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Orthochaetes estrelanus sp. n., a new species from northern Portugal and new records of other Styphlini (Coleoptera, Curculionidae).

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Abstract: *Orthochaetes estrelanus* sp. n. (Coleoptera, Curculionidae), morphologically the most similar to *O. nevadensis* González, 1967, is described from the Serra da Estrela in northern Portugal. The first records of *Orthochaetes extensus* (Chevrolat, 1881) and *O. rectirostris* Hoffmann, 1960 for Portugal, as well as additional records of *O. insignis* (Aubé, 1863) and *O. villiersi* González, 1967 are also provided.

Key words: Coleoptera, Curculionidae, Curculioninae, Styphlini, *Orthochaetes estrelanus*, new species, taxonomy, faunistics, Portugal.

Resumen: *Orthochaetes estrelanus* sp. n., una nueva especie del norte de Portugal (Coleoptera, Curculionidae) y nuevas citas de otros Styphlini. Se describe *Orthochaetes estrelanus* sp. n. (Coleoptera, Curculionidae) de la Serra da Estrela en el norte de Portugal, la más parecida morfológicamente a *O. nevadensis* González, 1967. También se aportan las primeras citas de *Orthochaetes extensus* (Chevrolat, 1881) y *O. rectirostris* Hoffmann, 1960 para Portugal, así como nuevos registros de *O. insignis* (Aubé, 1863) y *O. villiersi* González, 1967.

Palabras clave: Coleoptera, Curculionidae, Curculioninae, Styphlini, *Orthochaetes estrelanus*, nueva especie, taxonomía, faunística, Portugal.

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Introduction

The morphologically rather heterogeneous genus *Orthochaetes* Germar, 1824 comprises at present 14 species, one of which, *O. alpicola* K. Daniel, 1904, is represented by two subspecies according to Osella & Zuppa (1994), plus *O. caucasicus* Motschulsky, 1845, doubtfully included in this genus (Caldara 2013). The type species of the genus, *Rhynchaenus setiger* Beck, 1817 is also the most widespread in Europe. From the Iberian Peninsula the following 11 species are known, being 5 and a doubtful one exclusively or also occurring in Portugal, including the one presently described (Table 1).

During some entomological excursions to Northern Portugal, the authors found a series of a new *Orthochaetes* now described and illustrated in this paper. It is worthy to note that other Styphlini were recently discovered in the Mediterranean region (Germann 2015, Germann & Winkelmann 2016, Colonnelli 2016). As records of Styphlini are not commonly reported due to their cryptic lifestyle, the first records from Portugal of *O. extensus* (Chevrolat, 1881) and *O. rectirostris* Hoffmann, 1960, and more faunistic records of another two species are also provided.

Material and methods

A sifting leaf litter with a grid of 7 mm width was used. The extraction method follows Germann (2014).

Photographs were taken with a 5-megapixel digital camera (Leica DFC 420), the genitalia were photographed in glycerine. Series of images were captured through a binocular (Leica MZ16) and processed by an automontage software (Imagic Image Access, Version 8).

All measurements were taken digitally with the measurement tool of the above mentioned software. Body length was measured from the base of the rostrum to the apex of the elytra. All label data are within quotation marks (""); data from different localities are separated with a long slash (-); additional remarks to label data are set in square brackets ([]).

Abbreviations: MNCN - Museo Nacional de Ciencias Naturales de Madrid; NMBE - Naturhistorisches Museum der Burgergemeinde Bern; NMSO - Naturmuseum Solothurn; cCB - collection Carlo Braunert, Mensdorf; cCG - collection Christoph Germann, Thun.

Table 1. - List of Iberian *Orthochaetes* and their known distribution according to González (1967) (SP=Spain; PT=Portugal).

| Species | Distribution on the Iberian Peninsula |
|---------------------------------------|--|
| <i>O. baeticus</i> K. Daniel, 1906 | SP: Southern Spain (Cádiz, Algeciras). |
| <i>O. estrelanus</i> sp. n. | PT: Northern Portugal (Serra da Estrela). |
| <i>O. extensus</i> (Chevrolat, 1881) | SP: Northern, northeastern and central Spain. PT: First records from Portugal. |
| <i>O. franzi</i> González, 1967 | SP: Northwestern Spain (A Coruña, Pontevedra, Asturias). |
| <i>O. hirticulus</i> Hoffmann, 1963 | SP: Southern Spain (Jaén: Sierra de Cazorla). |
| <i>O. insignis</i> (Aubé, 1863) | SP and PT: Atlantic coast regions. |
| <i>O. nevadensis</i> González, 1967 | SP: Southern Spain (Sierra Nevada). |
| <i>O. pirenaeus</i> González, 1967 | SP: Pyrenean mountains. |
| <i>O. rectirostris</i> Hoffmann, 1960 | SP: Central Spain. PT: First records from Portugal. |
| <i>O. setiger</i> (Beck, 1817) | SP: Northern and eastern Spain. PT*: doubtful (old) records. |
| <i>O. villiersi</i> González, 1967 | PT: Southern Portugal (Algarve). |

* Oliveira (1889) records *O. setiger* from Valle d'Azares, and mentions from Serra da Estrela the same species as *O. rubricatus* (Fairmaire, 1862), a junior synonym of *O. setiger* described from Pyrenees (Fairmaire, 1862). These old records might refer either to *O. rectirostris* or *O. estrelanus* sp. n.

Results

Orthochaetes estrelanus sp. n. (Figs. 1-3)

Holotype: 1♂, "223_14.2 PORTUGAL, Beira Baixa, Serra da Estrela, E Penhas da Saude, Vale das Cortes, 1290m, N40°19'42"/W7°21'41", 22.4.2014, leg. C. Germann". Red label: Holotype *Orthochaetes estrelanus* sp. n. des. C. Germann & C. Braunert 2016 (MNCN).

Paratypes: 1♀, same data as Holotype (cCG). - 2♂♂, 1♀ "22.04.[20]14 P-Beira Baixa Serra da Estrela 3 km NW Covilha Vale das Cortes Macchie/Garrigue 40°17'3"N 7°32'14"W 1290 mNN 2014-02 223-14-2 C Braunert leg SIFTING (cCB)". - 1♂ "25.04.14 P-Beira Baixa Serra da Gardunha 2 km NW Alpedrinha Granitfelsen Macchie/Garrigue Birkenhain/Streu 40°06'10"N 7°29'13"W 1025 mNN 2014-9 223-14-9 C Braunert leg SIFTING (cCB)". - 1♀ "223_14.4 PORTUGAL, Beira Baixa, Serra da Estrela, Torre unterh., 1840m, N40°19'20"/W7°36'05", 22.4.2014, leg. C. Germann" (NMSO). All with red labels: Paratype *Orthochaetes estrelanus* sp. n. des. C. Germann & C. Braunert 2016.



Fig. 1. - Habitus of *Orthochaetes estrelanus* sp. n. a. - Lateral view. b. - Dorsal view. (Photos by Christoph Germann).

Size: 2.2-2.7 mm. Holotype: 2.3 mm.

Habitus: Figs. 1a-b.

Colour: Auburn, with antennae, tarsi, apex of rostrum and part of the elytra darker; darkened part on the elytra reaching from first third to apex, leaving a spot at last third reaching the third elytral interval on each side.

Head, rostrum and antennae: Head globular. Rostrum long, 4-5 times longer than its maximum width, longer in females. In males, the strongest constriction just before frons, from there suddenly broadened to maximum width. In females, the narrowest part of rostrum is just before middle.

Rostrum in lateral view regularly curved; in dorsal view weakly narrowing towards the insertion of the antennae (or before in females), then slightly widening towards apex. Rostral dorsum with surface striolate. Eyes round-oval, weakly bulged and placed below the level of dorsum of rostrum.

Antennae inserted at apical fourth of rostrum, scrobes lateral, well marked, directing above upper margin of the eyes. Antennal scape clubbed, 2.5 times as long as breadth of rostral dorsum at antennal insertion. Antennal funiculus consisting of 6 segments with the following measurements (length/width): 1st: 2.9; 2nd: 2.6; 3rd: 1.7; 4th and 5th globular; 6th transverse (0.5); club short oval almost 3 times as wide as the last funicular segment. Integument: Frons and rostrum with robust, clubbed, strongly bowed, bright brownish bristles. White hairs sparse on antennal scape and funiculus, and denser on club.

Pronotum: Transverse (length/width: 0.8), widest at middle, constricted towards fore and hind margins, irregularly and coarsely punctuate. Vestiture similar as that of rostrum, consisting of robust, clubbed, strongly bowed, bright brownish bristles. Scutellum not visible.

Elytra: Oval (length/width in males: 1.6; in females: 1.5), widest just before the middle, from there rounded towards the apex. Base constricted, humeral angles rounded, being the insect apterous. In lateral view weakly rounded on disc, regularly rounded on declivity. The 10 striae are coarsely and regularly punctuate. Intervals as wide as striae, just weakly bulged, intervals three and six somewhat more strongly elevated just at their base. All intervals set with short, clubbed, adjacent, bright brownish bristles. Odd intervals additionally with longer, clubbed, raised bristles (1.5 to 2 times as long as adjacent bristles), bristles denser at base of third interval.

Legs: Femora edentate, robust. Tibiae stout, all with small mucro at inner apical angle. Three visible strong tarsal segments; first 1/3 longer than second; second transverse, third bilobed, 1.5 longer than second. Claw segment gracile and elongate, twice as long as third segment, claws free and simple. Vestiture consisting of clubbed, strongly bowed bright brownish, scale-like bristles. These adjacent on femora, semi-raised towards apex of tibia.

Male genitalia: Figs. 2a, b. Penis broad oval in dorsal/ventral view, laterally strongly bowed; tip tongue-like prolonged. Median lobus with two parallel linear sclerites inside, of about half the length of the median lobus; a weakly sclerotised, helmet-like structure in the internal sac. Apodeme 1/3 longer than medianlobus.

Female genitalia: Figs. 2b-e. Spiculum with slender apodeme and plate separated into two separate pincer-like branches each with a triangular plate at apex (Fig. 2c). As already stated in the case of the closely related genera *Styphlidius* Penecke, 1936 and *Orthochaetes* Germar, 1824 by Germann (2015), and for *Styphlus* Schönherr, 1826 by Germann & Winkelmann (2016), gonocoxite very simple, with one sclerotised pair of segments, without styli, apex lateral with a tiny roundish area, which is less sclerotised, without any visible sensillum (Fig. 2d). Spermatheca with irregularly C-shaped cornu, short and straight nodulus and a tiny globular ramus (Fig. 2e).

Sexual dimorphism: Rostrum of females is 1/5 longer than those of males, and the rostral width is minimal just before its middle. Elytra of males are slender, those of females are broader (length/width: 1.6 in males; 1.5 in females).

Etymology: The name "*estrelanus*" derives from the mountain chain "Serra da Estrela" in northern Portugal, where it was collected.

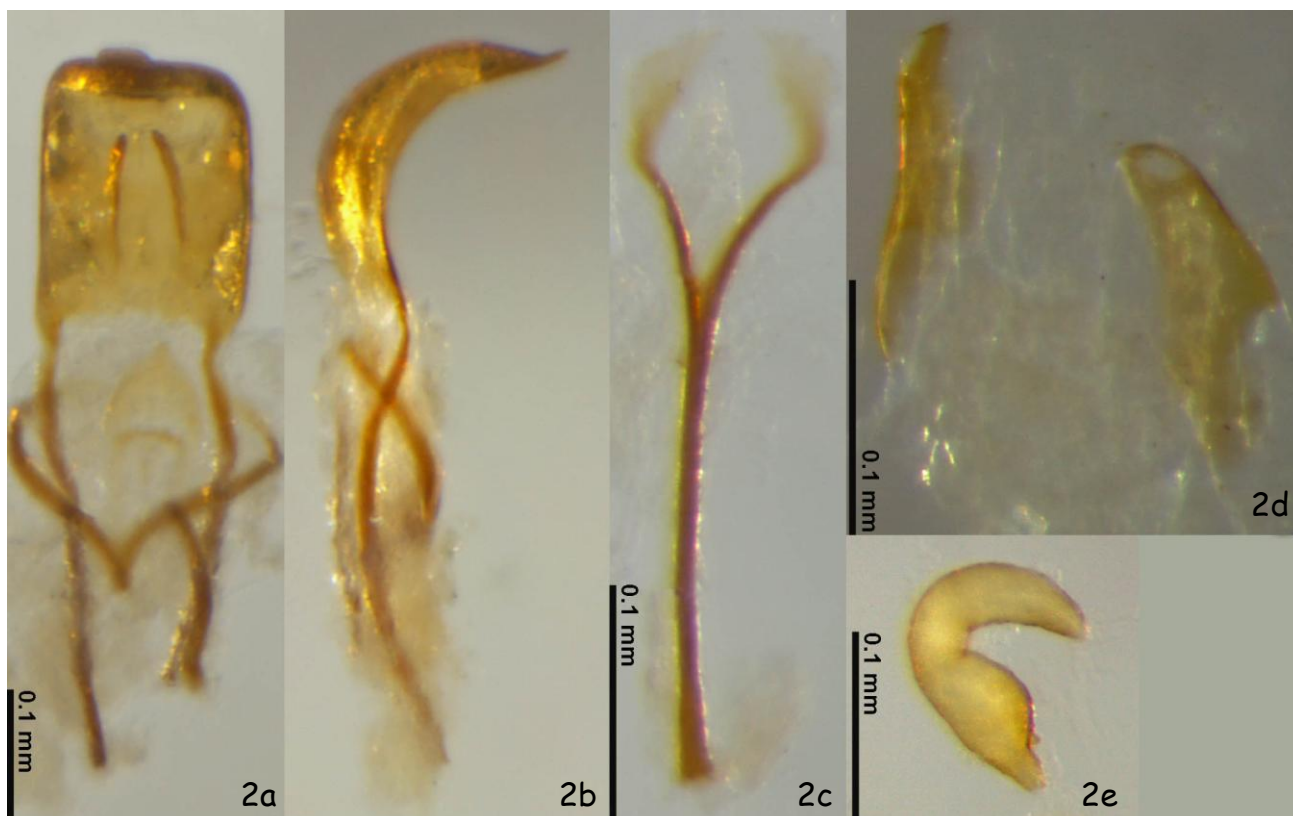


Fig. 2. - Genitalia of *Orthochaetes estrelanus* sp. n. a. - Penis, ventral view. b. - Penis, lateral view; c. - Spiculum ventrale. d. - Gonocoxite. e. - Spermatheca. (Photos by Christoph Germann).

Ecology: *Orthochaetes estrelanus* sp. n. was sifted from leaf litter, plant debris, mosses, and cushion plants together with the weevils *Orthochaetes extensus*, *O. rectirostris*, and *Dichotrachelus alonsoi* Meregalli, 1987 (Fig. 3). *O. estrelanus* sp. n. was also collected in Serra da Gardunha, nearby the main massif of Serra da Estrela.

Diagnosis and discussion: At present, the key to species of *Orthochaetes* by González (1967), with well illustrated male genitalia, can be used for determination of the species of the genus. Based on the similarly weakly convex elytral intervals, and the shorter oval elytra with pointed apex *O. estrelanus* is morphologically close to a group consisting of *O. alpicola*, *O. cerdanicus*, *O. hirticulus*, and *O. nevadensis*. Because of its rostrum the narrowest at base (in males) and the transverse pronotum, *O. estrelanus* is most similar to *O. hirticulus* and *O. nevadensis*. However, *O. estrelanus* sp. n. differs from *O. hirticulus* by the shorter setae on legs and pronotum, and the different shape of the penis. From *O. nevadensis* (Fig. 4) by the more elongate elytra (shorter oval in *O. nevadensis*), the more lifted and longer setae on elytra (about 1/3 shorter and semierect to bowed in *O. nevadensis*), the more rounded-oval, in lateral view less bowed penis (broader and more strongly bowed in *O. nevadensis*), the longer sclerites in the median lobus, and the shorter apodeme, which is about 1.5 longer than the median lobus (nearly 2.5 times as long as median lobus in *O. nevadensis*).

The close relationship between *O. estrelanus* sp. n. and *O. nevadensis* is surprising, as both (very low dispersibility) species are very likely restricted to small and widely separated areas, one in northern Portugal, the other in southern Spain. However, disjunction of populations even within the same species is already known (see González 1967) in the case of *Styphlus jonicus* (Reitter, 1899) (populations in southern France - although these should be re-examined carefully regarding their conspecificity - southwestern Greece, and Crete) and *S. penicillus* Schönherr, 1826 (Mallorca, southern France, Aegean Islands and Cyprus).



Fig. 3.- Habitat of *Orthochaetes estrelanus* sp. n. Type locality at Vale das Cortes, 22.4.2014. (Photo by Christoph Germann).



Fig. 4.- *Orthochaetes nevadensis* González, 1967. a.- Holotype from Lanjarón, Sierra Nevada, in Manuel González's collection, conserved at the MNCN. b.- Penis, dorsal view. c.- Penis, lateral view (Photos by Manuel Sánchez-Ruiz).

***Orthochaetes extensus* (Chevrolat, 1881)**

Material examined: 3♀ "223_14.4, 2014-04, PORTUGAL, Beira Beixa, Serra da Estrela, 9 km NW Covilhã, Gipfel Torre, felsig, Zwergsträucher, Bergwiesen, 1840m, N40°19'20"/W7°34'05", 22.04.2014, leg. C. Braunert" (cCB). - 3♂♂, 5♀♀ "223_14.10, 2014-10, PORTUGAL, Beira Beixa, Serra da Gardunha, 3 km NW Alpedrinha, Schieferfelsen, Machie, Garrigue, 1100m, N40°06'25"/W7°29'56", 25.04.2014, leg. C. Braunert" (cCB). - 2♂♂, 2♀♀ "223_14.11, 2014-11, PORTUGAL, Beira Alta, Serra da Estrela, 8 km SW Manteigas, Rio Zêzere, Glazialtal, Hangwald, 1300m, N40°19'58"/W7°34'14", 26.04.2014, leg. C. Braunert" (cCB). - 1♂ "223_14.12, 2014-12, PORTUGAL, Beira Alta, Serra da Estrela, 9 km SW Manteigas, Rio Zêzere, Ende Glazialtal, Birkenwald, 1500m, N40°19'34"/W7°34'20", 26.04.2014, leg. C. Braunert" (cCB). - 1♂ "223_14.4 PORTUGAL, Beira Baixa, Serra da Estrela, Torre unterh., 1840m, N40°19'20"/W7°36'05", 22.4.2014, leg. C. Germann" (cCG). - 2♂♂, 1♀ "223_14.11 PORTUGAL, Beira Alta, Manteigas, Gletschertal Zêzere, 1300m, N40°19'58"/W7°34'14", Betula-Hangwald, 26.4.2014, leg. C. Germann" (cCG).

Remarks: First records from Portugal. Described upon specimens from Asturias, northern Spain.

***Orthochaetes insignis* (Aubé, 1863)**

Material examined: 2♂♂, 5 ex. "193_13.11 PORTUGAL, Monchique, Fóia, N37°18'58"/W8°35'39", 890m, 10.4.2013, leg. C. Germann" (cCG, NMBE). - 1 ex. "193_13.12 PORTUGAL, W Monchique, N37°19'32"/W8°34'27", 630m, Garrigue (*Cistus*, Ginster), 10.4.2013, leg. C. Germann" (cCG). - 1 ex. "223_14.5 PORTUGAL, Beira Baixa, Serra da Esperança, Belmonte Umgb., 650m, N40°19'42"/W7°21'56", 23.4.2014, leg. C. Germann" (NMBE). - 2 ex. "223_14.7 PORTUGAL, Beira Alta, NE Cabeça Alta, 1060m, N40°33'26"/W7°21'19", GS Moos auf Felsen, 24.4.2014, leg. C. Germann" (NMBE). - 1♀ "PORTUGAL, 1,5 km S Rabal, Par. Nat. Montesinho, N41°51'22"/W6°44'54", 625m, 10.4.2012, leg. C. Braunert" (cCB). - 6♂♂, 4♀♀ "PORTUGAL, Algarve, Fóia, Granitberg, Gipfel, Serra de Monchique, N37°18'58"/W8°35'39", 890m, 10.4.2013, leg. C. Braunert, SIFTING" (cCB). - 1♂, 1♀ "PORTUGAL, Algarve, 1 km NE Alferce, Serra de Monchique, N37°20'35"/W8°28'56", 170m, 10.4.2013, leg. C. Braunert, SIFTING" (cCB). - 1♂ "PORTUGAL, Algarve, 2 km NW Monchique, Serra de Monchique, N37°19'33"/W8°34'26", 640m, 10.4.2013, leg. C. Braunert, SIFTING" (cCB). - 2♀♀ "223_14.7, 2014-7, PORTUGAL, Beira Alta, Serra da Estrela, 6 km NE Videmonte, Granitkuppe, Macchie/Garrigue, Moos/Graspolder, 1060m, N40°33'26"/W7°21'19", 24.4.2014, leg. C. Braunert" (cCB). - 1♀ "223_14.15, 2014-15, PORTUGAL, Beira Alta, Serra da Estrela, 3 km N Guarda, Granitkuppe, Macchie/Garrigue, 1020m, N40°33'67"/W7°16'26", 27.4.2014, leg. C. Braunert" (cCB).

Remarks: Already reported from Portugal by González (1967) with the three localities: Évora, Alentejo, and Serra da Estrela.

***Orthochaetes rectirostris* Hoffmann, 1960**

Material examined: 1♀ "223_14.1 PORTUGAL, Beira Baixa, Serra da Esperança, Belmonte Umgb., 580m, N40°19'42"/W7°21'41", 21.4.2014, leg. C. Germann" (cCG). - 4♂♂, 1♀, 1 ex. "223_14.2 PORTUGAL, Beira Baixa, Serra da Estrela, E Penhas da Saúde, Vale das Cortes, 1290m, N40°19'42"/W7°21'41", 22.4.2014, leg. C. Germann" (cCG, NMBE). - 1 ex. "223_14.5 PORTUGAL, Beira Baixa, Serra da Esperança, Belmonte Umgb., 650m, N40°19'42"/W7°21'56", 23.4.2014, leg. C. Germann" (NMBE). - 2♂♂, 2♀♀, 15 ex. "223_14.7 PORTUGAL, Beira Alta, NE Cabeça Alta, 1060m, N40°33'26"/W7°21'19", GS Moos auf Felsen, 24.4.2014, leg. C. Germann" (cCG, NMBE). - 1♂, 1♀, 11 ex. "23_14.11 PORTUGAL, Beira Alta, Manteigas, Gletschertal Zêzere, 1300m, N40°19'58"/W7°34'14", Betula-Hangwald, 26.4.2014, leg. C. Germann" (cCG, NMBE). - 1 ex. "223_14.17 PORTUGAL, Beira Baixa, Serra da Esperança, Belmonte, 550m, N40°21'36"/W7°21'05", Steinmauer, 28.4.2014, leg. C. Germann" (cCG). - 1♀ "223_14.17, 2014-17, PORTUGAL, Beira Baixa, Serra da Esperança, Belmonte, Stadtgebiet, 550m, N40°21'36"/W7°21'05", Steinmauer, 28.4.2014, leg. C. Braunert" (cCB). - 1♂,

2♀♀ "223_14.9, 2014-9, PORTUGAL, Beira Baixa, Serra da Gardunha, 2 km NW Alpedrinha, Granitfelsen, Macchie, Garrigue, 1025m, N40°06'10"/W7°29'13", 25.04.2014, leg. C. Braunert" (cCB).

Remarks: First records from Portugal. Described upon specimens from Sierra de Guadarrama in central Spain.

Orthochaetes villiersi González, 1967

Material examined: 3♂♂, 5♀♀, 15 ex. "193_13.21 PORTUGAL, W Sagres, Cabo S. Vicente, W-Spitze, N37°01'23"/W8°59'42", 20m, Küstenfelsen *Astragalus*, *Limonium*, 12.4.2013, leg. C. Germann" (cCG, NMBE). - 1 ex. "193_13.5 PORTUGAL, Loulé, Pena, Rocha da Pena, N37°15'17"/W8°06'33", 470m, 8.4.2013, leg. C. Germann" (NMBE). - 1 ex. "193_13.6 PORTUGAL, Loulé, Pena, Rocha da Pena, N37°15'14"/W8°05'40", 430m, 8.4.2013, leg. C. Germann" (cCG). - 5 ex. "193_13.19 PORTUGAL, W Sagres, Cabo S. Vicente, N37°01'35"/W8°58'11", 50m, 12.4.2013, leg. C. Germann" (cCG). - 3♂♂, 3♀♀ "PORTUGAL, Algarve, 5 km NW Sagres, Felsklippen, 20m, N37°01'23"/W8°59'42", 12.04.2013, leg. C. Braunert" (cCB). - 1♂ "PORTUGAL, Algarve, 3 km NW Sagres, Garrigue, steinig, 50m, N37°01'36"/W8°58'09", 12.04.2013, leg. C. Braunert" (cCB).

Remarks: Described upon specimens from Morocco and Portugal (Algarve: Tavira).

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