Additional description of *Scheloribates* (*Bischeloribates*) *mahunkai* Subías, 2010 (Acari: Oribatida: Scheloribatidae) on the basis of Vietnamese specimens

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Abstract. The oribatid mite, *Scheloribates* (*Bischeloribates*) *mahunkai* Subías, 2010 is redescribed in details on the basis of specimens from Vietnam. The size of body structures, morphology of the gnathosoma and legs are presented for the first time. Morphological differences of Vietnamese and Malaysian specimens are discussed.

Keywords. Oribatida, redescription, *Scheloribates* (*Bischeloribates*) *mahunkai*, Vietnam

INTRODUCTION

Scheloribates (*Bischeloribates*) *mahunkai* Subías, 2010 (Acari, Oribatida, Scheloribatidae) was described as *Bischeloribates heterodactylus* Mahunka, 1988. However, Subías (2004, online version 2006) has suggested to consider the genus *Bischeloribates* as subgenus of *Scheloribates* Berlese, 1908 because *Bischeloribates* differs from *Scheloribates* only by a single main character (leg tarsi with two claws versus with three claws). I support the subgeneric status for *Bischeloribates*, following the concept of Subías, because the number of leg claws is not apomorphic character at genus-level in Oripodoidea. Also, as the name *heterodactylus* is preoccupied by *Scheloribates* (*Topobates*) *heterodactylus* Pletzen, 1963 (see system of *Scheloribates* in Weigmann 2006), therefore Subías (2010) has proposed a replacement name – *mahunkai*.

At present, *Scheloribates* (*Bischeloribates*) *mahunkai* is recorded only in Malaysia and India (Subías 2004, online version 2012). In the course of taxonomic identification of Vietnamese oribatid mites, my friend (A. E. Anichkin) and I have found several specimens of this species; hence, it is first record in Vietnam.

Scheloribates (*Bischeloribates*) *mahunkai* is the type species of the subgenus *Bischeloribates*, therefore providing detailed morphological data on this species is needed, especially because, the original description (see Mahunka 1988) is incomplete and brief (lacking information on the measures of morphological structures, leg setation and solenidia, morphology of gnathosoma). The main goal of this paper is to present an additional description of *Scheloribates* (*Bischeloribates*) *mahunkai*, on the basis of the specimens found in Vietnam.

MATERIAL AND METHODS

Material examined. Ten specimens (three males and seven females) of *Scheloribates* (*Bischeloribates*) *mahunkai* found in Southern Vietnam, Dong Nai Province, Dong Nai Culture and Nature Reserve, pine (*Pinus kesiya* Royle ex Gordon, 11°16' N, 107° 40' E) and acacias (*Acacia auriculiformis* A.Cunn. ex Benth, 11°18' N, 107°3' E) plantations, in soil, leaves and litter, collected by A.E. Anichkin and S.G. Ermilov in July 2012.

Specimens were mounted in lactic acid on temporary cavity slides for measurement and il-

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lustration. All body measurements are presented in micrometers. Body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the ventral plate, to avoid discrepancies caused by different degrees of notogastral distortion. Notogastral width refers to the maximum width in dorsal aspect. Lengths of body setae were measured in lateral aspect. Formulae for leg setation (famulus included) are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus. Formulae for leg solenidia are given in square brackets according to the sequence genu–tibia–tarsus.

The general morphological terminology used in the description follows that summarized by Coetzer (1967–1968) and Norton & Behan-Pelletier (2009).

TAXONOMY

Scheloribates (*Bischeloribates*) *mahunkai* Subías, 2010

(Figs. 1–17)

Scheloribates (Bischeloribates) mahunkai Subias, 2010: 38, nom. nov. pro *Scheloribates heterodactylus* Mahunka, 1988 non *Scheloribates (Topobates) heterodactylus* (Pletzen, 1963)

Diagnosis. Body size 365–431 × 232–249. Rostrum rounded. Translamellar line present, interrupted medially. Prolamellar lines complete or incomplete. Rostral, lamellar and interlamellar setae long, setiform, barbed. Sensilli long, clavate, with barbed head. Four pairs of short notogastral setae (h_1, p_1–p_3) present; the other setae represented only by alveoli. Sacculi *Sa* with elongate openings, *S1*, *S2* and *S3* with rounded openings. Anogenital setae short and smooth.

Measurements. Ten specimens: body length 365–431 (mean 403); notogaster width without pteromorphs 232–249 (mean 242).

Integument (Figs. 1–5). Body light brown. Body surface smooth. Lateral surfaces of prodorsum microgranulate (diameter of granules less than 1). Epimeres IV with muscle sigillae. Circumgastric band of sigillae weakly visible.

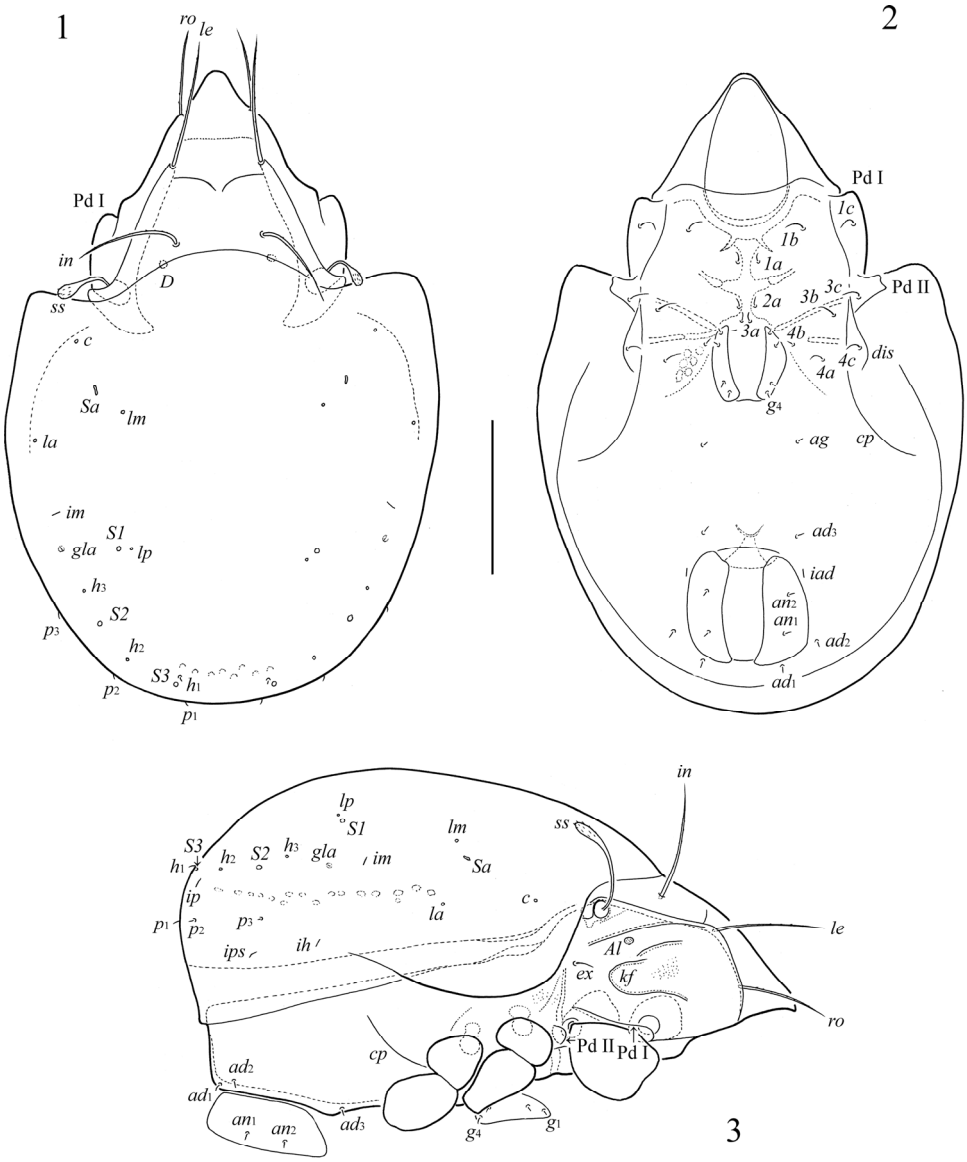
Prodorsum (Figs. 1, 3, 4, 6, 7). Rostrum rounded, weakly protruding in dorsal view. Lamellae equal approximately to half of prodorsum. Translamellar line present, interrupted medially. Prolamellar lines complete (in nine specimens) or incomplete, only its basal part developed (in one specimen). Sublamellar lines long and thin. Sublamellar porose areas (*Al*) small and rounded (4–6). Keel-shaped chitinized ridges (*kf*) distinct. Rostral (*ro*, 53–61), lamellar (*le*, 73–86) and interlamellar (*in*, 73–86) setae setiform, barbed. Sensilli (*ss*, 57–65) with long (32–41) stalk and shorter (20–24), barbed and distally rounded head. Exobothridial setae (*ex*, 12–24) setiform, thin and indistinctly barbed.

Notogaster (Figs. 1, 3, 4, 5). Anterior margin convex medially. Dorsophragmata (*D*) small and rounded. Four pairs of short, thin and smooth notogastral setae (h_1, p_1–p_3) present; other six pairs (rarely seven, including also h_1) represented only by alveoli. Sacculi *Sa* with elongate openings, *S1*, *S2* and *S3* small, with rounded openings. Lyrifissures *ia* inconspicuous; *im*, *ip*, *ih* and *ips* developed in typical arrangement for *Scheloribates*. Opisthonotal gland openings (*gla*) located posteriorly to *im* and laterally to *S1*.

Gnathosoma (Figs. 8–10). Subcapitulum longer than wide (86–94 × 49–57). Subcapitular setae setiform and slightly barbed; *h* and *a* (both 16–20) longer than *m* (8–12). Two pairs of adoral setae (or_1, or_2, 6–8) thickened, barbed and hook-like distally. Palps (53–57) with setation 0–2–1–3–9(+ω). Solenidion thickened, blunt-ended, attached with eupathidium *acm*. Chelicerae (94–98) with two setiform and barbed setae; *cha* (24–28) longer than *chb* (16–20). Trägårdh's organ (Tg) distinct.

Epimeral and lateral podosomal regions (Figs. 1–4, 11). Epimeral setal formula 3–1–3–3. Setae setiform and slightly barbed; *1a*, *2a*, *3a*, *4b* (6–12) shorter than others (16–20). Pedotecta I (Pd I) convex, pedotecta II (Pd II) rectangular and weakly concave distally. Discidia (*dis*) rounded distally. Circumpedal carinae (*cp*) distinct.

Anogenital region (Figs. 2, 3, 12, 13). Four pairs of genital (g_1–g_4, 4–8), one pair of aggenital

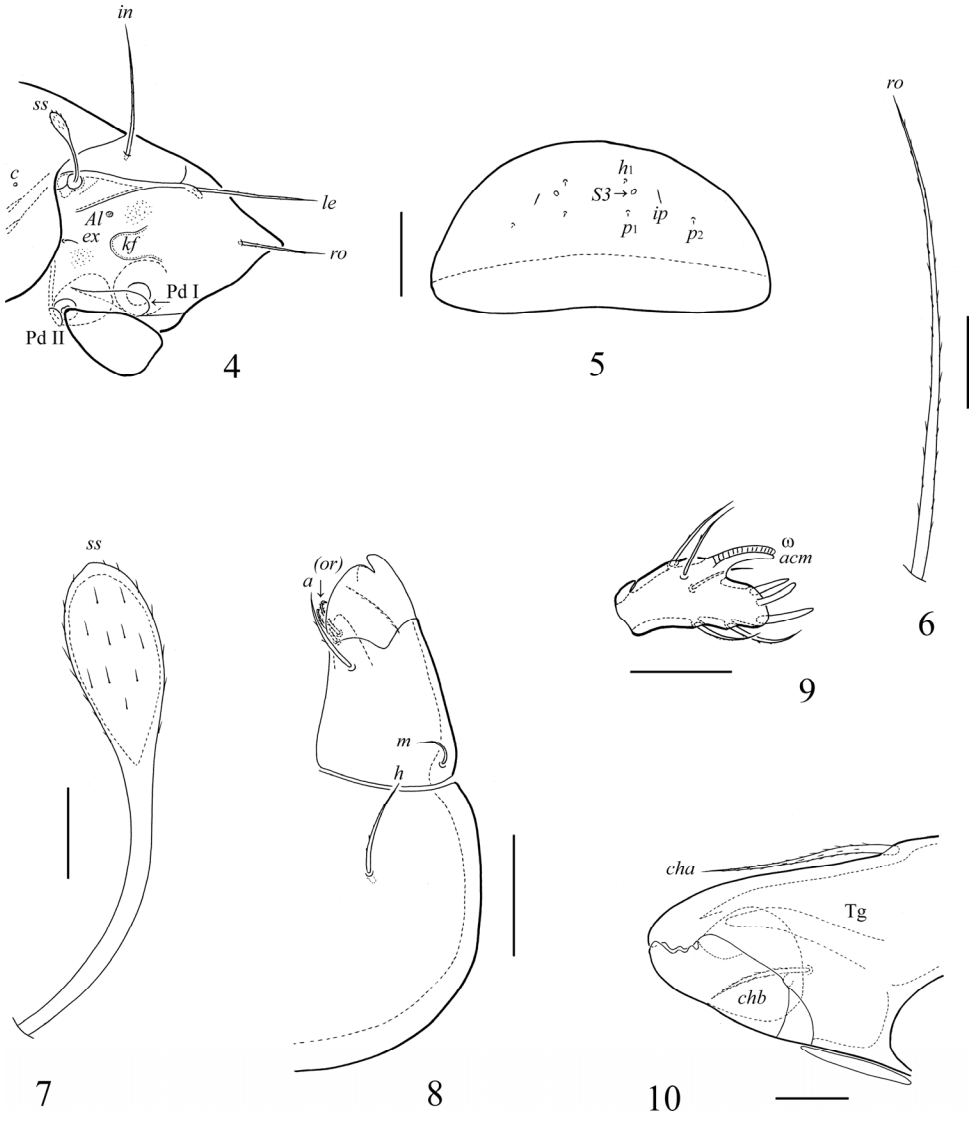


Figures 1–3. *Scheloribates (Bischeloribates) mahunkai* Subías, 2010. 1 = Dorsal view of body, 2 = ventral view of body (gnathosoma and legs not shown), 3 = lateral view of body (gnathosoma, epimeral setae, leg I and distal parts of legs II–IV not shown). Scale bar 100 μm.

Table 1. Leg setation and solenidia of *Scheloribates (Bischeloribates) mahunkai* Subías, 2010

Leg	Trochanter	Femur	Genu	Tibia	Tarsus
I	*v′*	*d, (l), bv″, v″*	*(l), v′,* σ	*(l), (v),* φ_1, φ_2	*(ft), (tc), (it), (p), (u), (a), s, (pv), v′, e,* ω_1, ω_2
II	*v′*	*d, l′*$_1$, *l′*$_2$, *bv″, v″*	*(l), v′,* σ	*(l), (v),* φ	*(ft), (tc), (it), (p), (u), (a), s, (pv),* ω_1, ω_2
III	*l′, v′*	*d, l′, ev′*	*l′,* σ	*l′, (v),* φ	*(ft), (tc), (it), (p), (u), (a), s, (pv)*
IV	*v′*	*d, ev′*	*d, l′*	*l′, (v),* φ	*ft″, (tc), (p), (u), (a), s, (pv)*

Roman letters refer to normal setae (*e* – famulus), Greek letters refer to solenidia. 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.



Figures 4–10. *Scheloribates* (*Bischeloribates*) *mahunkai* Subías, 2010. 4 = Lateral view of prodorsum (specimen with incomplete prolamellar line) and anterior part of notogaster (gnathosoma, epimeral setae, leg I and distal part of leg II not shown), 5 = posterior view of notogaster, 6 = rostral seta, 7 = sensillus, 8 = subcapitulum, ventral view of left half, 9 = palptarsus, 10 = chelicera, anterior part. Scale bars (4, 5) 50 μm, (6, 7, 9, 10) 10 μm, (8) 20 μm.

(*ag*, 4–8), two pairs of anal (an_1, an_2, 6–10) and three pairs of adanal (ad_1–ad_3, 6–10) setae setiform, thin and smooth. Lyrifissures *iad* short, located anteriorly to the level insertions of an_2.

Legs (Figs. 14–17). Both claws smooth. Formulae of leg setation and solenidia: I (1–5–3–4–17) [1–2–2], II (1–5–3–4–15) [1–1–2], III (2–3–1–3–15) [1–1–0], IV (1–2–2–3–12) [0–1–0]; homology of setae and solenidia indicated in Table 1. Famulus (*e*) short, straight, blunt-ended. Solenidia ω_2 on tarsi I, ω_1 and ω_2 on tarsi II, σ on genua III setiform, thickened and blunt-ended; other solenidia thinner (φ_1 on tibiae I longest).

Remarks. The present Vietnamese specimens of *Scheloribates* (*Bischeloribates*) *mahunkai* are morphologically and in general appearance similar to the Malaysian specimens (see the original description of Mahunka (1988), but there are

slight differences as well; i.e. body size (365–431 × 232–249 in Vietnamese specimens versus 282–302 × 188–213 in Malaysian specimens), development of prolamellar lines (well developed, complete, exception – incomplete in Vietnamese specimens versus only its basal part developed in Malaysian specimens). I believe these differences represent intraspecific (perhaps geographical) variability, and it should be indicated in any future diagnosis of *Scheloribates* (*Bischeloribates*) *mahunkai*.

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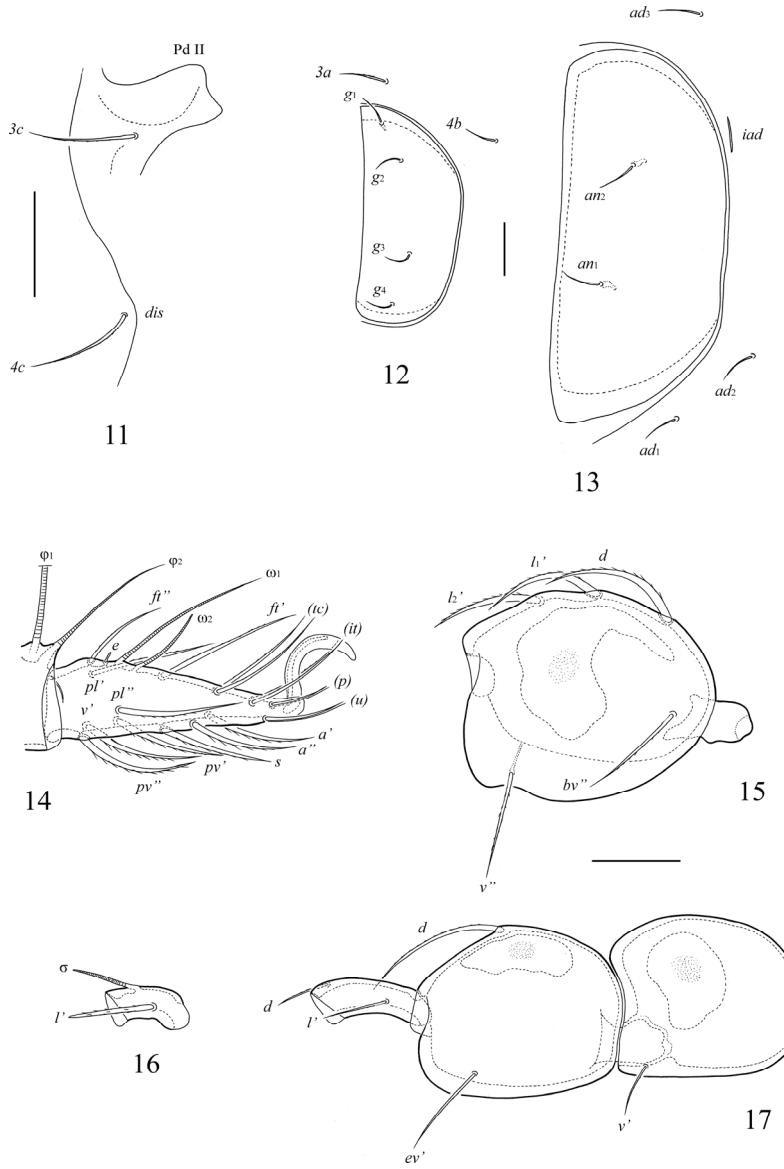

Figures 11–17. *Scheloribates* (*Bischeloribates*) *mahunkai* Subías, 2010. 11 = Pedotectum II, discidium and epimeral setae *3c*, *4c* in dissected specimen, 12 = left genital plate and epimeral setae *3a*, *4b*, 13 = left anal plate, adanal lyrifissures and adanal setae, 14 = tarsus and anterior part of tibia of leg I (right, antiaxial view), 15 = femur of leg II (left, antiaxial view), 16 = genu of leg III (right, antiaxial view), 17 = trochanter, femur and genu of leg IV (right, antiaxial view). Scale bars (11, 14–17) 20 μm, (12, 13) 10 μm.

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