

## Additions to the Peruvian oribatid mite fauna, including new records and descriptions of three new species

(Acari, Oribatida)

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The present study is based on oribatid mite material (Acari, Oribatida) collected during an expedition to Panguana (Amazonian Peru) in 2013, organized by the Bavarian State Collection of Zoology (Germany). A list of identified taxa, including 33 species, 27 genera and 19 families, is provided; of these, 13 species are recorded for the first time in Peru. Three new species, belonging to the genera *Xenillus* (Liacaridae), *Hermannobates* (Hermanniellidae) and *Mesoplophora* (Mesoplophoridae), are described. *Xenillus amicorum* Ermilov spec. nov. is similar to *X. sanctipauli* Pérez-Íñigo & Baggio, 1980, but differs by the presence of long lamellar cusps, strong inner tooth on each lamellar cusp and thick lamellar setae. *Hermannobates dillerorum* Ermilov spec. nov. is similar to *H. dilatatus* Ermilov, Sandmann, Marian & Maraun, 2014, but differs by the presence of bothridial setae with well developed heads, exuvial setae  $f_2E$  pointed distally and exuvial setae  $d_1E$ ,  $e_1E$  and  $f_1E$  comparatively long. *Mesoplophora* (*Mesoplophora*) *quasigaveae* Niedbala spec. nov. is similar to *M. (Mesoplophora) gaveae* Schuster, 1962, but differs by the not ciliated prodorsal setae, different arrangement of ventral setae, and location of anal setae  $an_1$  in posterior half of plates. Deuto- and tritonymphal instars of *M. (Mesoplophora) quasigaveae* Niedbala spec. nov. are described.

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### Introduction

This work is a final part of our study (Ermilov & Friedrich 2016a–e; Ermilov et al. 2016a,b) of the Peruvian oribatid mites collected during an one-month expedition to Amazonian Peru in second half of September and first half of October 2013, organized by the Bavarian State Collection of Zoology (Germany). The primary goal of the paper is to present a list of the identified taxa (excluding earlier published data) with new records for Peru.

In the course of taxonomic identification, we found three new species, belonging to the genera *Xenillus* Robineau-Desvoidy, 1839 (Liacaridae), *Hermannobates* Hammer, 1961 (Hermanniellidae) and *Mesoplophora* Berlese, 1904 (Mesoplophoridae). The secondary goal of the paper is to describe and illustrate these species.

The genus *Xenillus* was proposed by Robineau-Desvoidy (1839) with *Xenillus clypeator* Robineau-Desvoidy, 1839 as type species. Currently, it comprises 74 species, which are distributed in the

Holarctic, Oriental and Neotropical regions (Subías 2004, updated 2016). The main generic characters are listed by Balogh & Balogh (1988), Grobler et al. (2003) and Weigmann (2006). The identification keys to selective species have been presented by Balogh (1985, 1986), Balogh & Balogh (1988, 2002) and Ermilov & Kalúz (2012).

The genus *Hermannobates* was proposed by Hammer (1961) with *Hermannobates monstruosus* Hammer, 1961 as type species. Currently, it comprises 10 species, which are distributed in the Neotropical region (Subías 2004, updated 2016). The main generic characters are listed by Hammer (1961) and Balogh & Balogh (1988, 1992). The identification keys for selective species have been presented by Balogh & Balogh (1988, 2002) and Starý (1998).

The genus *Mesoplophora* was proposed by Berlese (1904) with *Mesoplophora michaeliana* Berlese, 1904 as type species. Currently, it comprises two subgenera and 38 species, which are distributed in the tropics (Subías 2004, updated 2016). The main generic and subgeneric characters are listed by Niedbala (1984, 1985). An identification key for majority species has been presented by Niedbala (2004).

## Material and methods

### Material

Mites were collected from: South America, Amazonian Peru, 9°37'S, 74°56'W, Huánuco Department, Puerto Inca Province, Yuyapichis District, Área de Conservación Privada, Panguana (biological field station), nearby Rio Yuyapichis (river), 230–260 m a.s.l., upper soil and leaf litter in the primary evergreen lowland rainforest, Winkler extraction, 20.IX.2013–07.X.2013 (S. Friedrich and F. Wachtel).

### Methods

Specimens were mounted in lactic acid on temporary cavity slides for measurement and illustration. 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 lateral aspect. All body measurements are presented in micrometers. Formulas for leg setation are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (famulus included). Formulas for leg solenidia are given in square brackets according to the sequence genu–tibia–tarsus.

Morphological terminology used in this paper follows that of F. Grandjean: see Travé & Vachon (1975) for general references and Norton & Behan-Pelletier (2009) for overview. Drawings were made with a camera lucida using a Carl Zeiss transmission light microscope “Axioskop-2 Plus” and phase contrast microscope Olympus BX50.

## A list of identified oribatid mite taxa<sup>1</sup>

This list includes number of specimens of each oribatid mite species and notes new records and overall known geographical distribution<sup>2</sup>.

### Mesoplophoridae

*Mesoplophora* (*Mesoplophora*) *quasigaveae* Niedbala spec. nov., 41 ex. Distribution: Peru.

### Oribotritiidae

*Mesotritia curviseta* (Hammer, 1961), 8 ex. Distribution: Neotropical region.

*Oribotritia didyma* Niedbala & Schatz, 1996, 5 ex. Distribution: Ethiopian, Neotropical and Oriental regions. First record of the species for Peru.

### Euphthiracaridae

*Acrotritia clavata* (Märkel, 1964), 1 ex. Distribution: Neotropical region.

*Acrotritia dikra* (Niedbala & Schatz, 1996), 19 ex. Distribution: Neotropical region and U.S.A.

*Acrotritia refracta* (Niedbala, 1998), 4 ex. Distribution: Pantropics. First record of the species for Peru.

*Microtritia tropica* Märkel, 1964, 1 ex. Distribution: Pantropics and Japan.

### Steganacaridae

*Arphthycarus inelegans* (Niedbala, 1986), 49 ex. Distribution: Ethiopian and Neotropical regions. First record of the species for Peru.

*Atropacarus* (*Hoplophorella*) *andrei* (Balogh, 1958), 7 ex. Distribution: Pantropics. First record of the species for Peru.

*Atropacarus* (*Hoplophorella*) *hamatus* (Ewing, 1909), 7 ex. Distribution: Semicosmopolitan. First record of the species for Peru.

### Epilohmanniidae

*Epilohmannia minuta* Berlese, 1920, 1 ex. Distribution: Tropics. First record of the species for Peru.

### Malaconothridae

*Malaconothrus pilosellus* Balogh & Mahunka, 1969, 6 ex. Distribution: Neotropical region. First record of the species for Peru.

1 Data on Oppioidea, Trizetoidea, *Ceratorchestes*, Oripodoidea and Galumnoidea were presented earlier by us (e.g. Ermilov & Friedrich 2016a–e; Ermilov et al. 2016a,b), therefore they are not included in the list.

2 See mostly Subías (2004, updated 2016).

### Trhypochthoniidae

*Archegozetes longisetosus* Aoki, 1965, 32 ex. Distribution: Tropics.

### Hermanniellidae

*Hermannobates dillerorum* Ermilov spec. nov., 3 ex. Distribution: Peru.

*Sacculobates horologiorum* Grandjean, 1962, 10 ex. Distribution: Neotropical region. First record of the species for Peru.

### Plasmobatidae

*Solenozetes carinatus* (Hammer, 1961), 7 ex. Distribution: Neotropical region.

### Pherolioididae

*Pheroliodes elegans* (Hammer, 1961), 6 ex. Distribution: Neotropical region.

### Arceremaeidae

*Tecteremaeus cachoeirensis* Franklin & Woas, 1992, 4 ex. Distribution: Brazil. First record of the species for Peru.

### Dampfiellidae

*Beckiella lamellata* Balogh & Mahunka, 1969, 1 ex. Distribution: Neotropical region. First record of the species for Peru.

### Carabodidae

*Carabodes (Klapperiches) excellens* Balogh & Mahunka, 1969, 9 ex. Distribution: Neotropical region.

*Yoshiobodes (Yoshiobodes) irmayi* Balogh & Mahunka, 1969, 8 ex. Distribution: Neotropical and Oriental regions and U.S.A. First record of the species for Peru.

### Liacaridae

*Xenillus amicum* Ermilov spec. nov., 8 ex. Distribution: Peru.

*Xenillus davisorum* Balogh, 1986, 7 ex. Distribution: Brazil. First record of the species for Peru.

*Xenillus deformatus* Balogh & Mahunka, 1969, 2 ex. Distribution: Peru.

### Eremulidae

*Eremulus rigidisetus* Balogh & Mahunka, 1969, 6 ex. Distribution: Neotropical region.

### Heterobelbidae

*Haplobelba simplex* Balogh & Mahunka, 1969, 4 ex. Distribution: Neotropical region.

*Heterobelba barbata* Beck, 1962, 5 ex. Distribution: Neotropical region.

*Heterobelba oxapampensis* Beck, 1962, 1 ex. Distribution: Neotropical region.

### Microzetidae

*Schalleria ramosa* Balogh & Mahunka, 1969, 47 ex. Distribution: Neotropical region.

### Oribatellidae

*Oribatella serrata* Balogh & Mahunka, 1969, 3 ex. Distribution: Neotropical region.

### Nasobatidae

*Nasobates mirabilis* Balogh & Mahunka, 1969, 6 ex. Distribution: Neotropical region.

### Punctoribatidae

*Allozetes pusillus* (Berlese, 1913), 4 ex. Distribution: Oriental and Neotropical regions. First record of the species for Peru.

*Lamellobates molecula* (Berlese, 1916), 5 ex. Distribution: Tropics.

Hence, we identified 33 species from 27 genera and 19 families. Three species are new for science, and 13 species are recorded for the first time in Peru.

### Descriptions

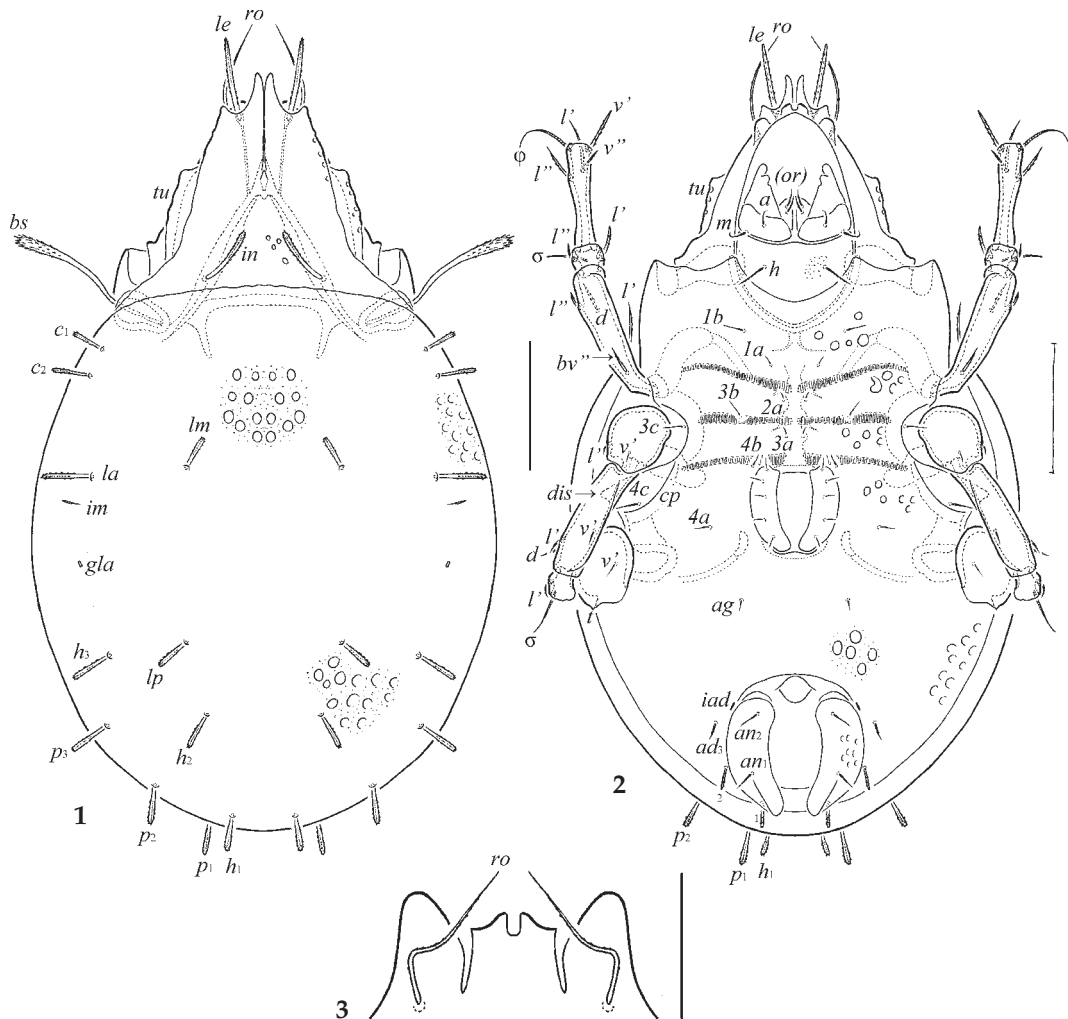
#### *Xenillus amicum* Ermilov spec. nov.

Figs 1–6

#### Adult

**Diagnosis.** Body size: 514–796 × 315–547. Notogaster and anogenital region foveolate.

Rostrum with trapezoid median part, having median indentation, and two incisions. Lamellar cusps as long as lamellae, distally with inner strong tooth, one small outer tooth and semioval indentation between them. Rostral setae setiform, indistinctly barbed. Lamellar setae thick, barbed. Interlamellar setae dilated distally, barbed. Bothridial setae clavate, with long stalks and heads shorter, elongated, barbed. Notogastral setae of medium size, dilated distally, barbed. Setae  $c_1$  slightly longer than  $c_2$  (26–26), both shorter than the other setae. Epimeral setae 1c absent. Five pairs of genital setae. Adanal setae



**Figs 1-3.** *Xenillus amicorum* Ermilov spec. nov., adult: 1. Dorsal view, legs not illustrated. 2. Ventral view, legs (except basal (IV) and medio-basal (II and III) parts) not illustrated. 3. Rostrum, dorso-frontal view. Scale bar 1,2=100  $\mu$ m; 3=50  $\mu$ m.

$ad_1$  and  $ad_2$  dilated distally. Trochanters IV with one small antero-dorsal tooth. Leg genua I and II with thick, barbed seta  $l''$ .

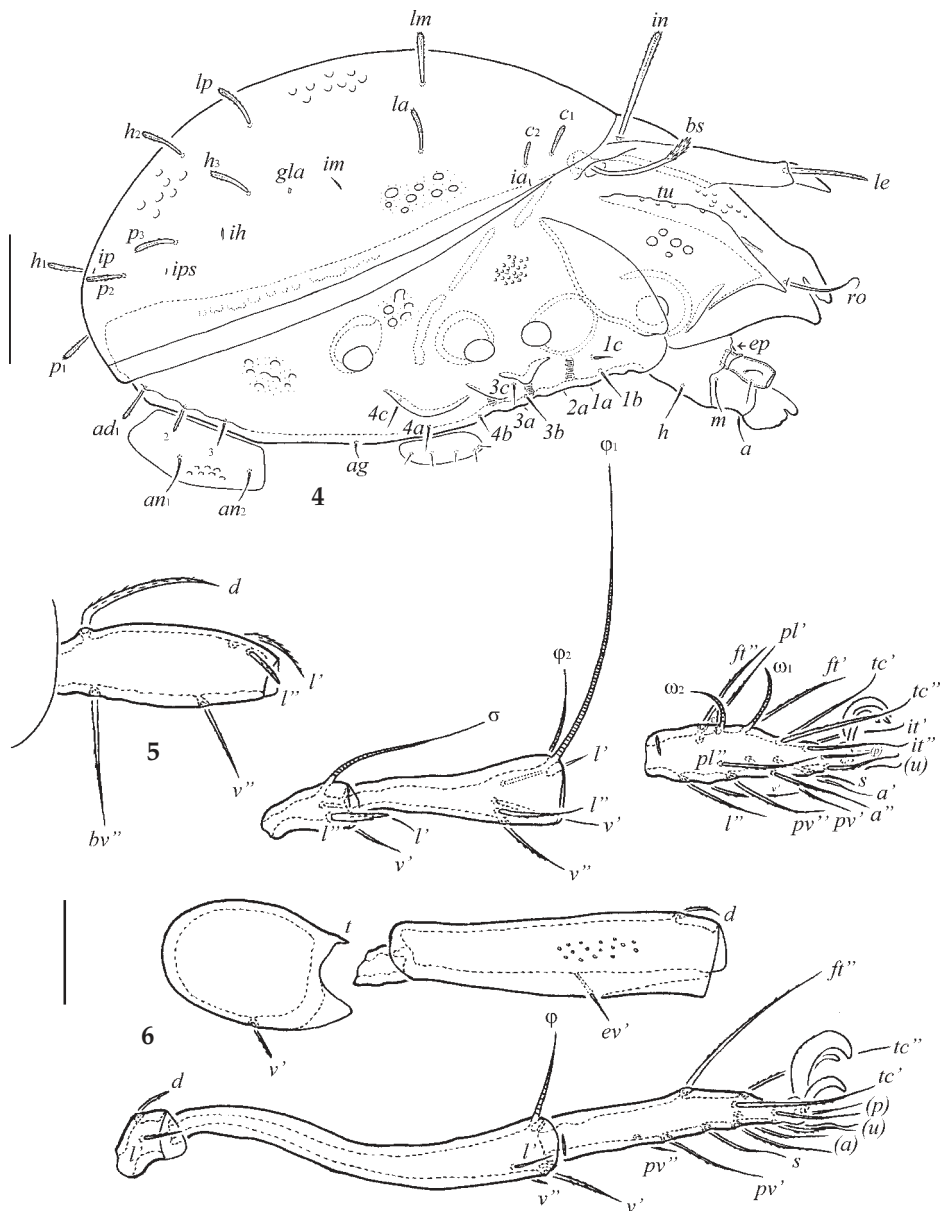
### Description

**Measurements.** Body length: 614 (holotype: male), 514-796 (seven paratypes: two females and five males); notogastral width: 415 (holotype), 315-547 (seven paratypes). Females larger than males: 780-796  $\times$  514-547 vs. 514-664  $\times$  315-431.

**Integument** (Figs 1, 2, 4, 6). Body colour brown to dark brown, covered by thick, colourless, amorphous cerotegumental layer. Body surface punctate (visible

under high magnification,  $\times 1000$ ). Notogaster, anogenital region, basal and lateral parts of prodorsum and epimeral region foveolate (diameter of foveolae up to 14). Leg segments also foveolate, but foveolae very small (diameter up to 4). Lateral parts of body between acetabula II, III and notogaster densely tuberculate (diameter of tubercles up to 8).

**Prodorsum** (Figs 1, 3, 4). Rostrum trapezoid medially, bordered by two deep incisions. Trapezoid part with median indentation. Lamellae shorter than length of prodorsum (measured in lateral view). Lamellar cusps as long as lamellae, connected medially at their bases by conical tubercle, distally with one inner strong tooth, one small outer tooth and



**Figs 4-6.** *Xenillus amicorum* Ermilov spec. nov., adult: 4. Lateral view, legs and distal part of palp not illustrated. 5. Leg I (except trochanter and basal part of femur), right, antiaxial view. 6. Leg IV, left, antiaxial view. Scale bar 4=100  $\mu$ m; 5,6=50  $\mu$ m.

semioval indentation between them. Rostral setae (*ro*, 69-77) setiform, directed antero-medially, indistinctly barbed, inserted postero-laterally to rostral incisions. Lamellar setae (*le*, 57-65) thick, straight, barbed, directed anteriorly, inserted on the lamellar cusps ends. Interlamellar setae (*in*, 90-102) thick, dilated distally, straight, barbed, directed upwards,

inserted on the inner parts of lamellae. Bothridial setae (*bs*, 102-106) clavate, with long, smooth stalks and heads shorter, elongated, barbed. Exobothridial setae and their alveoli absent. Tutoria (*tu*) long, half as long as lamellae with their cusps, reaching the insertions of rostral setae, with one triangular tip.

Notogaster (Figs 1, 4). Anterior notogastral

margin straight. Eleven pairs of notogastral setae of medium size, thickened, dilated distally, barbed. Setae  $c_1$  (28–32) and  $c_2$  (26–26) shorter than the other setae (41–49). Lyrifissures *ia*, *im*, *ip*, *ih* and *ips* and opisthonotal gland openings (*gla*) poorly visible.

Gnathosoma (Figs 2, 4). Morphology of subcapitulum, palps and chelicerae generally typical for *Xenillus* (e.g. Grandjean 1957, Schatz 2004, Ermilov & Kalúz 2012). Subcapitulum longer than wide (131–143 × 106–110). Subcapitular setae setiform, indistinctly barbed, similar in thickness, *a* (24–28) slightly shorter than *m* and *h* (28–32). Two pairs of adoral setae ( $or_1$ ,  $or_2$ , 20) setiform, barbed. Palps (length 90–94) with setation 0–2–1–3–9(+ $\omega$ ). Postpalpal setae (*ep*, 6) spiniform. Chelicerae (length 155–168) with two barbed setae, *cha* (53–61) longer than *chb* (36–41). Trägårdh's organ tapered.

Epimeral region (Figs 2, 4). Apodemes II, III and sejugal apodemes distinctly developed, long, slightly separated medially. Epimeral setal formula: 2–1–3–3. Setae thin, slightly barbed, *1a*, *2a* and *3a* (8) shorter than other setae (20–24), setae *1c* and their alveoli absent. Pedotecta I represented by laminae. Discidia (*dis*) strong, triangular. Circumpedial carinae (*cp*) well developed, comparatively short.

Anogenital region (Figs 2, 4). Five pairs of genital ( $g_1$ – $g_5$ , 10–16) and one pair of aggenital (*ag*, 12–16) setae thin, indistinctly barbed. Two pairs of anal setae ( $an_1$ ,  $an_2$ , 28–32) and adanal setae  $ad_3$  (24–28) setiform, barbed. Adanal setae  $ad_1$  (32–41) and  $ad_2$  (24–28) slightly thickened, dilated distally, barbed. Adanal lyrifissures (*iad*) located close and parallel or slightly inverse apoanal to anal plates. Setae  $ad_3$  inserted postero-laterally to *iad*.

Legs (Figs 2, 5, 6). Morphology of leg segments, setae and solenidia generally typical for *Xenillus* (e.g. Grobler et al. 2003, Schatz 2004, Ermilov & Kalúz 2012). Median claw larger and thicker than laterals, all serrate on dorsal sides. Trochanters IV with one small antero-dorsal tooth (*t*). Formulas of leg setation and solenidia: I (1–5–3–4–20) [1–2–2], II (1–4–2–4–16) [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. Genua I and II with thick, barbed seta *l''*.

**Table 1.** Leg setation and solenidia of adult *Xenillus amicorum* Ermilov spec. nov. [Roman letters refer to normal setae, Greek letters to solenidia (except  $\varepsilon$  = famulus). Single prime (') marks setae on the anterior and double prime (") setae on the posterior side of a given leg segment. Parentheses refer to a pair of setae.]

Leg	trochanter	femur	genu	tibia	tarsus
I	<i>v'</i>	<i>d</i> , ( <i>l</i> ), <i>bv''</i> , <i>v''</i>	( <i>l</i> ), <i>v'</i> , $\sigma$	( <i>l</i> ), ( <i>v</i> ), $\phi_1$ , $\phi_2$	( <i>ft</i> ), ( <i>tc</i> ), ( <i>it</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> ), <i>v'</i> , ( <i>pl</i> ), <i>l''</i> , $\varepsilon$ , $\omega_1$ , $\omega_2$
II	<i>v'</i>	<i>d</i> , <i>l''</i> , <i>bv''</i> , <i>v''</i>	( <i>l</i> ), $\sigma$	( <i>l</i> ), ( <i>v</i> ), $\phi$	( <i>ft</i> ), ( <i>tc</i> ), ( <i>it</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> ), <i>l''</i> , $\omega_1$ , $\omega_2$
III	<i>l'</i> , <i>v'</i>	<i>d</i> , <i>l'</i> , <i>ev'</i>	<i>l'</i> , $\sigma$	<i>l'</i> , ( <i>v</i> ), $\phi$	( <i>ft</i> ), ( <i>tc</i> ), ( <i>it</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> )
IV	<i>v'</i>	<i>d</i> , <i>ev'</i>	<i>d</i> , <i>l'</i>	<i>l'</i> , ( <i>v</i> ), $\phi$	<i>ft''</i> , ( <i>tc</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> )

**Material examined.** Holotype (male) and seven paratypes (two females and five males): see "Material and methods" section.

**Type deposition.** The holotype is deposited in the collection of the Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru; two paratypes are deposited in the collection of the Bavarian State Collection of Zoology, Munich, Germany; two paratypes are deposited in the collection of the Senckenberg Institution Frankfurt, Germany; three paratypes are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

**Etymology.** The specific name *amicorum* derives from the Latin word "amici", which means friends (German: "Freunde"). It is given in honour of the "Freunde der Zoologischen Staatssammlung München e.V.", an association of supporters of the Bavarian State Collection of Zoology, Munich, Germany, for their providing of expedition grants.

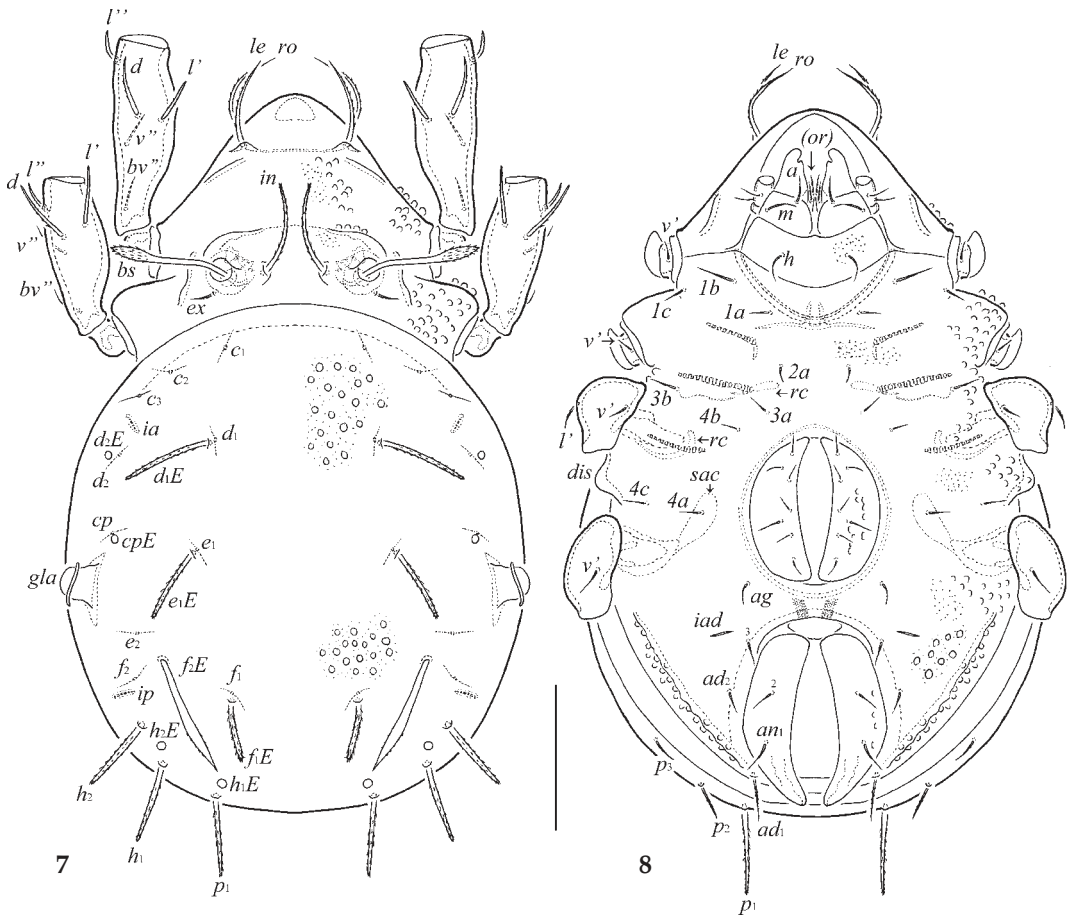
**Remarks.** The new species is morphologically most similar to *Xenillus sanctipauli* Pérez-Íñigo & Baggio, 1980 from Brazil (see Pérez-Íñigo & Baggio 1980) in having bothridial setae long, clavate, barbed, interlamellar and notogastral setae dilated distally and setae  $c_1$  and  $c_2$  well developed. However, it differs from the latter by the presence of long lamellar cusps (vs. short), strong inner tooth on each lamellar cusp (vs. tooth minute) and thick lamellar setae (vs. dilated medio-distally).

***Hermannobates dillerorum* Ermilov spec. nov.**

Figs 7–11

**Adult**

**Diagnosis.** Body size: 514–597 × 332–398. Notogaster and anogenital region foveolate, prodorsum and lateral side of body tuberculate. Rostral and lamellar setae setiform, barbed. Interlamellar setae setiform, straight, barbed. Bothridial setae fusiform, barbed. Exobothridial setae longer than diameter of bothridia. Exuvial setae  $d_1E$ ,  $e_1E$  and  $f_1E$  thickened, straight, heavily barbed,  $f_1E$  longer, distinctly dilated distally, serrate. Notogastral setae  $h_1$ ,  $h_2$  and  $p_1$  thick-



Figs 7-8. *Hermannobates dillerorum* Ermilov spec. nov., adult: 7. Dorsal view, legs (except basal parts I and II) not illustrated. 8. Ventral view, palps (except basal parts) and legs (except trochanters) not illustrated. Scale bar = 100  $\mu$ m.

ened, straight, heavily barbed,  $p_2$  and  $p_3$  setiform, slightly barbed, other setae reduced. Epimeral and anogenital setae thin, slightly barbed.

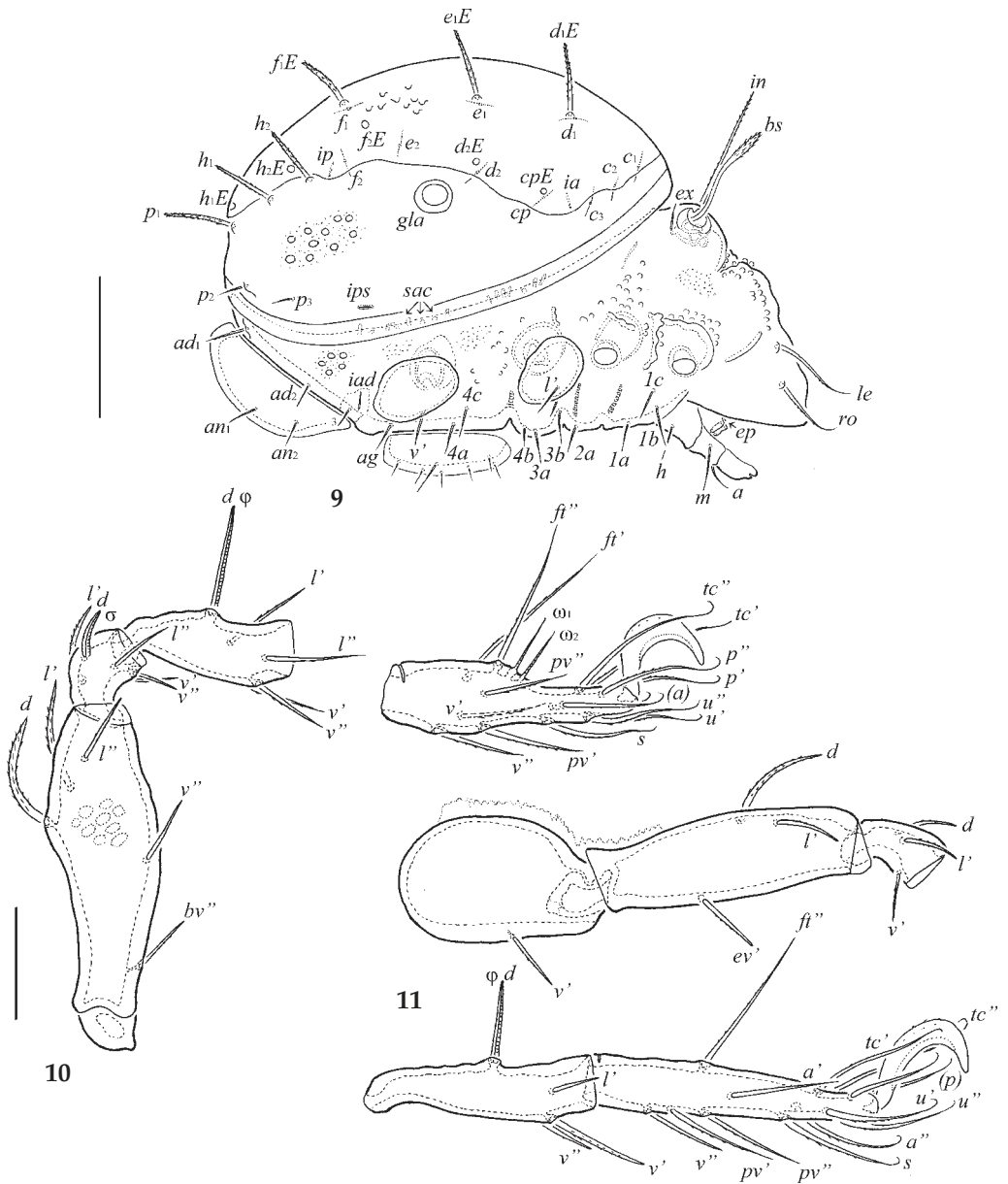
### Description

Measurements. Body length: 597 (holotype: female), 514, 597 (two paratypes: two females); notogastral width: 398 (holotype), 332, 398 (two paratypes).

Integument (Figs 7-9). Body colour yellowish to brownish. Body surface covered by microgranulate cerotegument (diameter of granules less than 1). Notogaster and anogenital region foveolate (diameter of foveolae up to 8). Prodorsum (except rostrum and interbothridial region) and lateral side of body tuberculate (diameter of tubercles up to 8). Notogastral exuvia punctate and foveolate (diameter of foveolae up to 8).

Prodorsum (Figs 7, 9). Rostrum widely rounded. Transverse concavity located anteriorly to each bothridium. Rostral and lamellar setae similar in length (73-82), setiform, barbed, directed anteromedially, inserted on tubercles. Interlamellar setae (98-106) setiform, straight, barbed, directed upwards. Bothridial setae (102-123) fusiform, with long, smooth stalks and heads shorter, elongated, barbed. Exobothridial setae (24-28) thin, slightly barbed, inserted postero-lateral to bothridia.

Notogaster (Figs 7, 9). Anterior margin convex medially. Notogaster covered by the thin exuvia, having four pairs founded setae:  $d_1E$ ,  $e_1E$  and  $f_1E$  (65-73) thickened, straight, heavily barbed,  $f_1E$  sometimes thicker and shorter (up to 57);  $f_2E$  (94-110) long, distinctly dilated distally, pointed apically, serrate; other seven pairs of setae absent ( $c_1E$ ,  $c_2E$ ) or represented by alveoli ( $d_2E$ ,  $cpE$ ,  $e_2E$ ,  $h_1E$ ,  $h_2E$ ). Notogastral



**Figs 9–11.** *Hermannobates dillerorum* Ermilov spec. nov., adult: 9. Lateral view, legs (except trochanters III and IV) and distal part of palp not illustrated. 10. Leg I (except trochanter), right, antiaxial view. 11. Leg IV, left, antiaxial view. Scale bar 9=100 µm; 10, 11=50 µm.

setae  $c_1$ ,  $c_2$ ,  $c_3$ ,  $d_1$ ,  $d_2$ ,  $cp$ ,  $e_1$ ,  $e_2$ ,  $f_1$  and  $f_2$  reduced. Only five pairs of notogastral setae developed:  $h_1$ ,  $h_2$  and  $p_1$  (57–65) thickened, straight, heavily barbed;  $p_2$  (28) and  $p_3$  (20) thin, setiform, slightly barbed. Lyrifissures  $ia$ ,  $im$ ,  $ip$  and  $ips$  poorly visible,  $ih$  not evident. Opisthonotal gland openings located typically for the

family. Circum marginal sacculi (*sac*) well developed.

Gnathosoma (Figs 8, 9). Morphology of subcapitulum, palps and chelicerae generally typical for Hermannelliidae (e.g. Grandjean 1962, Ermilov & Kalúz 2012, Ermilov et al. 2014). Subcapitulum longer than wide (123–131 × 102–110). Subcapitular



setae setiform, indistinctly barbed, *m* (41–45) longer than *a* and *h* (32–36). Palps (length 73) with setation 0–2–1–3–6(+ $\omega$ ). Postpalpal setae (12) thin, straight, slightly barbed. Chelicerae (length 159) with two barbed setae, *cha* (65) longer than *chb* (28). Trägårdh's organ tapered.

Epimeral region (Figs 8, 9). Epimeral setal formula: 3–1–2–3. Setae setiform, slightly barbed, *1b* (28–34) longer than *1a*, *2a* and *4b* (20–22) and *1c*, *3b*, *4a* and *4c* (24–28). Discidia triangular, rounded apically. Respiratory organs represented by one pair of large sacculi (*sac*), which are open into the cotyloid walls of acetabula IV, and respiratory channels (*rc*), which are located parallel to sejugal apodemes and apodemes 2 and are open into the respective acetabula.

Anogenital region (Figs 8, 9). Seven pairs of genital (one pair, 24–28; others, 12–16), one pair of aggenital (*ag*, 20–24), two pairs of anal (*an*<sub>1</sub>, 24–28; *an*<sub>2</sub>, 20–24) and three pairs of adanal (*ad*<sub>1</sub>, 36–41; *ad*<sub>2</sub>, *ad*<sub>3</sub>, 20–24) setae setiform, slightly barbed. One pair of longer genital setae inserted separately from others. Adanal lyrifissures transversally oriented, located antero-laterally to *ad*<sub>3</sub>.

Legs. Morphology of leg segments, setae and solenidia generally typical for Hermanniellidae (e.g. Grandjean 1962, Ermilov & Kalúz 2012, Ermilov et al. 2014). Claw of each leg serrate on dorsal side. Formulas of leg setation and solenidia: I (1–5–5–5–18) [1–2–2], II (1–5–5–5–15) [1–1–2], III (2–3–3–4–13) [1–1–0], IV (1–3–3–4–13) [0–1–0]; homology of setae and solenidia indicated in Table 2.

**Material examined.** Holotype (female) and two paratypes (two females): see “Material and methods” section.

**Type deposition.** The holotype is deposited in the collection of the Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru; two paratypes are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

**Etymology.** The specific name is dedicated to Dr. Juliane Diller, deputy director of the Bavarian State Collection of Zoology (ZSM) and head of the Panguana field station, and to her husband, Erich Diller, for their outstanding efforts in rainforest protection and research.

**Remarks.** The new species is morphologically most similar to *Hermannobates dilatatus* Ermilov, Sandmann, Marian & Maraun, 2014 from Ecuador (see Ermilov et al. 2014) in having setae *f*<sub>2</sub>*E* long and dilated medio-distally. However, it differs from the latter by the presence of bothridial setae with well developed heads (vs. setiform), exuvial setae *f*<sub>2</sub>*E* pointed distally (vs. rounded) and exuvial setae *d*<sub>1</sub>*E*, *e*<sub>1</sub>*E* and *f*<sub>1</sub>*E* long (vs. short).

*Mesoplophora* (*Mesoplophora*) *quasigaveae*  
Niedbala spec. nov.

Figs 12–24

**Adult**

Figs 12–17

**Diagnosis.** Body size: 514–580 × 177–202. Body surface rugged. Prodorsum with pointed rostrum and distinct lateral carinae. Bothridial setae ciliated, other prodorsal setae filiform, rough. Notogaster with 8 pairs of smooth setae, setae *cp* and *c*<sub>3</sub> longest. Ventral plate with nine pairs of smooth setae. Arrangement of genital setae: 6:1. Two pairs of anal setae.

**Description**

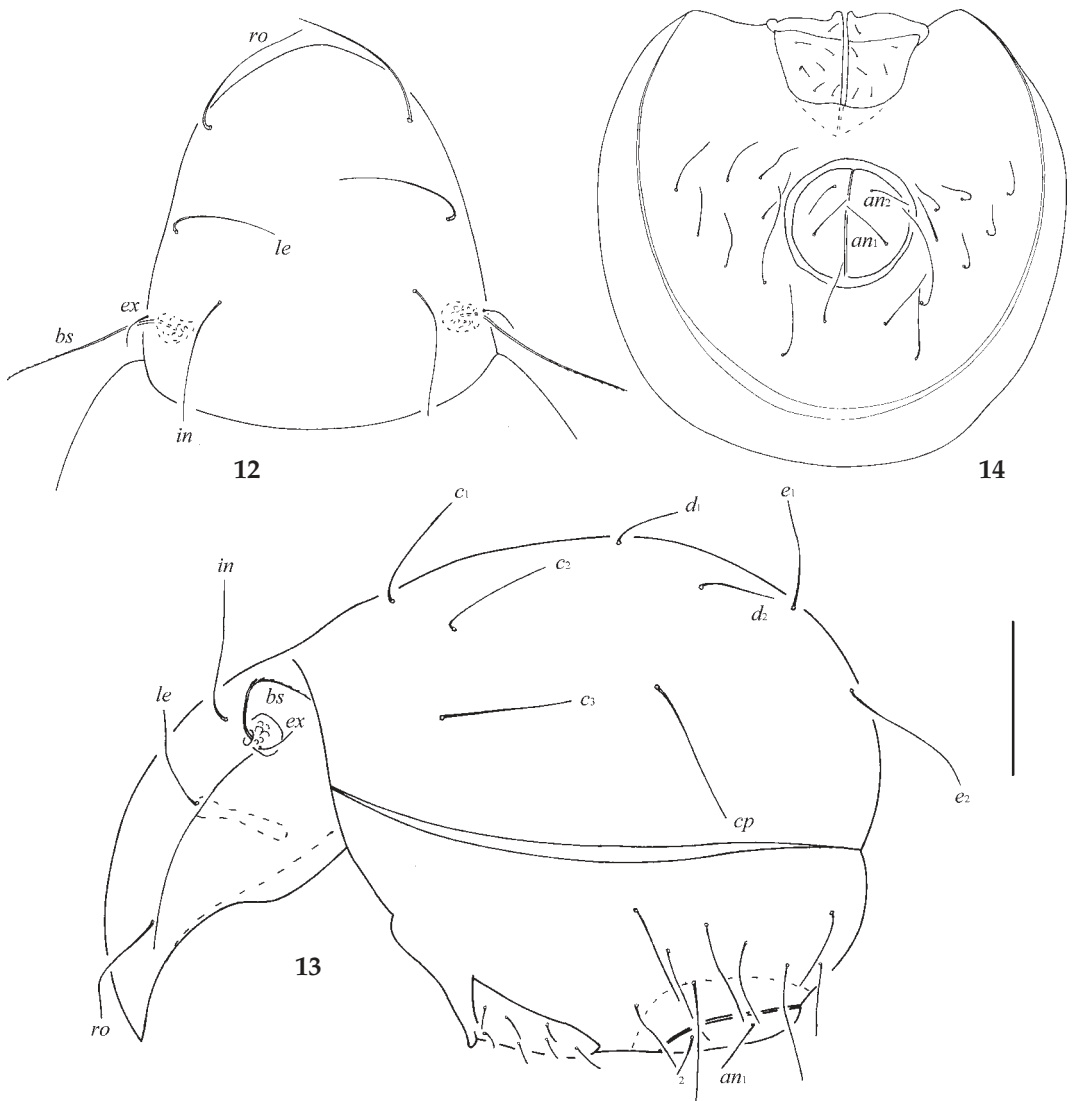
Measurements of holotype. Prodorsum: length 237, width 177, height 111; setae: rostral 63, lamellar 61, interlamellar 81, bothridial 71, exobothridial 18; diameter of bothridium 15. Notogaster: length 343, width 298, height 177; notogastral setae: *c*<sub>1</sub> 68, *cp* 88, *d*<sub>1</sub> 61, *d*<sub>2</sub> 68, *e*<sub>1</sub> 86. Anogenital region: genital plate: 68 × 91; anal plate 76 × 76; distance between genital and anal plates 30. Measurements of one paratype. Prodorsum: length 222, height 116. Notogaster: length 292, height 202.

Integument. Colour yellow. Body surface rugged.

Prodorsum (Figs 12, 13). With pointed rostrum. Lateral carinae distinct. Bothridial setae setiform, rather long, covered with 11–12 small cilia. Interlamellar, lamellar and rostral setae filiform, slightly rough, but without cilia. Exobothridial setae slightly longer than diameter of bothridia. Comparative length of setae: *in* > *ss* > *ro* > *le* > *ex*.

**Table 2.** Leg setation and solenidia of adult *Hermannobates dillerorum* Ermilov spec. nov.  $\underline{d\sigma}$ ,  $\underline{d\phi}$  – seta and solenidion coupled.

Leg	trochanter	femur	genu	tibia	tarsus
I	<i>v</i> '	<i>d</i> , (l), <i>bv</i> "', <i>v</i> "	(l), (v), $\underline{d\sigma}$	(l), (v), $\underline{d\phi}_1$ , $\phi_2$	(ft), (tc), (p), (u), (a), <i>s</i> , (pv), (v), (pl), $\epsilon$ , $\omega_1$ , $\omega_2$
II	<i>v</i> '	<i>d</i> , (l), <i>bv</i> "', <i>v</i> "	(l), (v), $\underline{d\sigma}$	(l), (v), $\underline{d\phi}$	(ft), (tc), (p), (u), (a), <i>s</i> , (pv), (v), $\omega_1$ , $\omega_2$
III	<i>l</i> ', <i>v</i> '	<i>d</i> , <i>l</i> ', <i>ev</i> '	<i>l</i> ', <i>v</i> ', $\underline{d\sigma}$	<i>l</i> ', (v), $\underline{d\phi}$	<i>ft</i> "', (tc), (p), (u), (a), <i>s</i> , (pv), <i>v</i> "
IV	<i>v</i> '	<i>d</i> , <i>l</i> ', <i>ev</i> '	<i>d</i> , <i>l</i> ', <i>v</i> '	<i>l</i> ', (v), $\underline{d\phi}$	<i>ft</i> "', (tc), (p), (u), (a), <i>s</i> , (pv), <i>v</i> "



**Figs 12–14.** *Mesoplophora (Mesoplophora) quasigaveae* Niedbala spec. nov., adult: **12.** Prodorsum, dorsal view. **13.** Lateral view of body, legs not illustrated. **14.** Opisthosoma, ventral view. Scale bar = 100  $\mu$ m.

“Notogaster” (Fig. 13) with eight pairs of smooth setae of medium length, setae *cp* and *c*<sub>3</sub> longest. Ventral region (Figs 13, 14) with nine pairs of smooth setae. Arrangement of genital setae: 6: 1. Anal setae smooth. Morphology of subcapitulum, palps and chelicerae generally typical for *Mesoplophora* (e.g. Grandjean 1934, Niedbala 1983).

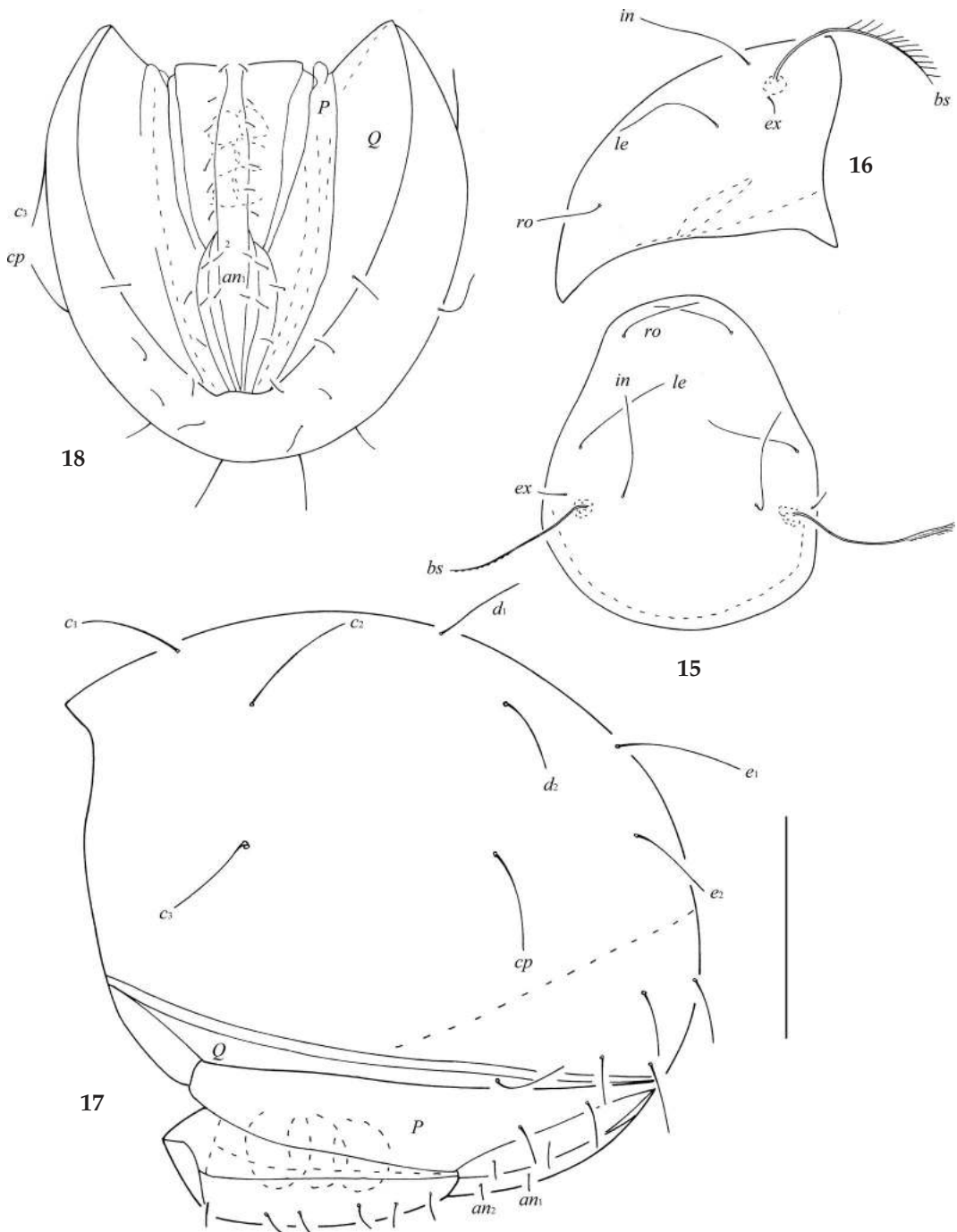
Legs. Morphology of leg segments, setae and solenidia generally typical for *Mesoplophora* (e.g. Niedbala 1983). Formulas of legs (without tarsi): I 0-3-3-4 [1-1]; II 0-4-3-3 [1-1]; III: 2-2-2-2 [1-1]; IV: 2-3-2-2 [0-0].

### Tritonymph

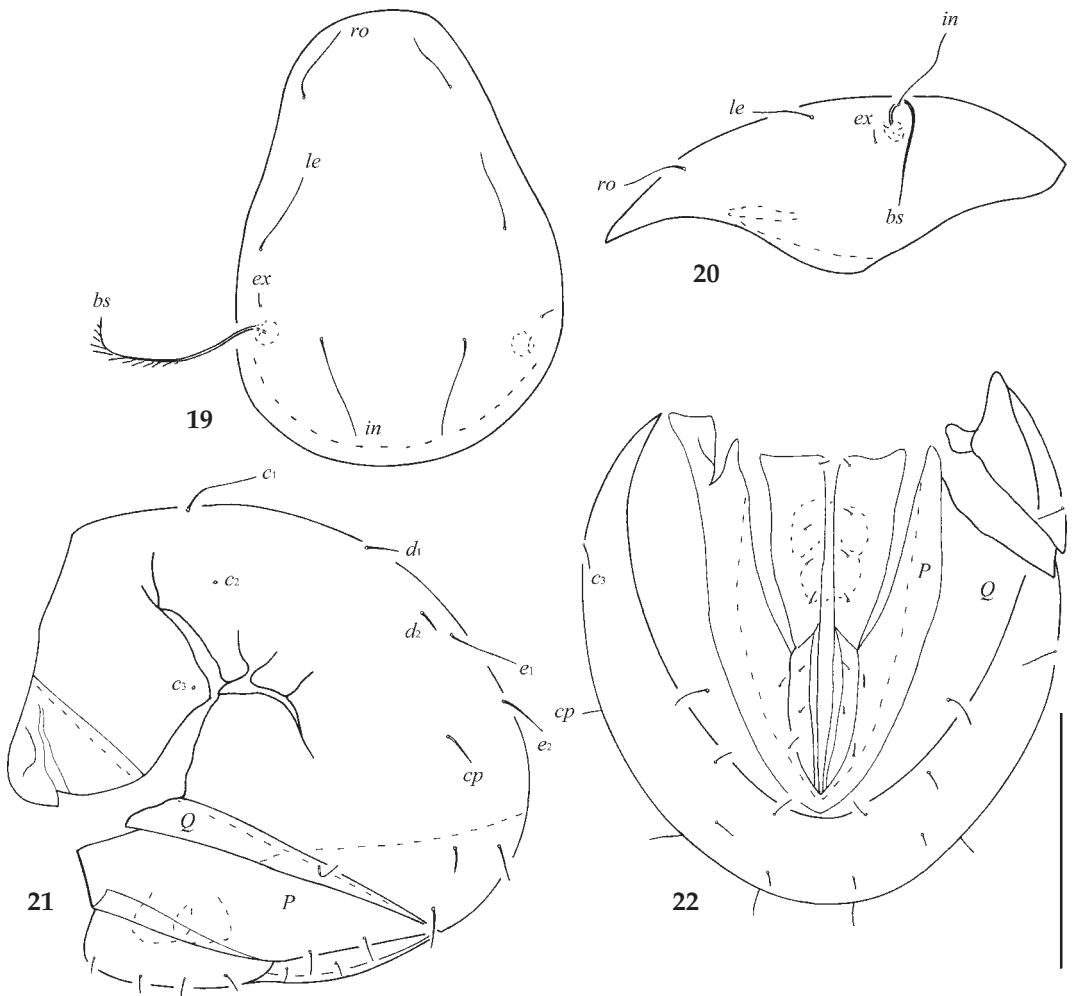
Figs 15–18

### Description

Measurements of one specimen. Prodorsum: length 202, width 157, height 147; setae: rostral 48, lamellar 56, interlamellar 61, bothridial 101, exobothridial 15; diameter of bothridium 13. Notogaster: length 291, width 119, height 177; setae: *c*<sub>1</sub> and *cp* 43, *e*<sub>1</sub> 48. Anogenital region: genital plate 96 × 28; anal + adanal plates 88 × 23.



Figs 15–18. *Mesoplophora (Mesoplophora) quasigaveae* Niedbala spec. nov., tritonymph: 15. Prodorsum, dorsal view. 16. Prodorsum, lateral view. 17. Opisthosoma, lateral view. 18. Opisthosoma, ventral view. Scale bar = 100  $\mu$ m.



Figs 19–22. *Mesoplophora (Mesoplophora) quasigaveae* Niedbala spec. nov., deutonymph: 19. Prodorsum, dorsal view. 20. Prodorsum, lateral view. 21. Opisthosoma, lateral view. 22. Opisthosoma, ventral view. Scale bar = 100  $\mu$ m.

Integument. Colour light yellow.

Prodorsum (Figs 15, 16). Without lateral carinae. Bothridial setae setiform, with 12 cilia longer than in adult form. Setae simple, fine, exobothridial setae longer than diameter of bothridia. Comparative length of setae:  $ss > in > le > ro > ex$ .

“Notogaster” (Fig. 17) with eight pairs of smooth, rather short setae.

Ventral region (Figs 17, 18). Plates with four pairs of setae; plates Q with one and plates P with two pairs of setae. Genital plates with six pairs, adanal plates with two pairs and anal plates with two pairs of setae. Posterior end of plates Q, anal and adanal are flat.

Legs. Formulas of legs (without tarsi): I 0–3–

3–3 [1–1]; II 0–3–2–4 [1–1]; III: 1–2–2–2 [1–1]; IV: 1–2–2–2 [0–0].

#### Deutonymph Figs 19–22

#### Description

Measurements of one specimen. Prodorsum: length 177, width 121, height 76; setae: bothridial 71, interlamellar 43, lamellar 25, rostral 28, exobothridial 5; diameter of bothridium 8. Notogaster: length 228, width 200, height 154; setae:  $c_1$  33,  $e_1$  20,  $e_2$  13. Anogenital region: genital plate 76  $\times$  23; anal + adanal plates 68  $\times$  11.

Integument. Colour light yellow.

Prodorsum (Figs 19, 20). Without lateral carinae. Bothridial setae setiform, with 12 cilia longer than in adult form. Setae simple, fine, exobothridial setae shorter than diameter of bothridia. Comparative length of setae:  $ss > in > ro > le > ex$ .

“Notogaster” (Fig. 21) with eight pairs of smooth, short setae.

Ventral region (Figs 21, 22). Plates with four pairs of setae; plates *Q* with one and plates *P* with two pairs of setae. Genital plates with four pairs and adanal plates with two pairs of setae. Anal plates without setae. Posterior end of plates *Q* and anal and adanal plates pointed.

Legs. Formulas of legs (without tarsi): I 0-2-2-3 [1-1]; II 0-3-2-2 [1-1]; III: 1-2-1-1 [1-1]; IV: 1-2-2-2 [0-0].

**Material examined.** Holotype (sex not identified), 40 paratypes (sex not identified). One tritonymph and one deutonymph: see “Material and methods” section.

**Type deposition.** The holotype is deposited in the collection of the Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru; 40 paratypes, one tritonymph and one deutonymph are deposited in the collection of the Department of Animal Taxonomy and Ecology, Adam Mickiewicz University, Poznań, Poland.

**Etymology.** The prefix *quasi* is Latin meaning “near” and refers to the similarity of the new species to *Mesoplophora* (*Mesoplophora gaveae* Schuster, 1962).

**Remarks.** The new species is similar to *Mesoplophora* (*Mesoplophora gaveae* Schuster, 1962 from Brazil and other tropical countries (see Schuster 1962) by the shape of ciliated bothridial setae, length and arrangement of prodorsal and notogastral setae, arrangement of genital setae (6:1), but it is distinguishable from the latter by the prodorsal setae not ciliated (vs. ciliated), different arrangement of ventral setae, and location of anal setae  $an_1$  in posterior half of plates (vs. in anterior half). Also, the holotype of *M. (M.) gaveae* is slightly bigger than specimens of new species.

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