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New faunistic and taxonomic data on oribatid mites (Acari, Oribatida) from Ethiopia: results of the Joint Russian-Ethiopian Biological Expedition in Bale Mountains National Park (2023)

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Original research

ABSTRACT

The present study is based on oribatid mite materials collected from Bale Mountains National Park, Southeastern Ethiopia in 2023. A list of 71 species belonging to 44 genera and 29 families is presented; of these, nine species, three genera and two families are reported in Ethiopia for the first time. Two new species—*Brachioppiella* (*Brachioppiella*) *sanettiensis* Ermilov **n. sp.** and *Drymobatoides* *harenaensis* Ermilov **n. sp.**—are described.

Keywords fauna; new record; taxonomy; *Brachioppiella*; *Drymobatoides*; morphology; Afrotropical region

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Introduction

Oribatid mites (Acari, Oribatida) of the Ethiopian Bale Mountains National Park have been insufficiently studied (e.g. Ermilov *et al.* 2012). The present study is based on materials collected from this park at the end of 2023. The main goals of our paper are: to present a list of the identified taxa (including new records) and to describe two new species belonging to the genera *Brachioppiella* (*Brachioppiella*) Hammer, 1962 (family Oppiidae) and *Drymobatoides* Jacot, 1936 (family Mochlozetidae).

Brachioppiella was proposed by Hammer (1962), with *Brachioppiella periculosa* Hammer, 1962 as type species. The genus comprises 28 species and one subspecies belonging to two subgenera (*B.* (*Brachioppiella*) and *B.* (*Gressittoppia*) Balogh, 1983), which differ from each other mainly by the number of the genital setae (five pairs in *B.* (*Brachioppiella*) versus four pairs in *B.* (*Gressittoppia*)). *Brachioppiella* (*Brachioppiella*) comprises 14 species distributed in the Afrotropical, Australasian, Neotropical, and Sub-Antarctic regions (Subías 2022, online version 2024). The main subgeneric traits of *B.* (*Brachioppiella*) have been presented by Subías and Balogh (1989), and Hugo-Coetzee (2014). An identification key to some species of *Brachioppiella* (*Brachioppiella*) has been presented by Balogh and Balogh (2002).


Drymobatoides was proposed by Jacot (1936), with *Drymobatoides mauritius* Jacot, 1936 as type species. This genus comprises seven species distributed in the Afrotropical and Oriental regions (Ermilov and Corpuz-Raros 2017). The main generic traits and an identification key

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to the known species of *Drymobatooides* have been presented by Ermilov and Corpuz-Raros (2017).

Prior to this study, one species of *Drymobatooides*—*D. elamellata* (Berlese, 1916)—has been registered in the Ethiopian fauna (Ermilov *et al.* 2012); *Brachioppiella* has not yet been registered in Ethiopia.

Material and methods

Sampling

Materials were collected in Bale Mountains National Park (Fig. 1), Bale Zone, Oromia region, Southeastern Ethiopia. Substrate samples containing oribatid mites were collected by L.B. Rybalov during the second half of October–first half of November (end of wet season) using a stainless-steel frame (50×50 cm) with a sieve (mesh size 2×2 cm) in the following locations:

1: 6°44'35"N, 39°42'58"E, 2604 m a.s.l., Harennna Forest, forest with *Hagenia abyssinica*, litter, 19.X.2023.

2: 6°46'39.5"N, 39°44'42"E, 3241 m a.s.l., slope to the Harennna Forest, forest with *Erica arborea*, green mosses *Hypnum cupressiforme*, *Bryum* sp. on the tree trunks, 19.X.2023.

3: 6°46'39.5"N, 39°44'42"E, 3241 m a.s.l., slope to the Harennna Forest, forest with *Erica arborea*, litter, 26.X.2023.

4: 6°46'39.5"N, 39°44'42"E, 3241 m a.s.l., slope to the Harennna Forest, forest with *Erica arborea*, mosses on the soil, 26.X.2023.

5: 6°52'44"N, 39°54'14"E, 3993 m a.s.l., Sanetti Plateau, Afroalpine community with *Alchemilla haumannii* as dominant, *Helichrysum gofense*, litter, 30.X.2023.

6: 7°5'52.5"N, 39°47'22"E, 3158 m a.s.l., Dinsho, Woodland with *Juniperus procera*, litter, 23.X.2023.

7: 7°5'52.5"N, 39°47'22"E, 3158 m a.s.l., Dinsho, Woodland with *Juniperus procera*, mosses *Leptodontium capituligerum* on the tree trunks, 23.X.2023.

8: 7°5'51"N, 39°47'26"E, 3165 m a.s.l., Dinsho, Woodland with *Hagenia abyssinica* and *Juniperus procera*, litter, 23.X.2023.

9: 6°46'17"N, 39°45'22"E, 3503 m a.s.l., Sanetti Plateau, bushes of *Erica arborea*, litter and mosses *Breutelia borbonica*, 30.X.2023.

10: 6°46'39.5"N, 39°44'42"E, 3241 m a.s.l., slope to the Harennna Forest, forest with *Erica arborea*, litter, 23.X.2023.

11: 6°46'39.5"N, 39°44'42"E, 3241 m a.s.l., slope to the Harennna Forest, forest with *Erica arborea*, mosses on the soil, 8.XI.2023.

12: 6°46'39.5"N, 39°44'42"E, 3241 m a.s.l., slope to the Harennna Forest, forest with *Erica arborea*, green mosses *Hypnum cupressiforme*, *Bryum* sp. on the tree trunks, 8.XI.2023.

13: 6°46'39.5"N, 39°44'42"E, 3241 m a.s.l., slope to the Harennna Forest, forest with *Erica arborea* and *Hagenia abyssinica*, litter under *H. abyssinica*, 26.X.2023.

14: 6°53'14"N, 39°54'24"E, 3975 m a.s.l., Sanetti Plateau, Afroalpine community with mosses *Grimmia laevigata*, *Braunia secunda* on the stones along spring, 6.XI.2023.

15: 6°53'14"N, 39°54'24"E, 3975 m a.s.l., Sanetti Plateau, Afroalpine community with *Aira caryophylla*, *Alchemilla haumannii*, *Lobelia scebelii*, *Euryops prostratus*, litter, 6.XI.2023.

16: 6°53'14"N, 39°54'24"E, 3975 m a.s.l., Sanetti Plateau, Afroalpine community, swamp, mosses *Braunia secunda*, *Campylopus* sp. along spring, 6.XI.2023.

17: 7°5'52.5"N, 39°47'22"E, 3158 m a.s.l., Dinsho, Woodland with *Juniperus procera*, litter, 4.XI.2023.

18: 6°46'17"N, 39°45'22"E, 3503 m a.s.l., Sanetti Plateau, bushes of *Erica arborea*, mosses *Breutelia borbonica* and litter, 30.X.2023.

19: 6°46'17.2"N, 39°45'22.1"E, 3503 m a.s.l., Sanetti Plateau, bushes of *Erica arborea*, mosses *Breutelia borbonica* and litter, 6.XI.2023.

20: 7°6'81"N, 39°47'29"E, 3156 m a.s.l., Dinsho, Woodland with *Hagenia abyssinica*, suspended soil on the tree trunk, 11.XI.2023.

21: 6°46'20"N, 39°45'19"E, 3503 m a.s.l., Sanetti Plateau, *Hagenia abyssinica* among bushes of *Erica arborea*, mosses *Breutelia borbonica* and litter, 6.XI.2023.

22: 6°49'19"N, 39°51'46"E, 4074 m a.s.l., Sanetti Plateau, Afroalpine community with *Alchemilla haumannii*, *Helichrysum citrispinum*, *H. gofense*, *H. forskahlii*, *H. splendidum*, *Senecio schultzei*, litter, 08.XI.2023.

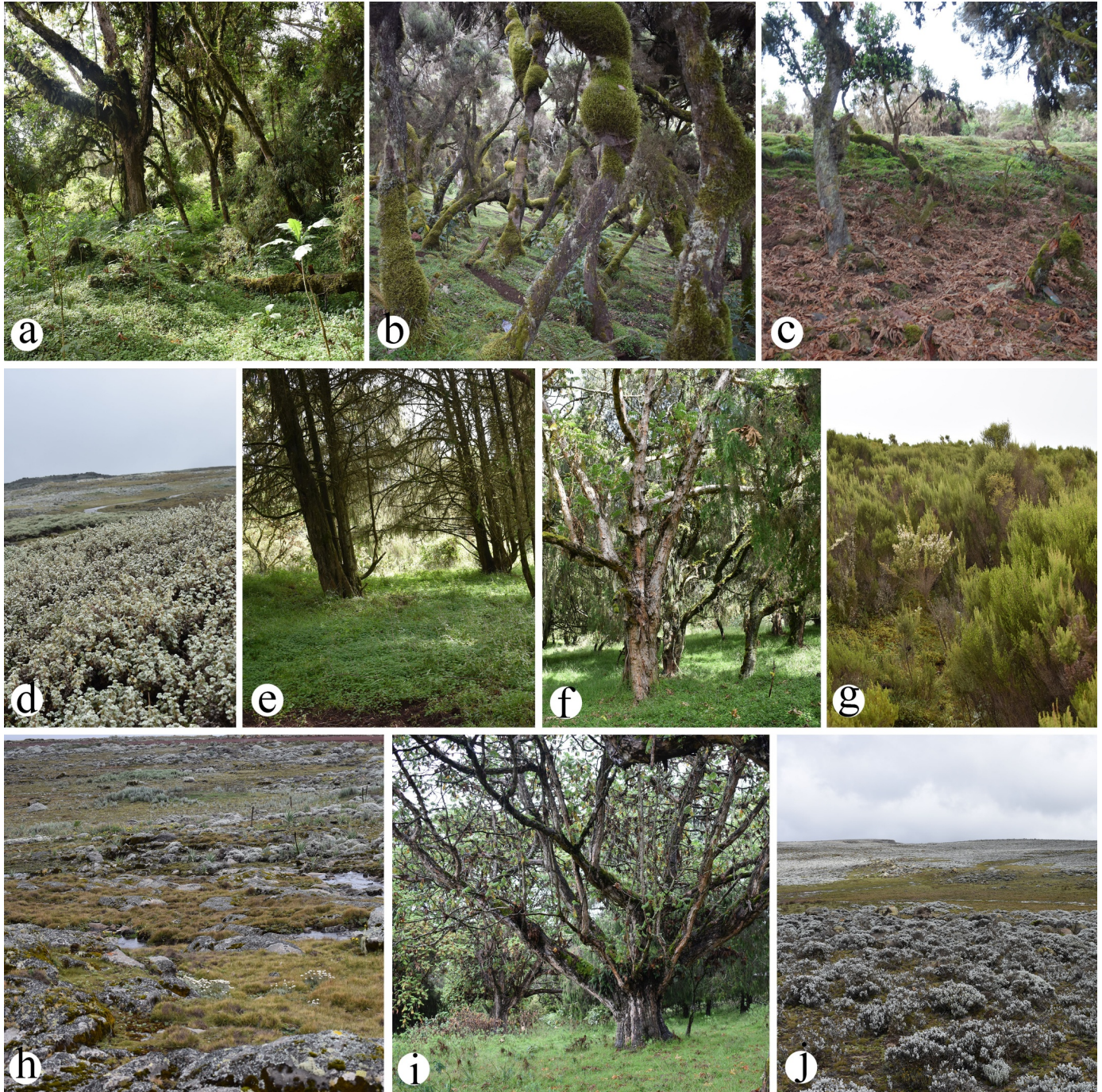


Figure 1 Photos of some sampling locations in the Bale Mountains National Park: a – location 1; b – location 2 and 3; c – location 13; d – location 5; e – location 6; f – location 8; g – location 9; h – location 15; i – location 20; j – location 22.

Mites were extracted into 75% ethanol using Berlese's funnels with electric lamps in laboratory conditions (locations 1–8: in Addis Ababa, Ethiopia; locations 9–22: in Moscow, Russia).

Observation and documentation

For measurement and illustration, specimens were mounted in lactic acid on temporary cavity slides. 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 notogaster; body width refers to the maximum width of the notogaster in dorsal view (for *Brachioppiella* (*Brachioppiella*) *sanettiensis* Ermilov n. sp.) and to the maximum width at pteromorph level in dorsal aspect and to the maximum width at ventral plate level in ventral view (for *Drymobatooides harenaensis* Ermilov n. sp.); the lengths of body setae were measured in lateral aspect. 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. Drawings were made with a camera lucida using a Leica DM 2500 light microscope.

Terminology

Morphological terminology used in this paper mostly follows that of papers on Brachioppiinae and *Drymobatooides* (e.g., Ermilov and Corpuz-Raros 2017; Ermilov *et al.* 2021); also, Norton (1977) for leg setal nomenclature and Norton and Behan-Pelletier (2009) for overview are used.

Abbreviations

Prodorsum: *lam* = lamella; *Al* = sublamellar porose area; *tu* = tutorium; *ro*, *le*, *in*, *bs*, *ex* = rostral, lamellar, interlamellar, bothridial, and exobothridial setae, respectively; *exv* = vestige of second exobothridial seta; *D* = dorsophragma; *P* = pleurophragma. *Notogaster*: *c*, *la*, *lm*, *lp*, *h*, *p* = setae; *ia*, *im*, *ip*, *ih*, *ips* = lyrifissures; *gla* = opisthonotal gland opening. *Gnathosoma*: *a*, *m*, *h* = subcapitular setae; *sup*, *inf*, *d*, *l*, *cm*, *acm*, *ul*, *su*, *vt* = palp setae; ω = palp solenidion; *cha*, *chb* = cheliceral setae; *Tg* = Trägårdh's organ. *Epimeral and lateral podosomal regions*: *1a–1c*, *2a*, *3a–3c*, *4a–4c* = epimeral setae; *Am*, *Ah* = humeral porose areas; *PdI*, *PdII* = pedotecta I and II, respectively; *cus* = custodium; *dis* = discidium; *cir* = circumpedal carina. *Anogenital region*: *g*, *ag*, *an*, *ad* = genital, aggenital, anal, and adanal setae, respectively; *iad* = adanal lyrifissure; *Amar* = marginal porose area; *po* = preanal organ. *Legs*: *Tr*, *Fe*, *Ge*, *Ti*, *Ta* = trochanter, femur, genu, tibia, and tarsus, respectively; *pa* = porose area; ω , ϕ , σ = solenidia; ϵ = famulus; *d*, *l*, *v*, *bv*, *ev*, *ft*, *tc*, *it*, *p*, *u*, *a*, *s*, *pv*, *pl* = setae.

Notes

References to the original descriptions of taxa are not included in the References section.

List of identified taxa

Distribution: mostly from Subías (2022, online version 2024). The unidentified species are not included. The number of the collected specimens is in parentheses.

Hypochthoniidae

- *Hypochthonius rufulus* Koch, 1835: location 19 (2 ex.). Distribution: Semicosmopolitan. New record of the family, genus and species in Ethiopia.

Nanhermanniidae

- *Nanhermannia quadridentata* Balogh, 1958: location 19 (1 ex.). Distribution: Afrotropical.

Crotoniidae

- *Camisia hamulifera* Hammer, 1961: locations 15 (5 ex.), 22 (3 ex.). Distribution: Neotropical, Afrotropical, Sub-Antarctic, Taiwan.
- *Heminothrus glaber* Mahunka, 1984: location 4 (6 ex.). Distribution: Afrotropical, Costa Rica.

Plasmobatidae

- *Plasmobates foveolatus* Ermilov, Sidorchuk and Rybalov, 2010: locations 8 (8 ex.), 18 (8 ex.), 19 (1 ex.). Distribution: Afrotropical.

Aleurodamaeidae

- *Aleurodamaeus aethiopicus* Ermilov, Hugo-Coetzee and Rybalov, 2023: locations 11 (27 ex.), 12 (36 ex.), 13 (1 ex.), 17 (5 ex.), 18 (29 ex.). Distribution: Ethiopia.
- *Aleurodamaeus africanus* Mahunka, 1984: locations 2 (1 ex.), 11 (1 ex.), 12 (1 ex.), 13 (1 ex.). Distribution: Afrotropical.

Damaeidae

- *Coronabelba adiscidialis* Ermilov and Kolesnikov, 2024: locations 11 (1 ex.), 15 (5 ex.), 21 (1 ex.). Distribution: Ethiopia.
- *Coronabelba platynota* (Grandjean, 1954): location 15 (12 ex.). Distribution: Southern Europe, Ethiopia.
- *Metabelba (Pateribelba) ginchiensis* Ermilov, 2014: locations 3 (2 ex.), 7 (10 ex.), 12 (2 ex.). Distribution: Ethiopia.
- *Metabelbella baleensis* Ermilov and Kolesnikov, 2024: locations 5 (6 ex.), 15 (11 ex.). Distribution: Ethiopia.

Liacaridae

- *Li acarus coracinus* (Koch, 1841): locations 3 (1 ex.), 4 (4 ex.), 5 (1 ex.), 15 (3 ex.), 16 (3 ex.), 17 (1 ex.), 18 (2 ex.), 19 (14 ex.), 21 (7 ex.). Distribution: Palaearctic, Afrotropical, Oriental.

Heterobelbidae

- *Heterobelba spumosa* Mahunka, 1983: locations 1 (1 ex.), 4 (1 ex.), 8 (18 ex.), 18 (17 ex.), 19 (1 ex.), 21 (1 ex.). Distribution: Afrotropical.

Machadobelbidae

- *Machadobelba shtanchaevae* Ermilov, Sidorchuk and Rybalov, 2010: locations 15 (1 ex.), 21 (1 ex.). Distribution: Ethiopia.

Oppiidae

- *Arcoppia gezahegni* Ermilov and Rybalov, 2022: locations 15 (8 ex.), 18 (1 ex.), 19 (14 ex.). Distribution: Ethiopia.
- *Arcoppia rugosa* (Mahunka, 1974): locations 4 (5 ex.), 8 (2 ex.), 9 (4 ex.), 17 (4 ex.), 18 (29 ex.), 19 (17 ex.). Distribution: Afrotropical, Hawaii.
- *Brachioppiella sanettiensis* Ermilov **n. sp.**: locations 9 (4 ex.), 19 (3 ex.). Distribution: Ethiopia. New record of the genus in Ethiopia.
- *Micropia minus* (Paoli, 1908): location 10 (84 ex.). Distribution: Cosmopolitan. New record of the species in Ethiopia.
- *Neoamerioppia africana* (Kok, 1967): locations 2 (29 ex.), 7 (17 ex.), 11 (54 ex.), 12 (46 ex.), 17 (7 ex.). Distribution: Afrotropical, Sub-Antarctic.
- *Neoamerioppia extrusa* (Mahunka, 1983): locations 1 (14 ex.), 2 (15 ex.), 12 (29 ex.), 16 (22 ex.), 19 (31 ex.), 21 (6 ex.), 22 (78 ex.). Distribution: Afrotropical.

- *Neoamerioppia polygonata* (Mahunka, 1982): locations 4 (3 ex.), 7 (1 ex.), 8 (2 ex.), 9 (17 ex.), 11 (27 ex.), 16 (43 ex.). Distribution: Afrotropical.
- *Oppia (Antennoppia) capilligera* (Berlese, 1916): locations 1 (1 ex.), 13 (2 ex.), 21 (4 ex.). Distribution: Afrotropical.
- *Oxyoppia complicata* Mahunka, 1986: location 20 (2 ex.). Distribution: Afrotropical.
- *Oxyoppia (Oxyoppiella) saskai* (Balogh, 1961): locations 11 (4 ex.), 12 (2 ex.). Distribution: Afrotropical. New record of the species in Ethiopia.
- *Separatoppia horvathae* Ermilov, Sidorchuk and Rybalov, 2011: location 18 (9 ex.). Distribution: Ethiopia.
- *Separatoppia robusta* Mahunka, 1997: locations 2 (30 ex.), 11 (30 ex.), 12 (32 ex.). Distribution: Kenya. New record of the species in Ethiopia.
- *Wallworkoppia tetraciliata* Ermilov, 2018: locations 3 (1 ex.), 18 (19 ex.), 19 (8 ex.). Distribution: Ethiopia.

Teratoppiidae

- *Teratoppia ciliata* Wallwork, 1961: locations 11 (17 ex.), 17 (1 ex.). Distribution: Afrotropical.
- *Teratoppia (Teratoppiella) pectinata* Balogh, 1961: locations 10 (12 ex.), 11 (18 ex.). Distribution: Afrotropical.

Quadroppiidae

- *Quadroppia (Coronoquadroppia) circumita* (Hammer, 1961): locations 5 (41 ex.), 15 (8 ex.), 18 (34 ex.). Distribution: Tropical, Subtropical. New record of the family, genus and species in Ethiopia.

Suctobelbidae

- *Suctobelbella (Flagrosuctobelba) elegantula* (Hammer, 1958): locations 8 (5 ex.), 18 (3 ex.). Distribution: Tropical, Subtropical.
- *Suctobelbella (Ussuribata) spirochaeta* Mahunka, 1983: locations 7 (1 ex.), 8 (22 ex.), 13 (1 ex.), 17 (25 ex.), 18 (7 ex.), 19 (3 ex.). Distribution: Afrotropical.

Dampfiellidae

- *Dampfiella setosa* Mahunka, 1984: locations 3 (5 ex.), 13 (2 ex.), 18 (2 ex.), 19 (1 ex.). Distribution: Afrotropical.

Tectocephidae

- *Tectocephus sarekensis* Trägårdh, 1910: locations 3 (22 ex.), 5 (6 ex.), 8 (9 ex.), 9 (3 ex.), 10 (34 ex.), 13 (18 ex.), 14 (33 ex.), 18 (45 ex.), 19 (15 ex.). Distribution: Cosmopolitan.

Microtegeidae

- *Microtegeus khaustovi* Ermilov, Sidorchuk and Rybalov, 2010: locations 3 (9 ex.), 4 (10 ex.), 5 (27 ex.), 8 (3 ex.), 10 (1 ex.), 11 (16 ex.), 12 (1 ex.), 15 (11 ex.), 19 (20 ex.), 21 (4 ex.). Distribution: Ethiopia.

Phenopelopidae

- *Eupelops acromios* (Hermann, 1804): locations 6 (1 ex.), 7 (6 ex.), 11 (1 ex.), 19 (3 ex.), 22 (7 ex.). Distribution: Semicosmopolitan.
- *Eupelops cf. occultus* (Koch, 1835): locations 4 (1 ex.), 6 (1 ex.), 15 (3 ex.), 19 (1 ex.). Distribution: Palaearctic, Ethiopia.
- *Eupelops torulosus* (Koch, 1839): locations 15 (3 ex.), 21 (1 ex.). Distribution: Palaearctic, Ethiopia.

Eremaeozetidae

- *Mahunkaia gracilis* (Mahunka, 1985): locations 1 (20 ex.), 4 (1 ex.). Distribution: South Africa. New record of the species in Ethiopia.

Microzetidae

- *Microzetes (Megazetes) eckeri* (Mahunka, 1982): locations 8 (5 ex.), 9 (1 ex.). Distribution: Ethiopia.

Licneremaeidae

- *Licneremaeus cf. costulatus* Mahunka, 1982: location 11 (1 ex.). Distribution: Ethiopia.

Scutoverticidae

- *Ethiovertex africanus* (Evans, 1953): location 14 (72 ex.). Distribution: Afrotropical.
- *Scutovertex evansi* Mahunka, 1984: locations 16 (1 ex.), 18 (1 ex.), 19 (1 ex.). Distribution: Afrotropical.

Ceratozetidae

- *Melanozetes paramollicomus* Bayartogtokh, Ermilov, Shtanchaeva and Subías, 2021: locations 1 (1 ex.), 3 (2 ex.), 4 (4 ex.), 11 (1 ex.), 13 (12 ex.), 14 (11 ex.), 16 (1 ex.), 18 (7 ex.). Distribution: Ethiopia.

Chamobatidae

- *Ocesobates schatzi* Ermilov, Sidorchuk and Rybalov, 2011: locations 2 (1 ex.), 7 (4 ex.), 11 (23 ex.), 12 (38 ex.), 21 (11 ex.). Distribution: Afrotropical.

Humerobatidae

- *Humerobates africanus* (Mahunka, 1984): locations 2 (44 ex.), 3 (56 ex.), 4 (17 ex.), 9 (16 ex.), 11 (28 ex.), 12 (27 ex.), 13 (1 ex.), 21 (36 ex.), 22 (12 ex.). Distribution: Afrotropical.

Punctoribatidae

- *Africoribates ornatus* Evans, 1953: location 5 (6 ex.). Distribution: Afrotropical.
- *Antarctozetes behanpeltierae* Ermilov, 2024: 4 (9 ex.), 7 (1 ex.), 9 (6 ex.), 16 (1 ex.), 18 (17 ex.), 19 (13 ex.). Distribution: Afrotropical.
- *Antarctozetes subiasi* Ermilov, Sidorchuk and Rybalov, 2011: locations 2 (1 ex.), 15 (3 ex.), 22 (1 ex.). Distribution: Ethiopia.

Mochlozetidae

- *Drymobatoides harenaensis* Ermilov **n. sp.**: locations 4 (1 ex.), 13 (4 ex.). Distribution: Ethiopia.
- *Unguizetes atypicus* (Mahunka, 1982): locations 2 (1 ex.), 12 (4 ex.), 21 (46 ex.). Distribution: Afrotropical.

Scheloribatidae

- *Scheloribates acutirostrum* Ermilov, Rybalov and Franke, 2011: location 1 (11 ex.). Distribution: Ethiopia.
- *Scheloribates aethiopicus* Mahunka, 1982: locations 14 (7 ex.), 16 (46 ex.), 18 (30 ex.), 20 (25 ex.). Distribution: Afrotropical, Canary Islands.
- *Scheloribates arszonensis* Ermilov and Rybalov, 2022: location 14 (11 ex.). Distribution: Ethiopia.

- *Scheloribates concentricus* Balogh, 1962: locations 3 (9 ex.), 6 (16 ex.), 7 (9 ex.), 8 (10 ex.), 11 (25 ex.), 12 (40 ex.), 13 (11 ex.), 17 (4 ex.). Distribution: Tanzania. New record of the species in Ethiopia.
- *Scheloribates discifer* Balogh, 1959: locations 2 (16 ex.), 5 (3 ex.), 6 (34 ex.), 7 (1 ex.), 21 (8 ex.), 22 (60 ex.). Distribution: Afrotropical.
- *Scheloribates elsi* Pletzen, 1965: location 6 (8 ex.). Distribution: Afrotropical. New record of the species in Ethiopia.
- *Scheloribates* cf. *laevigatus* (Koch, 1835): locations 9 (25 ex.), 13 (48 ex.), 15 (8 ex.), 17 (32 ex.), 18 (14 ex.), 19 (37 ex.). Distribution: Semicosmopolitan.
- *Scheloribates maximus* Balogh, 1962: locations 2 (7 ex.), 11 (32 ex.), 12 (36 ex.), 13 (16 ex.), 15 (1 ex.). Distribution: Afrotropical.
- *Scheloribates pallidulus* (Koch, 1841): locations 1 (45 ex.), 2 (42 ex.), 3 (52 ex.), 4 (29 ex.), 7 (22 ex.), 9 (67 ex.), 12 (9 ex.), 17 (14 ex.), 18 (18 ex.), 19 (34 ex.). Distribution: Cosmopolitan.
- *Scheloribates* cf. *rugiceps* Balogh, 1962: locations 5 (11 ex.), 8 (31 ex.), 13 (1 ex.), 17 (12 ex.), 21 (18 ex.). Distribution: Afrotropical.
- *Scheloribates tricarinus* Coetzer, 1968: locations 9 (10 ex.), 10 (11 ex.), 11 (17 ex.). Distribution: South Africa. New record of the species in Ethiopia.
- *Scheloribates* (*Bischeloribates*) *lizelhugoe* Ermilov and Rybalov, 2013: locations 1 (28 ex.), 12 (13 ex.), 13 (29 ex.). Distribution: Afrotropical.
- *Scheloribates* (*Perscheloribates*) *luminosus* Hammer, 1961: locations 4 (14 ex.), 11 (42 ex.), 12 (17 ex.), 21 (6 ex.). Distribution: Tropical, Subtropical.
- *Scheloribates* (*Perscheloribates*) *oromiaensis* Ermilov and Rybalov, 2023: locations 14 (6 ex.), 15 (20 ex.), 16 (3 ex.). Distribution: Ethiopia.
- *Scheloribates* (*Perscheloribates*) cf. *paratranslamellatus* (Ermilov and Rybalov, 2014): locations 4 (2 ex.), 8 (2 ex.), 11 (31 ex.), 13 (19 ex.), 15 (6 ex.). Distribution: Ethiopia.
- *Similobates demetorum* Mahunka, 1982: location 21 (1 ex.). Distribution: Ethiopia.

Oribatulidae

- *Zygoribatula josefstaryi* Ermilov and Rybalov, 2013: location 4 (1 ex.). Distribution: Ethiopia.
- *Zygoribatula setosa* (Evans, 1953): location 15 (1 ex.). Distribution: Afrotropical.

Galumnidae

- *Pergalumna makarovae* Ermilov, Sidorchuk and Rybalov, 2010: locations 1 (1 ex.), 18 (38 ex.), 19 (67 ex.). Distribution: Ethiopia.
- *Taeniogalumna behanae* Ermilov, Sidorchuk and Rybalov, 2010: location 15 (1 ex.). Distribution: Ethiopia.

The list includes 71 species belonging to 44 genera and 29 families. Nine species (*Hypochthonius rufulus*, *Microppia minus*, *Oxyoppia* (*Oxyoppiella*) *saskai*, *Separatoppia robusta*, *Quadroppia* (*Coronoquadroppia*) *circumita*, *Mahunkaia gracilis*, *Scheloribates concentricus*, *S. elsi*, *S. tricarinus*), three genera (*Hypochthonius*, *Brachioppiella*, *Quadroppia*) and two families (Hypochthoniidae, Quadroppiidae) are reported in Ethiopia for the first time. Twenty-three species are known only from Ethiopia, 30 are Afrotropical, 18 (including 6 Cosmopolitan/Semicosmopolitan) have broad distributions (more than one geographical region).

Taxonomy

Family Oppiidae Sellnick, 1937

Genus *Brachioppiella* Hammer, 1962

Subgenus *Brachioppiella* Hammer, 1962

Brachioppiella (Brachioppiella) sanettiensis Ermilov n. sp.

Zoobank: [A4524778-4801-4B0C-8C6C-F478BF96415E](https://zoobank.org/A4524778-4801-4B0C-8C6C-F478BF96415E)

(Figures 2, 3)

Type material — Holotype (male) and two paratypes (two males): Ethiopia, Oromia region, Bale Zone, Bale Mountains National Park, 06°46'17.2"N, 039°45'22.1"E, 3503 m a.s.l., Sanetti Plateau, bushes of *Erica arborea*, mosses *Breutelia borbonica* and litter, 6.XI.2023 (L.B. Rybalov).

The holotype is deposited in the collection of the Senckenberg Museum of Natural History, Görlitz, Germany; two paratypes are in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia. All specimens are preserved in 70% solution of ethanol with a drop of glycerol.

Diagnosis — Body length: 405–420. Costular-transcostular complex absent. Rostral, lamellar and interlamellar setae setiform, slightly barbed; *ro* medium-sized, *le* and *in* short; bothridial seta long, with elongate, slightly unilaterally dilated head having five or six dorsal tines. Interbothridial region with two pairs of muscle sigillae. Notogastral seta *c* represented by microseta; other setae medium-sized, setiform, shortly and sparsely ciliate; *la* located posterolateral to *lm*. Subcapitular setae *a*, *m* as well as all genital, aggenital, anal setae and epimeral setae *1a*, *1c*, *2a*, *3a*, *4b* roughened; subcapitular seta *h* as well as all adanal setae and epimeral setae *1b*, *3b*, *3c*, *4a*, *4c* shortly and sparsely ciliate. Discidium rounded distally. Leg tarsus II with 17 setae including *l''*, *v'*.

Description — *Measurements*. Body length: 405 (holotype), 405, 420 (paratypes); body width: 195 (holotype), 195, 210 (paratypes).

Integument — Body color light brown. Body surface mostly indistinctly microfoveolate (visible under high magnification, × 1000); lateral side of body between bothridium and acetabula I–III densely tuberculate (diameter of tubercle up to 2).

Prodorsum (Figs 2(a, d)) — Rostrum rounded. Costular-transcostular complex absent but two thin lineate longitudinal structures indistinctly observable instead costulae. Rostral (37–41), lamellar (15–19) and interlamellar (15–19) setae setiform, slightly barbed; exobothridial seta (9–11) setiform, roughened, inserted on small tubercle; bothridial seta (56–60) with long stalk and elongate, slightly unilaterally dilated head having five or six outer tines. Interbothridial tubercle absent; postbothridial tubercle slightly developed. Interbothridial region with two pairs of large muscle sigillae.

Notogaster (Figs 2(a, c, d)) — Anterior notogastral margin convex medially. Notogastral seta *c* represented by microseta; other setae setae (30–34) setiform, shortly and sparsely ciliate; *la* located posterolateral to *lm*. Opisthonotal gland opening and all lyrifissures distinct.

Gnathosoma (Figs 3(a–c)) — Subcapitulum size: 94–101 × 71–79; subcapitular setae *a* (17–19) and *m* (17–19) setiform, roughened; subcapitular seta *h* (24–26) setiform, shortly and sparsely ciliate; both adoral setae (7) setiform, smooth. Palp length: 60–64; setation: 0–2–1–3–9(+ω); solenidion long (3/4 of tarsus), slightly thickened, rounded distally, pressed to surface; postpalpal seta (4) spiniform, smooth. Chelicera length: 94–101; seta *cha* (30–32) setiform, barbed; seta *chb* (13–15) setiform, slightly barbed.

Epimeral and lateral podosomal regions (Figs 2(b, d)) — Epimeral setal formula: 3–1–3–3; setae *1a*, *1c*, *2a*, *3a*, *4b* (15) setiform, roughened; *3c* (39–41), *1b*, *3b*, *4a*, *4c* (30–34) setiform, shortly and sparsely ciliate. Discidium broadly triangular, rounded distally.

Anogenital region (Figs 2(b–d)) — Anogenital formula: 5–1–2–3; genital (11), aggenital (15–19) and anal (15–19) setae setiform, roughened; adanal setae (30–34) setae setiform, shortly and sparsely ciliate. Adanal lyrifissure oblique (inverse apoanal).

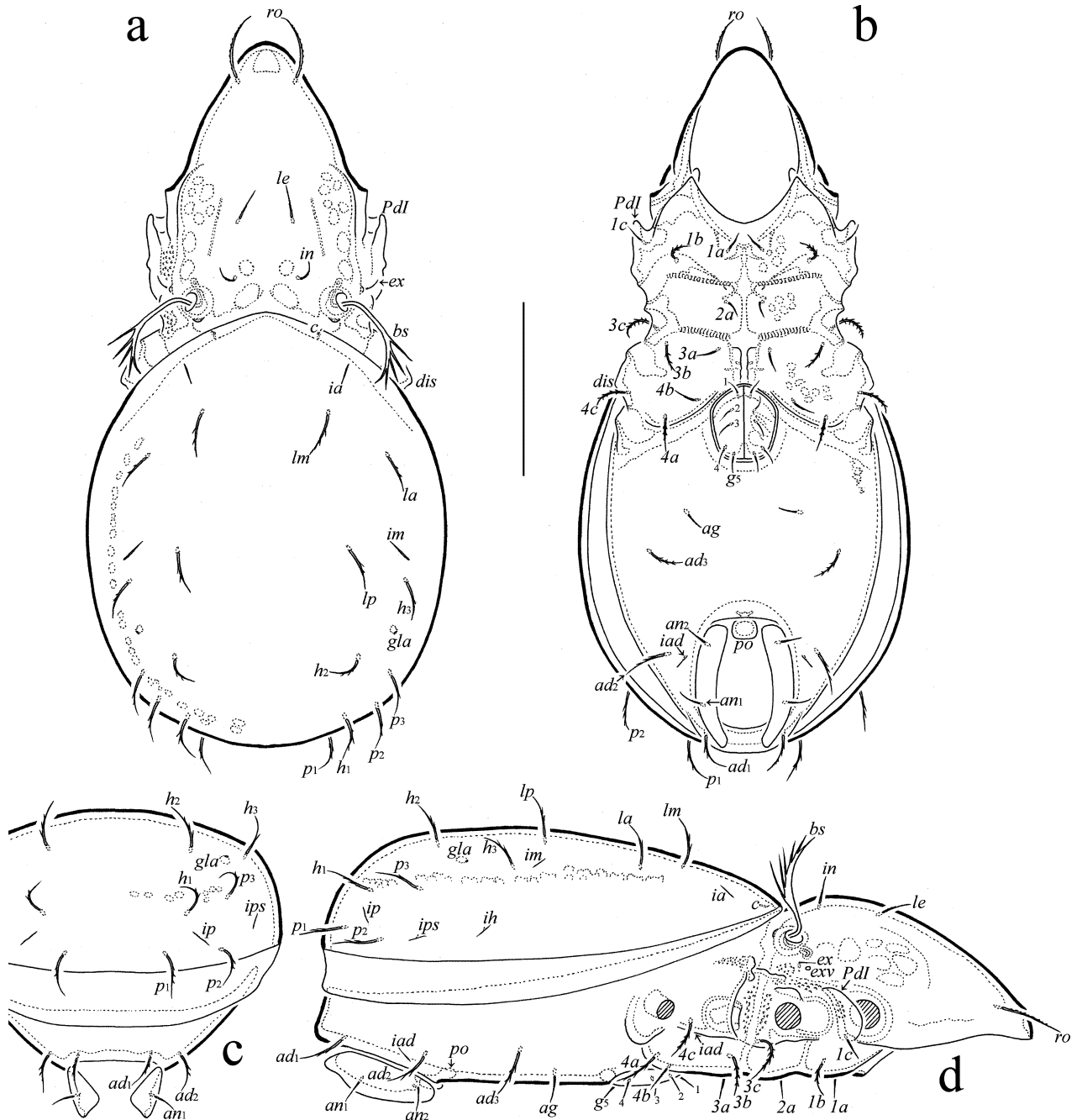


Figure 2 *Brachioppiella (Brachioppiella) sanettiensis* Ermilov n. sp., adult (gnathosoma and legs omitted): a – dorsal view; b – ventral view; c – posterior view; d – right lateral view. Scale bar 100 μ m.

Legs (Figs 3(d–g)) — Claw of each leg smooth. Dorsoparaxial porose area on trochanters III, IV and ventroparaxial porose area on femora I–IV present but slightly visible. Formulas of leg setation and solenidia: I (1–5–2–4–20) [1–2–2], II (1–5–2–4–17) [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 *p'* and *p''* eupathidial on tarsus I versus spiniform (poorly observable) on tarsi II–IV; seta *s* eupathidial on tarsus I, located between paired setae *u* and *a*; solenidia ω_1 , ω_2 on tarsi I, II and σ on genu III slightly thickened, rounded distally versus others solenidia rod-like.

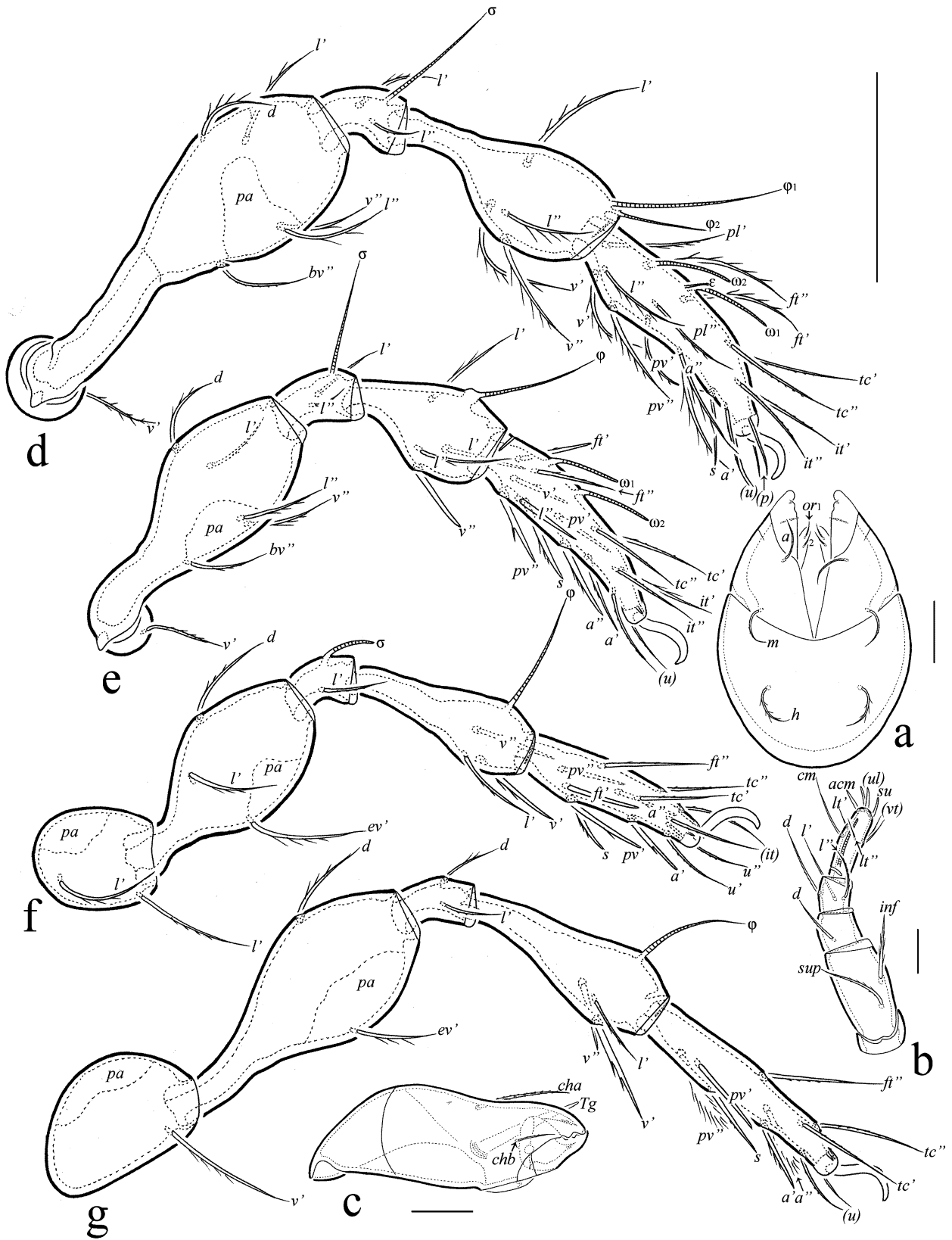


Figure 3 *Brachioppiella (Brachioppiella) sanettiensis* Ermilov n. sp., adult: a – subcapitulum, ventral view; b – palp, right, antiaxial view; c – chelicera, right, antiaxial view; d – leg I, right, antiaxial view; e – leg II, right, antiaxial view; f – leg III, left, antiaxial view; g – leg IV, left, antiaxial view. Scale bars 10 μ m (b), 20 μ m (a, c), 50 μ m (d–g).

Remarks — In having medium-sized body, slightly unilaterally dilated bothridial setal head bearing a few dorsal tines, the length of the prodorsal setae (*ro* medium-sized; *le* and *in* short; *bs* long) and in the absence of the costular-transcostular complex, *B. (B.) sanettiensis* Ermilov **n. sp.** is similar to *B. (B.) biseriata* (Balogh and Mahunka, 1975) from Australia and Vietnam. However, the new species can be distinguished from the latter by the location of the notogastral seta *la* (posterolateral to *lm* versus anterior to *lm*), the size and number of the interbothridial muscle sigillae (two pairs large versus three pairs small), and the morphology of the remaining notogastral setae (shortly and sparsely ciliate versus smooth).

Etymology — The species name *sanettiensis* refers to the place of origin, Sanetti Plateau.

Family Mochlozetidae Grandjean, 1960

Genus *Drymobatoides* Jacot, 1936

Drymobatoides harenaensis* Ermilov **n. sp.*

Zoobank: EBEE2D4C-6A65-40E5-93E0-CBFA161CC94B

(Figures 4, 5)

Type material — Holotype (male) and three paratypes (one male and two females): Ethiopia, Oromia region, Bale Zone, Bale Mountains National Park, 06°46'39.5"N, 039°44'42"E, 3241 m a.s.l., slope to the Harena Forest, forest with *Erica arborea* and *Hagenia abyssinica*, litter under *H. abyssinica*, 26.X.2023 (L.B. Rybalov).

The holotype is deposited in the collection of the Senckenberg Museum of Natural History, Görlitz, Germany; three paratypes are in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia. All specimens are preserved in 70% solution of ethanol with a drop of glycerol.

Diagnosis — Body length: 975–1080. Lamella without cusp. Rostral, lamellar, interlamellar, and bothridial setae long, setiform, barbed; *in* > *bs* > *le* > *ro*; *le* posteromedial to the lamella end. About 40 pairs of small porose areas. Custodium minute, triangular. Five pairs of genital setae. Marginal porose area represented by numerous porose areas. Leg femur IV with slight emarginate ventrodiscal part.

Description — *Measurements*. Body length: 1065 (holotype), 975 (male paratype), 1065, 1080 (female paratypes); body width (level of pteromorphs): 855 (holotype), 825 (male paratype), 825, 855 (female paratypes); body width ventral plate: 750 (holotype), 750 (male paratype), 735, 780 (female paratypes).

Integument — Body color brown. Body surface mostly indistinctly microfoveolate (visible under high magnification, × 1000).

Prodorsum (Figs 4(a, b, e)) — Rostrum slightly protruding, rounded. Lamella about 1/2 length of prodorsum, without cusp; prolamella, translamella and sublamella absent; tatorium slightly developed, short, lineate. Sublamellar porose area oval (34–37 × 24–26) oval. Rostral (146–154), lamellar (187–199), interlamellar (330–352), and bothridial (255–277) setae setiform, barbed; *le* posteromedial to the lamella end; exobothridial seta (26–30) setiform, roughened. Dorsosejugal porose area not observable.

Table 1 Leg setation and solenidia of *Brachioppiella (Brachioppiella) sanettiensis* Ermilov **n. sp.**

Leg	<i>Tr</i>	<i>Fe</i>	<i>Ge</i>	<i>Ti</i>	<i>Ta</i>
I	<i>v'</i>	<i>d, (l), bv'', v''</i>	<i>(l), σ</i>	<i>(l), (v), φ₁, φ₂</i>	<i>(ft), (tc), (it), (p), (u), (a), s, (pv), v', (pl), l'', ε, ω₁, ω₂</i>
II	<i>v'</i>	<i>d, (l), bv'', v''</i>	<i>(l), σ</i>	<i>(l), (v), φ</i>	<i>(ft), (tc), (it), (p), (u), (a), s, (pv), v', l'', ω₁, ω₂</i>
III	<i>l', v'</i>	<i>d, l', ev'</i>	<i>l', σ</i>	<i>l', (v), φ</i>	<i>(ft), (tc), (it), (p), (u), (a), s, (pv)</i>
IV	<i>v'</i>	<i>d, ev'</i>	<i>d, l'</i>	<i>l', (v), φ</i>	<i>ft'', (tc), (p), (u), (a), s, (pv)</i>

Note: Roman letters refer to normal setae; Greek letters to solenidia (except ε = famulus); single quotation mark (') designates seta on the anterior and double quotation mark (") seta on the posterior side of a given leg segment; parentheses refer to a pair of setae.

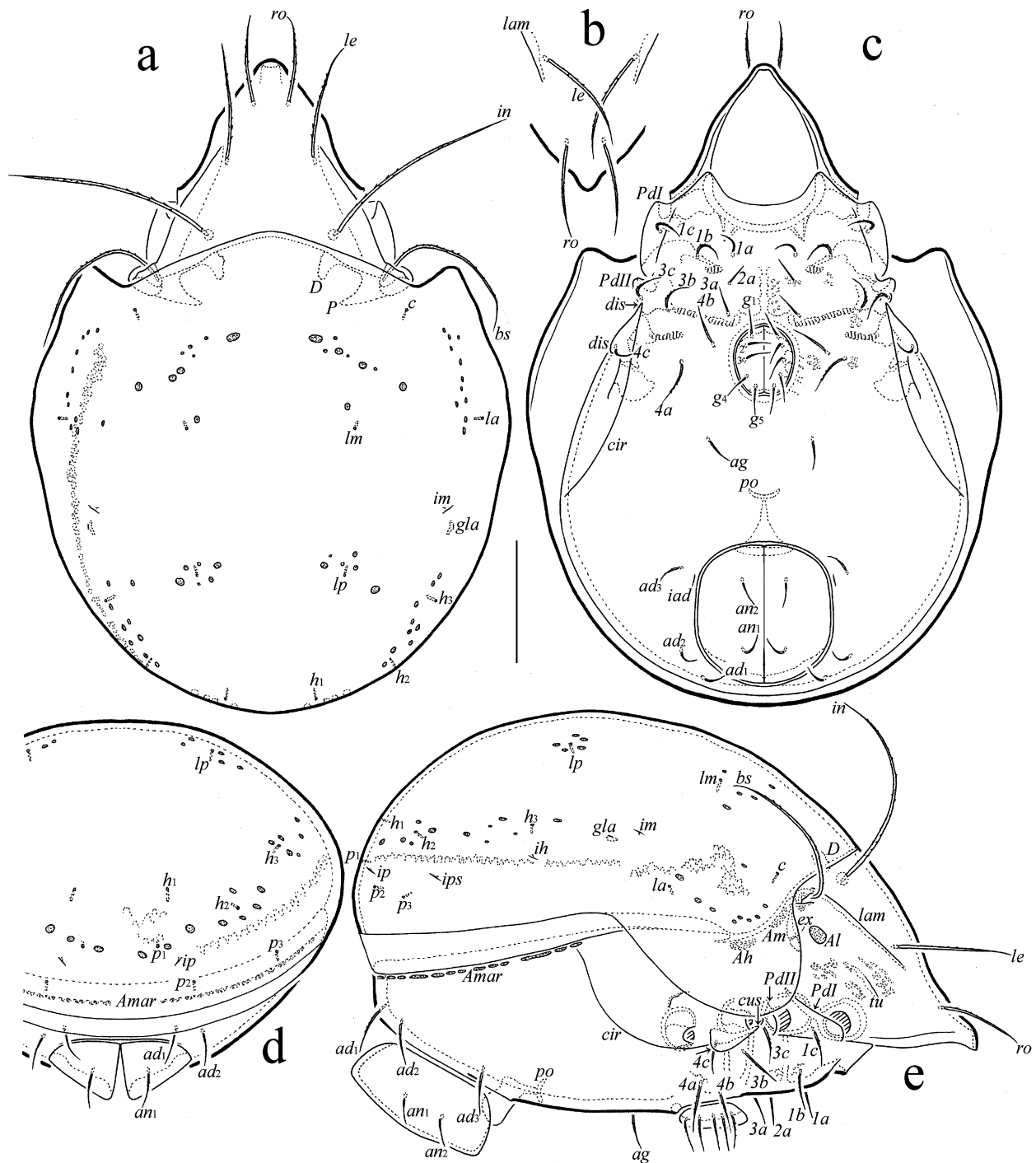


Figure 4 *Drymobatoides harenaensis* Ermilov n. sp., adult (gnathosoma and legs omitted): a – dorsal view; b – anterior part of prodorsum, dorsoanterior view; c – ventral view; d – posterior view; e – right lateral view. Scale bar 200 μ m.

Notogaster (Figs 4(a, d, e)) — Dorsosejugal suture slightly convex medially. Pteromorph broadly rounded laterally. About 40 pairs of small (diameter from 4 up to 19) porose areas. All notogastral setae represented by alveoli. Opisthonotal gland opening and all lyrifissures distinct.

Gnathosoma (Figs 5(a–c)) — Subcapitulum size: 229–244 \times 180–191; subcapitular setae (*a*)

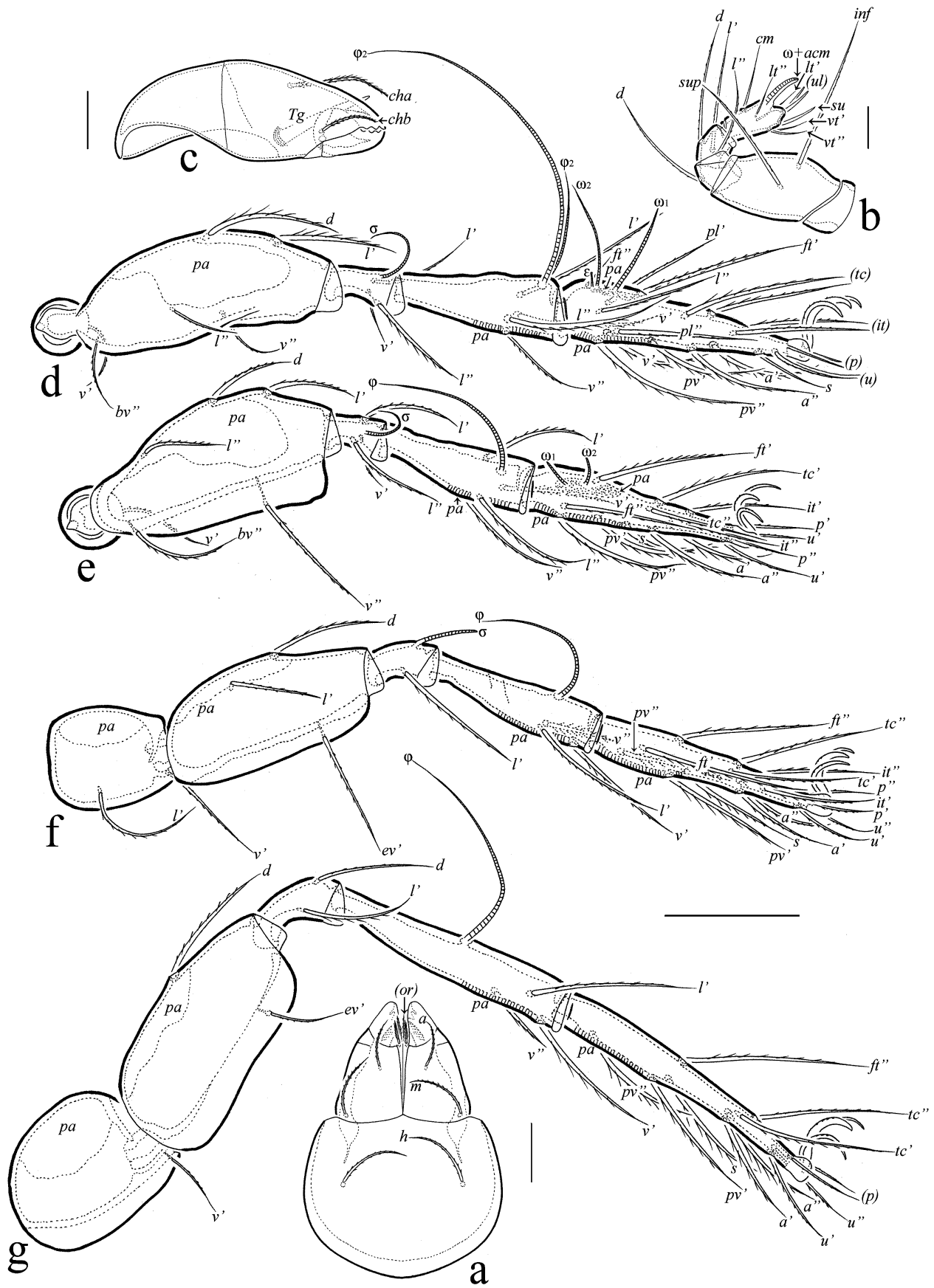


Figure 5 *Drymobatoides harenaensis* Ermilov n. sp., adult: a – subcapitulum, ventral view; b – palp, right, antiaxial view; c – chelicera, right, antiaxial view; d – leg I, right, antiaxial view; e – leg II, right, antiaxial view; f – leg III, left, antiaxial view; g – leg IV, left, antiaxial view. Scale bars 20 µm (b), 50 µm (a, c), 100 µm (d–g).

49–56; *m*: 71–75; *h*: 82–86) setiform, barbed; both adoral setae (26–30) setiform, shortly and densely ciliate. Palp length: 124–131; setation: 0–2–1–3–9(+ ω); solenidion medium-sized (1/2 of tarsus), slightly thickened, rounded distally, attached to *acm*; postpalpal seta (7) spiniform, roughened. Chelicera length: 229–244; setae (*cha*: 82–90; *chb*: 56–64) setiform, barbed.

Epimeral and lateral podosomal regions (Figs 4(c, e)) — Epimeral setal formula: 3–1–3–3; all setae (*1a*, *2a*, *3a*, *4c*: 49–60; *1b*, *1c*, *3b*, *3c*, *4a*, *4b*: 82–90) setiform, slightly barbed. Humeral porose areas *Am* and *Ah* elongate oval, slightly visible. Custodium minute, triangular. Discidium triangular, rounded distally. Circumpedal carina long, distally connected to custodium.

Anogenital region (Figs 4(c–e)) — Anogenital formula: 5–1–2–3; genital (49–60), aggenital (49–60), anal (41–49), and adanal (56–60) setae setiform, slightly barbed. Adanal lyrifissure parallel and close to anal plate. Marginal porose area represented by numerous small porose areas.

Legs (Figs 5(d–g)) — Median claw thicker than lateral claws; all claw slightly barbed on dorsal side; lateral claw without ventrodorsal tooth. Femur IV with slight emargination ventrodorsally. Dorsoparaxial porose area on trochanters III, IV and on femora I–IV as well as ventrodorsal porose area on tibia I–IV and proximoventral porose area on tarsi I–IV and dorsal porose area on tarsi I, II well visible. Formulas of leg setation and solenidia: I (1–5–3–4–20) [1–2–2], II (1–5–3–4–15) [1–1–2], III (2–3–1–3–15) [1–1–0], IV (1–2–2–3–12) [0–1–0]; homology of setae and solenidia indicated in Table 2; seta *s* eupathidial on tarsus I, located between paired setae *u* and *a*; solenidia ω_1 on tarsus I, ω_1 , ω_2 on tarsus II and σ on genu III slightly thickened, rounded distally versus others solenidia setiform.

Remarks — In having five pairs of genital setae, *D. harensensis* Ermilov **n. sp.** is similar to *D. boronganensis* Ermilov and Corpuz-Raros, 2017 from the Philippines and *D. malabaricus* (Adolph and Haq, 1982) from India. However, the new species can be distinguished from both mentioned species by larger body size (length: 975–1080 versus 664–747 in *D. boronganensis*; 737–767 in *D. malabaricus*), and the location of the lamellar seta (posteromedial to lamella end versus on lamellar end).

Etymology — The species name *harensensis* refers to the place of origin, Harena Forest.

Acknowledgements

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Table 2 Leg setation and solenidia of *Drymobatoides harensensis* Ermilov **n. sp.**

Leg	<i>Tr</i>	<i>Fe</i>	<i>Ge</i>	<i>Ti</i>	<i>Ta</i>
I	<i>v'</i>	<i>d</i> , (<i>l</i>), <i>bv''</i> , <i>v''</i>	(<i>l</i>), <i>v'</i> , σ	(<i>l</i>), (<i>v</i>), φ_1 , φ_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> , ϵ , ω_1 , ω_2
II	<i>v'</i>	<i>d</i> , (<i>l</i>), <i>bv''</i> , <i>v''</i>	(<i>l</i>), <i>v'</i> , σ	(<i>l</i>), (<i>v</i>), φ	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>), ω_1 , ω_2
III	<i>l'</i> , <i>v'</i>	<i>d</i> , <i>l'</i> , <i>ev'</i>	<i>l'</i> , σ	<i>l'</i> , (<i>v</i>), φ	(<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>), φ	<i>ft''</i> , (<i>tc</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>)

Note: See Table 1 for explanations.

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