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THE ORIBATID MITE FAMILIES NANHERMANNIIDAE AND LOHMANNIIDAE OF CAT TIEN NATIONAL PARK (VIETNAM)

S. G. Ermilov[1], A. E. Anichkin[2]

[1]Nizhniy Novgorod Referral Center of the Federal service for Veterinary and Phytosanitary Inspection, Nizhniy Novgorod 603107, Russia; e-mail: ermilovacari@yandex.ru
[2]Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow 119071, Russia; Joint Russian-Vietnamese Research and Technological Center, Southern Branch, Ho Chi Minh, Vietnam

ABSTRACT: In the oribatid mite fauna of Cat Tien National Park (southern Vietnam), we discovered four species, each representating a different genus of the family Nanhermanniidae, and eight species representing four genera of Lohmanniidae. Our records of *Cosmohermannia robusta* and *Masthermannia mammillaris* (Nanhermanniidae) are the first for the respective genera from Vietnam; the lohmanniids *Meristacarus sundensis*, *Mixacarus exilis*, *Papillacarus ramosus* and *P. cornutus* are also newly reported from this country. The morphology of juvenile instars of *Cosmohermannia robusta* is described and illustrated. The juvenile instars of *Cosmohermannia* differs from those of *Nanhermannia* by the morphology of prodorsal and gastronotic setae, the presence two large latero-posterior body apophyses, the epimeral formulae, and the length of some epimeral setae. Diagnoses of juvenile instars of the family Nanhermanniidae and the genus *Cosmohermannia* are proposed. *Papillacarus polygonatus* sp. n. is described from dark loamy soil of a lagerstroemia forest; it differs from all other species of the genus by its larger body and three different forms of neotrichous setae.

KEY WORDS: oribatid mites, Nanhermanniidae, Lohmanniidae, *Cosmohermannia*, *Papillacarus*, juvenile instars, new species, Cat Tien National Park, Vietnam

INTRODUCTION

This paper comprises part of a series of works on the oribatid mite fauna of Cat Tien National Park, in southern Vietnam. A brief history of research on the oribatid mites of Vietnam and geographical and floristic descriptions of Cat Tien National Park, was given earlier (Ermilov and Anichkin 2010). Herein, we treat the representatives of the families Nanhermanniidae (Nanhermannioidea) and Lohmanniidae (Hypochthonioidea).

Nanhermanniidae comprises seven genera and more than 60 species that collectively are cosmopolitan (except for Antarctica; Subías 2004, 2011). At present, the oribatid fauna of Vietnam has been sparsely studied, and only two species have been registered (Golosova 1983): *Cyrthermannia vicinicornuta* Aoki, 1965, and *Nanhermannia thainensis* Aoki, 1965. Both of these are reported from Cat Tien National Park, below.

We also report the presence, and describe and illustrate the juvenile instars, of *Cosmohermannia robusta* (Aoki, 1994). *Cosmohermannia* Aoki and Yoshida, 1970 currently comprises two species that are distributed in the southern Palearctic region and Australia (Subías 2004, 2011). The morphology of juvenile instars has not yet been described for any member of this genus. the sparse information on juveniles of Nanhermanniidae available in the literature relates only to *Nanhermannia* Berlese, 1914: Seniczak (1991) treated juvenile instars *N. comitalis* Berlese, 1916 and *N. nana* (Nicolet, 1855); Ermilov (2009) described those of *N. coronata* Berlese, 1913, and Grandjean (1953) listed several characters of juvenile instars of *Nanhermannia* and *Masthermannia* without mentioning species.

Lohmanniidae comprises 21 genera and more than 190 species that collectively are distributed primarily in tropical and subtropical regions (Subías 2004, 2011). At present, only nine identified species and six genera of this family have been reported from Vietnam (Golosova 1983; Krivolutskiy et al. 1997). These include: *Haplacarus pairathi* Aoki, 1965, *Javacarus kuehnelti* Balogh, 1961, *Lohmannia javana* Balogh, 1961, *Meristacarus madagaskarensis* Balogh, 1961, *Mixacarus foliifer* Golosova, 1984, *Papillacarus aciculatus* (Berlese, 1904), *P. hirsutus* (Aoki, 1961) (= *P. arboriseta* Jeleva and Vu, 1987), *P. ogawai* (Aoki, 1965), and *P. undirostratus* Aoki, 1965. The identified lohmanniid taxa of Cat Tien National Park are listed below.

We also have described and illustrated the new species of *Papillacarus*. The oribatid mite genus *Papillacarus* currently comprises 28 species that are collectively distributed in the tropical and subtropical regions (Subías 2004, 2011). The majority of species have restricted geographical distribution.

MATERIALS AND METHODS

Oribatid mites of the Nanhermanniidae and Lohmanniidae have been found in six sites of Cat Tien National Park.

List of collecting sites:

Viet-1: 11°26' N, 107°26' E, 137 m above sea level, in sandy soil of dipterocarp forest, February–March 2009, collected by A.E. Anichkin.

Viet-2: 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.

Viet-3: 11°26' N, 107°25' E, approximately 145 m above sea level, in dark loamy soil of lagerstroemia forest, 20 November 2006, collected by A.E. Anichkin.

Viet-4: 11°26' N, 107°25' E, approximately 145 m above sea level, in dark loamy soil of lagerstroemia forest, 19 November 2007, collected by A.E. Anichkin.

Viet-5: 11°26' N, 107°19' E, near Bau Sau village, yellow trail, 200 m above sea level, in dark loamy soil of polydominate forest, 28 April 2010, collected by V.A. Zryanin.

Viet-6: 11°26' N, 107°26' E, near Dong Nai river, 130 m above sea level, on fern *Asplenium nidus* (3 m above soil level) in dipterocarp forest, 24 May 2010, collected by V.A. Zryanin.

Juvenile instars and adults were studied and illustrated in lactic acid, mounted on temporary cavity slides for the duration of the study. 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 distension. Notogastral width refers to the maximum width in dorsal aspect. Formulae for leg setation are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (famulus included).
Formulae for leg solenidia are given in square brackets according to the sequence genu–tibia–tarsus.

Terminology used in this paper follows that of F. Grandjean (1950; see also Travé and Vachon 1975 for many references).

RESULTS

In the course of studies of oribatid mite fauna of Cat Tien National Park, we have found representatives of four species of the family Nanhermanniidae, each in a different genus, as follows:

— *Cosmohermannia robusta* Aoki, 1994 (distribution: Micronesia). Locality: Viet-3, Viet-4. *Cosmohermannia* is recorded for the first time for the Vietnam.

— *Cyrthermannia vicinicornuta* Aoki, 1965 (distribution: Oriental region). Locality: Viet-1.

— *Masthermannia mammillaris* (Berlese, 1904) (distribution: Pantropical and Subtropical regions). Locality: Viet-1. *Masthermannia* is recorded for the first time for the Vietnam.

— *Nanhermannia thainensis* Aoki, 1965 (distribution: Oriental region). Locality: Viet-1, Viet-2.

We also found representatives of eight species from four genera of the family Lohmanniidae in this study, as follows:

— *Javacarus kuehnelti* Balogh, 1961 (distribution: Tropical region and Egypt). Locality: Viet-1, Viet-2.

— *Meristacarus sundensis* Hammer, 1979 (distribution: Oriental region). Locality: Viet-2, Viet-5, Viet-6. The species is recorded for the first time from Vietnam.

— *Mixacarus exilis* Aoki, 1970 (distribution: southern Palearctic region and China). Locality: Viet-2. The species is recorded for the first time from Vietnam.

— *M. foliifer* Golosova, 1984 (distribution: Vietnam). Locality: Viet-1, Viet-2.

— *Papillacarus cornutus* Sarkar and Subías, 1984 (distribution: India). Locality: Viet-2. The species is recorded for the first time from Vietnam.

— *P. hirsutus* (Aoki, 1961) (distribution: Tropical region and east southern Palearctic region). Locality: Viet-1, Viet-2.

— *P. ramosus* Balogh, 1961 (distribution: Oriental region). Locality: Viet-1. The species is recorded for the first time from Vietnam.

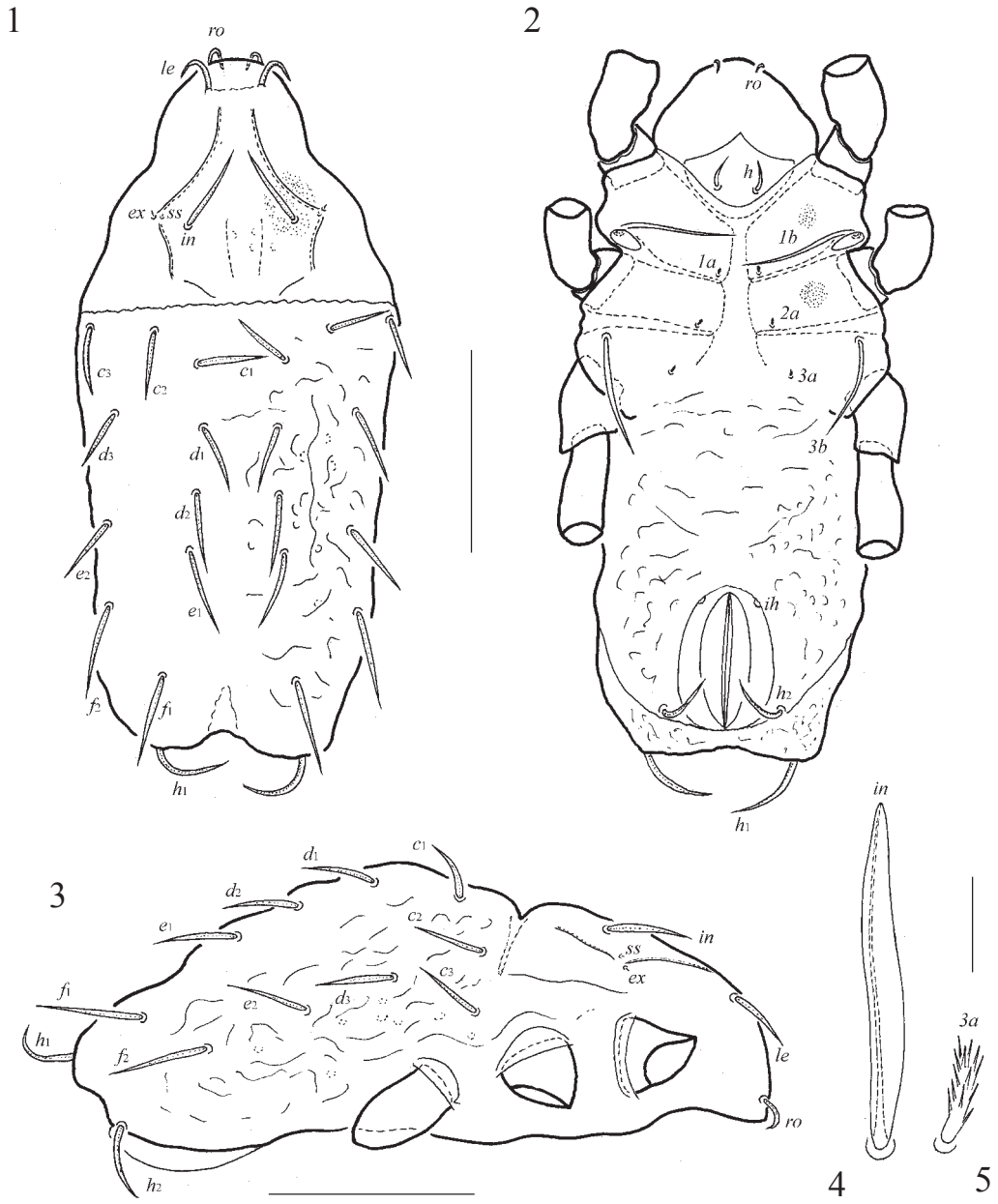
— *P. polygonatus* sp. n. — Locality: Viet-2.

Description of juvenile instars of *Cosmohermannia robusta*

Figs. 1–24

Measurements. Total length of: larva 358 (332–365, n=9), protonymph 457 (431–464, n=7), deutonymph 535 (498–547, n=4), tritonymph 702 (664–796, n=6). Maximum width of: larva 145 (132–149, n=9), protonymph 194 (166–199, n=7), deutonymph 220 (215–232, n=4), tritonymph 337 (282–381, n=6).

Integument. General body cuticle weakly sclerotized, colourless or yellowish; cuticle of epimeres, gnathosoma and legs more sclerotized, light brown. Colourless layer of cerotegument with dirt covers body in all juvenile instars. Cuticle of prodorsum and epimeres with microtuber-



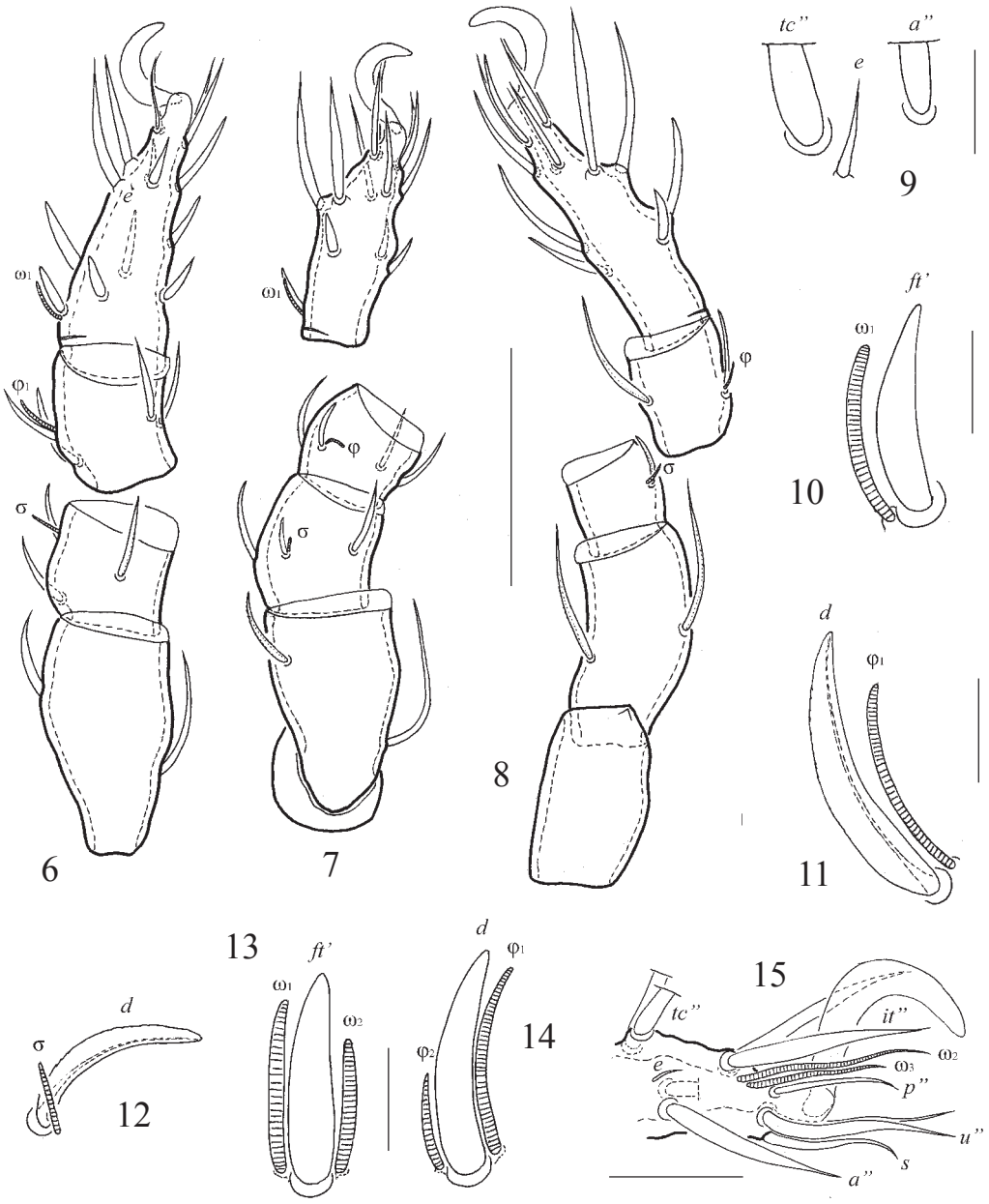
Figs. 1–5. *Cosmohermannia robusta*, larva: 1 — dorsal view, legs not shown; 2 — ventral view, legs and gnathosoma in part; 3 — lateral view, legs partly shown, gnathosoma and epimeral setae not shown; 4 — interlamellar seta; 5 — epimeral seta *3a*. Scale bar 100 μm (1–3); 10 μm (4, 5).

cles. Cuticle of prodorsum also with some dorsolateral folds. Larval cuticle of gastronotic and anogenital regions with weak folds and indistinct foveolae. Nymphal cuticle of gastronotic and anogenital regions with foveolae. Dorsal notogastral setae of nymphs inserted in light and smooth fields.

Prodorsum (Figs. 1, 3, 4, 20). Triangular, relatively short, about 2/3 length of gastronotic region in larva and half its length in nymphs (in lateral view). Rostrum widely rounded in dorsal view. Rostral (*ro*), lamellar (*le*) and interlamellar (*in*) setae well-developed, weakly leaf-shaped, inserted on small tubercles. Exobothridial setae short, smooth. Sensilli minute. Bothridia undeveloped, represented by simple alveoli. Length of prodorsal setae in larva: *in* > *le* > *ro* > *ex* > *ss*.

Gastronotic region (Figs. 1, 3, 16, 17, 20) oblong, with two large postero-lateral apophyses. Larva with 12 pairs of gastronotic setae; nymphs with 15 pairs (f_1 absent); setae well-developed, weakly leaf-shaped. Cupules indistinct.

Anogenital region (Figs. 2, 18, 19, 21). Ontogenetic genital, aggenital, adanal, anal formulas (larva to tritonymph) 0–1–4–7, 0–0–1–2, 0–0–3–3, 0–0–0–2 respectively. All setae setiform, slightly thickened, smooth. Anal setae shorter than others. Cupules *ih* (in larva), *ips* (in protonymph), *iad*



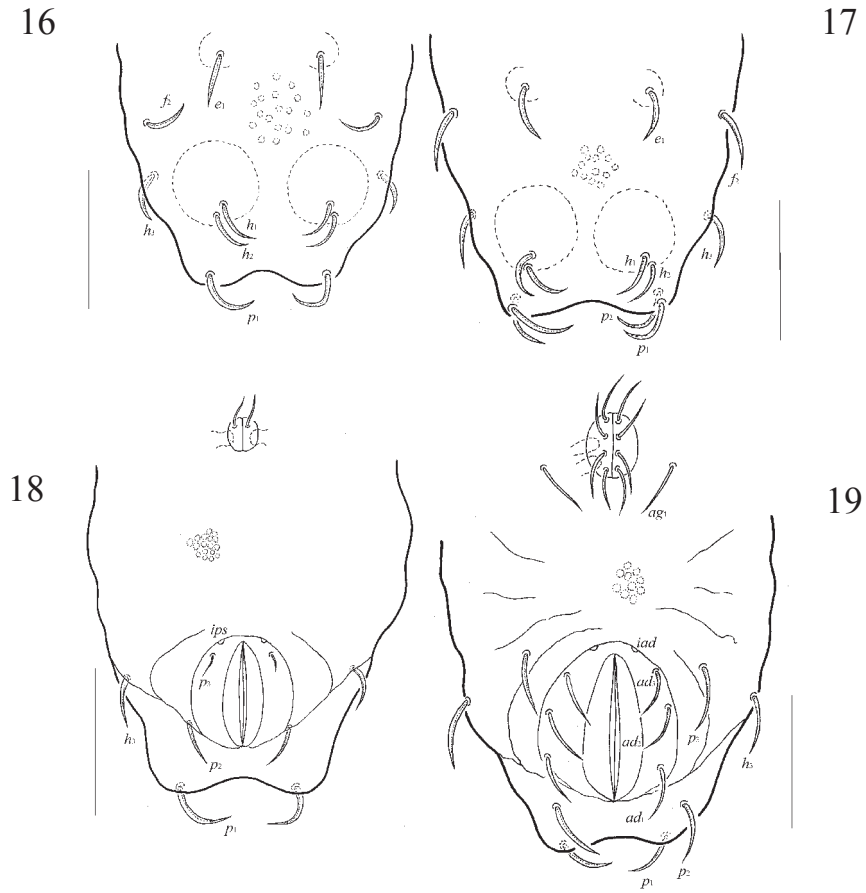
Figs. 6–15. *Cosmohermannia robusta*, legs of juvenile instars: 6 — leg I of larva, without trochanter, right, antiaxial view; 7 — leg II of larva, right, antiaxial view; 8 — leg III of larva, right, antiaxial view; 9 — famulus of larva; 10 — solenidion ω_1 and seta *ft*' on tarsus I of larva; 11 — solenidion φ_1 and seta *d* on tibia I of larva; 12 — solenidion σ and seta *d* on genu I of larva; 13 — solenidia ω_1, ω_2 and seta *ft*' on tarsus II of deutonymph; 14 — solenidia φ_1, φ_2 and seta *d* on tibia I of deutonymph; 15 — distal part of tarsus I of tritonymph, right, antiaxial view. Scale bar 50 μm (6–8); 10 μm (9–14); 20 μm (15).

(deuto- and tritonymph) and *ian* (tritonymph) visible; other cupules and opisthonotal gland opening present, but indistinct.

Epimeral region (Figs. 2, 5, 21). Setal formulas for epimeres: larva 3–1–2 (third setae of the first epimera (*1c*) forms protective scale over Claparéde's organ); protonymph 3–1–3–1; deutonymph 3–1–4–3, tritonymph 3–1–4(5)–4. Epimeral setae *1a*, *1c*, *2a*, *3a*, *4a* short, with long barbs; other setae long, slightly thickened, smooth.

Gnathosoma (Figs. 22–24). Subcapitulum longer than wide. Hypostomal setae *h* leaf-shaped, longer than thickened *a*, *m* shortest. Adoral setae (two pairs in larva and three pairs of nymphs) minute. Palpal setation similar for all juvenile instars: 0–1–0–1–6(+1ω). Palpal solenidion ω and eupathidium *acm* separate, not combined as "double horn". Chelicera chelate-dentate. Cheliceral seta *cha* short, thorn-like; *chb* long, setiform, smooth.

Legs (Figs. 6–15). Setae setiform, weakly leaf-shaped or thorn-like. All setae smooth, only some dorsal and lateral setae serrated dorsally. Famulus short, setiform, pointed. Solenidia ω_2 and ω_3 on tarsi II setiform, other solenidia thickened,



Figs. 16–19. *Cosmohermannia robusta*, proto- and deutonymph: 16 — posterior part of gastronotic region of protonymph, dorsal view; 17 — posterior part of gastronotic region of deutonymph, dorsal view; 18 — anogenital region of protonymph; 19 — anogenital region of deutonymph. Scale bar 100 μm.

rod-like. Ontogeny of leg setae and solenidia given in Tables 1 and 2.

Remarks. Juvenile instars of *Cosmohermannia robusta* are similar to known juvenile instars of Nanhermanniidae (*Nanhermannia comitalis*, *N. coronata*, *N. nana*) in formulae of gastronotic and anogenital setae, and in having a short exobothridial setae and sensilli, and foveolate body cuticle. However juvenile instars of *Cosmohermannia robusta* can be distinguished from juvenile instars of *Nanhermannia* spp. by the following character states.

1) Rostral, lamellar, interlamellar and gastronotic setae weakly leaf-shaped (in *C. robusta*); setiform (in *Nanhermannia*).

2) Gastronotic region with two large posterior-lateral apophyses (in *C. robusta*); widely rounded (in *Nanhermannia*).

3) Epimeral formulae of nymphs: protonymph 3–1–3–1; deutonymph 3–1–4–3, tritonymph 3–1–4(5)–4 (in *C. robusta*); 3–1–2–1; 3–1–3–3, 3–1–3–4 (in *Nanhermannia*).

4) Some epimeral setae very long, approximately the length of epimera (in *C. robusta*); without long setae (in *Nanhermannia*).

Table 1.
Setal and solenidial counts on legs of *Cosmohermannia robusta* during ontogeny

	Formula of setae	Formula of solenidia
Leg I		
Larva	0–2–3–4–16	1–1–1
Protonymph	0–4–3–4–16	1–1–2
Deutonymph	1–5–5–5–23	1–2–2
Tritonymph	1–5–5–5–27	1–2–3
Leg II		
Larva	0–2–3–4–13	1–1–1
Protonymph	0–4–3–4–13	1–1–1
Deutonymph	1–6–5–5–19	1–1–2
Tritonymph	1–7–5–5–22	1–1–2
Leg III		
Larva	0–2–1–2–13	1–1–0
Protonymph	2–3–1–2–13	1–1–0
Deutonymph	3–3–3–3–18	1–1–0
Tritonymph	4–3–3–4–21	1–1–0
Leg IV		
Protonymph	0–0–0–0–7	0–0–0
Deutonymph	1–2–2–2–14	1–1–0
Tritonymph	1–2–3–4–16	1–1–0

Table 2.
Development of leg setation of *Cosmohermannia robusta*

	Trochanter	Femur	Genu	Tibia	Tarsus
Leg I					
Larva	–	*d, bv″*	*(l), dσ*	*(v), l′, dφ*$_1$	*ft″, (tc), (p), (u), (a), s, (pv), (pl), e, ft′ω*$_1$
Protonymph	–	*(l)*	–	–	ω$_2$
Deutonymph	*v′*	*v″*	*(v)*	*l″*, φ$_2$	*(v*$_1$*), v′*$_2$*, (it), (l)*
Tritonymph	–	–	–	–	*v″*$_2$*, (v*$_3$*), v′*$_4$, ω$_3$
Leg II					
Larva	–	*d, bv″*	*(l), dσ*	*(v), l′, dφ*	*ft″, (tc), (p), (u), (a), s, (pv), ft′ω*$_1$
Protonymph	–	*(l*$_1$*)*	–	–	–
Deutonymph	*v′*	*v″, l″*$_2$	*(v)*	*l″*	*(v*$_1$*), (it), (l)*, ω$_2$
Tritonymph	–	*l″*$_3$	–	–	*(v*$_2$*), v′*$_3$
Leg III					
Larva	–	*d, ev′*	*dσ*	*v′, dφ*	*(ft), (tc), (p), (u), (a), s, (pv)*
Protonymph	*v′, l′*$_1$	*l′*	–	–	–
Deutonymph	*l′*$_2$	–	*l′, v′*	*l′*	*v′*$_1$*, (it), (l)*
Tritonymph	*l′*$_3$	–	–	*v″*	*v″*$_1$*, (v*$_2$*)*
Leg IV					
Protonymph	–	–	–	–	*ft″, (p), (u), (pv)*
Deutonymph	*v′*	*d, ev′*	*v′, dσ*	*v′, dφ*	*(tc), (a), s, v′*$_1$*, ft′,*
Tritonymph	–	–	*l′*	*l′, v″*	*v″*$_1$*, v′*$_2$

Roman letters refer to normal setae (*e* — famulus), Greek letters refer to solenidia, *dσ*, *dφ* and *ftω* — solenidia and seta 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. Setae are listed only for the instar in which they first appear.

Based on currently available information, we propose the following new diagnoses for juvenile instars of the family Nanhermanniidae and for those of the genus *Cosmohermannia*.

Nanhermanniidae. Nymphs without exuviae. Sensilli and bothridia reduced, non trichobothrial. Larva with 12 pairs of gastronotic setae, nymphs with 15 pairs; setae f_2 present in larva, absent in nymphs. Lyrifissures *ian* present. Paraproctal setae absent in larva, protonymph and deutonymph. Palpal solenidion and eupathidium not combined as "double horn". Two pairs of adoral setae in larva, three pairs in nymphs. One cheliceral seta short, thorn-like. Leg solenidia and dorsal setae of tibiae and genua coupled. Leg IV of protonymph with formula 0–0–0–0–7.

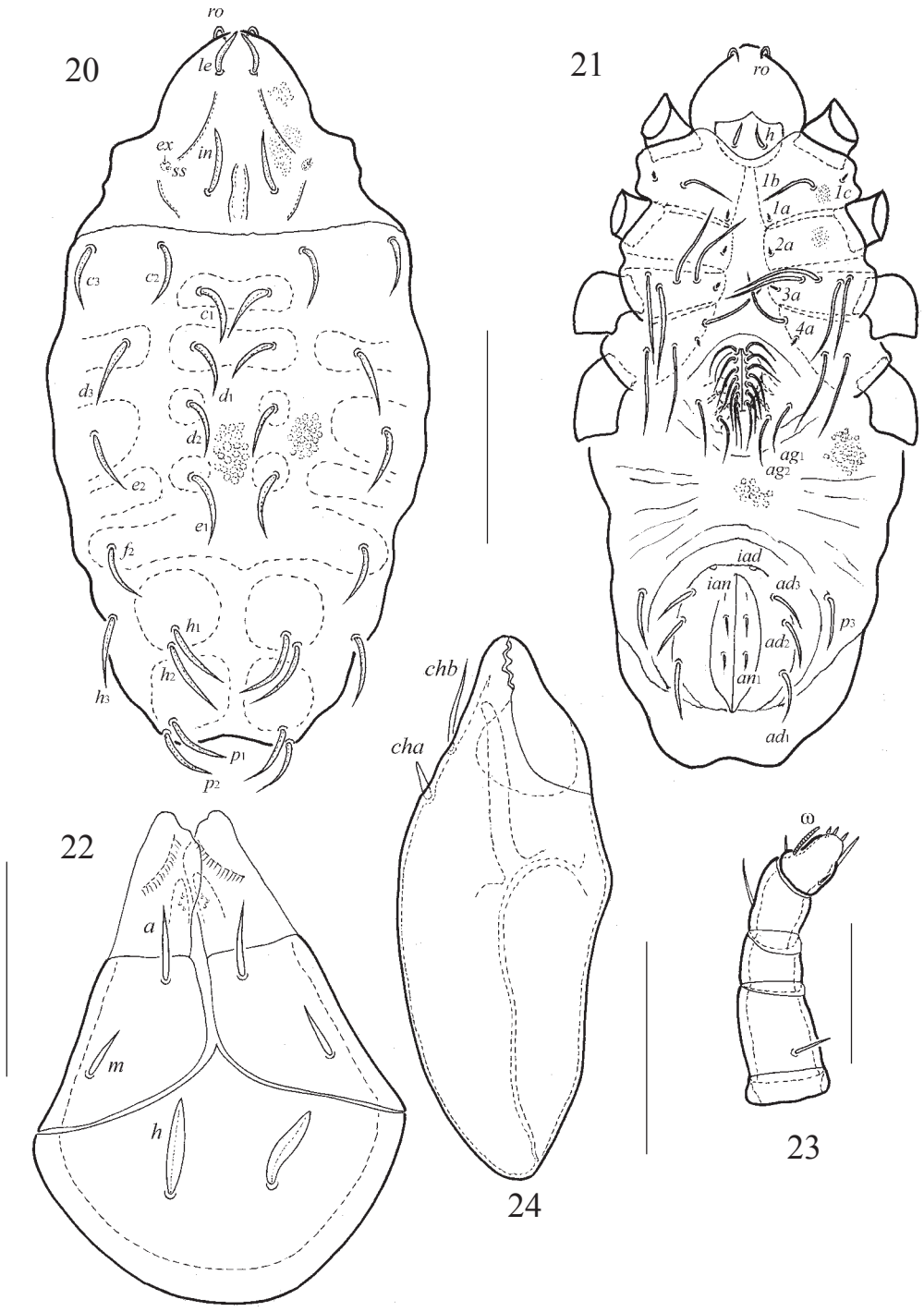
Cosmohermannia. Gastronotic region with two large latero-posterior apophyses. Rostral, lamellar, interlamellar and gastronotic setae leaf-shaped. Some epimeral setae very long, approximately as long as epimera. Gastronotic and anogenital regions of nymphs with foveolae. Genital formula 0–1–4–7. Epimeral formulae: protonymph 3–1–3–1, deutonymph 3–1–4–3, tritonymph 3–1–4(5)–4. Formula of palp 0–1–0–1–6(+1ω).

Description of *Papillacarus polygonatus* sp. n.

Figs. 25–47

With characters of *Papillacarus* as summarized by Balogh (1961), Balogh and Balogh (1992).

Diagnosis. The new species is distinguished by the following combination of character states: size of body 680–747 by 332–365; surface of body foveolate; rostrum concave in dorso-anterior view; rostral , lamellar, interlamellar and both pairs of exobothridial (*exa, exp*) setae long, setiform, thickened, with cilia; sensilli pectinate; two transverse bands developed, S_2 complete, S_3 medially incomplete; notogastral setae c_1, c_2, d_1, e_1, f_1 short, setiform, smooth; other notogastral setae long, setiform, thickened, with cilia; neotrichous setae of three types (four–six pairs of dorsal, minute; 4–5 marginal pairs and 2–3 ventral pairs



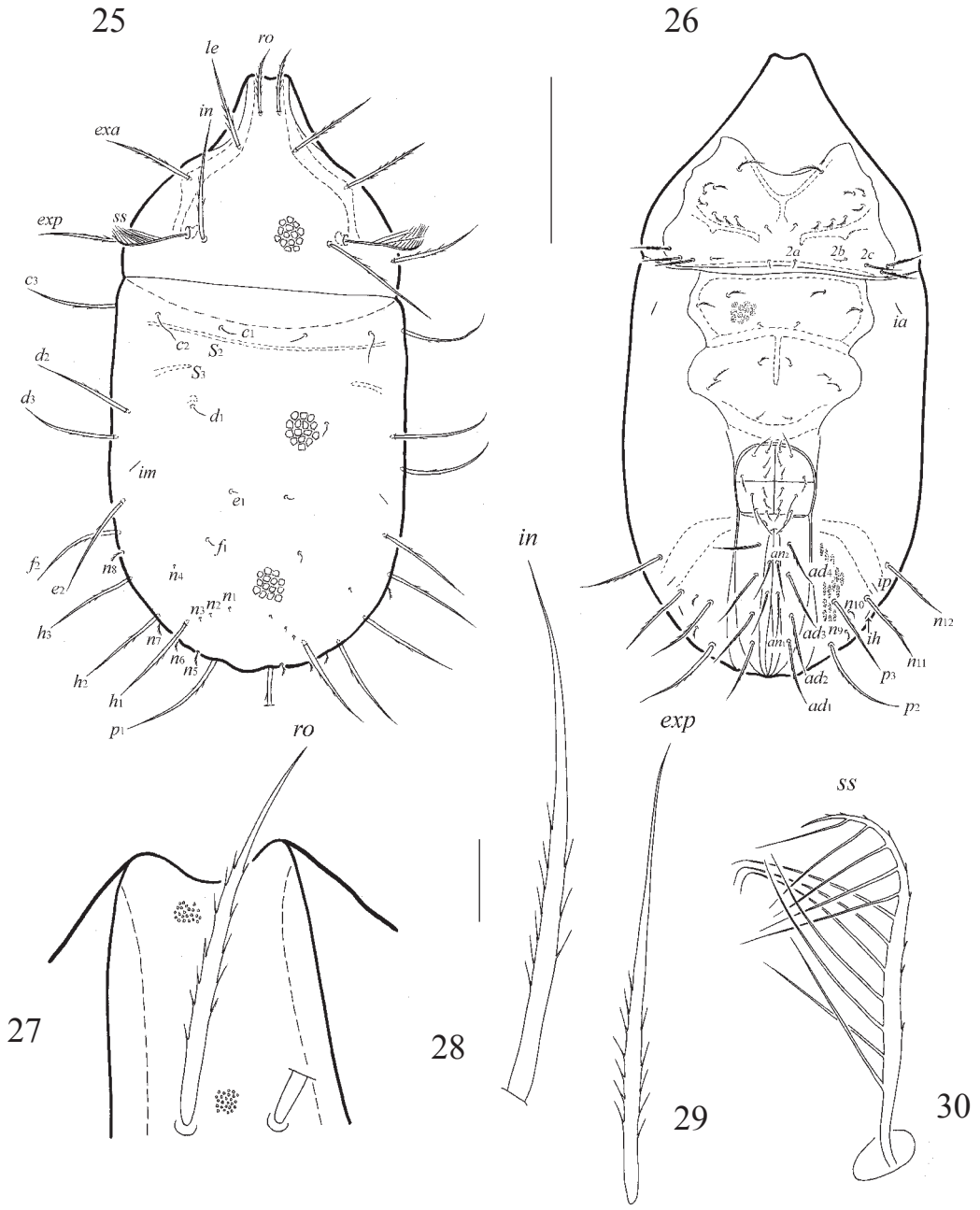
Figs. 20–24. *Cosmohermannia robusta*, tritonymph: 20 — dorsal view, legs not shown; 21 — ventral view, gnathosoma and legs partly shown; 22 — subcapitulum; 23 — palp; 24 —chelicera. Scale bar 200 μm (20, 21); 50 μm (22–24).

short, setiform, with long cilia; two latero-ventral pairs long, setiform, thickened, with cilia); anal and adanal setae long, setiform, thickened, with cilia; genital setae heterogeneous (three pairs long, smooth; seven pairs shorter, with cilia); epimeral setal formula: 8–5–3–4; four pairs of hypostomal setae.

Description. *Measurements*. Body length 730 (holotype), 680–747 (mean 710, 13 paratypes); body width 365 (holotype), 332–365 (mean 344, 13 paratypes).

Integument. Body color yellow-brownish. Surface of body foveolate. Foveolae of two types: (1) large, polygonal, forming polygonal network on prodorsum, notogaster, lateral part of body and anogenital region; (2) very small (distinctly visible only under high magnification), polygonal, located on all surfaces of body, also forming polygonal network from very small foveolae on all surface of body and legs.

Prodorsum (Figs. 25, 27–30). Roughly triangular in dorsal view, occupying about 1/3 of total

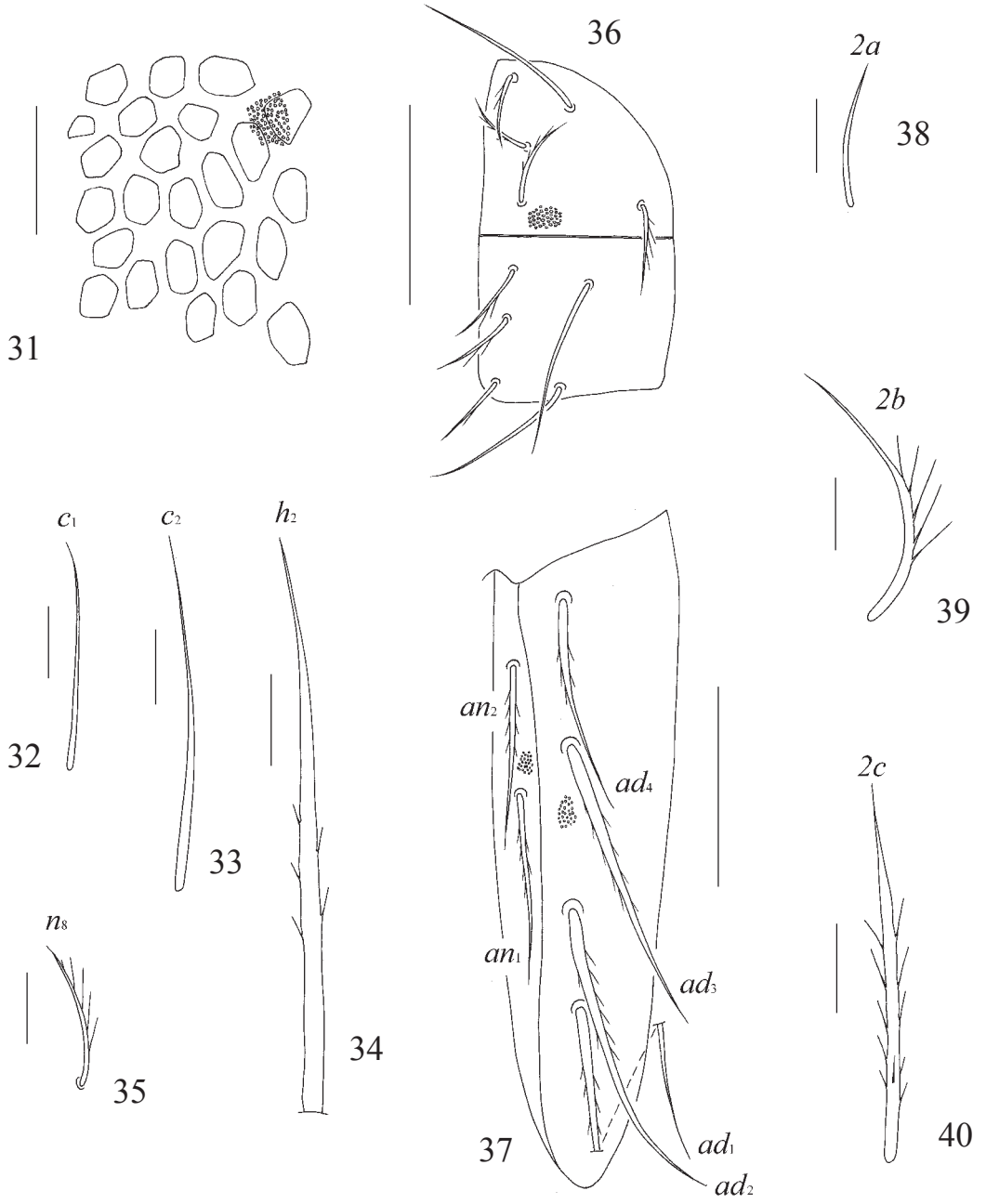


Figs. 25–30. *Papillacarus polygonatus* sp. n.: 25 — dorsal view, legs not shown; 26 — ventral view, gnathosoma and legs not shown; 27 — rostrum and rostral seta; 28 — interlamellar seta; 29 — exobothridial setae *exp*; 30 — sensillus. Scale bar 200 μm (25, 26); scale bar 20 μm (27–30).

body length. Rostrum concave in dorso-anterior view. Rostral, lamellar, interlamellar and both pairs of exobothridial setae similar: long, setiform, thickened, with cilia; *in* > *exa* ≈ *exp* ≈ *le* > *ro*. Sensilli pectinate, with 9–13 long branches on one side and 6–10 slightly developed barbs on other side. Bothridia funnel-shaped.

Notogaster (Figs. 25, 31–35). Anterior border of the notogaster straight. Only two pairs of transversal bands well-developed: S_2 complete, S_3 medially incomplete. Sixteen pairs of primary notogastral setae and 12–16 pairs of additional neotrichous setae. Setae c_1, c_2, d_1, e_1, f_1 short, setiform, smooth; others long, setiform, thickened, with cilia. Neotrichous setae of three types: four–six pairs of dorsal setae (n_1–n_4 on Fig. 25) minute, often visible only at large magnification; four–five pairs of marginal (n_5–n_8 on Fig. 25) and two–three pairs in anoadanal region (n_9–n_{10} on Fig. 25) short, setiform, with long cilia; two pairs of latero-ventral setae (n_{11}–n_{12} on Fig. 25) long, setiform, thickened, with cilia.

Anogenital region (Figs. 26, 36, 37). Two pairs of anal and four pairs of adanal setae long, setiform, thickened, with cilia. Adanal setae longer than anal setae; ad_4 shorter than other ada-



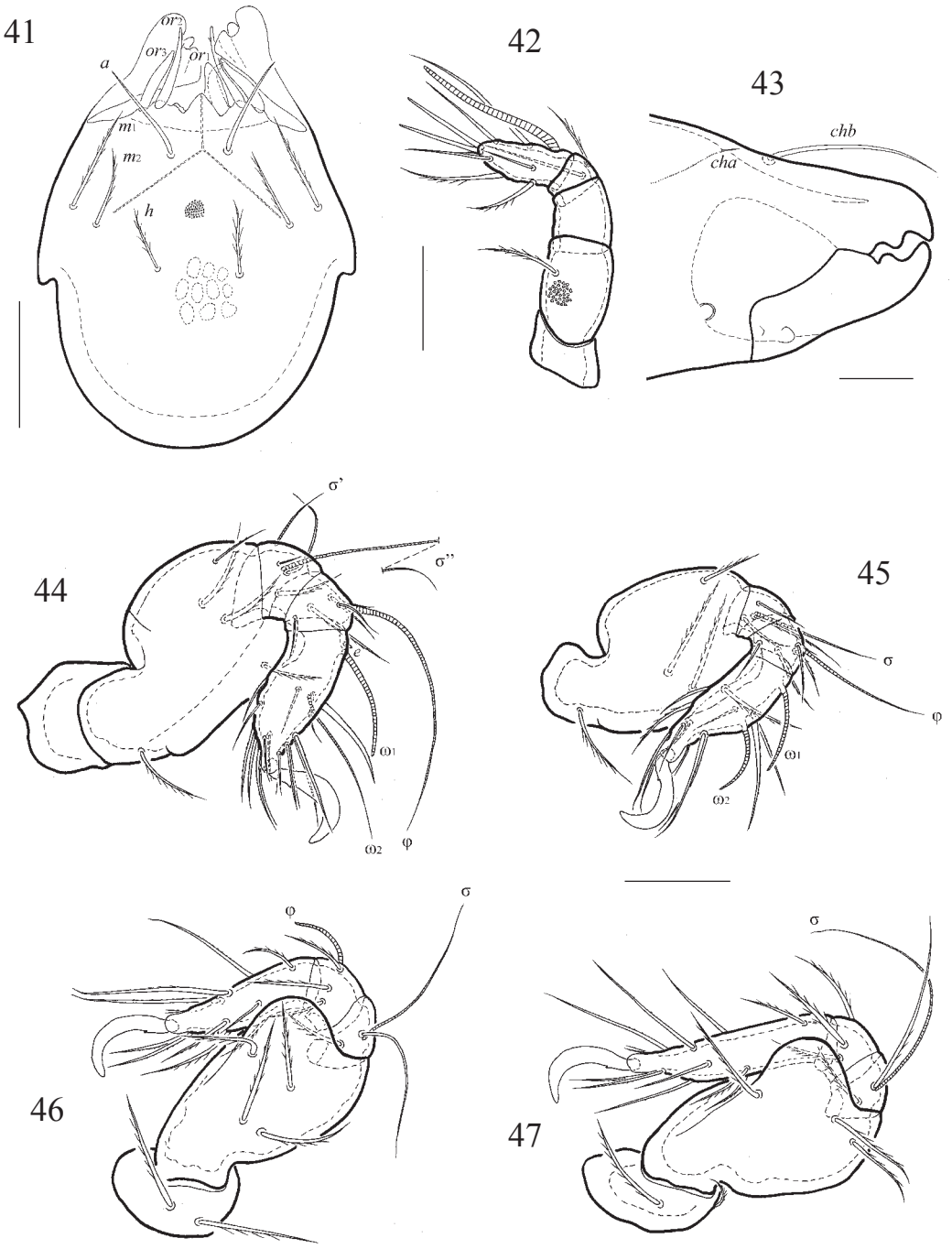
Figs. 31–40. *Papillacarus polygonatus* sp. n.: 31 — foveolae of notogaster; 32 — notogastral seta c_1; 33 — notogastral seta c_2; 34 — notogastral seta h_2; 35 — neotrichous seta n_8; 36 — genital plate, left; 37 — anal plate, left; 38 — epimeral seta *2a*; 39 — epimeral seta *2b*; 40 — epimeral seta *2c*. Scale bar 20 μm (31, 34); scale bar 10 μm (32, 33, 35, 38–40); scale bar 50 μm (36, 37).

nal setae. Genital setae heterogeneous: three lateral pairs long, smooth; six medial and one lateral pairs shorter, with cilia.

Epimeral region (Fig. 26, 38–40). Epimeres neotrichous, especially I and II; setal formula: 8–5–3–4. Medial setae *1a*, *2a*, *3a* short, setiform, smooth; three pairs of lateral setae on epimeres II long, setiform, with cilia; other setae short, setiform, with cilia.

Gnathosoma (Figs. 41–43). Subcapitulum with one pair of lateral tubercles. Subcapitulum longer than wide. Hypostomal setae *a* long, thickened, smooth; setae m_1, m_2 and *h* shorter, setiform, thickened, with cilia. Three pairs of adoral setae: or_2 long, thick, blunt, with single cilium distally; or_3 similar to or_2, but shorter, thicker and without cilia; or_1 slightly shorter than or_3, thickest. Palps with setation 0–1–0–2–9(+1ω). Solenidion long, thick, blunt-ended. Chelicera chelate-dentate. Cheliceral setae *chb* long, setiform, smooth; setae *cha* short, thorn-like.

Legs (Figs. 44–47). All legs with one simple claw, having small tubercle ventro-basally. Formulae of leg setation and solenidia: leg I (0–5–3–



Figs. 41–47. *Papillacarus polygonatus* sp. n.: 41 — subcapitulum; 42 — palp; 43 — anterior part of chelicera; 44 — leg I, left, paraxial view; 45 — leg II, without trochanter, left, paraxial view; 46 — leg III, right, antiaxial view; 47 — leg IV, right, antiaxial view. Scale bar 50 μm (41, 44–47); scale bar 20 μm (42, 43).

5–18) [2–1–2], leg II (0–5–3–5–13) [1–1–2], leg III (2–4–2–3–12) [1–1–0], leg IV (2–3–2–3–12) [1–0–0]; homology of setae and solenidia indicated in Table 3. Almost all setae with long cilia or barbs. Setae *it* on tarsi II–IV short, thin. Famulus conical, small, thickened. Solenidia ω_1 on tarsi I, ω_1 and ω_2 on tarsi II, σ on tibiae III thickened, blunt-ended. Other solenidia long, setiform, with thinner tips.

Material examined. Holotype and 13 paratypes. Locality: Viet-2.

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

Etymology. The specific name "*polygonatus*" refers to the polygonal network of body surface.

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

Table 3.
Leg setation and solenidia of adult *Papillacarus polygonatus* sp. n.

Leg	Trochanter	Femur	Genu	Tibia	Tarsus
I	–	*d, (l_1), bv″, v″*	*(l),* σ′, *d*σ″	*(l_1), l_2′, v′,* dφ	*ft′, (tc), (it), (p), (u), (a), s, (pv), n, m, e, ω1, ft″*ω_2
II	–	*d, (l_1), bv″, v″*	*(l), d*σ	*(l_1), l_2′, v′,* dφ	*(ft), (tc), (it), (u), (a), s, (pv),* ω_1, ω_2
III	*l′, v′*	*d, l_1′, l_2′, ev′*	*l′, d*σ	*d, l′, v′,* φ	*(ft), (tc), (it), (u), (a), s, pv’*
IV	*l′, v′*	*d, l′, ev′*	*l′, d*σ	*d, l′, v′*	*(ft), (tc), (it), (u), (a), s, pv’*

See Table 2 for explanations.

Remarks. *Papillacarus polygonatus* sp. n. clearly differs from all the other species of *Papillacarus* by the large size (body length 680–747; less than 640 in other species) and three types of neotrichial setae (one or two types in other species). The foveolate body surface, absence of papillae, long and setiform notogastral and prodorsal setae, and setiform neotrichous setae of *P. polygonatus* sp. n. are found elsewhere only in *P. simplirostratus* Bhattacharya, Bhaduri and Raychaudhuri, 1974 from India, but the latter differs by the two characters noted above and also by the rostrum which is entire (concave in new species), barbed setae c_2 (smooth in new species), normal genital setae (three pairs unusually long in new species), epimeral setal formula 9–4–3–4 (8–5–3–4 in new species), and two pairs of subcapitular setae *a* (one pair in new species).

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