

A NEW SPECIES OF ORIBATID MITES OF THE GENUS *MALACONOTHRUS* (ACARI, ORIBATIDA, MALACONOTHRIDAE) FROM VIETNAM

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ABSTRACT. A new species of oribatid mites of the genus *Malaconothrus*, *M. adilatatus* sp. n., is described from Vietnam. It differs from *M. heterotrichus* by the body size, morphology of interlamellar and exobothridial setae ex_1 , and some epimeral and leg setae. An identification key to species of the genus *Malaconothrus* known from Vietnam is given.

KEY WORDS: oribatid mites, *Malaconothrus*, new species, key, Vietnam

INTRODUCTION

Malaconothrus is a genus that was proposed by Berlese (1904) with *Nothrus monodactylus* Michael, 1888 as type species. Currently, it comprises around 60 species (see Subías 2004; Colloff and Cameron, 2013 for different classifications), which have a cosmopolitan distribution. The main generic characters of this genus were summarized by Balogh and Balogh (1992), Weigmann (2006), and Colloff and Cameron (2013).

The primary purpose of this paper is to describe and illustrate a new species of *Malaconothrus*, *M. adilatatus* sp. n., from southern Vietnam. At present, three species of *Malaconothrus* were recorded in Vietnam (for example, Ermilov et al. 2012a, b; Ermilov and Niedbała 2013): *M. dorsofoveolatus* Hammer, 1979, *M. geminus* Hammer, 1972, and *Malaconothrus variosetosus* Hammer, 1971. An identification key to the species of *Malaconothrus* known from Vietnam is provided.

MATERIAL AND METHODS

Specimens of *Malaconothrus adilatatus* sp. n. (holotype: female; paratype: female) were collected by A.E. Anichkin and S.G. Ermilov in southern Vietnam: Dong Nai Province, Dong Nai Biosphere Reserve, 11°26'N, 107°26'E, mosses on stone and tree bark (heights 0.5–2.5 m) near Dong Nai river, 26 November 2013.

Holotype and paratype were studied in lactic acid, mounted in temporary cavity slides for the duration of the study, and then stored in 70 per cent ethanol in vials. Body measurements are presented in micrometers. The body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the ventral plate. Notogastral width refers to the maximum width in dorsal aspect. Lengths of body setae were measured in lat-

eral aspect. Formula for leg setation is given in parentheses according to the sequence trochanter – femur – genu – tibia – tarsus (famulus included). Formula for leg solenidia is given in square brackets according to the sequence genu–tibia–tarsus. General terminology used in this paper mostly follows that summarized by Weigmann (2006), Norton and Behan-Pelletier (2009), and Colloff and Cameron (2013).

The holotype is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; the paratype is deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen.

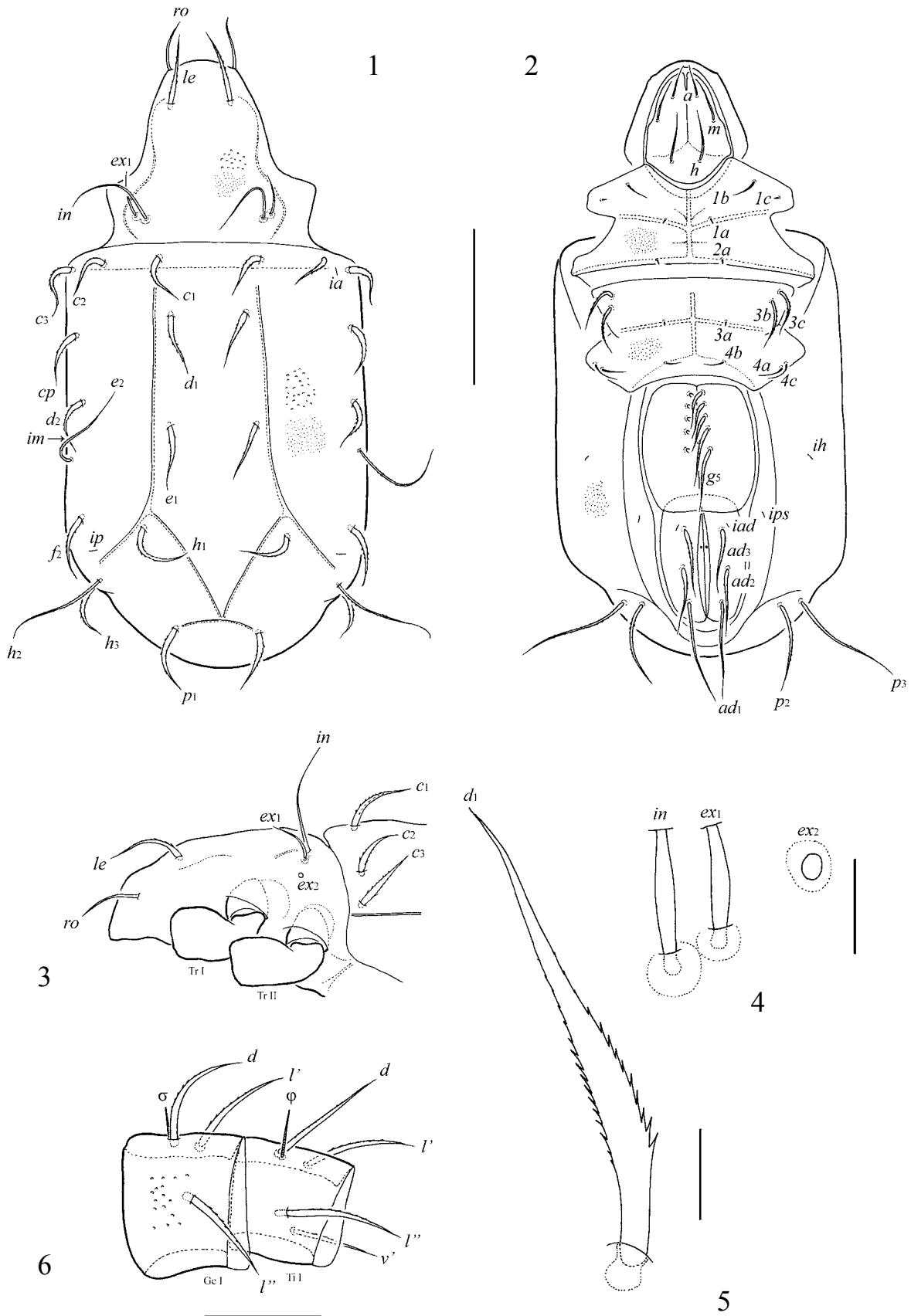
TAXONOMY

Malaconothrus adilatatus sp. n.

Figs 1–6

Diagnosis. Body size 398 × 182–190. Body surface microfoveolate. Rostral setae thickened, smooth, directed forward. Lamellar setae thicker than rostral setae, barbed. Interlamellar and exobothridial setae ex_1 setiform, indistinctly dilated, similar in thickness, smooth; interlamellar setae considerably longer than ex_1 . Notogastral ridges present. Notogastral setae barbed: c_1 – c_3 , cp , d_1 , d_2 , e_1 , f_2 , h_1 , h_3 , p_1 of medium size, weakly dilated; e_2 , h_2 , p_2 , p_3 long, thickened. Epimeral setal formula: 3–1–3–3; setae $1a$, $1c$, $2a$, $3a$ spiniform; $3b$, $3c$ longest, setiform, barbed; $4b$ longer than other medial setae. Five to six pairs of genital setae weakly dilated, barbed. Adanal setae long: ad_1 thickened, longer and thinner than weakly dilated ad_2 , ad_3 . Legs monodactylous. Setae d on tibiae and genua of legs thickened.

Description. *Measurements.* Body length 398 (holotype), 398 (paratype); notogaster width 190 (holotype), 182 (paratype).



Figs 1–6. *Malaconothrus adilatatus* sp. n. 1 — dorsal view; 2 — ventral view (legs not illustrated); 3 — lateral view of prodorsum and anterior part of notogaster (gnathosoma and anterior parts of legs I, II not illustrated); 4 — basal parts of interlamellar and exobothridial seta ex_1 , and alveolus of exobothridial seta ex_2 , dorso-lateral view; 5 — notogastral seta d_1 ; 6 — tibia and genu of leg I, right, antiaxial view. Scale bars 100 μ m (1–3), 10 μ m (4, 5), 20 μ m (6).

Table 1.

Leg setation and solenidia of *Malaconothrus adilatatus* sp. n.

| Leg | Trochanter | Femur | Genu | Tibia | Tarsus |
|-----|------------|---------------------|----------------|------------------|--|
| I | v' | $d, (l), bv'', v''$ | $d\sigma, (l)$ | $d\phi, (l), v'$ | $(ft), (tc), (p), (u), (a), e, \omega_1, \omega_2, \omega_3$ |
| II | v' | $d, (l), bv'', v''$ | $d\sigma, l'$ | $d\phi, (l), v'$ | $(ft), (tc), (p), (u), (a), \omega$ |
| III | l', v' | d, ev' | d | $d\phi, v'$ | $(ft), (tc), (p), (u), (a)$ |
| IV | v' | d, ev' | d | d, v' | $ft'', (tc), (p), (u), (a), s$ |

Roman letters refer to normal setae (e — famulus), Greek letters refer to solenidia, $d\phi$ and $d\sigma$ — seta and solenidion coupled. One apostrophe (') marks setae on anterior and double apostrophe (") setae on posterior side of the given leg segment. Parentheses refer to a pair of setae.

Table 2.

Morphological differences between *Malaconothrus heterotrichus* and *M. adilatatus* sp. n.

| Character | <i>M. heterotrichus</i> | <i>M. adilatatus</i> sp. n. |
|--|---|---|
| Body size | 414–429 × 182–200 | 398 × 182–190 |
| Morphology of <i>in</i> and <i>ex</i> ₁ | barbed | smooth |
| Lengths of <i>in</i> and <i>ex</i> ₁ | <i>in</i> little longer than <i>ex</i> ₁ | <i>in</i> considerably longer than <i>ex</i> ₁ |
| Thickness of <i>in</i> and <i>ex</i> ₁ | <i>in</i> thinner than <i>ex</i> ₁ | <i>in</i> and <i>ex</i> ₁ similar |
| Length of <i>4b</i> | similar to <i>1a</i> , <i>2a</i> and <i>3a</i> | longer than <i>1a</i> , <i>2a</i> and <i>3a</i> |
| Leg setae <i>d</i> on tibiae and genua | dilated | thickened, not diluted |

Integument. Body color light brownish. Body surface densely microfoveolate (clearly visible under high magnification; diameter of foveolae up to 1) and covered by amorphous and granular (granules rounded or conical, their diameter and length up to 6) cerotegument.

Prodorsum. Rostrum rounded. Lateral carinae poorly visible, reach of insertions of the lamellar setae. Rostral setae (*ro*, 41–45) thickened, smooth. Lamellar setae (*le*, 57–61) thicker than rostral setae, barbed. Both pairs of these setae directed forward. Interlamellar (*in*, 69–77) and exobothridial setae *ex*₁ (32–41) setiform, indistinctly diluted in basal part, smooth. Exobothridial setae *ex*₂ represented by alveolus.

Notogaster. Anterior margin straight. Posterior margin rounded. Notogastral ridges well developed. All notogastral setae barbed: c_1 – c_3 , cp , d_1 , d_2 , e_1 , f_2 , h_1 , h_3 , p_1 of medium size (53–61), thickened, weakly diluted in medio-basal part; e_2 , h_2 , p_3 (73–77) and p_2 (65–69) long, thickened. Lyrifissures *ia*, *im*, *ip*, *ih* and *ips* distinct.

Gnathosoma. Generally as typical for the genus (Ermilov et al. 2013; Colloff and Cameron 2013). Subcapitulum longer than wide (77 × 57). Subcapitular setae setiform, smooth; *h*, *m* (both 32) longer than *a* (24).

Epimeral region. Epimeral plates I, II and IV fused medially, plates III fused partially posterior-medially. Epimeral setal formula (from 1 to 4):

3–1–3–3. Epimeral setae *1a* (also *1b* in paratype), *1c*, *2a*, *3a* short (4–6), spiniform; *1b* (only in holotype), *4a*, *4c* (28–32) and *4b* (16) longer, setiform, smooth; *3b*, *3c* longest (41–45), setiform, barbed. Setae *4b* longer than other medial setae (*1a*, *2a*, *3a*).

Anogenital region. Five pairs of genital setae (g_1 – g_3 , 28–32; g_4 , g_5 , 41–45) thickened, weakly diluted, barbed. One pair of anal setae represented by alveoli. Three pairs of adanal setae slightly barbed: ad_1 weakly thickened, longer (73–77) and thinner than weakly diluted ad_2 , ad_3 (53–61). Adanal lyrifissures iad distinct, located latero-anteriorly to ad_3 .

Legs. Claw of each leg smooth. Morphology of leg segments typical for *Malaconothrus* (Knülle 1957; Colloff and Cameron 2013). Formulae of leg setation and solenidia: I (1–5–3–4–11) [1–1–3], II (1–5–2–4–10) [1–1–1], III (2–2–1–2–10) [0–1–0], IV (0–2–1–2–10) [0–0–0]; homology of setae and solenidia indicated in Table 1. Famulus and solenidia short, simple, blunted. Setae *d* on tibiae and genua thickened, barbed.

Etymology. The specific name “*adilatatus*” refers to the leg setae *d* on tibiae and genua, which are not diluted.

Remarks. The new species is most similar to *Malaconothrus heterotrichus* Mahunka, 1992 (see Mahunka 1992), however, it differs from the latter by the body size, morphology of interlamellar and

exobothridial setae ex_1 and some epimeral and leg setae (see Table 2).

**KEY TO SPECIES OF THE GENUS
MALACONOTHRUS FROM VIETNAM**

1. Notogastral setae c_1-c_3 , cp , d_1 , d_2 , e_1 , f_2 , p_1 , h_3 dilated, barbed 2

— All notogastral setae simple, thin, smooth 3

2. Rostral setae barbed, thicker than lamellar setae; interlamellar setae little longer than exobothridial setae ex_1 ; notogastral setae h_1 simple, smooth; body length 300 *M. variosetosus* Hammer, 1971 (see Hammer 1971). Distribution: Fiji and Vietnam.

— Rostral setae smooth, thinner than lamellar setae; interlamellar setae considerably longer than exobothridial setae ex_1 ; notogastral setae h_1 weakly dilated, barbed; body size: 398 × 182–190 *M. dilatatus* sp. n. Distribution: Vietnam.

3. Lamellar setae thicker than rostral setae; notogaster with well developed ridges, without foveolae; notogastral setae e_1 clearly longer than c_1 and d_1 ; body length 425 *M. geminus* Hammer, 1972 (see Hammer 1972). Distribution: Polynesia and Oriental region.

— Lamellar setae not thicker than rostral setae; notogaster with indistinctly developed or without ridges, with foveolae; notogastral setae e_1 not longer than c_1 and d_1 ; body length: 380 *M. dorsofoveolatus* Hammer, 1979 (see Hammer 1979). Distribution: Indonesia and Vietnam.

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