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Article

A new species of *Amboroppia* (Acari, Oribatida, Oppiidae) from the Peruvian Andes, with remarks on generic diagnosis

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ABSTRACT
A new species of the neotropical genus *Amboroppia* (Oribatida, Oppiidae), *A. andensis* **sp. nov.** is described, based on adults collected from upper soil and leaf litter in primary mountain forest in the Andes, Central Peru. Additions to the generic diagnosis of *Amboroppia* are presented.

KEY WORDS: Fauna; morphology; Neotropical region; oppiid mites; taxonomy.

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INTRODUCTION

The oribatid mite genus *Amboroppia* (Acari, Oribatida, Oppiidae, Arcoppiinae) was proposed by Emilov & Starý (2022) with *Amboroppia bayartogtokhi* Ermilov & Starý, 2022 as type species. The genus is monotypic; the single representative was recorded from Bolivia, collected from leaf litter in the rain forest of the Amboró National Park.

The main goal of the paper is to describe and illustrate a new species of *Amboroppia* (the second known species of the genus) which was found from the Andes in Peru. Also, some additions to the generic diagnosis of *Amboroppia* are presented.

At present, the oppiid mite fauna of Peru is insufficiently investigated; only two species of Arcoppiinae were registered (Hammer 1958, 1961): *Arcoppia tenuicoma* (Hammer, 1958); and *A. tripartita* (Hammer, 1961).

METHODS

Observation and documentation

Specimens were mounted in lactic acid on temporary cavity slides for measurement and

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illustration. Body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the notogaster. Notogastral width refers to the maximum width of the notogaster in dorsal view. 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. Drawings were made with a camera lucida using a Leica transmission light microscope "Leica DM 2500".

Terminology

Morphological terminology used in this paper mostly 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: *ctc* = costular-transcostular complex; *con* = concavity; *ro*, *le*, *in*, *bs*, *ex* = rostral, lamellar, interlamellar, bothridial, and exobothridial seta, respectively; *exv* = vestige of the second exobothridial seta; *lpc* = lateral prodorsal carina. *Notogaster*: *c*, *la*, *lm*, *lp*, *h*, *p* = setae; *ia*, *im*, *ip*, *ih*, *ips* = lyrifissures; *gla* = opisthonotal gland opening. *Gnathosoma*: *a*, *m*, *h* = subcapitular setae; *or* = adoral seta; *d*, *l*, *v*, *cm*, *ul*, *su*, *vt*, *lt* = 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; *PdI* = pedotectum I; *dis* = discidium. *Anogenital region*: *g*, *ag*, *an*, *ad* = genital, aggenital, anal, and adanal seta, respectively; *iad* = adanal lyrifissure; *p.o.* = preanal organ. *Legs*: *Tr*, *Fe*, *Ge*, *Ti*, *Ta* = trochanter, femur, genu, tibia, and tarsus, respectively; *p.a.* = porose area; ω, φ, σ = solenidia; ε = famulus; *d*, *l*, *v*, *bv*, *ev*, *ft*, *tc*, *it*, *p*, *u*, *a*, *s*, *pv*, *pl* = setae.

RESULTS

Oppiidae Sellnick, 1937
Arcoppiinae Balogh, 1983
Genus *Amboroppia* Ermilov & Starý, 2022

Type species: *Amboroppia bayartogtokhi* Ermilov & Starý, 2022

Amboroppia andensis sp. nov. (Figs. 1–10)

Diagnosis

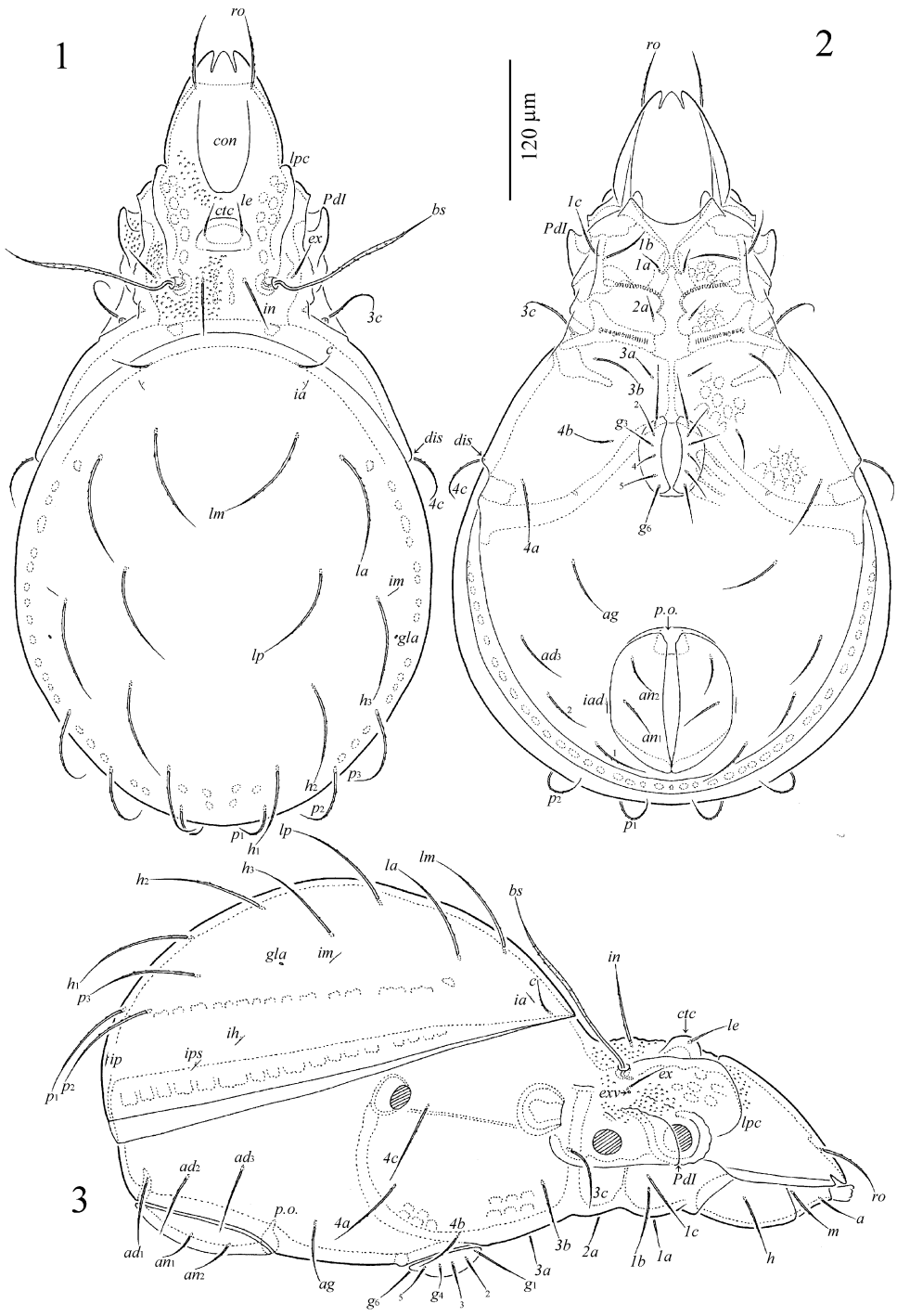
Body length 614–680. Teeth of rostrum well separated. Relative length of prodorsal setae: *in* > *ro* > *le* = *ex*; all setae setiform, barbed; *le* inserted on costular-transcostular complex. Bothridial seta very long, sparsely barbed, slightly dilated mediodistally. Notogastral seta *c* similar in length to *le* and *ex*; other notogastral setae comparatively long; all setae setiform, sparsely barbed. Epimeral and anogenital setae setiform, sparsely barbed.

Description

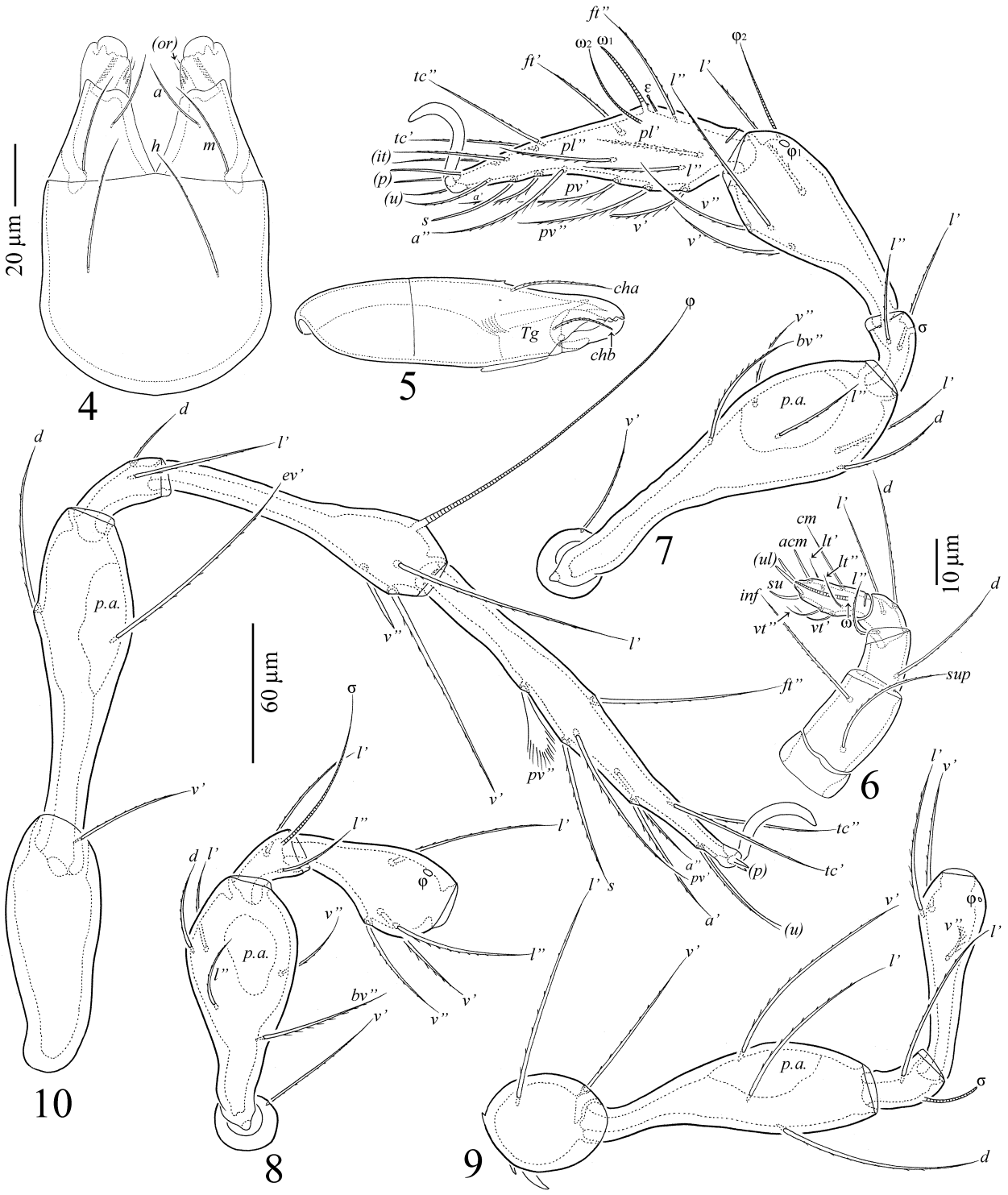
Measurements – Body length: 614 (holotype, female), 614–680 (11 paratypes, six males and five females); notogaster width: 348 (holotype), 348–415 (11 paratypes). No difference between males and females in body size.

Integument – Body color light brown. Body surface microporose (visible only under high magnification in dissected specimen, × 1500). Dorsal and lateral (between bothridium and acetabula I, II) parts of prodorsum partially tuberculate (diameter of tubercle up to 6).

Prodorsum – Rostrum of typical form, tripartite; median and lateral teeth well separated. Costula, transcostula and transverse ridge behind them forming unclear ring-like or trapezoid structure. Elongate concavity between rostrum and transcostula well developed. Rostral (57–61), lamellar (32–36), interlamellar (65–69), and exobothridial (32–36) setae setiform, barbed; *le* and *ex* thinner than *ro* and *in*; *le* inserted on costular-transcostular complex. Bothridial seta (184–192) with indistinct, narrowly elongate dilatation in mediodistal part, sparsely barbed. Some pairs of interbothridial muscle sigillae present but poorly observed. Lateral prodorsal carina strong, arch-like.



Figures 1–3. *Amboroppia andensis* **sp. nov.** (adult) – 1. Dorsal view (legs not shown); 2. Ventral view (gnathosoma and legs not shown); 3. Lateral view (legs not shown).



Figures 4–10. *Amboroppia andensis* **sp. nov.** (adult) – 4. Subcapitulum, ventral view; 5. Chelicera, right, antiaxial view; 6. Palp, left, antiaxial view; 7. Leg I, left, antiaxial view; 8. Leg II, without tarsus, right, dorsal view; 9. Leg III, without tarsus, right, antiaxial view; 10. Leg IV, left, antiaxial view.

Notogaster – Anterior border convex medially. Seta *c* (32–36) setiform, sparsely barbed; others (102–114) thicker, barbed; often majority setae broken. Opisthonotal gland opening and all notogastral lyrifissures distinct; *ip* located posterior to p_1.

Gnathosoma – Subcapitulum size: 127–135 × 90–98. All subcapitular setae (*a*: 28–32; *m*: 36–41; *h*: 49–53) setiform, sparsely barbed; adoral seta (10–12) setiform, thin, smooth. Chelicera (123–131) with two setiform, barbed setae (*cha*: 36–41; *chb*: 20–24). Palp (77–82) with typical setation 0–2–1–3–9(+1ω). Postpalpal seta (8) spiniform, roughened.

Epimeral and lateral podosomal regions – Epimeral border IV well developed, slightly semi-oval. With typical epimeral setal formula 3–1–3–3; all epimeral setae (*1a*, *2a*, *3a*: 28–32; *1b*, *1c*, *3b*: 49–53; *3c*, *4a*, *4c*: 65–73; *4b*: 41–45) setiform, sparsely barbed; *3c* inserted on tubercle. Discidium slightly developed, rounded distally.

Anogenital region – Genital (g_1: 45–49; g_2, g_3, g_5: 32–36; g_4: 20–24; g_6: 36–41), aggenital (57–61), adanal (57–61), and anal (32–36) setae setiform, sparsely barbed. Adanal lyrifissure distinct, located at level of insertion of anal seta an_1. Ovipositor is typical for Oppiidae (Ermilov 2010), elongated (159 × 32), each of the three blades (49) shorter than length of distal section (beyond middle fold; 110), with four rod-like, smooth setae ($\psi_1 \approx \tau_1$: 32; $\psi_2 \approx \tau_a \approx \tau_b \approx \tau_c$: 24); six coronal setae not observed.

Legs – Leg IV obviously longer than legs I–III. Claw of all legs roughened on dorsal side. Trochanter III with two or three posterior teeth. All femora with large ventral porose area. Formulas of leg setation and solenidia: I (1-5-2-4-20) [1-2-2], II (1-5-2-4-16) [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. Famulus of tarsus I short, slightly swollen distally, erect, smooth, inserted close and posterolateral to solenidion ω_1. Solenidia ω_1 of tarsus I, ω_1 and ω_2 of tarsus II and σ of genu III medium-sized, slightly bacilliform; φ_2 of tibia I and ω_2 of tarsus I medium-sized, rod-like; others long, setiform; often solenidia broken.

Table 1. Leg setation and solenidia of adult *Amboroppia andensis* **sp. nov.**

Leg	*Tr*	*Fe*	*Ge*	*Ti*	*Ta*
I	*v'*	*d, (l), bv", v"*	*(l)*, σ	*(l), (v)*, φ_1, φ_2	*(ft), (tc), (it), (p), (u), (a), s, (pv), (pl), l", v'*, ε, ω_1, ω_2
II	*v'*	*d, (l), bv", v"*	*(l)*, σ	*(l), (v)*, φ	*(ft), (tc), (it), (p), (u), (a), s, (pv), l"*, ω_1, ω_2
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)*

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.

Remarks

Amboroppia andensis **sp. nov.** differs from the type species (*A. bayartogtokhi*) by the larger body size (length: 614–680 versus 398–415), the structure of the rostrum (three rostral teeth well separated versus touching tightly), and the localization and length of lamellar seta (located on costular-transcostular complex versus located before costular-transcostular complex; similar in length to exobothridial seta and notogastral seta *c* versus distinctly longer than exobothridial seta and notogastral seta *c*).

Type material

Holotype (female) and 11 paratypes (six males and five females): South America, Central Peru, Andes, 09° 42' 58" S, 75° 05' 33" W, Huánuco Department, Huánuco Province, Chinchao District, NW Tunel de Carpish, 2770 m a.s.l., upper soil and leaf litter in primary mountain forest, Winkler extraction, 14.IV.2016 (S. Friedrich, F. Wachtel and D. Hauth).

Type deposition

The holotype is deposited in the collection of the Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru; 11 paratypes are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

Etymology

The species name refers to the place of origin, Andes.

DISCUSSION

Ermilov and Starý (2022) proposed a detailed generic diagnosis of the genus *Amboroppia*. Their data were based only on morphology of one (type) species. In light of the description of the new (second) species, some generic traits need to be adjusted.

The generic diagnosis of *Amboroppia* indicated a body length of about 400 (Ermilov and Starý 2022), however, specimens of the new species are longer with a body length of 614–680. Hence, the generic diagnosis should include a body length of about 400–700.

The generic diagnosis of *Amboroppia* shows the insertion of the lamellar seta before the transcostula (Ermilov and Starý 2022); however, in specimens of the new species the lamellar seta is situated on the costular-transcostular complex. Hence, the generic diagnosis should include the following: lamellar seta inserted on costular-transcostular complex or before transcostula.

The generic diagnosis of *Amboroppia* indicated the palp setation as 0–2–1–3–8(+1ω) (Ermilov and Starý 2022), however, this is a typo, because their figure 2*b* shows nine setae on the palp tarsus (not eight). Palp setation of the new species is also 0–2–1–3–9(+1ω).

According to the morphology of *A. bayartogtokhi* and *A. andensis* **sp. nov.**, we provisionally propose to include two additional characters in the generic diagnosis of *Amboroppia*: epimeral setae *1b* and *1c* inserted close to each other; three pairs of genital papillae medium-sized, similar in size.

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گونهٔ جدیدی از *Amboroppia* (Acari, Oribatida, Oppiidae) از آند پرو، با نکاتی در مورد مشخصات جنس

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چکیده

گونهٔ جدیدی از جنس نوتروپیکال *Amboroppia* (Oribatida, Oppiidae) *A. andensis* **sp. nov.** بر اساس کنه‌های کامل جمع‌آوری شده از خاک فوقانی و بستر برگ در جنگل‌های کوهستانی اولیه در آند، مرکز پرو توصیف می‌شود. مواردی به مشخصات جنس *Amboroppia* اضافه شده است.

واژگان کلیدی: فون؛ ریخت‌شناسی؛ منطقهٔ نئوتروپیکال؛ کنه‌های oppiid؛ آرایه‌شناسی.

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