

THREE NEW SPECIES OF HAPLOZETIDAE (ACARI: ORIBATIDA) FROM VIETNAM

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ABSTRACT — Three new species of oribatid mites of the family Haplozetidae, *Perxylobates crassisetosus* **n. sp.**, *Protoribates cattienensis* **n. sp.** and *Indoribates microsetosus* **n. sp.**, are proposed and described. All three are from dark loamy soil of *Lagerstroemia* forest in Cat Tien National Park (Southern Vietnam). An identification key to the Vietnamese species of *Perxylobates* is presented.

KEYWORDS — oribatid mites; new species; Haplozetidae; *Perxylobates*; *Protoribates*; *Indoribates*; Cat Tien National Park; southern Vietnam

INTRODUCTION

Earlier we presented a brief history of research on the oribatid mites of Vietnam and the geographical and floristic descriptions of Cat Tien National Park, in the southern part of this country (Ermilov and Anichkin, 2010). Our purpose herein is to describe three new species of the family Haplozetidae—each representing a different genus—that were discovered in the course of our faunistic studies in this park.

The genus *Perxylobates* Hammer, 1972 comprises 15 species that are collectively distributed in Pantropical and subtropical regions (Subías, 2004, online version 2010). At present only four species of this genus have been recorded from Vietnam (see Jeleva and Vu, 1987; Mahunka, 1988a; Krivolutskiy *et al.*, 1997; Vu, 2007; Ermilov *et al.*, in press): *Perxylobates brevisetus* Mahunka, 1988; *Perxylobates thanhoaensis* Ermilov, Vu, Trinh and Dao; *Perxylobates vermiseta* (Balogh and Mahunka, 1968); *Perxy-*

lobates vietnamensis (Jeleva and Vu, 1987). The new species is described below as *Perxylobates crassisetosus* **n. sp.**

The genus *Protoribates* Berlese, 1908 comprises more 60 species that collectively have a cosmopolitan distribution (Subías, 2004, online version 2010). At present seven species of *Protoribates* have been recorded from Vietnam (see Golosova, 1983; Mahunka, 1988a, b; Krivolutskiy *et al.*, 1997; Vu, 2007; Ermilov and Anichkin, in press): *Protoribates capucinus* Berlese, 1908; *Protoribates dentatus* (Berlese, 1883); *Protoribates gracilis* (Aoki, 1982); *Protoribates heterodactylus* Ermilov and Anichkin; *Protoribates lophothrichus* (Berlese, 1904); *Protoribates maximus* (Mahunka, 1988), *Protoribates paracapucinus* (Mahunka, 1988). The new species is described below as *Protoribates cattienensis* **n. sp.**

The genus *Indoribates* Jacot, 1929 comprises 10 species that distributed in the Oriental region (Sub-

ías, 2004, online version 2010). At present only one species of this genus, *Indoribates nobilis* (Golosova, 1984), has been recorded from Vietnam. The new species is described below as *Indoribates microsetosus* n. sp.

MATERIALS AND METHODS

Collection localities and habitats of the new species are characterized in the "Material examined" sections.

Specimens were studied in lactic acid, mounted in temporary cavity slides for the duration of the study, then stored in 70% alcohol in tubes. All body measurements are presented in micrometers (μm). 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 distension. Notogastral width refers to the maximum width in dorsal aspect. Length of body setae was measured in lateral aspect. Some paratypes of each species were dissected for detailed studies (gnathosoma, ovipositor, legs).

Formulae for leg setation are given in parentheses according to the sequence trochanter-femur-genu-tibia-tarsus (femulus included). Formulae for leg solenidia are given in square brackets according to the sequence genu-tibia-tarsus.

FAMILY HAPLOZETIDAE

Perxylobates crassisetosus n. sp. (Figures 1 – 3)

With characters of *Perxylobates* as proposed by Hammer (1972), and summarized by Balogh and Balogh (1984, 1992). The diagnostic characters of the genus *Perxylobates* are: sensilli setiform; dorsosejugal suture absent; notogaster with 10 or 11 pairs of short notogastral setae; three or four pairs of areae porosae; lamellae well-developed, but mostly narrow, no true translamella is present; tutorium present; pteromorphae movable; five pairs of genital setae, one pair of aggenital setae; legs monodactylous.

Diagnosis

Perxylobates crassisetosus n. sp. is distinguished by the following combination of character states. Body size 381 – 448 x 166 – 215; surface of body punctate; rostrum rounded or slightly truncate; rostral and lamellar setae setiform, thickened, with rare cilia dorsally; interlamellar setae setiform, barbed, shorter than rostral and lamellar setae; sensilli setiform, thickened, with 25 – 30 cilia on outer margin; ten pairs of short, setiform, straight, smooth notogastral setae; epimeral and anogenital setae setiform, smooth (only one pair of genital setae g_1 barbed).

Description

Measurements — Body length 381 (holotype), 381 – 448 (mean 410, 12 paratypes); body width 166 (holotype), 166 – 215 (mean 190, 12 paratypes). Males slightly smaller than females: body length of males (holotype and seven paratypes) 381 – 415 (mean 396), body width of males 166 – 199 (mean 178); body length of females (five paratypes) 415 – 448 (mean 428), body width of females (five paratypes) 199 – 215 (mean 205).

Integument — Body color light brown to brown. Surface of body punctate.

Prodorsum — (Figure 1A; Figure 2A–E). Rostrum rounded or slightly truncate. Lamellae located dorsolaterally, slightly longer than half of prodorsum. Rostral (*ro*, 57 – 69) and lamellar (*le*, 73 – 82) setae setiform, thickened, with rare cilia dorsally; *ro* inserted on small tubercles. Interlamellar setae (*in*, 41 – 53) setiform, barbed. Exobothridial setae (*ex*) short (4), thin, smooth. Sensilli (*ss*, 90 – 102) setiform, thickened, with 25 – 30 cilia on outer margin. Prodorsum laterally with short tutorium. Sublamellar lines slightly developed. Sublamellar areae porosae absent. Raised line runs between setae *ro* and acetabulum I (visible in lateral view). Pedotecta I and II small.

Notogaster — (Figure 1A). Pteromorphae short, movable, with small concavity in anterior margin. Ten pairs of short (12 – 20), setiform, straight, smooth notogastral setae. Three pairs of circular areae porosae: *Aa* 10 – 12, *A1* 6 – 8, *A2* 4 – 6.

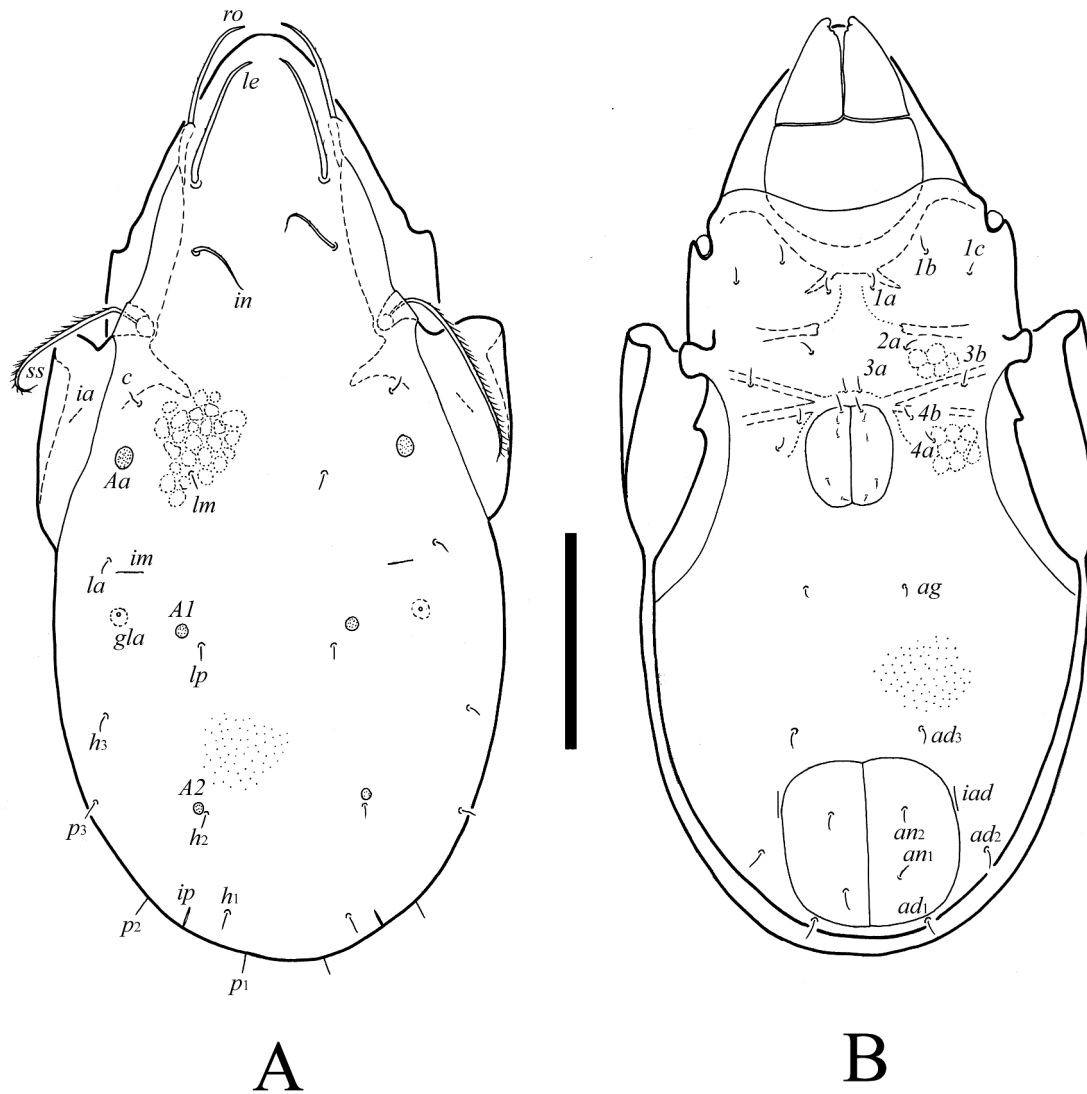


FIGURE 1: *Perxylobates crassisetosus* n. sp. A – dorsal view, legs not shown; B – ventral view, legs, palps and setae of subcapitulum not shown. Scale bar (A + B) 100 μ m.

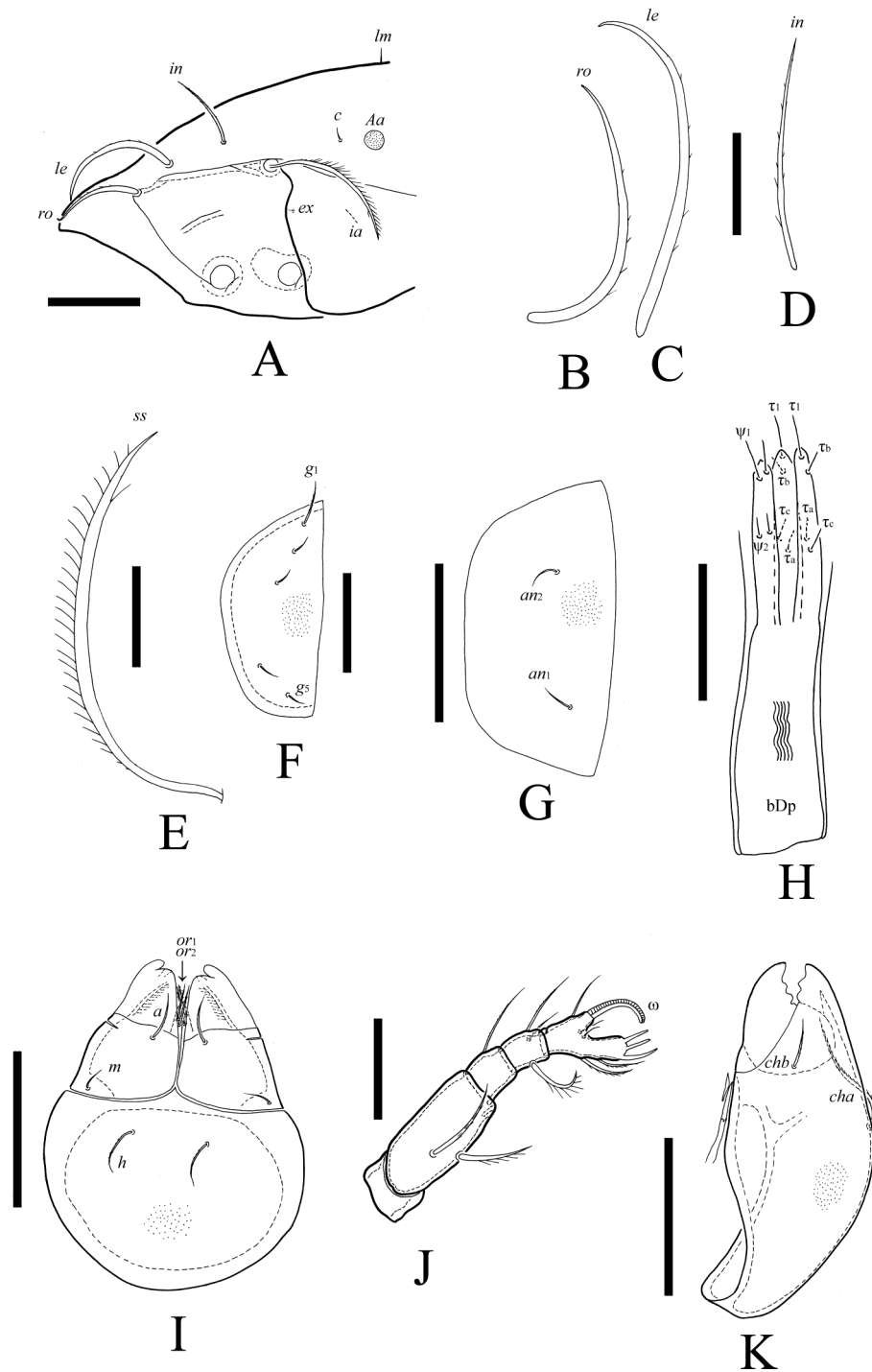


FIGURE 2: *Perxylobates crassisetosus* n. sp. A – lateral view of prodorsum, legs, gnathosoma and epimeral setae not shown; B – rostral setae; C – lamellar seta; D – interlamellar seta; E – sensillus; F – genital plate, right; G – anal plate, right; H – unextended, partially inverted ovipositor (within body); I – subcapitulum; J – palp; K – chelicera. Scale bars (A, G – I, K) 50 µm, scale bars (B + C + D, E, F, J) 20 µm.

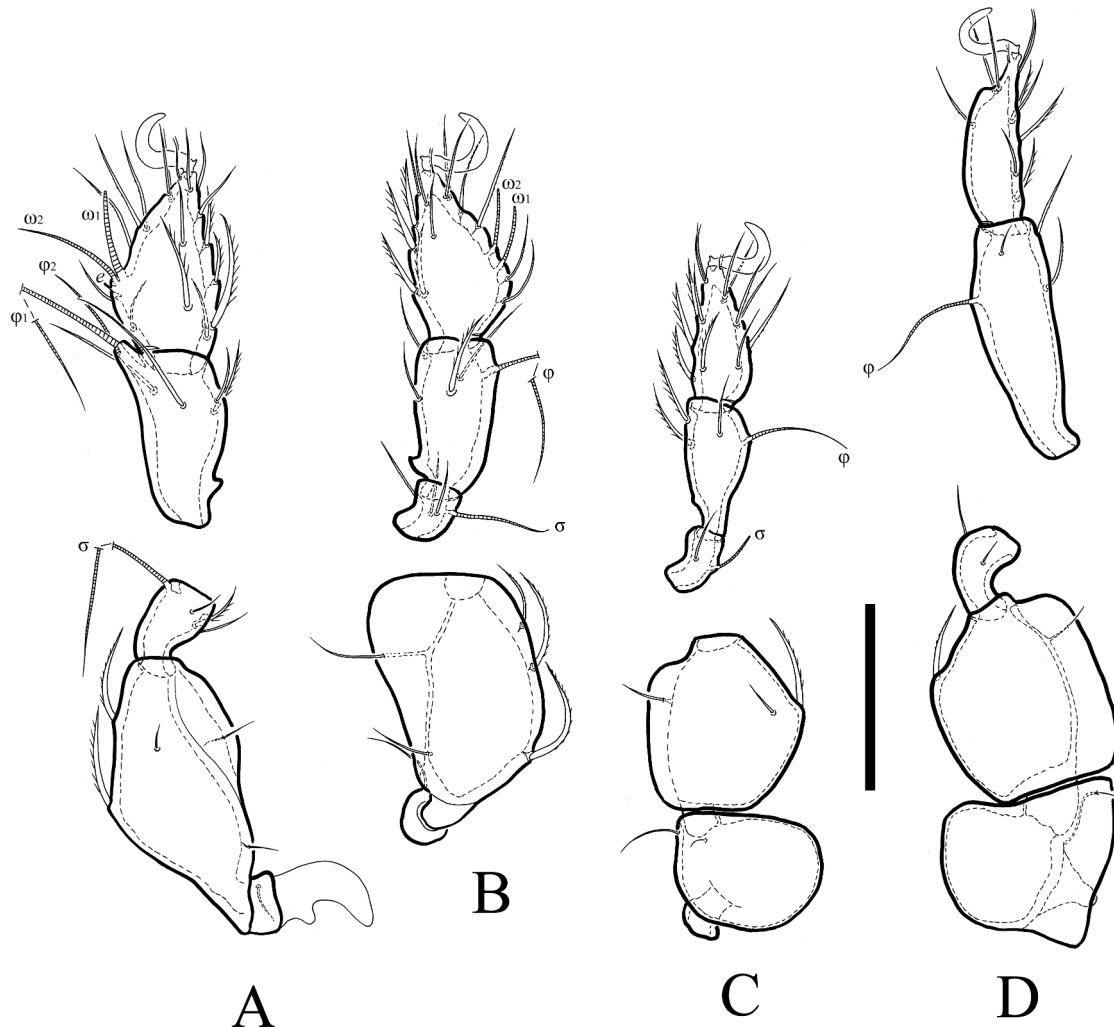


FIGURE 3: *Perxylobates crassisetosus* n. sp. A – leg I, right, antiaxial view; B – leg II, left, antiaxial view; C – leg III, right, antiaxial view; D – leg IV, left, antiaxial view. Scale bar (A + B + C + D) 50 μ m.

Opisthonotal gland opening (*gla*) and lyrifissures *ia*, *im*, *ip*, *ih*, *ips* developed in typical arrangement for genus. Discidia triangular.

Anogenital region — (Figure 1B; Figure 2F–H). Two pairs anal (*an*₁, *an*₂, 16 – 20), three pairs adanal (*ad*₁ – *ad*₂, 16 – 20) and one pair aggenital (*ag*, 8 – 12) setae setiform, smooth. Five pairs of genital setae: *g*₁ (10) setiform, barbed, others shorter and smooth (*g*₂ – *g*₅ 4 – 6). Lyrifissures *iad* in typical position for genus. Ovipositor elongate, narrow (143 x 32);

length of lobes 61, length of cylindrical distal part (bDp) 82. Lobes with 12 pairs thin, smooth setae: $\psi_1 \approx \tau_1$ (16) longer than $\psi_2 \approx \tau_a \approx \tau_b \approx \tau_c$ (8 – 10). Coronal setae *k* absent.

Epimeral region — (Figure 1B). Apodemes 1, 2, sejugal, 3 and circumpedal carina well-developed. Epimeral setal formula 3-1-3-3. Setae differ little in length, short (10 – 12), setiform, thin, smooth. Setae 3c and 4c visible only in lateral view.

Gnathosoma — (Figure 2I–K). Subcapitulum

TABLE 1: Leg setation and solenidia of *Perxylobates crassisetosus* n. sp.; (same for *Indoribates microsetosus* n. sp.)

Leg	Trochanter	Femur	Genu	Tibia	Tarsus
I	v'	$d, (l), bv'', v''$	$(l), v', \sigma$	$(l), (v), \varphi_1, \varphi_2$	$(ft), (tc), (it), (p), (u), (a), s, (pv), v', (pl), e, \omega_1, \omega_2$
II	v'	d, l_1', l_2', bv'', v''	$(l), v', \sigma$	$(l), (v), \varphi$	$(ft), (tc), (it), (p), (u), (a), s, (pv), \omega_1, \omega_2$
III	l', v'	d, l', ev'	l', σ	$l', (v), \varphi$	$(ft), (tc), (it), (p), (u), (a), s, (pv)$
IV	v'	d, ev'	d, l'	$l', (v), \varphi$	$ft'', (tc), (p), (u), (a), s, (pv)$

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

longer than wide: $94 - 110 \times 82 - 94$. Hypostomal setae setiform, slightly barbed; a ($16 - 20$) longer than h ($12 - 16$) and m (8). Lateral lips with two pairs of adoral setae (12), setiform, straight, with dense cilia. Palps (length $65 - 73$) with setation $0-2-1-3-9(+1\omega)$. All setae (except some on tarsi) with cilia (ventral setae on femora and tibiae) or barbs (others). Chelicerae (length $102 - 114$) chelate-dentate; cheliceral setae setiform, barbed, cha ($41 - 45$) longer than chb ($16 - 20$).

Legs — (Figure 3). All legs with one simple claw. Formulae of leg setation and solenidia: I ($1-5-3-4-19$) [$1-2-2$], 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. Setae setiform, barbed (except p), some ventral setae of tarsi and tibiae with long spines. Famulus short, straight, slightly dilated distally, blunt-ended. Solenidia ω_1 on tarsi I, ω_1 and ω_2 on tarsi II, σ on genua III thickened, rod-shaped; other solenidia setiform.

Material examined — Holotype (male), paratypes (12 specimens: seven males and five females) were obtained from Cat Tien National Park in southern Vietnam, $11^\circ 25' N$, $107^\circ 25' E$, 149 m above sea level, in dark loamy soil of *Lagerstroemia* forest, February-March 2009, collected by A.E. Anichkin.

Type deposition — The holotype is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; all paratypes are deposited in the collection of the Siberian Zoological Museum, Novosibirsk, Russia.

Etymology — The specific name "*crassisetosus*" refers to the thickened rostral and lamellar setae.

Distribution — At present, this species is known only from Cat Tien National Park, in southern Vietnam.

Remarks — *Perxylobates crassisetosus* n. sp. is similar to several other species in having thickened lamellar setae: *P. paravermiseta* Mahunka, 1976 from China, *P. vermiseta* (Balogh and Mahunka, 1968) from Antilles, *P. vietnamensis* (Jeleva and Vu, 1987) from Vietnam. However, it differs from these and all other species by the thickened rostral setae (thin in the other species). A new species also differs from *P. paravermiseta* by having rostral setae longer than interlamellar setae (shorter in *P. paravermiseta*), short and straight notogastral setae (longer and curved in *P. paravermiseta*), epimeral setae $1b$ and $1c$ short and smooth (long and barbed in *P. paravermiseta*). It differs from *P. vermiseta* by having greater length ($381 - 448$ vs. $338 - 363$ in *P. vermiseta*), body surface not foveolate (foveolate in *P. vermiseta*). It differs from *P. vietnamensis* by the lamellar setae inserted in normal position (very close to each other in *P. vietnamensis*), body surface not foveolate (foveolate in *P. vietnamensis*).

Key to species of *Perxylobates*

1. Lamellar setae thickened 2
— Lamellar setae not thickened 4
2. Rostral setae thickened *P. crassisetosus* n. sp.
— Rostral setae not thickened 3
3. Lamellar setae inserted dorsolaterally
..... *P. vermiseta* (Balogh and Mahunka)
— Lamellar setae inserted dorsally, close to each other *P. vietnamensis* (Jeleva and Vu)

4. Lamellar setae obviously shorter than rostral and interlamellar setae *P. brevisetus* Mahunka — Rostral, lamellar and interlamellar setae little different in length.....
 *P. thanhoaensis* Ermilov, Vu, Trinh and Dao

***Protoribates cattienensis* n. sp.**
(Figures 4 – 6)

With characters of *Protoribates* as summarized by Weigmann *et al.* (1993). The diagnostic characters of the genus *Protoribates* are: sensilli setiform or with a dilated head; notogaster with 10 or 11 pairs of short notogastral setae or vestigial; four pairs of areae porosae; lamellae well-developed, but mostly narrow, no true translamella and prolamellae are present; sublamellae present; tutorium present; dorsosejugal suture complete; pteromorphae movable; discidia well-developed; five pairs of genital setae, one pair of aggenital setae.

Diagnosis

Protoribates cattienensis n. sp. is distinguished by the following combination of character states. Body size 315 – 348 x 140 – 166; surface of body punctate (visible under high magnification); rostrum rounded or slightly truncate; rostral setae setiform, smooth; lamellar setae short, thin, smooth; interlamellar setae setiform, thicker and slightly longer than rostral setae, barbed; sensilli setiform, thickened, with cilia on outer margin; dorsosejugal suture convex; ten pairs of short, setiform, straight, smooth notogastral setae, three pairs of small areae porosae present; epimeral and anogenital setae setiform, smooth (except anteriormost pair of genital setae barbed).

Description

Measurements — Body length 348 (holotype), 315 – 348 (mean 333, 10 paratypes); body width 149 (holotype), 140 – 166 (mean 149, 10 paratypes). Males and females similar in size.

Integument — Body color light brown to brown. Surface punctate (visible under high magnification).

Prodorsum — (Figure 4A; Figure 5A–E). Rostrum rounded or slightly truncate. Lamellae located

dorsolaterally, slightly longer than half of prodorsum. Rostral setae 20 – 24, setiform, smooth, located on tubercles. Lamellar setae short (6 – 8), setiform, thin, smooth, inserted medially from lamellar tips. Interlamellar setae thicker and slightly longer than rostral setae, 28 – 32, setiform, barbed. Exobothridial setae minute (1 – 2). Sensilli (57 – 65) setiform, thickened, with 21 – 25 cilia on outer margin. Prodorsum laterally with short tutorium. Sublamellar lines well-developed. Sublamellar areae porosae absent. Raised line between rostral setae and acetabulum I present (visible in lateral view). Pedotecta I and II small.

Notogaster — (Figure 4A). Dorsosejugal suture convex. Pteromorphae short, movable. Ten pairs of short (6 – 8), setiform, straight, smooth notogastral setae. Three pairs of small circular areae porosae: *Aa* 6, *A1* 4, *A2* 4. Areae porosae *A3* absent. Opisthonotal gland opening and lyrifissures *ia*, *im*, *ip*, *ih*, *ips* developed in typical arrangement for genus. Discidia triangular.

Anogenital region — (Figure 4B; Figure 5F–H). Two pairs anal (8), three pairs adanal (*ad*₁, *ad*₂ 8, *ad*₃ 6 – 8) and one pair aggenital (4) setae setiform, smooth. Five pairs of genital setae: *g*₁ (8 – 10) setiform, barbed, others shorter and smooth (4 – 6). Lyrifissures *iad* in typical position for genus. Ovipositor elongate, narrow (102 – 110 x 16); length of lobes 49 – 53, length of cylindrical distal part 53 – 57. Lobes with 12 pairs thin, smooth setae: $\psi_1 \approx \tau_1$ (16) longer than $\psi_2 \approx \tau_a \approx \tau_b \approx \tau_c$ (8 – 10). Coronal setae *k* absent.

Epimeral region — (Figure 4B). Apodemes 1, 2, sejugal, 3 and circumpedial carina well-developed. Epimeral setal formula 3-1-3-3. All setae differ little in length, short (4 – 6), setiform, thin, smooth. Setae 3c and 4c visible only in lateral view.

Gnathosoma — (Figure 5I–K). Subcapitulum longer than wide: 86 – 94 x 57 – 65. Hypostomal setae setiform, *a* and *h* slightly barbed, *m* smooth; *a* (16) longer than *h* (8 – 12) and *m* (4). Lateral lips with two pairs of adoral setae (12), setiform, straight, with dense cilia. Palps (length 49 – 57) with setation 0-2-1-3-9(+1 ω). All setae (except some on tarsi) with cilia (ventral seta on femora and tibiae) or barbs (others). Chelicerae (length 94 – 98) chelate-dentate;

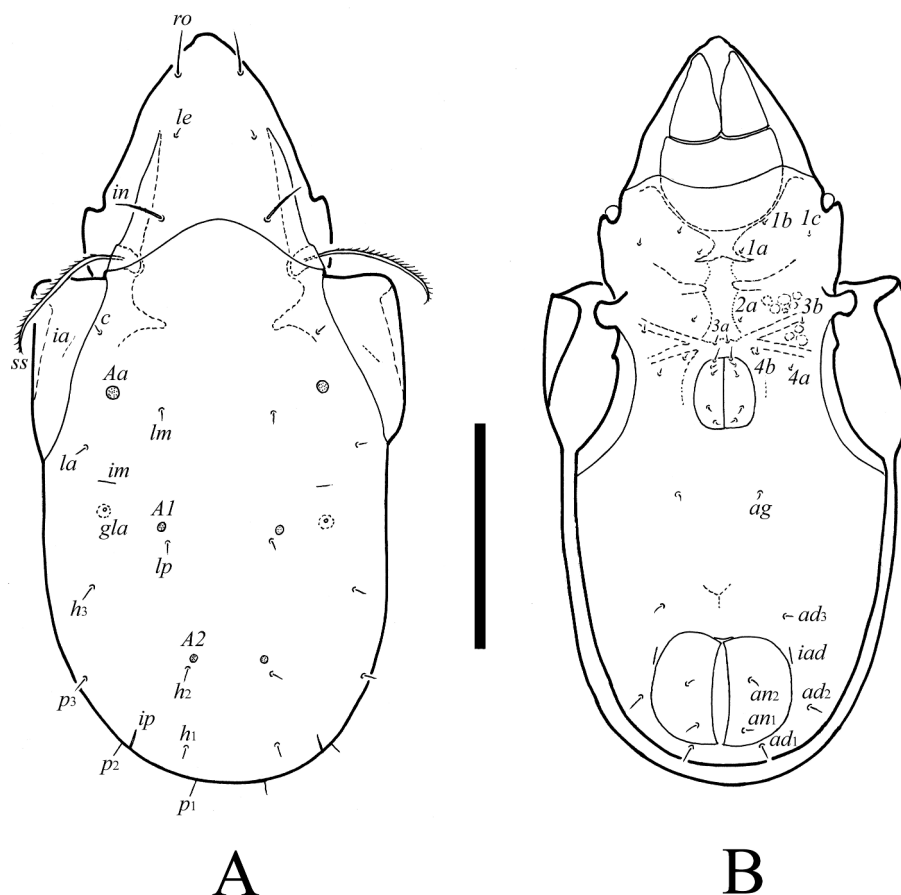


FIGURE 4: *Protoribates cattienensis* n. sp. A – dorsal view, legs palps and setae of subcapitulum not shown; B – ventral view, legs not shown. Scale bar (A + B) 100 μ m.

cheliceral setae setiform, barbed, *cha* (32 – 36) longer than *chb* (12 – 16).

Legs — (Figure 6). All legs with one simple claw. Formulae of leg setation and solenidia: I (1-5-3-4-20) [1-2-2], II (1-5-3-4-15) [1-1-2], III (2-2-1-3-15) [1-1-0], IV (1-2-1-3-12) [0-1-0]; homology of setae and solenidia indicated in Table 2. Setae setiform, barbed (except *p*), some ventral setae of tarsi and tibiae with long spines. Famulus short, straight, blunt-ended. Solenidia ω_1 on tarsi I, ω_1 and ω_2 on tarsi II, σ on genua III thickened, rod-shaped; other solenidia setiform.

Material examined — Holotype (male), paratypes (10 specimens: four males and six fe-

males) were obtained from Cat Tien National Park, in southern Vietnam, 11°25' N, 107°25' E, 149 m above sea level, in dark loamy soil of *Lagerstroemia* forest, February-March 2009, collected by A.E. Anichkin.

Type deposition — The holotype is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; all paratypes are deposited in the collection of the Siberian Zoological Museum, Novosibirsk, Russia.

Etymology — The specific name "*cattienensis*" refers to Cat Tien National Park.

Distribution — At present, this species is only

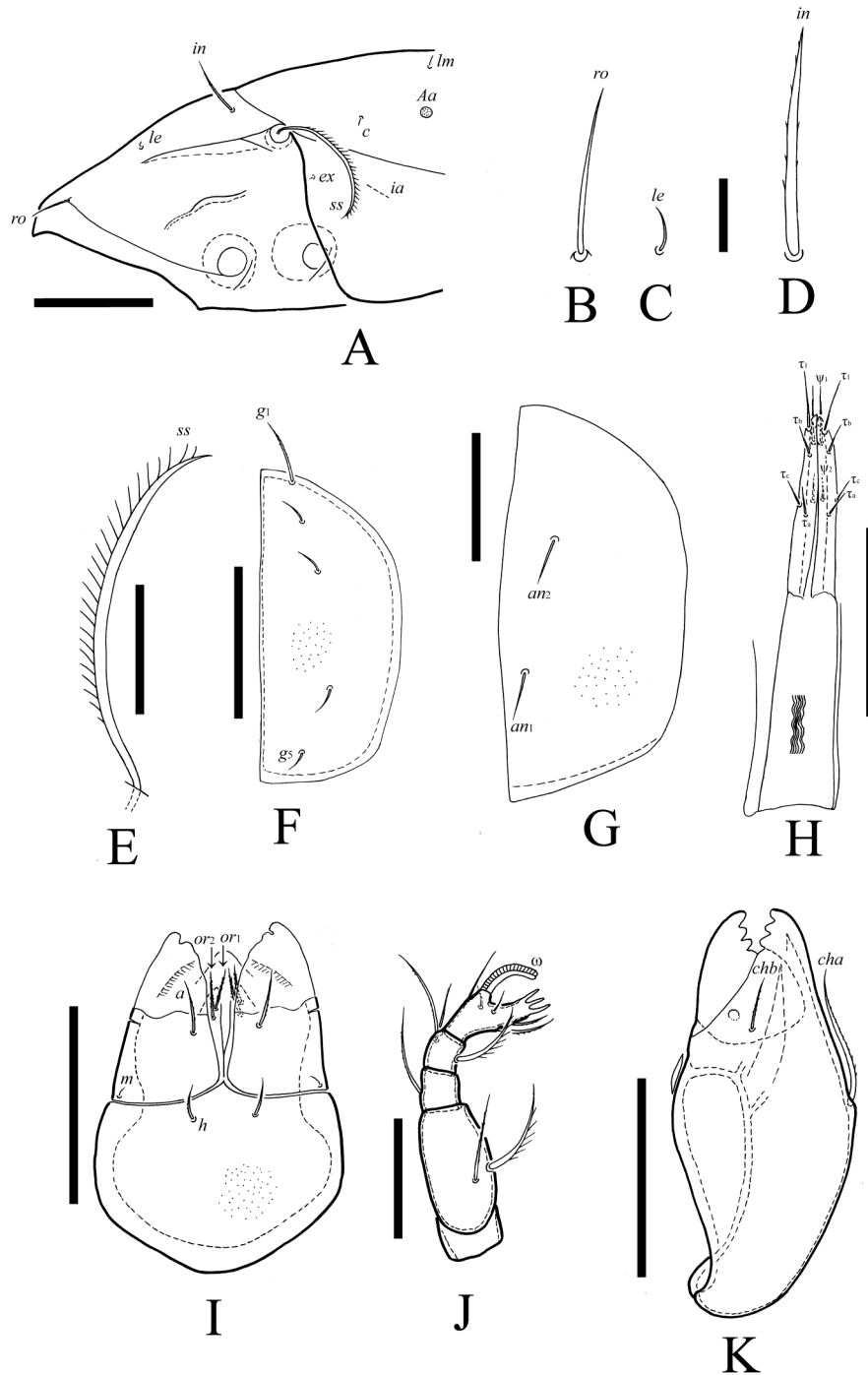


FIGURE 5: *Protoribates cattienensis* n. sp. A – lateral view of prodorsum, legs, gnathosoma and epimeral setae not shown; B – rostral setae; C – lamellar seta; D – interlamellar seta; E – sensillus; F – genital plate, left; G – anal plate, left; H – ovipositor; I – subcapitulum; J – palp; K – chelicera. Scale bars (A, H, I, K) 50 μm, scale bars (E – G, J) 20 μm, scale bar (B + C + D) 10 μm.

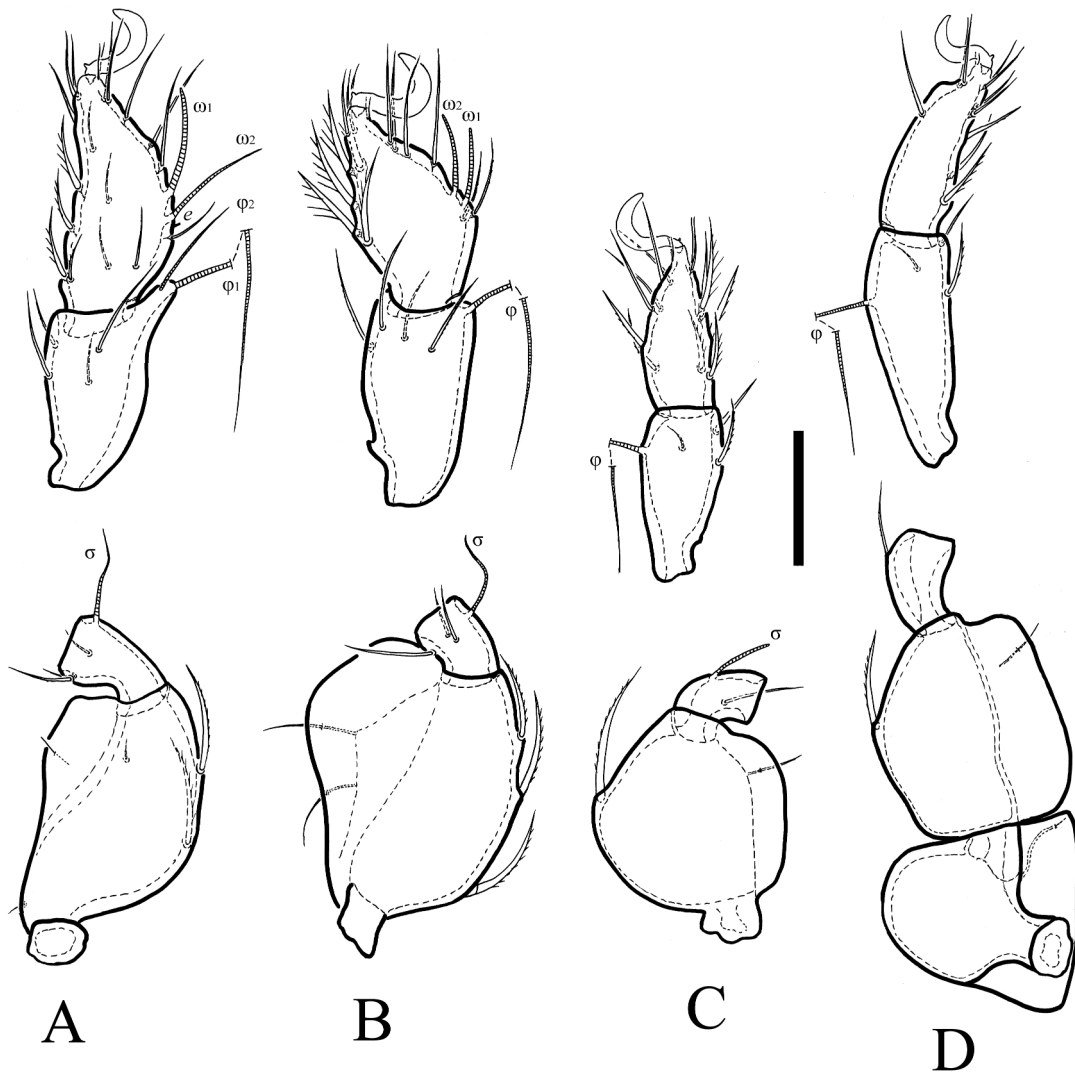


FIGURE 6: *Protoribates cattienensis* n. sp. A – leg I, right, paraxial view; B – leg II, right, without trochanter, paraxial view; C – leg III, right, without trochanter, paraxial view; D – leg IV, right, paraxial view. Scale bar (A + B + C + D) 20 μ m.

known from Cat Tien National Park, in southern Vietnam.

Remarks — *Protoribates cattienensis* n. sp. is similar to the following species in having short lamellar setae and monodactylous legs: *P. brevisetosus* (Fujita, 1989) from Japan, *P. capucinus* Berlese, 1908 with cosmopolitan distribution, *P. geonjiensis* Choi, 1994 from Korea, *P. paracapucinus* (Mahunka, 1988) from

Oriental region. It differs from these species by the setiform sensilli (with well-developed head in the other species).

The new species differs from: *P. brevisetosus* by the smooth epimeral setae 1c (barbed in *P. brevisetosus*); from *P. capucinus* by the rostral setae being considerably longer than lamellar setae (little difference in length in *P. capucinus*); from *P. geonjiensis*

TABLE 2: Leg setation and solenidia of *Protoribates cattienensis* n. sp.

Leg	Trochanter	Femur	Genu	Tibia	Tarsus
I	v'	$d, (l), bv'', v''$	$(l), v', \sigma$	$(l), (v), \varphi_1, \varphi_2$	$(ft), (tc), (it), (p), (u), (a), s, (pv), v', (pl), l'', e, \omega_1, \omega_2$
II	v'	d, l_1', l_2', bv'', v''	$(l), v', \sigma$	$(l), (v), \varphi$	$(ft), (tc), (it), (p), (u), (a), s, (pv), \omega_1, \omega_2$
III	l', v'	d, ev'	l', σ	$l', (v), \varphi$	$(ft), (tc), (it), (p), (u), (a), s, (pv)$
IV	v'	d, ev'	d	$l', (v), \varphi$	$ft'', (tc), (p), (u), (a), s, (pv)$

See Table 1 for explanation.

by the smaller body (315 – 348 vs. 404 – 430 in *P. geonjiensis*); and from *P. paracapucinus* by the shorter interlamellar setae (longer in *P. paracapucinus*).

Weigmann and Monson (2004) consider that the insertion of lamellar setae is among the diagnostic characters distinguishing between *Protoribates* and *Octodurozetes* Mahunka, 1993 (inserted on tips of lamellae in *Protoribates*; inserted medial to lamellar tips in *Octodurozetes*). *Protoribates cattienensis* n. sp. has these setae inserted medial to the lamellar tips, therefore in this character it is similar to *O. berndhauseri* Mahunka, 1993 from Switzerland, which is the only known species of *Octodurozetes*. In our opinion, this character does not distinguish the genera, because several species of *Protoribates* (for example, *P. bayanicus* Bayartogtokh, 2000 from Mongolia, *P. brevisetosus*, *P. geonjiensis*, *P. kumayaensis* Nakamura, Fukumori and Fujikawa, 2010 from Japan, *P. nagaroensis* (Fujita, 1989) from Japan, *P. paracapucinus* and some others) have lamellar setae inserted medial to the lamellar tips. *Octodurozetes* can be clearly distinguished from *Protoribates* only by the presence of prolamellae (absent in *Protoribates*).

Indoribates microsetosus n. sp. (Figures 7 – 9)

With characters of *Indoribates* (= *Nixozetes* Mahunka, 1977; = *Sundazetes* Hammer, 1979) as proposed by Jacot (1929), and summarized by Balogh and Balogh (1992) (see also Mahunka (1977) for *Nixozetes* and Hammer (1979) for *Sundazetes*). The diagnostic characters of the genus *Indoribates* are: sensilli setiform; notogaster with 10 pairs of notogastral setae; four pairs of sacculi; lamellae well-developed, translamella absent or present; tutorium present; pteromorphae movable; dorsosejugal suture com-

plete; five or four pairs of genital setae, one pair of aggenital setae; legs monodactylous or tridactylous.

Diagnosis

Indoribates microsetosus n. sp. is distinguished by the following combination of character states. Body size 431 – 481 x 215 – 249; surface of body punctate (visible under large magnification); rostrum rounded or slightly truncate; rostral, lamellar and interlamellar setae setiform, barbed; sensilli setiform, thickened, with 18 – 24 cilia on its outer margin; sublamellar areae porosae present; dorsosejugal suture slightly convex; ten pairs of very short, setiform, smooth notogastral setae; four pairs of small sacculi present; adanal setae ad_1 , ad_2 barbed, considerably longer than smooth ad_3 .

Description

Measurements — Body length 481 (holotype), 431 – 481 (mean 447, four paratypes); body width 249 (holotype), 215 – 249 (mean 236, four paratypes).

Integument — Body color light brown to brown. Surface of body punctate (visible only under large magnification). Epimeral region with muscle sigilla.

Prodorsum — (Figure 7A; Figure 8A–E). Rostrum rounded or slightly truncate. Lamellae located dorsolaterally, longer than half of prodorsum. Rostral (41 – 45), lamellar (61 – 69) and interlamellar (77 – 86) setae setiform, barbed. Exobothridial setae minute (1 – 2). Sensilli (82 – 94) setiform, thickened, with 18 – 24 cilia on its outer margin. Lateral parts of prodorsum with short tutorium. Sublamellar lines well-developed. Sublamellar areae porosae present (Al , diameter 14 – 18). Sclerotized line between rostral setae and acetabulum I absent. Pedotecta I and II small.

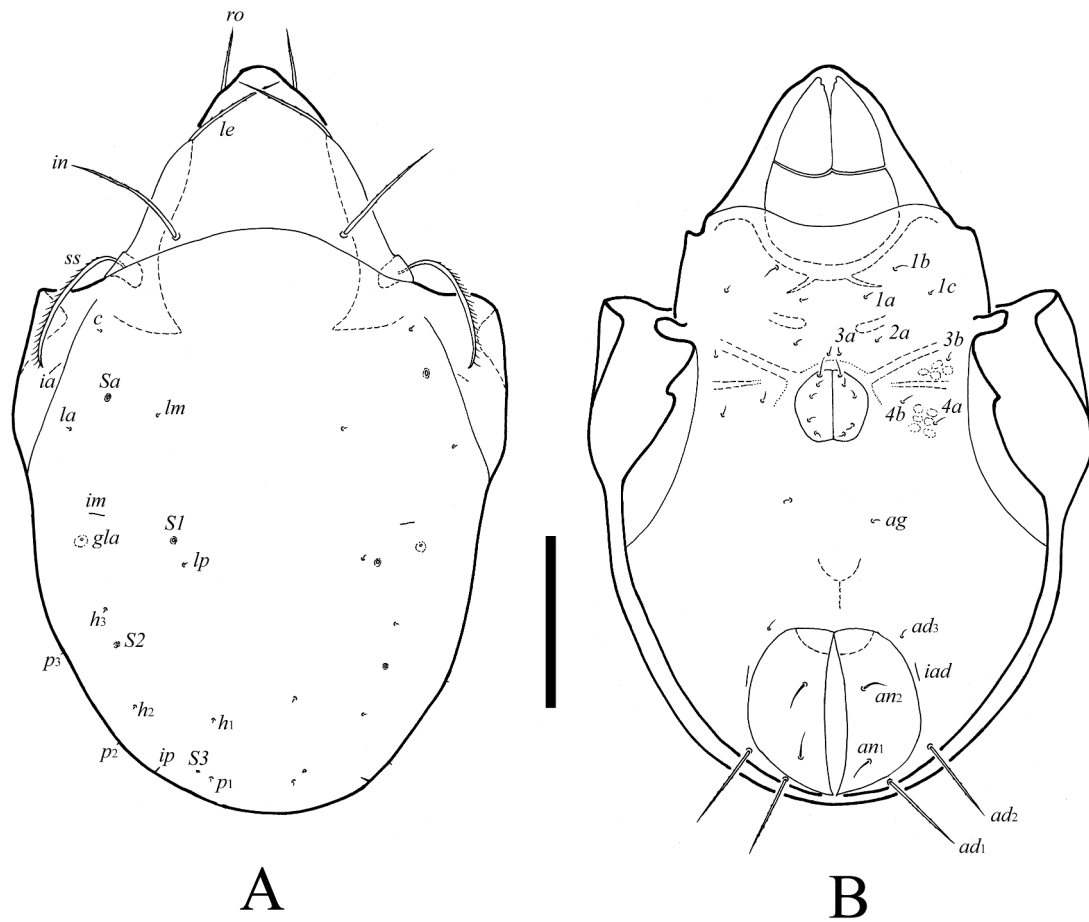


FIGURE 7: *Indoribates microsetosus* n. sp. A – dorsal view, legs removed; B – ventral view, legs, palps and setae of subcapitulum not shown. Scale bar (A + B) 100 μ m.

Notogaster — (Figure 7A). Dorsosejugal suture slightly convex. Pteromorphae short, movable. Ten pairs of very short (4), setiform, smooth notogastral setae. Four pairs of small sacculi (*Sa*, *S1*, *S2*, *S3*) present. Opisthonotal gland opening and lyrifissures *ia*, *im*, *ip*, *ih*, *ips* developed in typical arrangement for genus. Discidia triangular.

Anogenital region — (Figure 7B; Figure 8F, G). All setae setiform. Two pairs anal setae 20, slightly barbed. Adanal setae *ad*₁, *ad*₂ long (49 – 57), straight, barbed. Adanal setae *ad*₃ (8 – 10) and one pair aggenital setae (6) smooth. Five pairs of genital setae: anterior one pair 16, barbed, others shorter (8) and smooth. Lyrifissures *iad* in typical position

for genus.

Epimeral region — (Figure 7B). Apodemes 1, 2, sejugal, 3 and circumpedal carina well-developed. Epimeral setal formula 3-1-3-3. Setae *1a*, *1c*, *2a* short (10 – 12), setiform, smooth. Others setae longer (20 – 36), setiform, slightly barbed. Setae *3c* and *4c* visible in lateral view.

Gnathosoma — (Figure 8H–J). Subcapitulum longer than wide: 106 – 114 x 73 – 94. Hypostomal setae setiform, slightly barbed; *h* (32 – 36) longer than *a* (24 – 28) and *m* (8 – 12). Lateral lips with two pairs of adoral setae (28 – 32), setiform, with dense cilia. Palps (length 61 – 69) with setation 0-2-1-3-9(+1 ω). All setae (except some on tarsi) barbed.

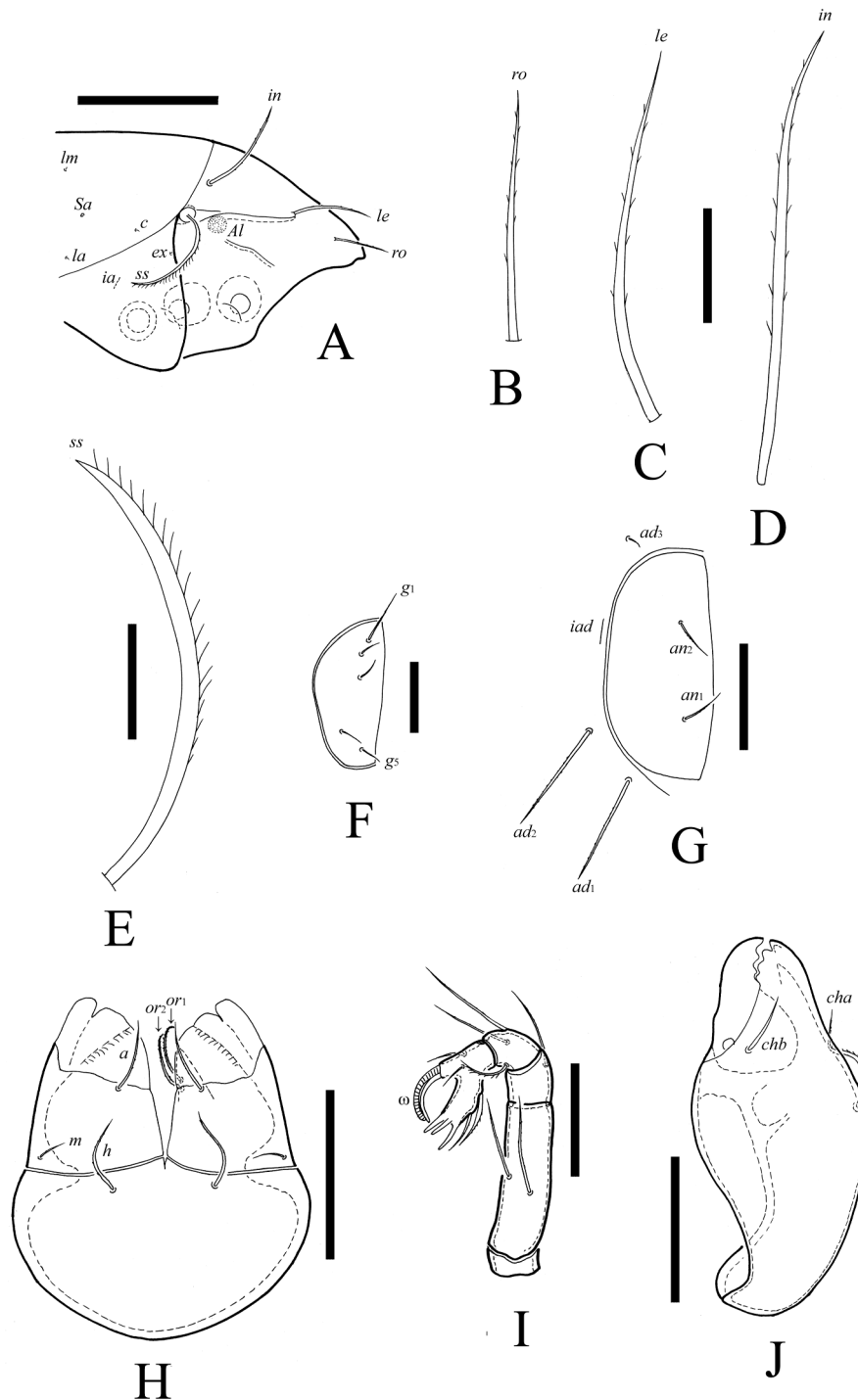


FIGURE 8: *Indoribates microsetosus* n. sp. A – lateral view of prodorsum, legs, gnathosoma and epimeral setae not shown; B – rostral setae; C – lamellar seta; D – interlamellar seta; E – sensillus; F – genital plate, right; G – anal plate, right, and adanal setae; H – subcapitulum; I – palp; J – chelicera. Scale bar (A) 100 μm, scale bars (G, H, J) 50 μm, scale bars (B + C + D, E, F, I) 20 μm.

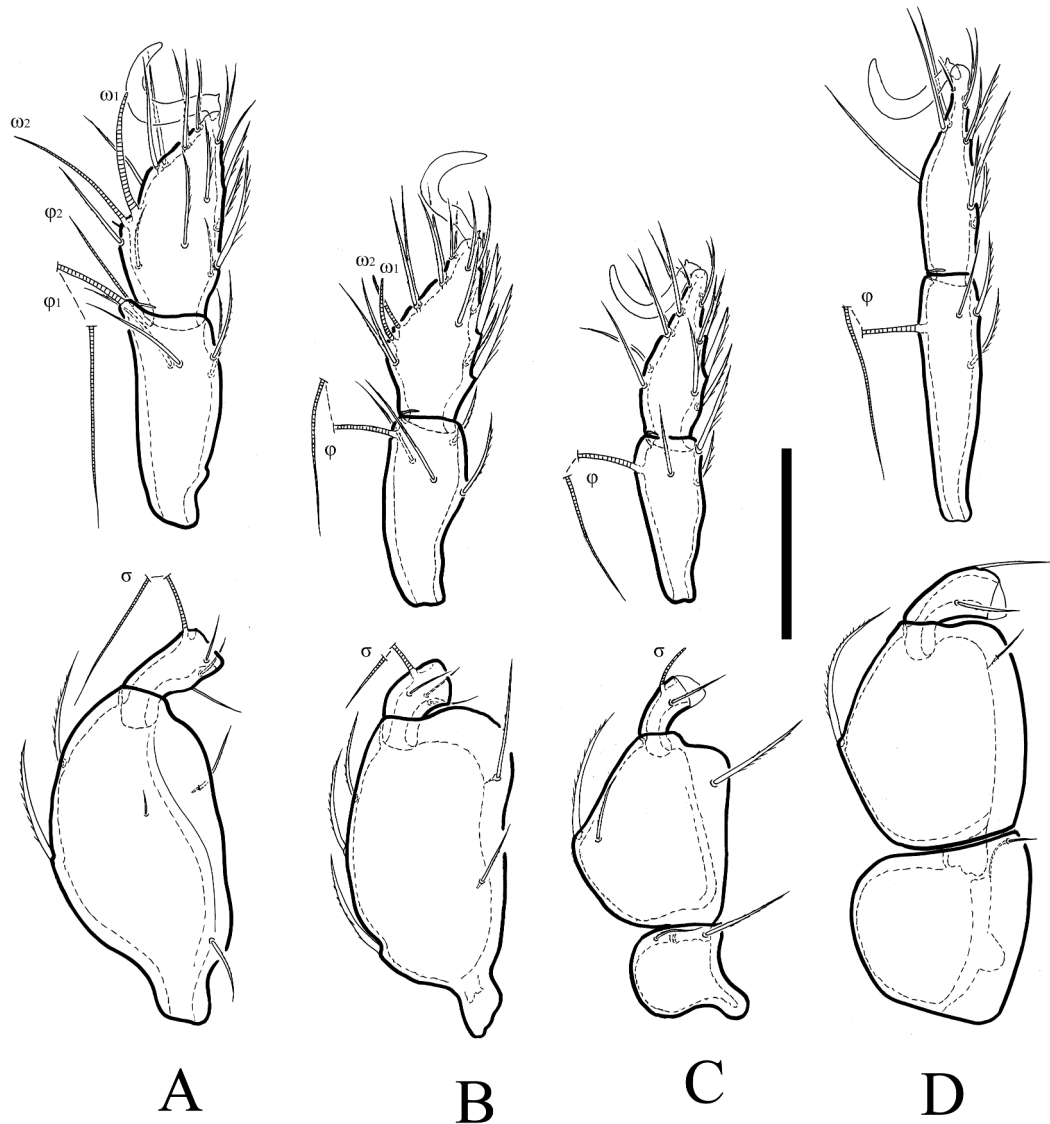


FIGURE 9: *Indoribates microsetosus* n. sp. A – leg I, without trochanter, right, antiaxial view; B – leg II, without trochanter, right, antiaxial view; C – leg III, left, antiaxial view; D – leg IV, left, antiaxial view. Scale bar (A + B + C + D) 50 μ m.

Chelicerae (length 127 – 131) chelate-dentate; cheliceral setae setiform, barbed, *cha* (45 – 53) longer than *chb* (20).

Legs — (Figure 9). All legs with one simple claw. Formulae of leg setation and solenidia: I (1-5-3-4-19) [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. Setae seti-

form, barbed (except *p*), some ventral setae of tarsi and tibiae with long spines. Famulus short, straight, blunt-ended. Solenidia ω_1 on tarsi I, ω_1 and ω_2 on tarsi II, σ on genua III thickened, rod-shaped; other solenidia setiform.

Material examined — Holotype (male), paratypes (four specimens, males) were obtained from Cat Tien National Park in southern Vietnam,

11°25' N, 107°25' E, Cat Tien National Park, 149 m above sea level, in dark loamy soil of *Lagerstroemia* forest, February–March 2009, collected by A.E. Anichkin.

Type deposition — The holotype is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; all paratypes are deposited in the collection of the Siberian Zoological Museum, Novosibirsk, Russia.

Etymology — The specific name "*microsetosus*" refers to the very short notogastral setae.

Distribution — At present, this species is known only from Cat Tien National Park, in southern Vietnam.

Remarks — Among known species of *Indoribates* *microsetosus* n. sp. is similar only to *I. japonicus* (Aoki, 1988) from Japan, in having short, smooth notogastral setae and long adanal setae ad_1 , ad_2 . It differs from the latter in the following ways: smaller body (431 – 481, vs. 627 – 777 in *I. japonicus*), notogastral setae very short (longer in *I. japonicus*), adanal setae ad_1 , ad_2 considerably longer than ad_3 , 5 : 1 (little longer, 2 : 1.7 in *I. japonicus*), and adanal setae ad_3 thin, smooth (thickened, barbed in *I. japonicus*).

The new species differs from *I. nobilis* (see Golosova 1984), the only other species of *Indoribates* recorded from Vietnam, by having: lamellar and interlamellar setae with sparse, short barbs (with longer and dense barbs in *I. nobilis*), sensilli without flagellate tips (with flagellate tips in *I. nobilis*), notogastral setae short and smooth (longer and densely barbed in *Indoribates nobilis*), anal and adanal (ad_1 , ad_2) setae with sparse barbs (densely barbed in *Indoribates nobilis*), aggenital and adanal (ad_3) setae smooth (densely barbed in *I. nobilis*), five pairs of genital setae (four pairs in *I. nobilis*).

Indoribates was proposed by Jacot (1929) with *Protoribates punctulatus* Sellnick, 1929 from Java as type species. Since then, two similar genera have been proposed that have been treated by some authors as synonyms of *Indoribates*. Mahunka (1977) proposed *Nixozetes* with *N. javanus* Mahunka, 1977 from Indonesia as type species, but did not compare its diagnostic characters with those of *Indoribates*. Hammer (1979) proposed *Sundazetes* with *S.*

crispus Hammer, 1979 from Java as type species, but did not compare the genus with either *Indoribates* or *Nixozetes*. As obvious generic distinctions between them are absent, Mahunka (1987) suggested *Sundazetes* to be a junior synonym of *Nixozetes* and synonymy of their type species has been suggested (Balogh and Balogh 2002; Subías 2004, online version 2010). Further, all species of *Nixozetes* were included in *Indoribates* by Balogh and Balogh (2002) (see also Subías, 2004, online version 2010). While none of these authors presented supporting discussion for these changes, we agree with them, due to the absence of obvious generic distinctions.

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