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Description of *Trigonuropoda (Foveolatatrigon) mahunkaorum* sp. n. (Acari: Uropodina: Trigonuropodidae): the first record of the genus *Trigonuropoda* in Madagascar

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ABSTRACT

Trigonuropoda (Foveolatatrigon) mahunkaorum sp. n. is described and illustrated on the basis of two females and one male collected in Madagascar. This is the first record of the genus in the Malagasy region. The new species differs from the other known *Trigonuropoda (Foveolatatrigon)* species by the shapes of ventral setae, genital shield of female and peritremes. A new key to the Afrotropical *Trigonuropoda* species is given.

KEY WORDS: Acari, Uropodina, *Trigonuropoda*, Afrotropical, Madagascar, new species, identification key.

INTRODUCTION

Madagascar is the largest island in the Afrotropical Region, which had been a part of Gondwana but separated from its other fragments in the Mesozoic (Flynn & Wyss 2003). Due to the long isolation of the island, the evolution of its fauna resulted in a high level of endemism (Paulian & Viette 2003). The Uropodina mite fauna of Madagascar is scarcely investigated (Kontschán & Starý 2012). So far, 14 species have been recorded from Madagascar, but adults of only five species are known and hence only these can be identified with confidence.

Members of the family Trigonuropodidae occur in the tropical and subtropical regions, but most of species are recorded from the South-East Asia and Australasia (Wiśniewski 1993; Kontschán 2013). Little is known about Afrotropical trigonuropodid mites, with only four species being described from Africa (Hirschmann 1981; Kontschán 2006*a*, *b*): *T. ulugurensis* Hirschmann, 1981, *T. takacsi* Kontschán, 2006, *T. gerei* Kontschán, 2006 and *T. shimbaensis* Kontschán, 2006. None of them were originally placed in subgenera. All of these have an elevated caudal area on the dorsal shield, but the anterior pit is absent on the dorsal shield; therefore we move them into the subgenus *Latipilitrigon* Hirschmann, 1979.

MATERIAL AND METHODS

Specimens were cleared in lactic acid and drawings were made with the aid of a drawing tube. Type specimens are stored in 75% ethanol and deposited in the Soil Zoology Collections of the Hungarian Natural History Museum, Budapest (HNHM) and the Biology Centre AS CR, Institute of Soil Biology, České Budějovice (ISB). The following abbreviations are used: *St* – sternal setae, *h* – hypostomal setae, *V* – ventral setae, *ad* – adanal setae.

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TAXONOMY

Family Trigonuropodidae Hirschmann, 1979

Genus *Trigonuropoda* Trägårdh, 1952

Subgenus *Foveolatatrigon* Hirschmann, 1979

Hirschmann (1975) divided the genus *Trigonuropoda* into several species groups, which were mentioned later as "Stadiengattung" (maybe subgenus) in his new system (Hirschmann 1979). Kontschán (2008) used the *cubabaloghia* species group as *Baloghiatrigon* subgenus after Hirschmann's (1979) system, therefore we follow this logic in this paper as well, and we placed the new species into the *Foveolatatrigon* Hirschmann, 1979 subgenus, which was discussed as "difoveolata-group" in other Hirschmann's systems (Wiśniewski & Hirschmann 1993). Species of the subgenus *Foveolatatrigon* are easy to separate from the other trigonuropodid species on the basis of the following combination of characters: (1) the inner margin of the marginal shield is undulate, (2) anterior pit absent on the dorsal idiosoma, and (3) caudal area is not elevated from the neighbouring regions of the dorsal shield.

The species of the subgenus *Foveolatatrigon* are recorded from Philippines, Taiwan, Japan, Indonesia, Malaysia, New Guinea, Australia and Peru (Wiśniewski 1993). This tropical and subtropical distribution suggested that *Foveolatatrigon* can be found in the Afrotropics as well; hence the finding of a new species has not been unexpected.

Trigonuropoda (Foveolatatrigon) mahunkaorum sp. n.

Figs 1–16

Etymology: We dedicate this species to two renowned Hungarian acarologists, Prof. Sándor Mahunka (1937–2012) and his wife Luise ("Csibi") Mahunka-Papp (1937–2011), for their enormous contribution to the knowledge of the world, and especially Malagasy, oribatids.

Description:

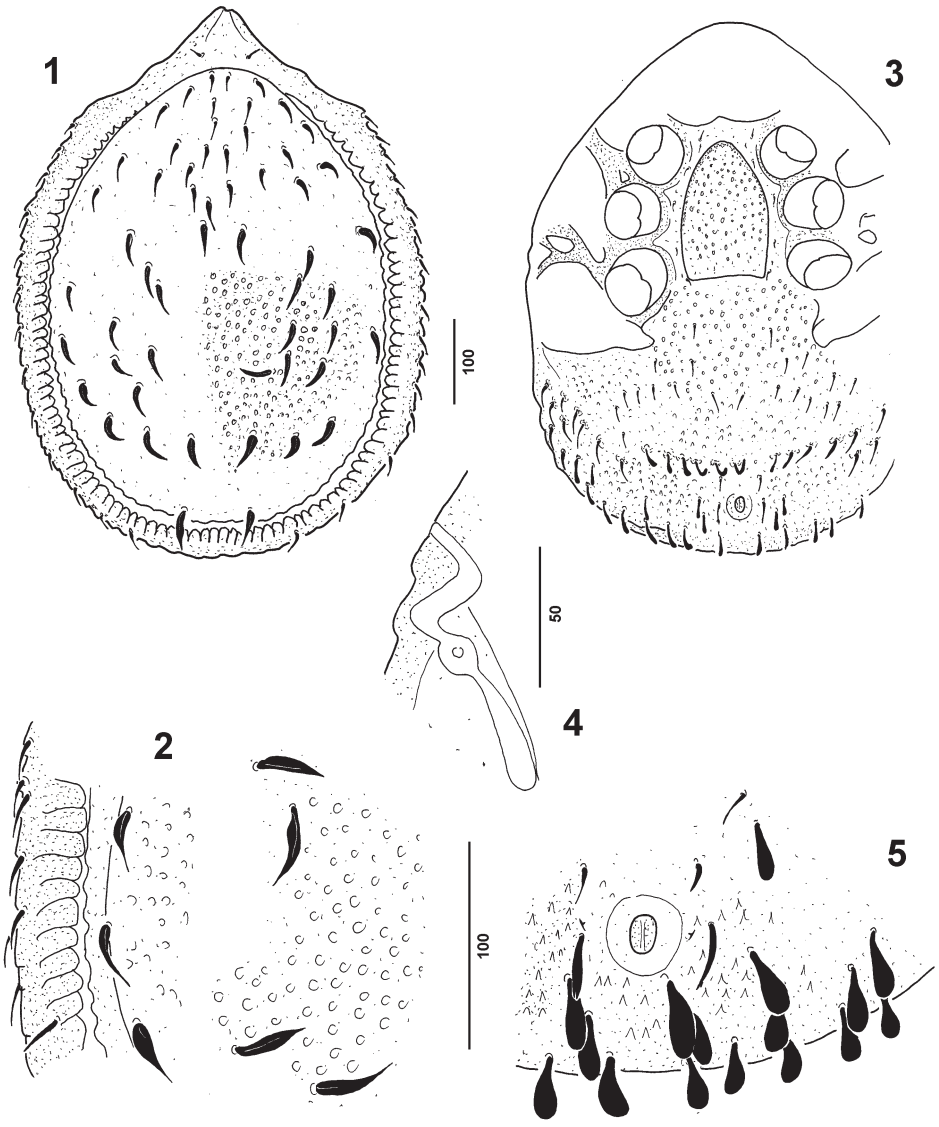
Female.

Idiosoma: Length 620–630 μm, width 450–460 μm (n=2). Shape oval, posterior margin rounded.

Dorsal aspect (Fig. 1). Dorsal and marginal shield completely separated. Dorsal setae short and spine-like (*ca* 25–27 μm) anteriorly, and wide and phylliform (*ca* 36–44 μm) posteriorly. Dorsal shield covered by oval pits. Marginal shield with undulate inner margin, marginal setae smooth and needle-like (*ca* 17–23 μm), surface of marginal shield smooth (Fig. 2).

Ventral aspect (Fig. 3). Sternal shield without sculptural pattern, but some oval pits situated near coxal margins. All sternal setae short (*ca* 8–10 μm), smooth and needle-like. *St1* situated at level of anterior margin of coxae II, *St2* at level of central area of coxae II, *St3* at level of anterior margin of coxae III, *St4* at level of central area of coxae III, *St5* placed near basal edges of genital shield (Fig. 6). Two pairs of lyriform fissures situated on sternal shield, first pair near to *St1*, second pair near to *St5*. Ventral shield neotrichous; smooth and needle-like setae (*ca* 15–23 μm) situated between pedofossae of legs IV. Ventral shield also covered by oval pits. Posterior part of this region with numerous bulbiform setae (*ca* 20–22 μm) can be seen on small protuberances. At level

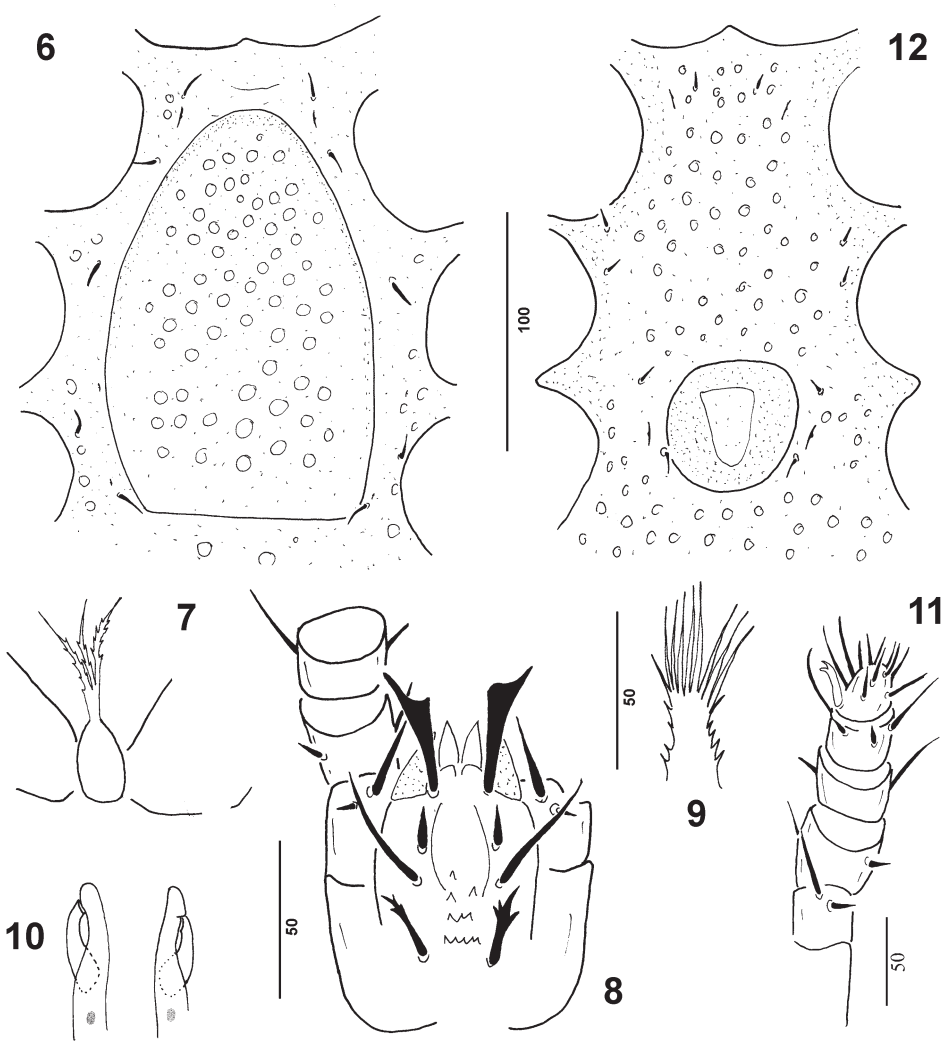
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Figs 1–5. *Trigonuropoda (Foveolatatrigon) mahunkaorum* sp. n., female, holotype: (1) dorsal aspect of idiosoma; (2) dorsal and marginal setae and dorsal ornamentation; (3) ventral aspect of idiosoma; (4) peritreme; (5) anal area of ventral shield.

of anal opening, surface covered by small, funnel-like pits (Fig. 5). First pair of adanal setae (*ad1*), narrow and needle-like (*ca* 11–12 μm), second pair (*ad2*) wider and apically pilose (*ca* 18–20 μm). One pair of lyriform fissures situated between *ad1* and *ad2* (Fig. 5). Pedofossae deep, their surface smooth, separate furrows for tarsi IV absent. Peritremes short, prestigmatid part Z-like, post-stigmatid part straight (Fig. 4). Stigmata situated between coxae II and III. Genital shield linguliform situated between coxae II

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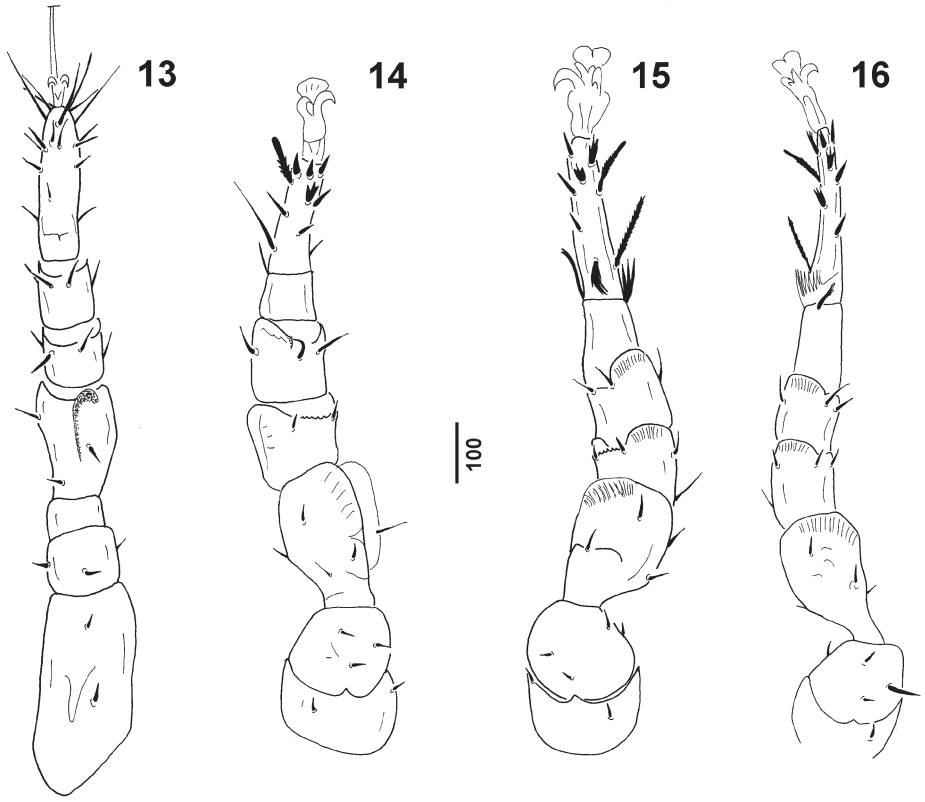


Figs 6–12. *Trigonuropoda (Foveolatatrigon) mahunkaorum* sp. n., holotype female (6–11) and male (12): (6) intercoxal area; (7) tritosternum; (8) ventral view of gnathosoma; (9) epistome; (10) chelicerae; (11) palp; (12) intercoxal area of male.

and IV, surface with oval pits; without anterior process. Tritosternum with narrow basis, tritosternal laciniae divided into three, marginally serrate branches (Fig. 7).

Gnathosoma (Fig. 8): Corniculi horn-like, internal malae short, triangular and marginally smooth. Hypostomal setae *h1* smooth, apically wide and Y-shaped (*ca* 43 µm), *h2* smooth, needle-like and very short (*ca* 12 µm), *h3* long (*ca* 44 µm) and smooth, *h4* apically serrate (*ca* 27 µm). Epistome with serrated basal margin, apically pilose (Fig. 9). Digitus fixus of chelicerae without teeth and longer than digitus mobilis, digitus mobilis with one central tooth, internal sclerotized node present (Fig. 10). Palp with smooth and needle-like setae (Fig. 11).

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Figs 13–16. *Trigonuropoda (Foveolatatrigon) mahunkaorum* sp. n., female, holotype: (13) leg I; (14) leg II; (15) leg III; (16) leg IV.

Legs (Figs 13–16): All legs with ambulacral claws and bearing smooth setae on all segments except tarsi. Tarsi II–IV with long marginally serrate and short robust apically serrate setae Leg I–II with large lateral flaps on femurs.

Male.

Idiosoma: Length 590 µm, width 440 µm (n=1). Shape oval, posterior margin rounded. Dorsal pattern and chaetotaxy similar to that of female.

Ventral aspect: Sternal shield covered by oval pits. Sternal setae smooth, short (*ca* 8–10 µm) and needle-like. *St1* situated at level of anterior margin of coxae II, *St2* at level of posterior margin of coxae II, *St3* at level of anterior margin of coxae III, *St4* at level of anterior margin of coxae IV, *St5* at level of central area of coxae IV, near margin of genital opening. Two pairs of lyriform fissures situated, first pair near to *St1*, second pair between *St4* and *St5* (Fig. 12). Ventral chaetotaxy similar to that of female. Genital shield circular, situated between coxae IV.

Larva and nymphs. Unknown.

Holotype: ♀ MADAGASCAR: Ranomafana National Park, 21°14'51"S 47°24'13"E, 1079 m, litter sifting, 16–18.xi.2010, P. Baňař (HNHM).

Paratypes: 1♀ 1♂ same data as for holotype (♀ ISB, ♂ HNHM).

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Comparison: The new species has several unique characters in the *Foveolatatrigon* subgenus. The new species has linguliform genital shield, which is scutiform in other *Foveolatatrigon* species. The post-stigmatid part of peritreme is short in the *T. (F.) mahunkaorum*, but longer in the other species of the subgenus. The bulbiform setae of the caudal area of the ventral shield, which can be found in *T. (F.) mahunkaorum*, are unknown in other *Foveolatatrigon* species.

Key to the Afrotropical *Trigonuropoda* species

1 Caudal area of dorsal shield elevated from the neighbouring parts, dorsal shield fused on anterior region with marginal shield, setae *h1* narrow 2
– Caudal area of dorsal shield not elevated from the neighbouring parts, dorsal shield completely separated from marginal shield, setae *h1* apically wide and Y-shaped... ..... **T. (F.) mahunkaorum** sp. n.

2 Idiosoma pear-like, genital shield scutiform 3
– Idiosoma oval, genital shield linguliform 4

3 Dorsal setae short and needle-like, marginal shield with reticulate sculpture .... **T. (L.) ulugurensis** Hirschmann
– Dorsal setae phylliform, surface of marginal shield smooth..... ..... **T. (L.) takacsi** Kontschán

4 One pair of large and one pair of small strongly sclerotized areas situated on anterior part of dorsal shield, genital shield of female covered by oval pits..... ..... **T. (L.) shimbaensis** Kontschán
– Strongly sclerotized areas absent on anterior part of dorsal shield, genital shield of female covered by reticulate sculpture..... **T. (L.) gerei** Kontschán

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