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Ptyctimous mites (Acari, Oribatida) from the Ecuador rainforest

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Abstract

Twelve species of ptyctimous mite have been found in new localities in forest litter, in two National Parks of Ecuador: Bombuscaro and Cajanuma. The ptyctimous mite fauna has been shown to differ totally between the two parks. Two new species are described: *Euphthiracarus bombuscaroensis* sp. nov. and *Austrophthiracarus cajanumaensis* sp. nov. Three species are reported from Ecuador for the first time. The specimens of two species: *Protophthiracarus quasiminisetosus* Niedbala and Illig, 2006 and *Notophthiracarus aculeatus* Niedbala, 1988 found in Ecuador have some morphological characters different from their analogues in the type specimens.

Keywords: *Acari, Ecuador, new species, Oribatida, ptyctimous mites*

Introduction

The knowledge of ptyctimous mites of the Neotropical Region has been summarized in the monograph of Niedbala (2004). Recently, eight new species have been described and seven species which are new for continental Ecuador have been published (Niedbala & Illig 2006). The second author collected samples at two new localities in the rainforest. Six species have been found in each of the two samples, and two of the species are new. These two species belong to two different genera relatively abundantly represented in the Neotropical Region. Two specimens of *Protophthiracarus quasiminisetosus* Niedbala and Illig, 2006 and *Notophthiracarus aculeatus* Niedbala, 1988 found in the samples from Ecuador show slight morphological differences from the typical specimens and the differences are described.

Material and methods

During his ecological study in Ecuador, the second author collected two samples from two localities in two National Parks, containing representatives of 12 species of ptyctimous

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mite. The samples were collected at the following localities: Podocarpus National Park, Bombuscaro, 4°06.87'S, 78°08.31'W, 1040 m, *Podocarpus* litter fermentation layer, November 2005, leg. J. Illig (no. 11.2005) and Podocarpus National Park, Cajanuma, 4°06.711'S, 79°10.581'W, 3060 m, *Podocarpus* litter fermentation layer, December 2005, leg. J. Illig (no. 12.2005).

Drawings were made of the specimens, which were cleaned in lactic acid and examined under a phase-contrast microscope. Terminology is based on that of Niedbala (2004). Measurements are given in μm . Types are deposited in the Department of Animal Taxonomy and Ecology, Poznań.

Forest faunas

In the two samples of forest litter collected in two National Parks of Ecuador—Bombuscaro and Cajanuma—12 species of ptyctimous mite have been identified. Species composition of ptyctimous mites in these two samples is completely different, probably because of the difference in altitude. The following species were collected.

In the sample from Bombuscaro National Park (NP): *Mesoplophora* (*Mesoplophora*) *cubana* Călugăr and Vasiliu, 1977 (one specimen), *M. (M.) hauseri* Mahunka, 1982 (two specimens), *Microtrititia tropica* Märkel, 1964 (three specimens), *Euphthiracarus bombuscaroi* sp. nov. (three specimens), *Atropacarus* (*Hoplophorella*) *cucullatus* (Ewing, 1909) (three specimens), *A. (H.) vitrinus* (Berlese, 1913) (one specimen); and in the sample from Cajanuma NP: *Austrophthiracarus diazae* Ojeda, 1985 (one specimen), *Protophthiracarus quasiminisetosus* Niedbala and Illig, 2006 (two specimens), *P. paraminisetosus* Niedbala and Illig, 2006 (12 specimens), *Austrophthiracarus cajanumus* sp. nov. (four specimens), *Notophthiracarus aculeatus* Niedbala, 1988 (eight specimens), *N. pedanos* Niedbala, 2003 (one specimen).

Three species have been reported from Ecuador for the first time: *Mesoplophora* (*Mesoplophora*) *hauseri*, *Atropacarus* (*Hoplophorella*) *cucullatus*, and *Notophthiracarus pedanos*.

Two of the species found are new to science: *Euphthiracarus bombuscaroensis* sp. nov. and *Austrophthiracarus cajanumaensis* sp. nov.

The specimens of two species known from Ecuador, *Protophthiracarus quasiminisetosus* and *Notophthiracarus aculeatus*, have been found to have some morphological characters different from the analogous ones in the type specimens.

Morphological descriptions of those species, as well as those of the two new species, are given below.

Description of species

Euphthiracarus bombuscaroensis sp. nov.

(Figure 1A–C)

Material examined

Holotype and two paratypes: Ecuador, Bombuscaro National Park, 4°06.87'S, 78°08.31'W, 1040 m, *Podocarpus*, soil litter fermentation horizon, November 2005, leg. J. Illig.

Figure 1. (A–C) *Euphthiracarus bombuscaroensis* sp. nov., holotype: (A) prodorsum, dorsal view; (B) lateral view of body; (C) genitoaggenital plate. (D, E) *Protophthiracarus quasiminisetosus* Niedbala and Illig, 2006, specimen from Cajanuma NP: (D) opisthosoma, lateral view; (E) posterior and lower part of opisthosoma. (F–H) *Notophthiracarus aculeatus* Niedbala, 1988, specimen from Cajanuma NP: (F) prodorsum, lateral view; (G) anterior part of opisthosoma; (H) trochanter and femur of leg I.

Measurements of holotype

Prodorsum: length 215, width 147, height 96.1, sensillus 91.1, setae: interlamellar 96.1, lamellar 75.9, rostral 88.5, exobothridial 15.2; notogaster: length 374, width 257, height 252, setae: c_1 81.0, h_1 75.9, ps_1 50.6, c_3 27.8, ps_3 32.9; genitoaggenital plate 119×50.6 , anoadanal plate 182×37.9 .

Description

Colour yellow. Integument densely dotted.

Prodorsum with a pair of long lateral carinae. Sensilli long, bacilliform, curved, covered with seven to nine cilia in distal half. Setae long, flagellate distally (especially rostral setae), interlamellar and lamellar setae erect, covered with small spines, rostral setae bent towards the end of rostrum, rough, exobothridial setae the smallest, $in > ro > le > ex$. Distance between rostral setae shorter than between lamellar and interlamellar setae. Mutual distance between rostral setae slightly longer than between lamellar setae.

Notogaster with rather short setae ($c_1 < c_1 - d_1$), covered with small spines in distal half, dorsal setae longer than other setae. Setae c_1 and c_2 remote from anterior border more than c_3 setae.

Nine pairs of genital setae present, two pairs in progenital position. Two pairs of aggenital setae present, setae ag_2 longer than ag_1 . Three pairs of anal and three pairs of considerably longer adanal setae present. Anal setae an_1 considerably longer than an_2 and an_3 setae. Adanal setae ad_1 and ad_2 also considerably longer than ad_3 setae.

Tarsi of legs monodactylous.

Etymology

The specific name *bombuscaroensis* refers to the locality Bombuscaro National Park.

Comparison

The new species is distinguishable by the following character states: presence of two pairs of lateral carinae of prodorsum, long and bacilliform sensilli, flagellate rostral setae, aggenital setae ag_2 longer than ag_1 setae and setae ad_1 , ad_2 , an_1 longer than setae an_2 , ad_3 , an_3 .

***Austrophthiracarus cajanumaensis* sp. nov.**

(Figure 2A–G)

Material examined

Holotype and three paratypes: Ecuador, Cajanuma National Park, $4^{\circ}06.711'S$, $79^{\circ}10.581'W$, soil litter fermentation horizon, December 2005, leg. J. Illig.

Measurements of holotype

Prodorsum: length 379, width 212, height 116, sensillus 35.4, setae: interlamellar 37.9, lamellar 40.5, rostral 43.0, exobothridial 22.8; notogaster: length 616, width 454, height 429, c_1 227, $c_1/c_1 - d_1 = 1.61$, h_1 222, ps_1 263, ps_4 60.6; genitoaggenital plate 151×95.9 , anoadanal plate 263×111 .

Figure 2. *Austrophthiracarus cajanumaensis* sp. nov., holotype. (A) Prodorsum, lateral view; (B) prodorsum, dorsal view; (C) opisthosoma, lateral view; (D) mentum of infracapitulum; (E) genitoaggenital plate; (F) anoadanal plate; (G) trochanter and femur of leg I.

Description

Colour brown. Surface of body dotted.

Prodorsum without posterior furrows and lateral carinae, sigillar fields well discernible. Sensilli short, with narrow pedicel and club-like head, smooth. Setae short, spiniform. Notogaster with 21 pairs of rather long setae ($c_1 > c_1 - d_1$), flagellate, covered with small cilia at distal half. Setae c_1 and c_3 situated near anterior margin, setae c_2 far from margin. Vestigial setae f_1 posteriorly of h_1 setae. Two pairs of lyrifissures *ia* and *im* present.

Setae *h* of mentum slightly longer than distance between them. Genitoaggenital plates with nine pairs of genital setae with arrangement: 4+4:1. Anoadanal plates each with seven pairs of flagellate setae, two anal and five adanal setae; anterior adanal setae shorter than others.

Legs: formulae of setae and solenidia of 'complete type'. Setae *d* of femora I remote from distal end of article.

Etymology

The specific name *cajanumaensis* refers to the locality Cajanuma National Park.

Comparison

The new species is similar to *Austrophthiracrus hirtus* (Balogh, 1984) from Colombia but the latter species has longer prodorsal setae, fewer pairs (18) of notogastral setae, and four pairs of adanal setae.

***Protophthiracarus quasiminisetosus* Niedbala and Illig, 2006**
(Figure 1D, E)

Measurements of one specimen from Cajanuma NP

Prodorsum: length 404, height 136; notogaster: length 828, height 535, c_1 53.1, $c_1/c_1 - d_1 = 0.26$, h_1 63.2, ps_1 55.7.

Remark

Morphological characters of prodorsum and genitoaggenital plates are similar to those of the type species. Morphological differences concern the considerably longer notogastral and anal setae, greater number (24 pairs) of notogastral setae (21 pairs in holotype) and different arrangement of *ps* row setae.

***Notophthiracarus aculeatus* Niedbala, 1988**
(Figure 1F–H)

Measurements of one specimen from Cajanuma NP

Prodorsum: length 228, height 88.5, sensillus 27.8, interlamellar setae 68.3, lamellar setae 15.2; notogaster: length 409, height 257, c_1 106, $c_1/c_1 - d_1 = 1.3$.

Remark

All morphological characters are similar to those in the type species except for the presence of longer interlamellar and dorsal notogastral setae; also the surface of the notogaster is not covered with concavities but by a kind of mosaic.

Summary

During a survey conducted in two National Parks of Ecuador: Bombuscaro and Cajanuma, twelve species of ptyctimous mites have been found in the two samples of forest litter. Among them two species are new to science: *Euphthiracarus bombuscaroensis* sp. nov. and *Austrophthiracarus cajanumaensis* sp. nov. Their morphological characteristics are given. Three other species are new records for the Ecuador fauna: *Mesoplophora* (*Mesoplophora*) *hauseri*, *Atropacarus* (*Hoplophorella*) *cucullatus* and *Notophthiracarus pedanos*.

The specimens of *Protophthiracarus quasiminisetosus* and *Notophthiracarus aculeatus*, species already known from Ecuador, have been found to have some morphological traits different from the analogous ones in the type specimens. The fauna of ptyctimous mites occurring in the two parks: Bombuscaro and Cajanuma is totally different, probably due to the difference in altitude.

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