The relationship among the Auletobius species of the subgenus Canarauletes and the description of a new species (Attelabidae: Rhynchitinae)

With 6 figures

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Abstract

A new Auletobius species of the subgenus Canarauletes, Auletobius gaditanus spec. nov., is described from southern Spain. The report that the sister taxon Auletobius maroccanus Hoffmann, 1953 (Locus typicus: Morocco, Reggou, Moyen Moulouya) also occurs in Spain (Almeria: Punta del Sabinar) is corrected, because this specimen also belongs to the new species without doubt. In a morphological and molecular differential diagnosis, the new species is distinguished from the closest related species, and for the first time, a molecular relationship analysis (CO1) is presented for almost all species of the subgenus Canarauletes, whose main distribution area is in the Canary Islands and Madeira.

Taxonomic acts


Key words

Curculionoidea, new species, taxonomy, molecular systematics, morphology, Spain, Portugal, Morocco, Canary Islands, Madeira

Zusammenfassung

The genus *Auletobius* Desbrochers des Loges, 1869 (Attelabidae: Rhynchitinae: Auletini) is represented in the Iberian Peninsula by a single species, based on a record of *Auletobius marocanus* Hoffmann, 1953 from Almería (Alonso-Zarazaga, 2002) and another from Cádiz, as *Auletobius* subgenus *Canarauletes* spec. (Verdugo, 2019). However, all Iberian records reported so far, which include a specimen from Almería (Punta del Sabinar) and others from Cádiz (three localities) belong to the new species *Auletobius gaditanus* from the subgenus *Canarauletes*, which is described here for the first time. The subgenus *Canarauletes* as presented by Legalov in 2007 - with the type species *Auletobius convexifrons* Wollaston, 1864 from Gran Canaria - currently contains six species from Northwest Africa, the Canary Islands and Madeira: *A. (C.) convexifrons*, *A. (C.) anceps* (Woll., 1864) from the western Canary Islands, *A. (C.) cylindricollis* (Woll., 1864) only from La Palma (the reports from Tenerife and Gran Canaria are doubtful and should be verified), *A. (C.) garajonay* Stüben, 2015 from La Gomera and El Hierro, *A. (C.) madrensis* (Woll., 1854) from Madeira (see Stüben 2019) and another from Cádiz, as *Auletobius* subgenus *Canarauletes* spec. (Verdugo, 2019). Only the latter species is covered in long, dense, fine hairs. The genus *Auletobius* Desbrochers des Loges, 1869 is divided into seven subgenera (Legalov, 2007), from which the *Canarauletes* Legalov, 2007 differ slightly, for example the *Auletobius s. st.* species have the insertion of the antennae somewhat further from the base of the rostrum; the *Rostauletes* Legalov, 2007 have a longer and thinner rostrum, *Pseudoparauletes* Legalov, 2001 species have a strongly curved rostrum in lateral view and also a very wide forehead. *Longoauletes* Legalov, 2007 has a very elongated body; the *Micrauletes* Legalov, 2003 are characterized by their smaller size and for having small wings, not suitable for flight. *Pseudometopum* Legalov, 2003 has the base of the pronotum and the elytra finely granulated and finally, the body of *Auletobioides* Legalov, 2007 is covered in long, semi-erect setae.
Fig. 1: *Auletobius gaditanus* spec. nov.: Holotype, male (A), and paratype, female (B), from Spain: Los Barrios (photos by P. E. Stüben).
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Total length 2.3 mm–3.2 mm (excluding rostrum).

**Colour:** Body without metallic reflections. Dorsal surface of head, pronotum, scutellum and elytra ochraceous-yellowish to pale orange, with apex of rostrum and suture of elytra slightly darker. Legs and antennae yellowish, but with antennal club and onychium blackish. Ventral surface with pro sternum, mesosternum, lateral margins of metasternum, coxae and trochanters pale orange; disc of metasternum and abdominal sternites black.

**Head:** Eyes rounded, convex and prominent. Frons with robust and regular punctuation; punctures with white and elongate setae directed forwards. Rostrum about twice longer than pronotum, in dorsal view three times longer than the width between antennal insertions. Sides of rostrum with white and short setae, 4 or 5 longer setae on the apex. Antennae inserted very close to base of rostrum; 1st antennal segment as long as 2nd; 3rd, 4th and 5th segments 1.5 times as long as 1st; 6th, 7th and 8th approx. as long as 1st; last three antennal segments (9th, 10th and 11th) forming a club as long as 3rd and 4th combined.

**Pronotum:** Pronotum slightly shorter than its maximum width; in dorsal view basal margin about as wide as anterior margin, sides moderately rounded, maximum width behind middle; surface with long white setae, directed forwards, and with robust and regular punctuation; the space between punctures is equal to the diameter of a puncture.

**Scutellum:** Equilateral triangle-shaped.

**Elytra:** Elytra subovoid, 1.5 times longer than wide; presutural interstria elevated; punctuation not uniform, irregularly arranged, confluent close to the distal area; elytral pubescence double, consisting of reclinate, pale yellow setae (directed backwards) and sparse, blackish, erect setae (especially visible on the elytral margin).

**Ventral surface:** 1st abdominal sternite as long as 2nd and slightly shorter than 3rd + 4th + 5th combined; abdominal sternites with whitish pressed setae that are shorter than elytral setae.

**Aedeagus / endophallus:** See Fig. 1A.

**Females:** The females are somewhat bigger and equipped with a slightly longer rostrum than the males (see Fig. 1A vs. 1B). Spiculum ventrale of the female genitalia is presented in Fig. 2B.

Morphological differential diagnosis

The new species has a habitus similar to that of *Aule tobius* (*C.*) *maroccanus* (see Fig. 3), but the differences between the two taxa are in fact numerous: the colour of the abdominal sternites is not uniformly orange and the abdominal setae are shorter; the pronotum shows dense dorsal punctuation (in *Auletobius maroccanus*, the punctuation is sparser and, on the disc, the space between punctures is 2 or 3 times the diameter of a puncture; the elytral punctuation is also sparser and more regularly arranged); elytral setae shorter and thinner; presence of sparse, erect darkish setae on elytral surface (these darkish setae are absent in *Auletobius maroccanus*). Other differences can also be found in the shape and size of antennal segments: *Auletobius gaditanus* sp. n. shows the 2nd antennal segment as long as 1st; *Auletobius maroccanus* shows 2nd antennal segment subglobose and shorter.

Preliminary data from molecular markers show that *Auletobius gaditanus* spec. nov. is closely related to *Auletobius* (*C.*) *convexifrons* (from Gran Canaria), which can be distinguished from the new species by several characters, such as the dimensions of the rostrum (shorter and thicker in *A. convexifrons*), the shape of the pronotum (cordiform in the new species and with more parallel sides in *A. convexifrons*), etc.

**Etymology:** The species name „gaditanus” refers to the Latin name of Cádiz, “gades”.

**Ecology:** All specimens were collected on *Pistacia lentiscus* from the basal to medium height branches (1.5 m); see Fig. 6.

**Distribution:** This species is so far only known from Spain: Almería and Cádiz [Fig. 5].
Discussion of the relationship among the Auletobius species of the subgenus Canarauletas

The molecular analysis (Fig. 4) is based on 30 specimens of 8 Auletobius species, including one specimen of Mesaulotobius pubescens (Kiesenwetter, 1851) as outgroup. The neighbour joining tree is a subtree of currently 3517 samples of 1493 Curculionoidea species which will be published soon in GenBank. A voucher specimen and extracted genomic DNA have been deposited in the Biobank of the Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany (ZFMK) and Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany (SDEI). Based on the fast evolving Cytochrome c oxidase subunit 1 (COI) gene, the NJ-tree presented here is highly suitable for Alpha taxonomic questions, e.g., showing the systematic position between closely related taxa. The molecular COI sequences of the new species A. gaditanus are presented in fasta format in appendix 1.

The new species Auletobius (Canarauletas) gaditanus from southern Spain forms, together with A. convexifrons from Gran Canaria, the sister taxon of all other Canarauletas species known only from the four western islands of the Canaries: El Hierro, La Palma, La Gomera and Tenerife. The holo- and paratype specimens of A. gaditanus from Cádiz (Los Barrios / 3188-AVE and Medina Sidonia / 3189-AVE) show a genetic distance to the next related species A. convexifrons of 6.5 %, which is presented here.

Fig. 3: The comparison species: The holotype of Auletobius maroccanus Hoffmann, 1953 (photo by C. Rivier, MNHN, Paris).
sufficient to classify *A. gaditanus* as a molecularly clearly distinguishable species within the subgenus *Canarauletes* (interspecific distances of sister species fluctuate only by 0.0%–2.5% in general).

A. Hoffmann (1953) mentions in his first description of *Auletobius (C.) maroccanus* that this species from Morocco (Moyen Moulouya, 1460 m) is closely related to *A. convexifrons* WOLL. Unfortunately, the phylogenetic relationships between *Auletobius (C.) maroccanus* from Morocco and the new species from Spain (see morphological comparison above) remain unclarified, because we have no comparative biomolecular data relating to *Auletobius maroccanus*. Therefore, in relation to this specific question, the description of the new species *A. gaditanus* is based exclusively on morphological comparison (see above).

In addition to the species *A. garajonay*, described by the second author from La Gomera (STÜBEN 2015) and which also occurs on El Hierro (STÜBEN 2018), there is a second species (*Auletobius sp. 1*) from the Canary Islands which remains undescribed (STÜBEN, in prep.). Resolving the species complex around *Auletobius anceps* might be very difficult. This species varies considerably in its body size and eludes morphological analysis to this day.
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Appendix 1

We are firmly convinced that molecular sequences should be part of the scientific article in which they were first published. This is especially true in the first description of a new taxon. The fact that they are also deposited separately and furthermore in GenBank is undoubtedly an additional safeguard for long-term accessibility.

We provide the CO1 sequence data of the new species in fasta format. The content can be copied and pasted into a *.fasta text file which can be imported easily in any bioinformatics application.

Auletobius gaditanus spec. nov. / E: Cádiz, Los Barrios, Pista a Tiradero / collector’s no: 3188-AVE / GenBank: MN627733

Auletobius gaditanus spec. nov. / E: Cádiz, Medina Sidonia, El Berrueco / collector’s no: 3189-AVE / GenBank: MN627734