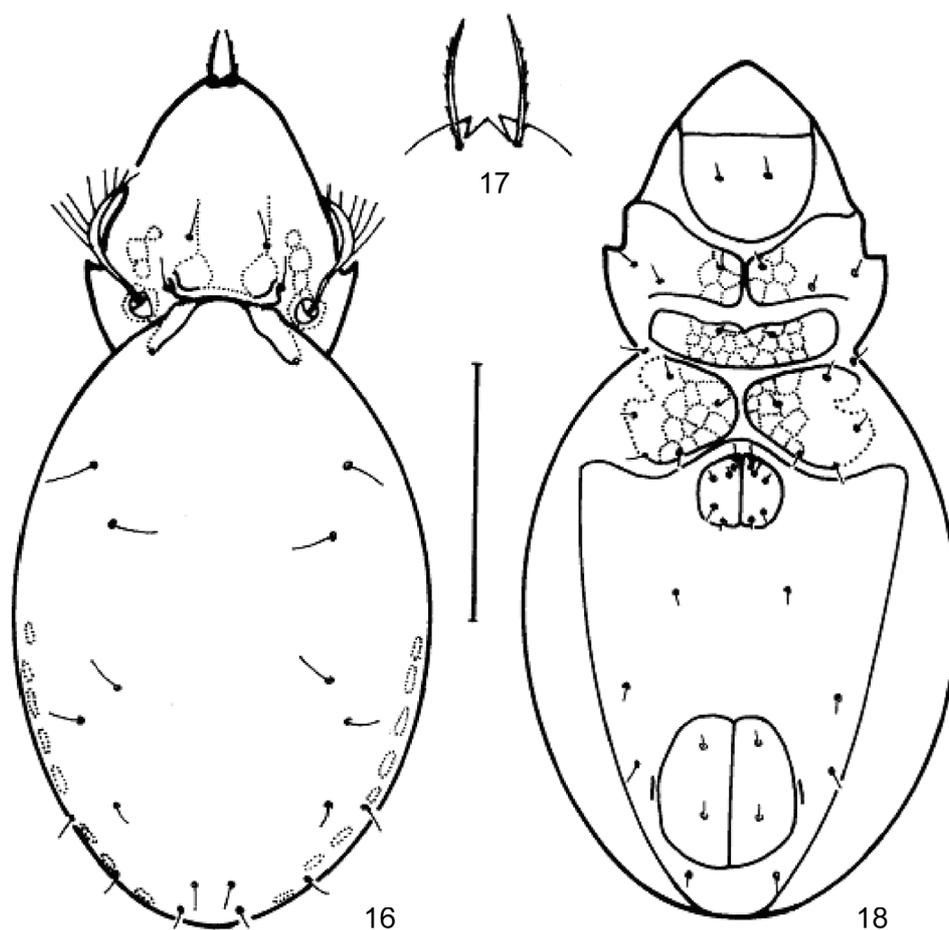


Figs 14–15. *Rhinoppia mahunkai* sp. n.: 14 = leg IV, 15 = leg III (scale for both figures = 40 μ m)

Quercus spp., N 39°48.140', E 034°48.666', 1563 m, 18 Apr. 2006; two paratypes, soil under *Pinus nigra*, N 39°48.033', E 034°48.555', 1547 m, 19 June 2006, Yozgat, Turkey.

Etymology: This new species is dedicated to Dr. S. MAHUNKA, Hungarian Natural History Museum, Hungary, for his contribution to our knowledge on oribatid mites.

Remarks: *Rhinoppia mahunkai* sp. n. is close morphologically to *R. parapectinata* (RYABININ, 1987) in having pectinate sensilli, bothridial costulae and five pairs of genital setae. The characters differentiating these two species are listed in Table 2.



Figs 16–18. *Rhinoppia elifae* sp. n.: 16 = dorsal view, 17 = rostrum, 18 = ventral view (scale for 16 and 18 = 100 μ m, 17 = 40 μ m)

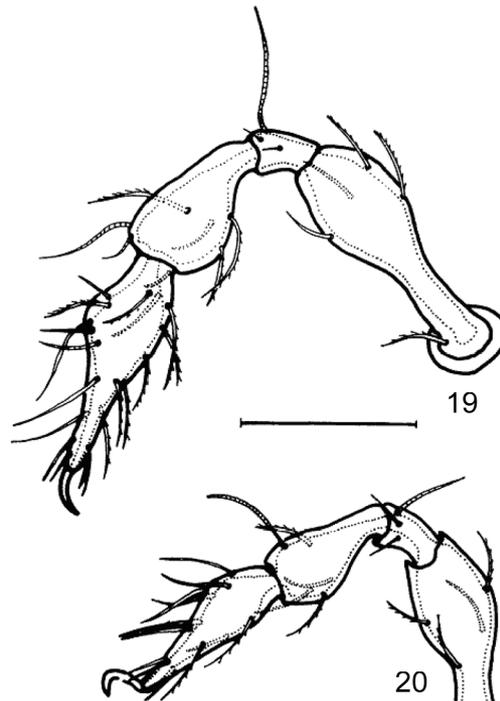
Rhinoppia elifae sp. n.
(Figs 16–21)

Diagnosis: Rostrum tridentate; length of median dent of rostrum equal to lateral ones, bothridial costula absent; sensilli pectinate; all prodorsal setae smooth; anterior margin of notogaster reaches to the anterior margin of the bothridia; genital setae six pairs.

Measurements – Body length: 284–324 (holotype: 316), body width: 128–160 (holotype 148). Ten specimens were measured.

Prodorsum (Figs 16, 17): Rostrum with tridentate that separated by two deep incisions; the median and lateral dents equal in size, sharply ended. Rostral setae long, finely barbed in their basal half and slightly curved towards. Lamellar and interlamellar setae smooth, short and thin. Distance between lamellar and interlamellar setae shorter than that between rostral and lamellar setae. A few tubercles located anterior to bothridia. Sensilli pectinate, with long stalk and their distal half being dilated; seven long setae unilaterally, among them proximal setae longer than distal ones.

Notogaster (Fig. 16): Elongate-oval, with a narrowed anterior part, penetrates the prodorsum's base, up to the level of bothridia. Ten pairs of thin, smooth notogastral setae. A number of muscle sigillae present along lateral margins of notogaster.



Figs 19–20. *Rhinoppia elifae* sp. n.: 19 = leg I, 20 = leg II (scale for both figures = 40 μ m)

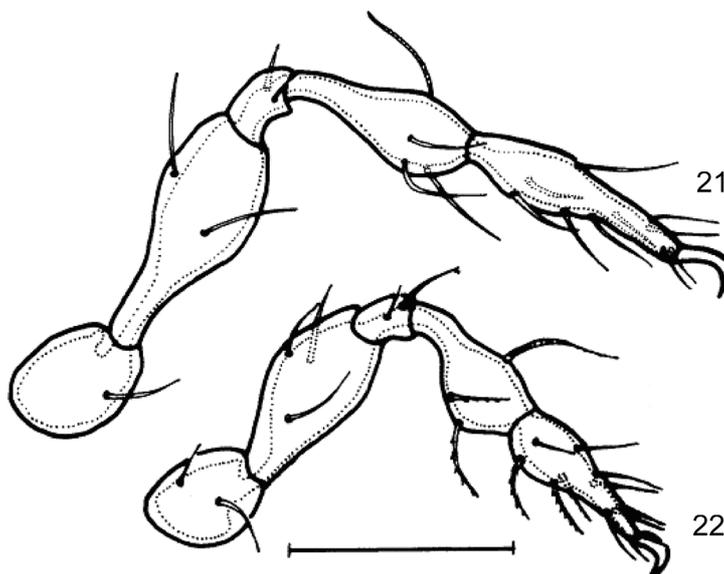
Table 3. The characters differentiating *Rhinoppia elifae* sp. n. and *R. tridentata* (SUBÍAS et MINGUEZ, 1985).

Characters	<i>R. elifae</i> sp. n	<i>R. tridentata</i>
Shape of rostral setae	barbed	smooth
Length of median and lateral dents of the rostrum	Length of median dent is equal to lateral ones	The median dent is longer than the lateral ones
Presence of the internal muscle sigilla between epimeres III and IV	present	absent
Location of anterior margin of notogaster	reaches to the anterior margin of the bothridia	reaches to the posterior margin of the bothridia
Body measurements for holotype	316 / 148	240 / 130

Ventral side (Fig. 18): Length of infracapitulum 66, width 48. Pedotectum 1 narrowed anteriorly. Epimeral borders easily visible and well sclerotized. Apodemata apo_1 , apo_2 , apo_3 and apo_4 well developed. Epimeral regions with internal muscle sigilla; epimeral setal formula 3–1–3–3. Genital plate 26 in length, 34 in width, with five pairs of setae. Anal plate 58 in length, 52 in width, with two pairs of setae. One pair of aggenital and three pairs of adanal setae. Distance between genital and anal plates 68. Lyrifissures *iad* situated in paraanal position. Adanal setae ad_1 in postanal, ad_2 in paraanal and ad_3 in preanal positions.

Legs: All legs monodactylous. Setation of leg segments is given in Figs 19–22.

Material examined: Holotype and 14 paratypes, soil under *Pinus nigra*, N 39°48.154', E 034°48.733', 1500 m, 12 May 2006, Yozgat, Turkey.

**Figs 21–22.** *Rhinoppia elifae* sp. n.: 21 = leg IV, 22 = leg III (scale for both figures= 40 μ m)

Etymology: We dedicate this new species to our collaborator and friend ELIF KOÇOĞLU (Turkey), who helped our field work in different ways.

Remarks: *Rhinoppia elifae* sp. n. is close morphologically to *R. tridentata* (SUBÍAS et MINGUEZ, 1985) in having pectinate sensilli and tridentate rostrum. The characters differentiating these two species are listed in Table 3.

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