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New species of *Caloderella* BERNHAUER, 1912 from Ecuador with a key to the species (Coleoptera: Staphylinidae)

U. IRMLER

Abstract

Three new species of the aleocharine genus *Caloderella* BERNHAUER, 1912 (Coleoptera: Staphylinidae: Aleocharinae) are described from Ecuador: *C. mariannae*, *C. lobata*, and *C. pastazae*. A key to the Neotropical species of *Caloderella* is provided. The ecological demands of two species are discussed.

Key words: Coleoptera, Staphylinidae, Aleocharinae, *Caloderella*, Neotropics, new species, river margin, boulder fauna.

Introduction

The genus *Caloderella* was established by BERNHAUER (1912) on the basis of two species from western Argentina (Chañar Region, Province La Roja). The generic name refers to the habitus, which resembles the European genus *Calodera* MANNERHEIM, 1830 (Oxyopini), although the species are in fact attributed to the tribe Hygronomini by the tarsal formula 4-4-4. Since several decades, no further species were added until PACE (1996, 2008) described six new species from Colombia, Peru and Ecuador. During my trip to Ecuador in 2009, I found three undescribed species at the margin of Río Machay, a small tributary to Río Pastaza near the city of Baños, all living together in coarse gravel. Thus, the Neotropical fauna of the genus comprises eleven species, all living in the western part of the continent.

This paper includes descriptions of the three new species and a key to all known species.

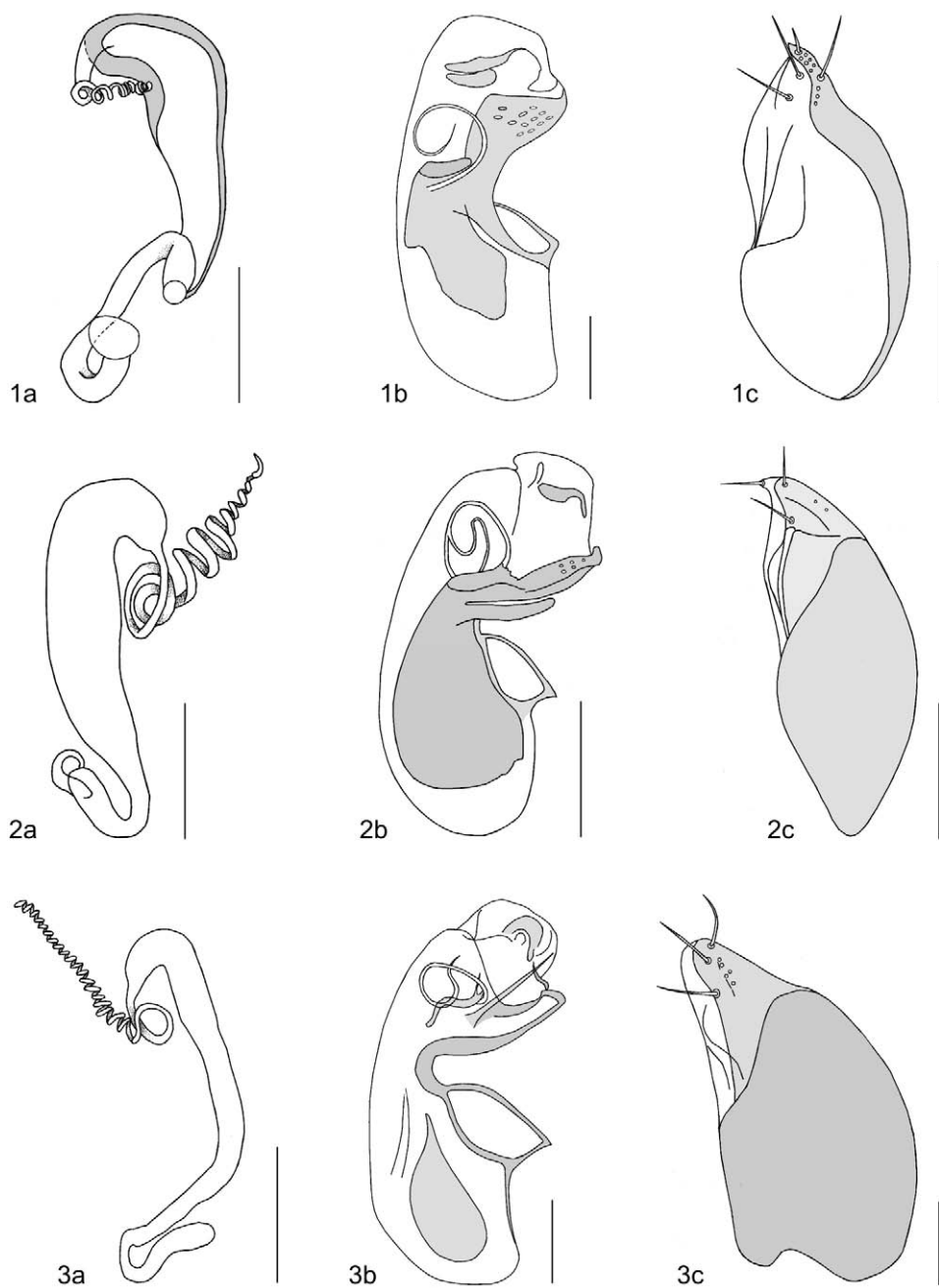
Material and methods

The material was collected by the author and types will be deposited in the author's collection of Neotropical Staphylinidae (UIC). The collection will be later transferred to a public museum.

For the measurements of the total length the inter-segmental space of the abdominal segments was considered. The lengths of individual tagmata were determined along the midline, their widths at the widest part of the respective tagmata. For the photographs of the species, a Makroskop M 420 (Wild Herbrugg) was used in combination with a digital camera (Nikon D100).

Caloderella pastazae sp.n.

Holotype ♀: Ecuador: Río Machay (78°16.49'W, 1°23.26'S), 16 km east of Baños, gravel at river margin, 1600 m, 26.VII.2009, leg. U. Irmeler (UIC). **Paratypes**: 3 ♂♂, 2 ♀♀, same data as holotype (UIC).



Figs. 1–3: 1) *Caloderella pastazae*; 2) *C. mariannae*, and 3) *C. lobata*; spermatheca (a), aedeagus in lateral aspect (b), and paramera (c). Scale bar: 0.1 mm.

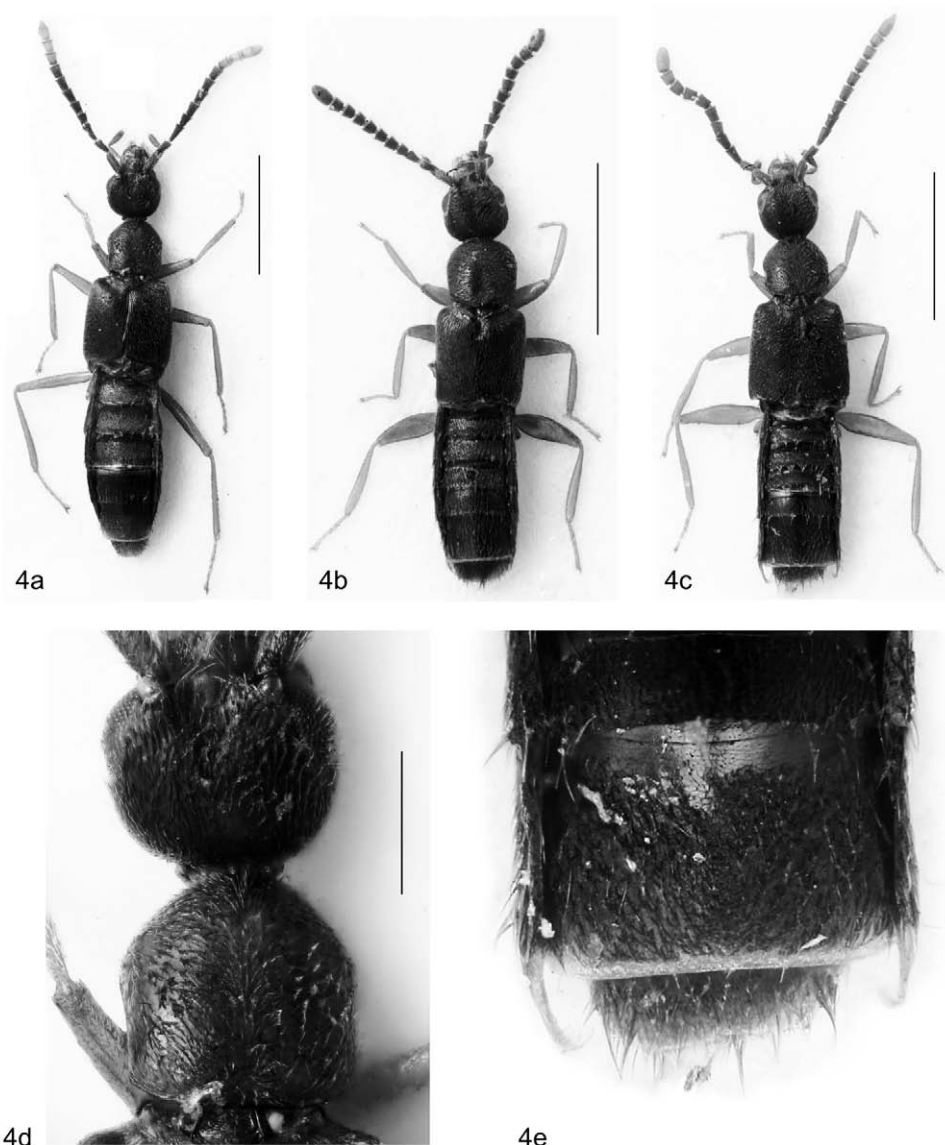


Fig. 4: Total aspect of *Caloderella pastazae* (a), *C. mariannae* (b), and male of *C. lobata* (c); dorsal aspect of *C. pastazae* showing pubescence of head and pronotum (d); lobes of abdominal segment VII in male of *C. lobata* (e). Scale bar a–c: 1 mm, d, e: 0.25 mm.

DESCRIPTION (Figs. 1a–c, 4a, d): Length: 3.0–3.2 mm. Colouration: head, posterior half of elytra, and abdominal segment VI dark brown; pronotum, anterior half of elytra, and abdominal segments III–V and VII–IX light red; legs yellow; antennomeres 1–6 dark brown, 7–8 light brown, and 9–11 yellow. Head: 0.50 mm long, 0.45 mm wide; more or less globular; temples smoothly curved to narrow neck; not margined ventrally; eyes not prominent; as long as temples;

densely and finely punctate, pubescent; setae pointing anteriorly; surface without microsculpture, shiny. Antennae as long as head, pronotum, and half of elytra combined; antennomeres 1–3 two times as long as wide; following antennomeres shorter, decreasing in length; quadrate to only 1/3 as long as wide; all antennomeres pubescent. Pronotum: 0.43 mm long, 0.43 mm wide; widest in anterior half; straightly narrowed to anterior edge, as wide as neck; posteriorly hardly narrowed, nearly parallel-sided; as densely and finely punctate as head; pubescent; setae along midline pointing anteriorly, on each side of midline pointing more or less laterally; surface without microsculpture, shiny. Elytra: 0.63 mm long, 0.70 mm wide; much wider than head and pronotum; with dense and fine punctation, pubescent; surface without microsculpture, shiny. Abdomen with abdominal segments III–VI slightly widened; tergites III–V with deep transverse depression at base; punctation and pubescence as on fore-body. Legs relatively long, in particular hind legs; metatibia as long as length of elytra; protarsi with tarsomeres 1–3 equal in length and only half as long as protibia; mesotarsi longer; with elongate 1st tarsomere; metatarsi still longer with 1st tarsomere nearly as long as tarsomeres 2–4 combined.

DIAGNOSIS: This species resembles *C. humboldti* PACE, 1996 in length and shape of the head. As in *C. humboldti*, the posterior angles of the head are more or less absent. The colouration is also very similar, but the head is darker and the colouration of the antennomeres is different. The spermathecae of both species are very similar, but the aedeagus in *C. humboldti* shows an additional lobe that is absent in *C. pastaza*.

ETYMOLOGY: The species name is derived from the Río Pastaza.

Caloderella mariannae sp.n.

Holotype ♂: Ecuador: Río Machay (78°16.49'W, 1°23.26'S), 16 km east of Baños, gravel at river margin, 1600 m, 26.VII.2009, leg. U. Irmeler (UIC). **Paratypes:** 3 ♂♂, 2 ♀♀, same data as holotype (UIC).

DESCRIPTION (Fig. 2a–c, 4b): Length: 2.5 mm. Colouration: black, femora brown, tibiae and tarsi yellow. Head: 0.33 mm long, 0.33 mm wide, more or less quadrate; with posterior angles widely curved, ventrally not margined; eyes not prominent; as long as more or less parallel-sided temples; vertex finely and densely punctate, pubescent; setae pointing anteriorly; without microsculpture, surface shiny. Antennae slightly longer than head and pronotum combined; antennomeres 1–3 distinctly longer than wide, following four antennomeres more or less quadrate, penultimate antennomeres slightly wider than long. Pronotum: 0.33 mm long, 0.35 mm wide; widest near smoothly curved anterior angles; slightly narrowed to posterior angles, nearly parallel-sided; disc finely and densely punctate as head, pubescent, setae at midline pointing anteriorly, setae on each side of midline pointing more or less laterally, without microsculpture; surface shiny. Elytra: 0.45 mm long, 0.50 mm wide; only slightly wider than head and pronotum; as finely and densely punctate as pronotum, but with weak net-like microsculpture; surface less shiny than on pronotum. Abdomen parallel-sided; segments not widened apically; segments III–V with deep transverse depression at base; as densely and finely punctate as elytra and with slightly denser microsculpture; surface only slightly shiny. Legs relatively short; metatibia shorter than elytra; 1st tarsomere of protarsi and mesotarsi not elongate; 1st tarsomere of metatarsi slightly elongate, 2/3 as long as metatibia; tarsomeres 2–4 twice as long as 1st tarsomere.

DIAGNOSIS: This species resembles *C. nigrofemoralis* PACE, 2008 in length and colouration. It can be hardly identified without dissection of the spermatheca. Unfortunately, only females of *C. nigrofemoralis* are known. However, the spermatheca of *C. nigrofemoralis* is distinctly different from that of *C. mariannae*. Remarkably, the aedeagus of *C. mariannae* shows an additional lobe as in *C. humboldti*.

ETYMOLOGY: Named for my daughter Marianne, who accompanied me on my collecting trip to Ecuador and helped me by her fluent Spanish.

***Caloderella lobata* sp.n.**

Holotype ♀: Ecuador: Río Machay (78°16.49'W, 1°23.26'S), 16 km east of Baños, gravel at river margin, 1600 m, 26.VII.2009, leg. U. Irmiler (UIC). **Paratype**: ♂, same data as holotype (UIC).

DESCRIPTION (Fig. 3a–c, 4c, e): Length: 2.7 mm. Colouration: black; legs yellow; antennomeres 1–8 black, antennomere 9 brown; antennomere 10 light brown; antennomere 11 yellow. Head: 0.40 mm long, 0.40 mm wide; more or less globular; eyes not prominent, as long as temples; temples smoothly curved without developed angles; ventrally not margined; vertex finely and densely punctate; pubescent; setae pointing anteriorly; without microsculpture; surface shiny. Antennae as long as head, pronotum and half of elytra combined; antennomere 1–3 elongate; 3rd antennomere 2.5 times as long as wide; 2nd antennomere slightly shorter than 1st and 3rd; antennomeres 4–8 quadrate; penultimate two antennomeres slightly wider than long. Pronotum: 0.40 mm long, 0.40 mm wide; widest near anterior angles; anterior angles smoothly curved; only slightly narrowed to posterior angles; nearly parallel-sided; disc finely and densely punctate; pubescent; setae at midline pointing anteriorly; setae on each side of midline pointing more or less laterad. Elytra: 0.60 mm long, 0.65 mm wide; distinctly wider than head and pronotum; punctuation as fine and dense as on head and pronotum; pubescent; setae in anterior half pointing more or less laterad; setae in posterior half pointing posteriorly. Abdomen slightly widened from segments III–V, but nearly parallel-sided; segments III–V with deep transverse depression at base; punctuation coarser than that on fore-body, but as dense; segment VII of male with long lateral lobes nearly reaching posterior edge of segment VIII. Legs relatively long; metatibia nearly as long as elytra; 1st tarsomere of protarsi and mesotarsi not elongate; 1st tarsomere of metatarsi slightly elongate; metatarsi 0.6 times as long as metatibiae; 1st tarsomere of metatarsi as long as tarsomeres 2–3 combined.

DIAGNOSIS: This species can be easily differentiated from the other known Neotropical *Caloderella* by the dark body combined with yellow apical antennomeres. In the other *Caloderella* species, a dark body is always combined with totally dark antennae. Moreover, the development of lateral lobes on the male abdominal segment VII is also unique within the genus.

ETYMOLOGY: The epithet refers to the sexual dimorphism (long lateral lobes of the male abdominal segment VII).

Key to Neotropical species of *Caloderella*

- 1 Antennae unicoloured brown or dark brown, body except legs also unicoloured brown, antennae relatively short, not or only slightly longer than head and pronotum combined 2
- Antennae unicoloured red or bicoloured with either basal antennomeres or apical antennomeres lighter, yellow, reddish or light brown, body also bicoloured 4
- 2 Abdomen parallel-sided, abdominal segment VII not narrower than preceding segments, 2.5 mm long, spermatheca with long spiral apical appendage *mariannae* IRMLER, 2011
- Abdomen not distinctly parallel-sided, abdominal segment VII narrower than preceding segment; segment III narrower than segment V, 2.5–2.9 mm long, spermatheca with short or without spiral apical appendage 3
- 3 Body 2.9 mm long, eyes shorter than temples, spermatheca with short spiral appendage *giachinoi* PACE, 2008

- Body 2.5 mm long, eyes as long as temples, spermatheca without spiral appendage *nigrofemoralis* PACE, 2008
- 4 Basal antennomeres yellow or reddish, apical antennomeres either also yellow or reddish or darker brown 6
- Basal antennomeres dark brown, apical antennomeres yellow 5
- 5 Pronotum and abdominal segments III and IV dark brown, male with lobes at abdominal segment VII *lobata* IRMLER, 2011
- Pronotum and abdominal segments III and IV yellow, without sexual dimorphism *pastazae* IRMLER, 2011
- 6 Antennae totally red or yellow, without sexual dimorphism, or abdominal segment III of male carinate 7
- Basal antennomeres yellow or red, apical antennomeres brown, abdominal segment VII of male with numerous tubercles or conical prominences 8
- 7 Body light reddish, abdominal segment VII dark red, without sexual dimorphism *neotropica* PACE, 1996
- Body yellow-red, abdominal segment VII not darker, but elytra lighter, yellow; abdominal segment III of male carinate, abdominal segment VII with tubercle *carinata* PACE, 1996
- 8 Body 3.7 mm long, dark red with brown elytra, tubercles of abdominal segment VII of male less dense *humboldti* PACE, 1996
- Body 2.2–3.0 mm long, abdominal segment of male densely tuberculate or with conical prominences 9
- 9 Body brown, abdomen lighter brown, abdominal segment VII of male with conical prominence *caoduroi* PACE, 2008
- Body yellow, head, elytra and posterior segments of abdomen brown, abdominal segment VII of male densely tuberculate 10
- 10 Body 3.0 mm long, pronotum quadrate *fraterna* BERNHAUER, 1912
- Body 2.2–2.8 mm long, pronotum longer than wide *argentina* BERNHAUER, 1912

Discussion

Unfortunately, nothing is known about the habitat requirements of the members of *Caloderella*, except for the new species described herein. The biotope of the three new species is a typical valley of a torrential mountain creek (Fig. 5). The three species were all found under coarse gravel at the same locality. They obviously occupy different ecological niches on a very small area. This may be also expressed by their overall habitus with relatively long legs in *C. pastazae* and a parallel-sided body with short legs in *C. mariannae*. It can be supposed from their habitus that they are living in different zones of the gravel bank: *Caloderella pastazae* with long legs may prefer the soil surface and *C. mariannae* small caverns where small legs provide a survival advantage. *Caloderella lobata*, which was found in only two specimens, seems to be rarer and certainly occupies another type of microhabitat in the gravel bank. Although gravel was examined in different creeks and rivers, no other *Caloderella* were found during that trip. Nevertheless, it can be assumed that a lot of other *Caloderella* species might be detected in the mountainous regions of Ecuador and other Andean countries. All species known so far were found in the western part of the continent in the mountainous Andean region from Argentina via Bolivia, Peru, and Ecuador up to Colombia. At present, the genus is not known from Central America giving rise to the assumption that it might be a South American zoogeographic element.

Sexual dimorphism seems to be common in the genus. Among the eleven known species, six have typical male characters: lobes, carinae, or tubercles.

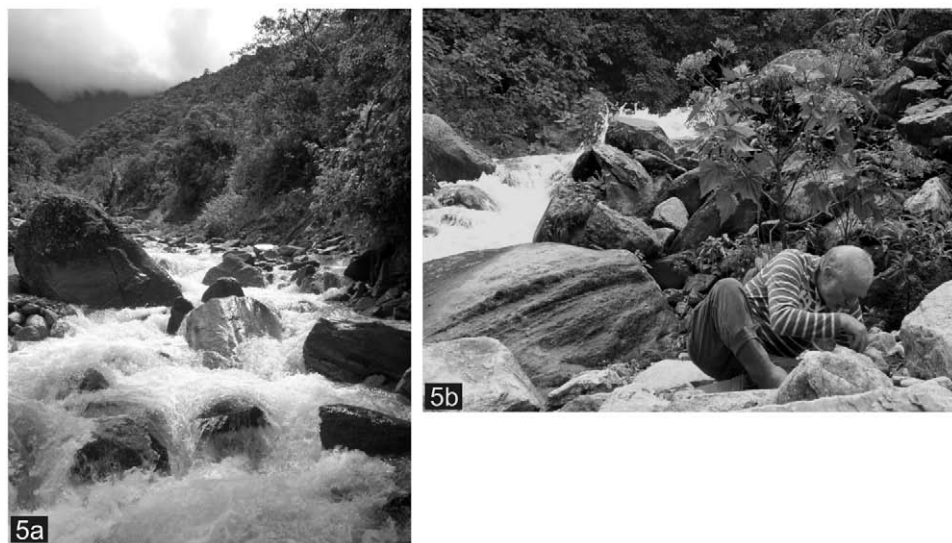


Fig. 5: Río Machay at 2nd waterfall (a) with coarse boulder and shingle field (b), where the new *Caloderella* species have been collected.

Zusammenfassung

Drei neue Arten der Gattung *Caloderella* BERNHAUER, 1912 (Coleoptera: Staphylinidae: Aleocharinae) aus dem Tal des Río Machay (Ecuador) werden beschrieben: *C. mariannae*, *C. lobata*, and *C. pastazae*. Den Beschreibungen folgt ein Bestimmungsschlüssel zu den Arten sowie eine Diskussion der ökologischen Ansprüche.

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Dr. Ulrich IRMLER

Institute for Ecosystem Research, Dept. of Applied Ecology, University of Kiel, Olshausenstraße 40, D – 24098 Kiel, Germany (uirmler@ecology.uni-kiel.de)

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