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First record of the genus *Phauloppia* (Acari, Oribatida, Oribatulidae) in Ethiopia, with description of a new arboreal species

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ABSTRACT

The genus *Phauloppia* (Oribatida, Oribatulidae) is recorded for the first time from Ethiopia. A new species, *P. hageniaica* **sp. nov.**, is described based on females collected from bark and moss of *Hagenia abyssinica* in southeastern Ethiopia. The new species is characterized by the absence of the lamella.

KEYWORDS

Afrotropical region, morphology, oribatid mites, taxonomy, tree dweller

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INTRODUCTION

The oribatid mite genus *Phauloppia* (Acari, Oribatida, Oribatulidae) comprises 25 species having a cosmopolitan distribution collectively (Subías 2022, online version 2024; Ermilov *et al.* 2024). Species of the genus inhabit various substrates across different ecosystems; some species are arboreal (e.g., Bayartogtokh 2010; Murvanidze and Mumladze 2016; Ermilov and Salavatulin 2025). Generic diagnosis was revised by Ermilov and Salavatulin (2023). Identification keys to some species of *Phauloppia* were presented by, e.g., Balogh and Balogh (2002), Weigmann (2006), Bayartogtokh (2010), and Ermilov and Salavatulin (2023).

The oribatid mite fauna of Ethiopia comprises 375 species; representatives of *Phauloppia* have not been recorded (Ermilov and Rybalov 2026). During taxonomic identification of arboreal mites from *Hagenia abyssinica* (Rosaceae) in southeastern Ethiopia, we found a new species belonging to *Phauloppia*. The main goal of the paper is to describe this new species under the name *Phauloppia hageniaica* **sp. nov.**

Eight species of Oribatulidae (1 species – *Lunoribatula* Mahunka, 1982(a); 2 species – *Oribatula* Berlese, 1896; 5 species – *Zygoribatula* Berlese, 1916) have been previously recorded in the Ethiopian fauna (Ermilov and Rybalov 2026).

METHODS

For measurement and illustration, specimens were mounted in lactic acid on temporary cavity

slides. Body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the gastronotum. Maximum body width refers to the maximum width of the notogaster in dorsal view. Setae were measured from the side to avoid foreshortening. All measurements are in micrometres (μm). Formulas for leg setation are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (famulus of tarsus I included). Formulas for leg solenidia are given in square brackets, according to the sequence genu–tibia–tarsus. Paired structures are described in the singular, unless otherwise noted. Drawings were made with a camera lucida using a Leica DM 2500 light microscope.

Morphological terminology used in this paper follows that of Grandjean: see Travé and Vachon (1975) for references, Norton (1977) for leg setal nomenclature, and Norton and Behan-Pelletier (2009) for overview.

Abbreviations: Prodorsum: *ro*, *le*, *in*, *bs*, *ex* = rostral, lamellar, interlamellar, bothridial, and exobothridial setae, respectively; *Ad* = dorsosejugal porose area; *D* = dorsophragma; *P* = pleurophragma. Notogaster: c_1, c_2, *da*, *dm*, *dp*, *la*, *lm*, *lp*, h_1–h_3, p_1–p_3 = setae; *Aa*, *A1*, *A2*, *A3* = porose areas; *ia*, *im*, *ip*, *ih*, *ips* = lyrifissures; *gla* = opisthonotal gland opening. Gnathosoma: *a*, *m*, *h* = subcapitular setae; *or* = adoral seta; *d*, *l*, *cm*, *acm*, *ul*, *su*, *lt*, *vt*, *inf*, *sup* = palp setae; ω = palp solenidion; *cha*, *chb* = cheliceral setae; *Tg* = Trägårdh's organ. Epimeral and lateral podosomal regions: *1a*, *1b*, *1c*, *2a*, *3a*, *3b*, *3c*, *4a*, *4b*, *4c* = epimeral setae; *PdI*, *PdII* = pedotecta I and II, respectively; *dis* = discidium; *cir* = circumpedal carina. Anogenital region: *g*, *ag*, *an*, *ad* = genital, aggenital, anal, and adanal setae, respectively; *iad* = adanal lyrifissure; *Ap* = postanal porose area; *po* = preanal organ. Legs: *pa* = porose area; *d*, *l*, *v*, *ev*, *bv*, *ft*, *tc*, *it*, *p*, *u*, *a*, *s*, *pv*, *pl* = setae; *e* = famulus; ω, σ, φ = solenidia.

RESULTS

TAXONOMY

Family Oribatulidae Thor, 1929

Genus *Phauloppia* Berlese, 1908

Type species: *Zetes lucorum* C.L. Koch, 1841 (syn.: *Oppia conformis* Berlese, 1895)

Phauloppia hageniaica sp. nov. (Figs 1–10)

http://zoobank.org/urn:lsid:zoobank.org:act:6FF1A2F1-7444-40C2-B39E-0207F3634FC1

Type material

Holotype (female) and two paratypes (two females): southeastern Ethiopia, Oromia Region, Bale Zone, Bale Mountains National Park, 6° 44′ 37″ N, 39° 43′ 00″ E, 2628 m a.s.l., Harenna Forest, forest with *Hagenia abyssinica* Willd. and *Oldeania alpina* (K. Schum.), bark and moss on *H. abyssinica* at a height of 7 m, 16.XII.2025 (collected by V.M. Salavatulin). Detailed description of arboreal acarofauna extraction techniques is presented in Salavatulin (2019).

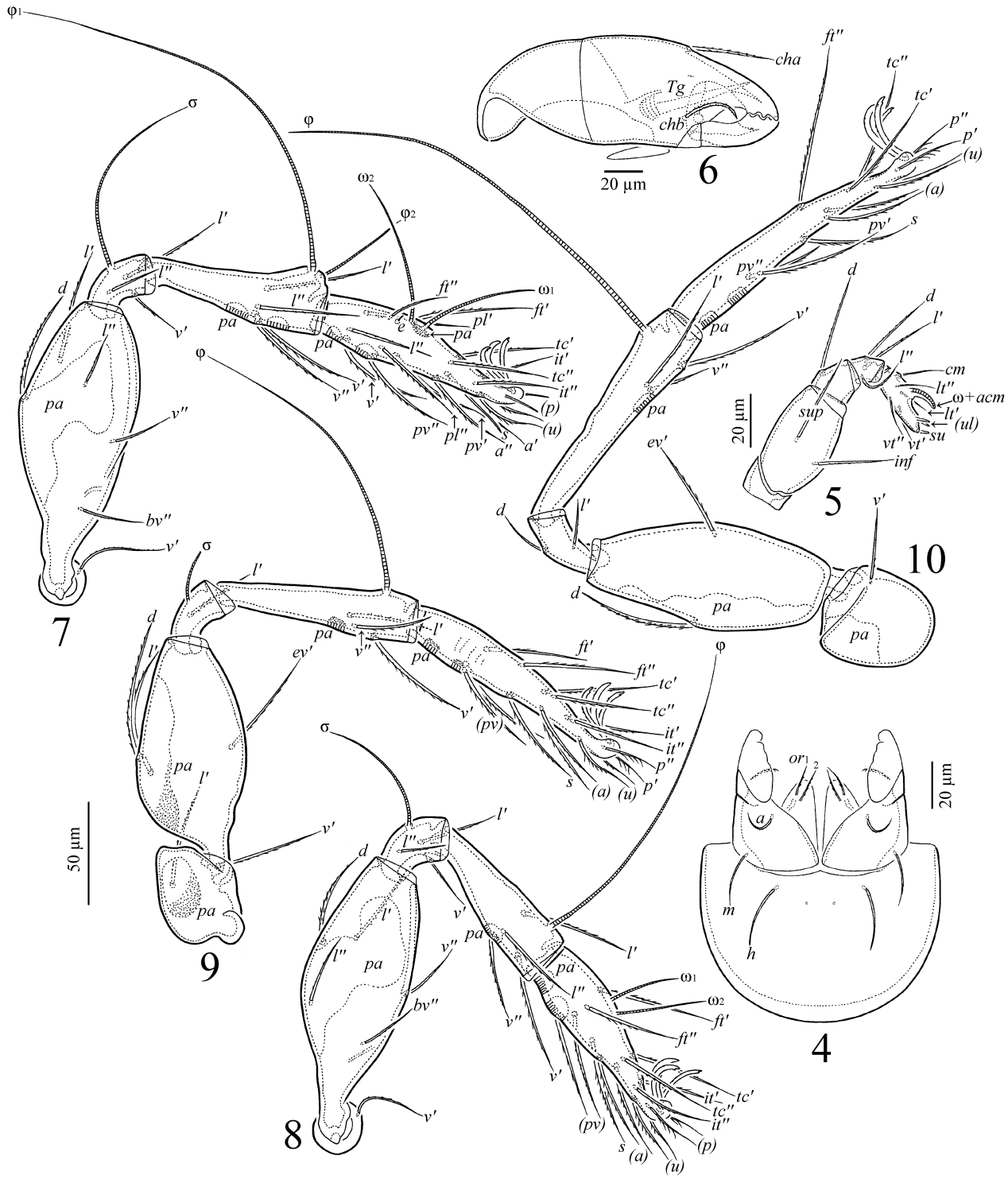
Type deposition

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

Diagnosis

Body length 630–645. Lamella absent. Rostral, lamellar, and interlamellar setae long, setiform, barbed; relative length *in* > *le* > *ro*. Bothridial seta short, clavate, barbed. Fourteen pairs of setae present: c_1 medium-sized, stiff, erect, barbed; *da*, *dm*, *dp*, *la*, *lm*, and *lp* long, setiform, barbed; h_1–h_3 and p_1–p_3 medium-sized, setiform, barbed. Notogastral prose area *Aa* elongate oval, others nearly circular. Epimeral and anogenital setae short, setiform, thin, nearly smooth or roughened. Leg chaetome complete.

Figures 1–3. *Phauloppia hageniaica* **sp. nov.** (adult) – **1.** Dorsal view; **2.** Ventral view (gnathosoma and legs omitted); **3.** Right lateral view (gnathosoma and legs omitted).



Figures 4–10. *Phauloppia hageniaica* **sp. nov.** (dissected adult) – **4.** Subcapitulum, ventral view; **5.** Palp, right, antiaxial view; **6.** Chelicera, right, antiaxial view; **7.** Leg I, right, antiaxial view; **8.** Leg II, right, antiaxial view; **9.** Leg III, right, paraxial view; **10.** Leg IV, left, antiaxial view.

Description

Measurements – Body length 645 (holotype), 630, 645 (paratypes). Body width 420 (holotype), 390, 435 (paratypes).

Integument – Body brown. Surface of body densely microgranulate sculpturing (clearer visible in humeral region).

Prodorsum – Rostrum rounded. Lamella completely absent, but several vaguely defined wrinkles present instead it. Rostral (82–90), lamellar (116–135), and interlamellar (139–157) setae setiform, barbed. Bothridial seta (36–45) clavate, barbed, with short stalk and head. Exobothridial seta (60–64) setiform, thin, slightly barbed. Dorsosejugal porose area oval (15–19 × 11–15).

Notogaster – Anterior margin distinctly convex medially. Fourteen pairs of setae present, c_1 (49–53) stiff, erect, barbed, others (*da*, *dm*, *dp*, *la*, *lm*, *lp* 101–116; c_2, h_1–h_3 75–86; p_1–p_3 56–64) setiform, barbed. Four pairs of porose areas present, *Aa* elongate oval (30–34 × 11–13), *A1*, *A2*, and *A3* nearly circular (11–19). Opisthonotal gland opening and all lyrifissures well visible.

Gnathosoma – Subcapitulum size 135–157 × 101–127. Three pairs of subcapitular setae (*a* 26–28; *m* 34–37; *h* 41–45) setiform, thin, roughened. Two pairs of adoral setae (15–17) setiform, thin, barbed. Palp length 97–101. Palp setal formula 0–2–1–3–9(+ω). Postpalpal seta (7) spiniform, smooth. Chelicera length 143–161. Cheliceral setae (*cha* 45–49, *chb* 34) setiform, barbed.

Epimeral and lateral podosomal regions – Epimeral setal formula 3–1–3–3. Epimeral setae *1a*, *2a*, and *3a* (30–34) setiform, thin, nearly smooth; other setae (37–45) setiform, thin, roughened. Custodium absent. Discidium and circumpedal carina present. Humeral porose area *Am* and *Ah* oval.

Anogenital region – Anogenital setal formula 4–1–2–3. Genital (30–34), aggenital (37–45), anal (an_1 17–19; an_2 22–24), and adanal (ad_1, ad_2 22–30; ad_3 30–34) setae setiform, thin, nearly smooth. Adanal lyrifissure oblique, located anterior to anal plate. Postanal porose area (visible in posterior view) band-like.

Legs – All leg tarsi tridactylous. Medial claw thicker than lateral claws. All claws slightly barbed on dorsal side. Lateral claws with small tooth distoventrally. Dorsal porose area on tarsus I, proximoventral porose area on tarsi I–IV, distoventral porose area on tibiae I–IV, and dorsoparaxial porose area on femora I–IV, and on trochanters III, IV distinct. Ventral porose area on tarsi and tibiae usually divided into two parts. 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 1.

Table 1. Leg setation and solenidia of adult *Phauloppia hageniaica* **sp. nov.**

Leg	*Tr*	*Fe*	*Ge*	*Ti*	*Ta*
I	*v′*	*d*, *(l)*, *bv″*, *v″*	*(l)*, *v′*, σ	*(l)*, *(v)*, φ1, φ2	*(ft)*, *(tc)*, *(it)*, *(p)*, *(u)*, *(a)*, *s*, *(pv)*, *v′*, *(pl)*, *l″*, *e*, ω1, ω2
II	*v′*	*d*, *(l)*, *bv″*, *v″*	*(l)*, *v′*, σ	*(l)*, *(v)*, φ	*(ft)*, *(tc)*, *(it)*, *(p)*, *(u)*, *(a)*, *s*, *(pv)*, ω1, ω2
III	*l′*, *v′*	*d*, *l′*, *ev′*	*l′*, σ	*l′*, *(v)*, φ	*(ft)*, *(tc)*, *(it)*, *(p)*, *(u)*, *(a)*, *s*, *(pv)*
IV	*v′*	*d*, *ev′*	*d*, *l′*	*l′*, *(v)*, φ	*ft″*, *(tc)*, *(p)*, *(u)*, *(a)*, *s*, *(pv)*

Note: *Tr*, *Fe*, *Ge*, *Ti*, *Ta* = trochanter, femur, genu, tibia, and tarsus, respectively. Roman letters refer to normal setae, Greek letters to solenidia, *e* = 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.

Remarks

Phauloppia hageniaica **sp. nov.** is similar to *P. lucorum* (Koch, 1841) (supplementary descriptions see in, e.g., Mahunka 1982b; Weigmann 2006), from the Holarctic region and Nepal, in the length of the prodorsal and dorsal notogastral setae (relatively long) and the morphology of the notogastral seta c_1 (stiff and erect). However, the new species differs from the latter by the absence (versus presence) of the lamella and the morphology of the notogastral porose area *Aa* (elongate oval versus band-like).

Etymology

The specific name *hageniaica* refers to the tree (*Hagenia abyssinica*) on which the new species was found.

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نخستین گزارش از جنس *Phauloppia* (Acari, Oribatida, Oribatulidae) در اتیوپی، به همراه توصیف گونهٔ جدید درختی

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چکیده

جنس *Phauloppia* (Oribatida, Oribatulidae) برای نخستین بار از اتیوپی گزارش می‌شود. گونهٔ جدیدی به نام ***P. hageniaica* sp. nov.** بر اساس کنه‌های ماده جمع‌آوری‌شده از پوست و خزه درخت *Hagenia abyssinica* در جنوب شرقی اتیوپی توصیف می‌شود. این گونه جدید با نداشتن تیغه مشخص می‌شود.

واژگان کلیدی: ناحیهٔ آفروتروپیکال، ریخت‌شناسی، هرناهای اریباتید، آرایه‌شناسی، درختزی

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