

SHORT NOTE

Two new micropterous species of the genus *Sunius* from Andalusia (Spain) (Coleoptera: Staphylinidae: Paederinae)

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Accepted:

12th July 2023

Published online:

31st August 2023

Abstract. Two new species of the genus *Sunius* Stephens, 1829 are described from southern Spain: *Sunius tricoliensis* sp. nov. and *Sunius lauxaensis* sp. nov., both found in the same mountain massif, Sierra Gorda de Loja, Granada, Andalusia, but at different altitudes. Colour images of the adult habitus, forebody, sternite VIII, and aedeagus are provided for both species.

Key words. Coleoptera, Staphylinidae, Paederinae, Medonina, taxonomy, new species, Iberian Peninsula, Palaearctic Region

Zoobank: <http://zoobank.org/urn:lsid:zoobank.org:pub:16CED11A-F1EA-4637-90AC-1E4E27379D24>

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Introduction

The genus *Sunius* Stephens, 1829 is represented in the Palaearctic Region by approximately 140 species and 2 subspecies, the vast majority of which are confined to the Western Palaearctic (SCHÜLKE & SMETANA 2015, ASSING 2017, ANLAŞ 2021). Seventeen species have been recorded from the Iberian Peninsula so far (ASSING 2011); 12 of them are endemic to this region. Many species have reduced eyes and wings, weak pigmentation, and they all have restricted distributions, usually confined to medium and high altitudes (1,400–2,500 m a.s.l.) in fairly isolated mountains of southern Spain which, for the moment, hold the highest diversity of species of the genus *Sunius* in the entire Iberian Peninsula. The main aim of this paper is the description of two new micropterous species found in the same mountain massif, Sierra Gorda de Loja, Granada province, but at different altitudes: *Sunius tricoliensis* sp. nov., above 1,500 m, near the summit area, and *Sunius lauxaensis* sp. nov., on the slopes at 1,200 m.

Material and methods

Dissections were made using standard techniques. Genitalia were dissected from the abdomen of specimen previously softened in boiling water for 5 minutes. After the examination, the genitalia were mounted on plastic transparent cards in dimethyl hydantoin formaldehyde resin (DMHF) and pinned beneath the specimen. Specimens

were studied with a Leica M125 C stereomicroscope. Habitus images were taken using a Canon EOS 50D digital camera with an attached Canon MP-E 65 mm f/2.8 1–5 macro lens. Male genitalia and sternites were photographed using a Canon EOS 50D digital camera attached to a Zeiss Axiostar plus compound microscope. Serial images were stacked with Helicon Focus software. Measurements were taken with a linear ocular micrometer and are given in millimeters. Head length was measured from the anterior margin of the frons to the posterior margin of the head; length of the pronotum was measured along the median line; elytral length was measured at the suture from the apex of the scutellum to the posterior margin of the elytra. The length of the aedeagus was measured from the apex of the ventral process to the base of the capsule. With the label data, a slash “/” indicates a new line.

Type material of both species is deposited in the following collections:

CHCB Carles Hernando's collection, Badalona, Catalonia, Spain;

M CNB Natural Sciences Museum of Barcelona, Catalonia, Spain.

Taxonomy

Sunius tricoliensis sp. nov.

(Figs 1–5)

Type locality. Spain, Andalusia, Granada, Loja, Sierra Gorda, small sink-hole near Pico de Cabras, 37°06'42.64"N 4°09'49.20"W, 1,503 m a.s.l.



Type material. HOLOTYPE: ♂ (MCNB), "SPAIN, Granada, Loja, S° Gorda / circa Pico de Cabras, 1503 m / 37°06'42.64"N 4°09'49.20"W / Under stones buried deep in the soil / 18.IV.2022, C. Hernando leg.", plus red holotype label. PARATYPES: 4 ♂♂ 5 ♀♀ (CHCB), same data as holotype, plus red paratype labels.

Description. Male. Habitus as in Fig. 1. Body length: 3.1–3.5 mm.

Colouration. Forebody uniformly reddish brown (Fig. 2); abdomen dark brown; legs and antennae yellowish brown.

Head slightly longer than wide (0.41/0.39 mm), distinctly dilated posteriorly; with coarse, sparse punctation; lacking microsculpture; length of eyes less than half of length of postocular region in dorsal view (Fig. 2). Length of antennae: 0.8 mm.

Pronotum as long as head and slightly narrower than head (0.36 mm), slightly oblong, evenly narrowing posteriorly, with posterior margin narrower than anterior one; punctation less impressed than that of head, but denser (Fig. 2); lacking microsculpture.

Elytra as wide (0.35 mm) and distinctly shorter than pronotum (0.37 mm); punctation somewhat finer than pronotum, dense and weakly defined, surface between punctures somewhat rugose. Hind wings reduced.

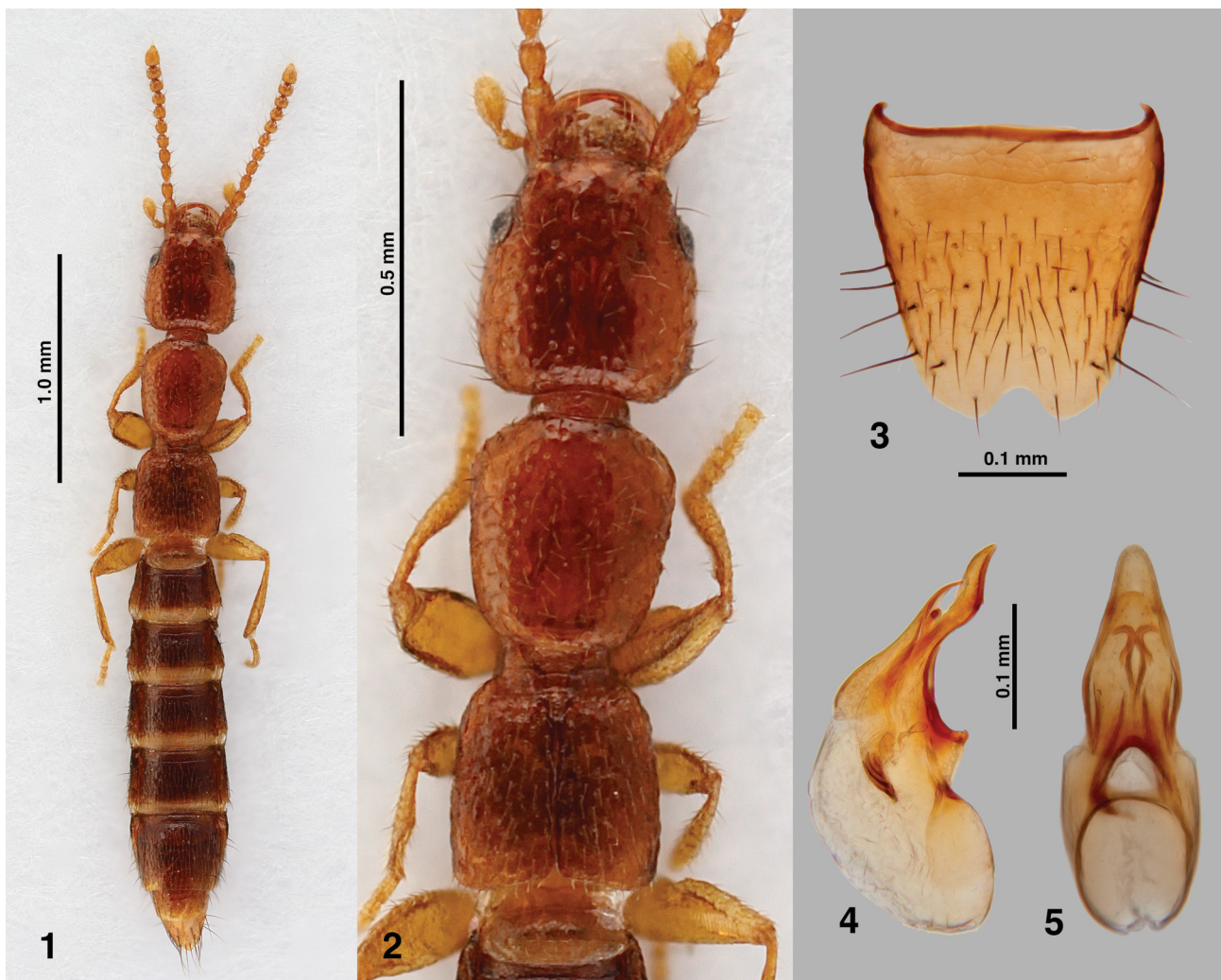
Abdomen about 1.1 times as wide as elytra, widest at segment VI; punctation fine and moderately dense; surface

with shallow microsculpture; posterior margin of tergite VII without palisade fringe. Sternite VII with weakly concave posterior margin, pubescence unmodified; sternite VIII with broad U-shaped incision at its posterior margin (Fig. 3).

Aedeagus (Figs 4–5) with ventral process distinctly longer than basal part of aedeagus; endophallus with small series of stout sclerotized spines on basal lobe (Fig. 4) in lateral view, with two internal preapical structures with falciform apices (Fig. 5) in ventral view.

Female. General appearance as male, except for unmodified sternite VIII.

Differential diagnosis. Using the key of ASSING (2011), this species would key out at couplet 85 together with the Betic-Rifean species with spines on the endophallus; however, it is easily separated from all of them by a very small and poorly developed group of spines (Fig. 4). Based on the general shape of the aedeagus, *S. tricoliensis* sp. nov., is quite similar to *S. nevadensis* (Coiffait, 1980) and *S. tronqueti* Assing, 2008, both from Sierra Nevada, from which it is distinguished by the different shape of the aedeagus and the structures of the endophallus. For illustrations of *S. nevadensis* and *S. tronqueti* see ASSING (2008a, b). Although apparently not closely related, it differs from the sympatric species described below, which lives at lower



Figs 1–5. *Sunius tricoliensis* sp. nov. ♂. 1–habitus in dorsal view; 2–forebody; 3–sternite VIII; 4–aedeagus in lateral view; 5–aedeagus in ventral view.

altitudes, in having smaller eyes, pronotum with the posterior margin clearly narrower than the anterior one, and in a very different shape of the aedeagus (Figs 4–5, 9–10).

Etymology. In reference to Tricolia, the name given to the city of Loja in Roman times due to its settlement on three hills, in whose municipal district the type locality lies; the name is an adjective.

Distribution and bionomics. The known distribution is limited to the high plateaus near Pico de Cabras, the second-highest altitude in the Sierra Gorda de Loja. Type specimens were collected under stones buried deep in the soil in a doline with herbaceous vegetation and tufts of *Asphodelus* sp., at an altitude above 1,500 m (Fig. 11), together with *Geostiba* (*Trachyglutosipalia*) *baetica* Pace, 1983, *Scydmaenus* sp. (both Staphylinidae), and the endogean ant *Stigmatomma gaeticum* (Baroni Urbani, 1978).

***Sunius lauxaensis* sp. nov.**

(Figs 6–10)

Type locality. Spain, Andalusia, Granada, Loja, Sierra Gorda, Camino de los Pajonares, 37°08'05.48"N 4°10'55.04"W, 1,227 m a.s.l.

Type material. HOLOTYPE: ♂ (MCNB), "SPAIN, Granada, Loja, S^o Gorda / Camino de los Pajonares, 1227m / 37°08'05.48"N 4°10'55.04"W / Under stones, 21.IV.2022 / C. Hernando leg.", plus red holotype label. PARATYPES: 6 ♂♂ 4 ♀♀ (CHCB), same data as holotype, plus red paratype labels.

Description. Male. Habitus as in Fig. 6. Body length: 3.3–3.6 mm.

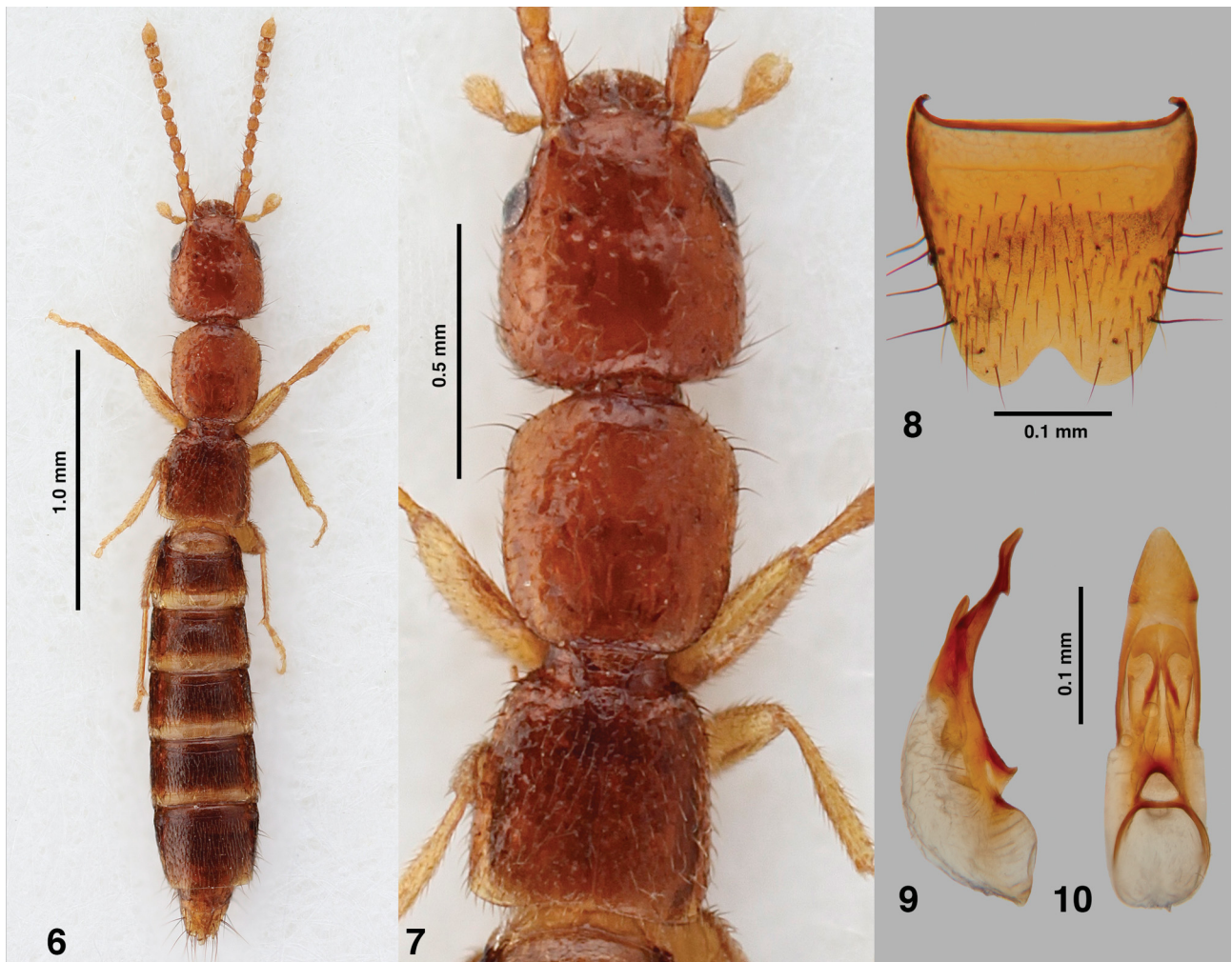
Colouration. Forebody uniformly reddish brown (Fig. 7); abdomen dark brown; legs and antennae yellowish.

Head about as long as wide (0.44/0.40 mm), distinctly dilated posteriorly; coarse, with sparse punctation; lacking microsculpture; length of eyes less than 1/4 of length of postocular region in dorsal view (Fig. 7). Length of antennae: 0.8 mm.

Pronotum longer than wide (0.42/0.39) and slightly narrower than head, weakly oblong and parallel-sided, anterior and posterior margins equal in width; punctation less impressed than that on head, but denser (Fig. 7); lacking microsculpture.

Elytra about as wide as pronotum, slightly shorter than pronotum (0.40 mm); punctation somewhat finer than on pronotum, dense and weakly defined, surface between punctures somewhat rugose (Fig. 7). Hind wings reduced.

Abdomen approximately 1.1 times as wide as elytra, widest at segment VI; punctation fine and moderately dense; surface with shallow microsculpture; posterior margin of tergite VII without palisade fringe. Sternite VII with weakly concave posterior margin, pubescence unmodified; sternite VIII posteriorly with rather deep U-shaped incision (Fig. 8).



Figs 6–10. *Sunius lauxaensis* sp. nov., ♂. 6 – habitus in dorsal view; 7 – forebody; 8 – sternite VIII; 9 – aedeagus in lateral view; 10 – aedeagus in ventral view.



Figs 11–12. Habitat of *Sunius* in Sierra Gorda de Loja. 11 – type locality of *Sunius tricoliensis* sp. nov.; 12 – type locality of *Sunius lauxaensis* sp. nov.

Aedeagus (Figs 9–10) with ventral process slender and distinctly longer than basal part of aedeagus; endophallus in lateral view lacking sclerotized internal structures at basal bulb (Fig. 9), with two internal preapical structures strongly dilated distally in ventral view (Fig. 10).

Female. General appearance as male, except for unmodified sternite VIII.

Differential diagnosis. Using the key of ASSING (2011), this species would key out at couplet 85 together with the three Iberian species without distinct spines on the endophallus of the aedeagus. This small group of species would consist of *S. calatravae* Assing, 2008, *S. behnei* Assing, 2008 and *S. cordobanus* Assing, 2008. Among them, *S. lauxaensis* nov. sp. seems to be mainly related to *S. calatravae*, due to the shape of the aedeagus and the absence of a tubercle on sternite VIII; however, the new species has a longer and more slender ventral process and the two internal preapical structures are very different in shape when seen ventrally. For illustrations of *S. calatravae*, *S. behnei*, and *S. cordobanus* see ASSING (2008a), for the comparison with the sympatric *S. tricoliensis* described previously in this paper, see the differential diagnosis under that species.

Etymology. Refers to Lauxa, the name given to the city of Loja during the Muslim period, in whose municipal district the type locality lies; the name is an adjective.

Distribution and bionomics. The known distribution is so far restricted to the northern slopes of the Sierra Gorda de Loja. The type specimens were collected under stones, on calcareous substrate with some sparse brushes at an altitude above 1,200 m (Fig. 12).

Discussion

Despite recent advances (ASSING 2003, 2008a, b, 2011), knowledge of the Iberian species of the genus *Sunius* is still limited, especially in the southernmost mountain ranges, which is where the genus seems to be most diverse in Iberia as a whole, since out of the 17 known Iberian species, 12 are endemic and of these, 8 are endemic to the Betic Mountain Range. Furthermore, these more southern species seem to have very restricted distributions and some of them seem to be very specialized, as so far, most of them have been known only from the type locality and have only been found in summit areas between 1,400–2,500 m. These species are usually small, brachypterous and pale-coloured. Some have small eyes, and they are usually found under large stones embedded in the soil, sifting humus, or along the edge of snowfields (ASSING 2008a, b). In the absence of molecular data, all these mountain species with restricted distributions are included in the *S. seminiger* species group (ASSING 2008a) and can be provisionally placed in two subgroups using aedeagus morphology. The first consists of species without distinct spines on the endophallus and comprises the following four species in the Iberian Peninsula (including the species described here): *S. behnei* (found at 1,660 m in Sierra Mágina, province of Jaén), *S. cordobanus* (Sierra de Córdoba and Sierra de Cabra,

province of Córdoba – no data on its biology or precise localities are known, but its area of distribution includes several mountain massifs with altitudes up to 1,400 m), *S. calatravae* (Pozuelo de Calatrava, province of Ciudad Real – not a Betic species and no data on its biology or precise localities are known, but it is probably a low altitude species as the highest areas surrounding the type locality do not exceed 1,000 m), and *S. lauxaensis* sp. nov. (found under stones at 1,200 m in Sierra Gorda de Loja, province of Granada). The second subgroup consists of species with a cluster of short and stout spines on the endophallus and comprises the following nine species in the Betic Mountain Range (including the species described here): *S. cazorlae* Assing, 2003 (found at 1,200–1,400 m in Sierra de Cazorla, province of Jaén), *S. confusus* (Coiffait, 1970) (found near snowfields at 1,700 m in Sierra de las Nieves, province of Málaga), *S. filabresicus* Assing, 2008 (found under stones at 1,800 m in Sierra de Filabres, province of Almería), *S. gadoricus* Assing, 2008 (found under stones near the edge of a snowfield at 1,510–2,220 m in Sierra de Gádor, province of Almería), *S. nevadensis* (Coiffait, 1980) (no data on its biology or precise localities are known, Sierra Nevada, province of Granada), *S. segurae* Assing 2003 (found under stones at 1,580 m in Sierra de Segura, province of Albacete), *S. simoni* (Quedenfeldt, 1881) (a forest species living at low altitudes, distributed in the Betic-Rifean area), *S. tronqueti* Assing, 2008 (found under stones at 2,100–2,550 m in Sierra Nevada, province of Granada), and *S. tricoliensis* nov. sp. (found under stones at 1,500 m in Sierra Gorda de Loja, province of Granada).

The genus *Sunius* could be an excellent model to study the colonization of altimontane habitats in the southern Iberian Peninsula and the evolution of traits adaptive to this environment. Practically all known species seem to have very restricted distributions, in many cases known only from the type locality; however, the genus needs to be revised in depth and studied in a molecular phylogenetic framework. Only with the use of phylogenetic tools will we be able to better understand the evolutionary history of this genus and interpret patterns for other altimontane organisms. The lack of knowledge on the systematics, biogeography, and ecology of *Sunius* species highlights the need for further research and it is very likely that the number of species will continue to increase as more material becomes available and sampling areas expand, especially in the mountain massifs above 1,400 m altitude in the southern Iberian Peninsula.

Acknowledgments

I would like to thank Dr. Adrián Villastrigo (Zoologische Staatssammlung München, Germany) for his help in editing the images, Peter Hlaváč (National Museum, Prague, Czech Republic) for his comments and suggestions which have helped to improve the manuscript, and Dr. Keith Bensusan (Gibraltar Botanic Gardens, Gibraltar) for the help provided with the English language.

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