Zootaxa 3931 (1): 117–126
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3931.1.8
http://zoobank.org/urn:lsid:zoobank.org:pub:1625A8F7-9449-4F21-800D-4D90A908A6D5

A new species of *Oromia* (Coleoptera: Curculionidae) from the Canary Islands

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Abstract

The weevil *Oromia thoracica* **n. sp.** from Gran Canaria (Canary Islands) is described and compared to its closest allies. It can easily be distinguished by less sculptured elytra, its differently shaped antennal scrobe, and by the pronotum not constricted anteriorly and expanded over the head. Some ecological data are also provided, and considerations on the fauna occurring in the mesovoid shallow substratum (MSS) from the locality of this new species are made. Additional records and comments on other *Oromia* species as well as an identification key to the species of the genus are given.

Key words: Molytinae, *Oromia thoracica* **n. sp.**, MSS fauna, edaphobiont, identification key

Resumen

Se describe la nueva especie de gorgojo *Oromia thoracica* **n. sp.** de Gran Canaria (Islas Canarias) y se compara con sus congéneres. Se distingue fácilmente por los élitros menos esculpidos, la diferente conformación de la escroba antenal, y por el pronoto no constreñido anteriormente y proyectado sobre la cabeza. Se proporcionan datos ecológicos y algunas consideraciones sobre la fauna presente en el medio subterráneo superficial (MSS) de la localidad típica donde se colectó la especie. Además, se aportan nuevos datos de distribución, comentarios faunísticos y una clave de identificación de las especies de este género.

Palabras clave: Molytinae, *Oromia thoracica* **n. sp.**, fauna del MSS, edafobionte, clave de identificación

Introduction

The troglobitic fauna present in the Canary Islands has been found in lava tubes formed in pahoehoe basaltic flows, in volcanic pits, in the mesovoid shallow substratum (MSS; Hlaváč *et al*. 2006 and López & Oromí 2010), and in the deep underground network of voids and cracks. Other subterranean species, like proper edaphobionts (i.e., living in the soil), frequently appear together with this fauna, contributing to the enrichment of these habitats. Studies carried out in the Canary Islands since the 1980s have shown that this archipelago has a rich diversity of species adapted to subterranean habitats (Oromí 2004, 2008), with more than 150 described species. Most of these species have been discovered in studies carried out in lava tubes, but the MSS also harbors a significant number of exclusive species (31) or species that are also present in volcanic caves (37). The development of an effective pitfall trap (López & Oromí 2010) to evaluate the richness of the MSS has contributed to improved knowledge of the subterranean fauna in some Canary islands (Arnedo *et al.* 2007; Assing 2005; Enghoff 2012, 2013; Frisch & Oromí 2006; Machado 2008, 2011; Mahnert 2011; Vít & Oromí 2004). The use of this new MSS pitfall trap has been most valuable in those islands where lava tubes have collapsed and/or disappeared, such that biospeleological

Accepted by R. Anderson: 9 Feb. 2015; published: 11 Mar. 2015

studies are impossible to carry out. This is the situation in Gran Canaria, a mature island with only a few old volcanic caves, from which only two troglobitic species have been discovered prior to the last decade (Naranjo *et al.* 2014). The use of the MSS pitfall trap in a few localities of Gran Canaria within the last ten years has contributed to the discovery of 21 new species in this subterranean habitat, 14 of them still undescribed. Ten of these new taxa have been collected in Los Berrazales (Northwest of Gran Canaria), the richest place for subterranean biodiversity on the island, with troglobitic species belonging to a range of taxonomic groups (spiders, pseudoscorpions, millipedes, cockroaches and beetles). One of these new species is a remarkable weevil belonging to the Canary Islands endemic genus *Oromia* Alonso-Zarazaga, 1987, the description of which is the main objective of this article.

Only two eyeless and flightless species of *Oromia* have been previously described, both from Tenerife, the largest of the Canary Islands. This weevil genus was originally placed in the tribe Cycloterini Lacordaire, 1863 within the subfamily Molytinae Schoenherr, 1823 (Alonso-Zarazaga 1987); later moved to Typoderina Voss, 1965 in the Molytini Schoenherr, 1823 (Alonso-Zarazaga & Lyal 1999), and finally grouped as Typoderini Voss, 1965 together with two related genera: *Baezia* Alonso-Zarazaga & García, 1999 and *Styphloderes* Wollaston, 1873 (Alonso-Zarazaga 2013). *Baezia* is also endogean (flightless and blind) and endemic to the Canary Islands, while *Styphloderes* is epigean and is more widely distributed in the Mediterranean region. One of the three known species of the latter genus, *S. (Parastyphloderes) lindbergi* Roudier, 1963, is present in Morocco and Canary Islands, but it is not clear if the endogean endemic genera *Oromia* and *Baezia* are derived from a *Styphloderes*-like ancestor. Relationships among the three genera require further study.

In the present article, length of the insect is measured without rostrum (*s.r.*). Drawings were made with a *camera lucida* attached to a microscope. Stack photography was performed with a Canon PowerShot A640 digital camera with a reverse mounted 50 mm objective, and applying CombineZP software by Alan Hadley. All geographic coordinates are given with the Universal Transverse Mercator (UTM) coordinate system (datum WGS84) with a precision of 500 m.

Taxonomic treatment

Oromia thoracica Machado & López n. sp.

(Figs. 1–3)

Type series. Holotype 1 ♂**,** Canary Islands, Gran Canaria, Los Berrazales (480 m a.s.l., UTM 28R4355-31050), 30-XII-2013, H. López & E. Morales leg. (DZUL 34166). Deposited in the entomological collection of the Department of Animal Biology (Zoology), University of La Laguna (DZUL).

Paratypes: same data as holotype, 1♂, 1♀ (coll. H. López, La Laguna), 1 ♀ (coll. Machado, La Laguna); same locality as holotype, 1 ♀, 2-I-2009, H. López & E. Morales leg. (coll. Museo de Ciencias Naturales, Santa Cruz de Tenerife, TFMC, CO-16001); 1 ♀, same locality, 08-V-2014, H. López leg. (coll. P. Oromí, La Laguna).

Diagnostic features. Elongate, subparallel and depressed hypogean molytine of moderate size (3.7–5.0 mm, without head), eyeless and apterous (fig. 1a-c). Integument well sclerotized, dark reddish brown, almost glabrous, with tiny dispersed granules and covered by more or less developed foveae. Rostrum as long as pronotum, with several irregular micro-ridges along epifrons; scrobe sinuous, upper margin reaching base of rostrum, lower margin reaching ventral margin of rostrum at middle. Pronotum not constricted anteriorly, front margin broad and thick covering head (roof-like), laterally reflexed; with one wide submarginal depression on each side; front half with conspicuous median keel. Elytra with base concave and lateral angles sharply pointed, protruding; striae shallow, interstriae slightly rippled. Metapleurosternal sulcus absent; metaventral apophysis truncate, thickly bordered; first and second abdominal ventrite fused (suture obsolete), much longer than the rest together. Femora slender, unarmed; tibiae much compressed, uncinate; protibiae with premucro; tarsal plantae replaced by loose hairs; third tarsomere broad, bilobed; onychium long with free claws (fig. 3b).

Measurement of holotype (♂). Length: total 6.4 mm (with rostrum) 5.0 mm (without head); rostrum 1.35 mm; antenna 1.86 mm, scape 0.86 mm; funicle 0.56 mm, segments (1–4) 0.16/ 0.08/ 0.06 /0.06/ 0.05 /0.06 /0.07 mm; club 0.44 mm; pronotum 1.40 mm (midline); elytra 3.45 mm; protibiae 1.40 mm, mesotibiae 1.14 mm, metatibiae 1.28 mm; metatarse 0.60 mm (segments 0.13/ 0.11 /0.17 /0.24 mm); abdominal ventrites (1+2) 1.38, ventrites (3/4/ 5) 0.22/ 0.22/ 0.42 mm. *Width*: head 0.65 mm; rostrum 0.41 (at pterygia) 0.29 mm (at base) 0.34 mm (at middle);

scape (base/apex) 0.02/ 0.10 mm; club 0.21 mm; pronotum (anterior/ maximum/ posterior) 0.84/1.28/ 0.92 mm; elytra 1.77 mm (maximum). *Height*: prorostrum 0.32 mm, metarostrum 0.28 mm; prothorax 1.02 mm, mesothorax 1.24 mm, abdomen 1.24 mm.

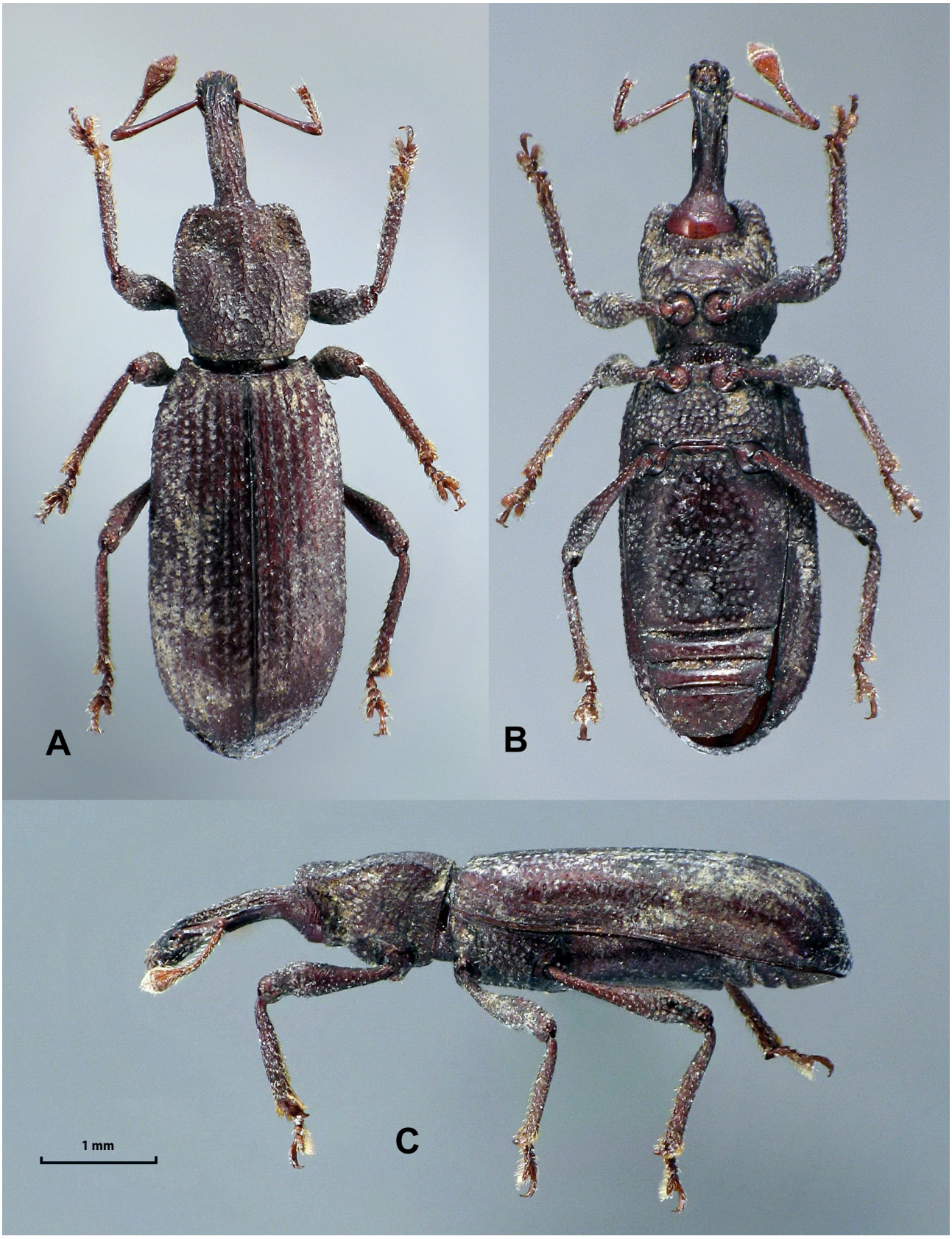

FIGURE 1. Habitus of *Oromia thoracica* **n. sp.** (female). A: dorsal view. B: ventral view. C: lateral view.

Description. Size moderate (*s.r.* 3.75–5.00 mm), body elongate, subparallel and depressed. Integument dull, of dark reddish-brown color (club lighter) and foveolate-rugose aspect; glabrous (except limbs), and with dispersed microgranules (tip of granules and ridges defined). Apterous.

Head completely covered by pronotum, eyeless. Rostrum narrow (L/W_{middle}= 3.9–4.0), parallel, as long as pronotum, dorsally twice as wide as ventrally, slightly constricted at base and at level of antennal insertion (dorsally), widest at apex; epistome laterally separated from pregenae; pterygia short, moderately protruding; dorsum in lateral view straight at basal third, deflexed at middle and deflexed again at apical third; ventral margin moderately arcuate; dorso-lateral margins sharply keeled. Scrobes deep, not visible from above (except at pterygia); upper margin sinuous and reaching base of rostrum at mid-length; lower margin keeled, oblique, reaching ventral margin of rostrum at mid-length. Integument with several fine irregular micro-ridges along epifrons and foveae between the micro-ridges badly defined; ventral integument shinier, without ridges (only microgranules). Some short flat setae at prorostrum and distal part of metarostrum.

Antennae slender, inserted at ¾ of rostral length. Scape straight (0.7× length of rostrum), progressively but not much incrassate towards apex (slightly thickened at apex), integument smooth, with very few tiny setae. Funicle 7-segmented, compact (0.65× length of scape), desmomere 1 more than twice the length of 2; 3–6 subequal, slightly transverse; 7 thicker. Club large (L/W= 2.1), almost as long as funicle; rhaptomere 1 cup-shaped, longer than the rest together (fig. 3a).

Pronotum weakly convex, in dorsal view with outline elongate, somewhat rectangular (L/W= 1.1); apex strongly thickened, not constricted, margin reflexed (roof-like, covering head), slightly emarginate; lateral margins variable, little arcuate and convergent in apical third (anterior angles blunt, border thick, with asperities), subparallel in middle third, then straight and convergent basad (in one specimen somewhat undulate); base finely bordered, weakly emarginate; maximum width usually at apical third. Median line sharply keeled and conspicuous on apical half, flanked by shallow longitudinal depressions on disk, and by larger and deeper antero-lateral depressions; margins reflexed. Integument with large confluent foveae, intervals very narrow, forming an irregular sharp reticulate pattern (better defined in posterior half) or longitudinal irregular ridges on each side of disk. Microchaetae present.

Scutellum not visible.

Elytra elongate (L/W= 2.0), barely convex, subparallel, level with pronotum in lateral view, 2.5–2.6× longer and 1.4–1.5× wider than pronotum. Base concave, markedly keeled, slightly wider than base of pronotum; lateral angles acute, pointed, shortly protruding forwards; lateral margins subparallel, convergent at base, with separate granules (looking denticulate); maximum width and height at apical 4/5; apical declivity abrupt; apex uniformly rounded. Striae shallow, interstriae subconvex, somewhat rippled; with shallow diffuse foveae and sparse but conspicuous granules (tip shiny) in irregular rows. Microchaeta present, longer at apex.

Legs slender. Femora 1.3× length of tibiae, moderately inflated, thin at base, without teeth, with sharp-pointed internal subapical angle. Tibiae straight, strongly compressed, uncinate, with premucro; outer angle of protibia largely curved, fringed by tibial comb (long reddish setae); corbels with inner flanges as typical in Molytinae (figs. 4a,b,c). Tarsi broad, segment 2 transverse, segment 3 strongly bilobed, reaching half the length of onychium (fig. 3b); tarsal pads thin with loose long hairs. Integument foveolate-rugose with short setae; longer setae on inner face of tibiae and covering tarsi.

Ventral surface rather flat. Integument somewhat shinier than on dorsum. Prosternum with more or less impressed foveae (but almost effaced on antecoxal declivity), very deep and dense on metasternum, and more disperse and shallower on abdominal ventrites, vanishing towards the flanks and apex. Prosternum at apex depressed and constricted, foramen oblique (45º), retracted, occupying 0.60 of width. Procoxae very close, 1.5× its diameter distant from anterior margin and 0.5× from posterior margin. Mesoventrite punctate, mesoventral process flat, not protruding; mesocoxae separated by almost one diameter. Ventral margins of elytra submarginally deflexed along its length (integument smoother, only with granules). Metaventrite twice as broad as long, truncate at base, thickly bordered, at same level as abdominal ventrites; metanapleural sulcus not present; metacoxae little convex, separated by twice its diameter from each other, not reaching pleural margin. Abdominal ventrites 1+2 fused (suture not discernible), depressed at disk, 1.6× as long as rest of ventrites together, thickly bordered at base of intermetacoxal process, finely bordered at posterior margin; ventrites 3 and 4 subequal, very short, strongly depressed and thin at base, posterior margin incrassate, bordered; ventrite 5 as long as 3 and 4 together, broadly rounded (♀) or more truncate (♂) at apex, rugose, without special subterminal setae (only short inconspicuous microchaetae). Tergite 8 emarginate in females.

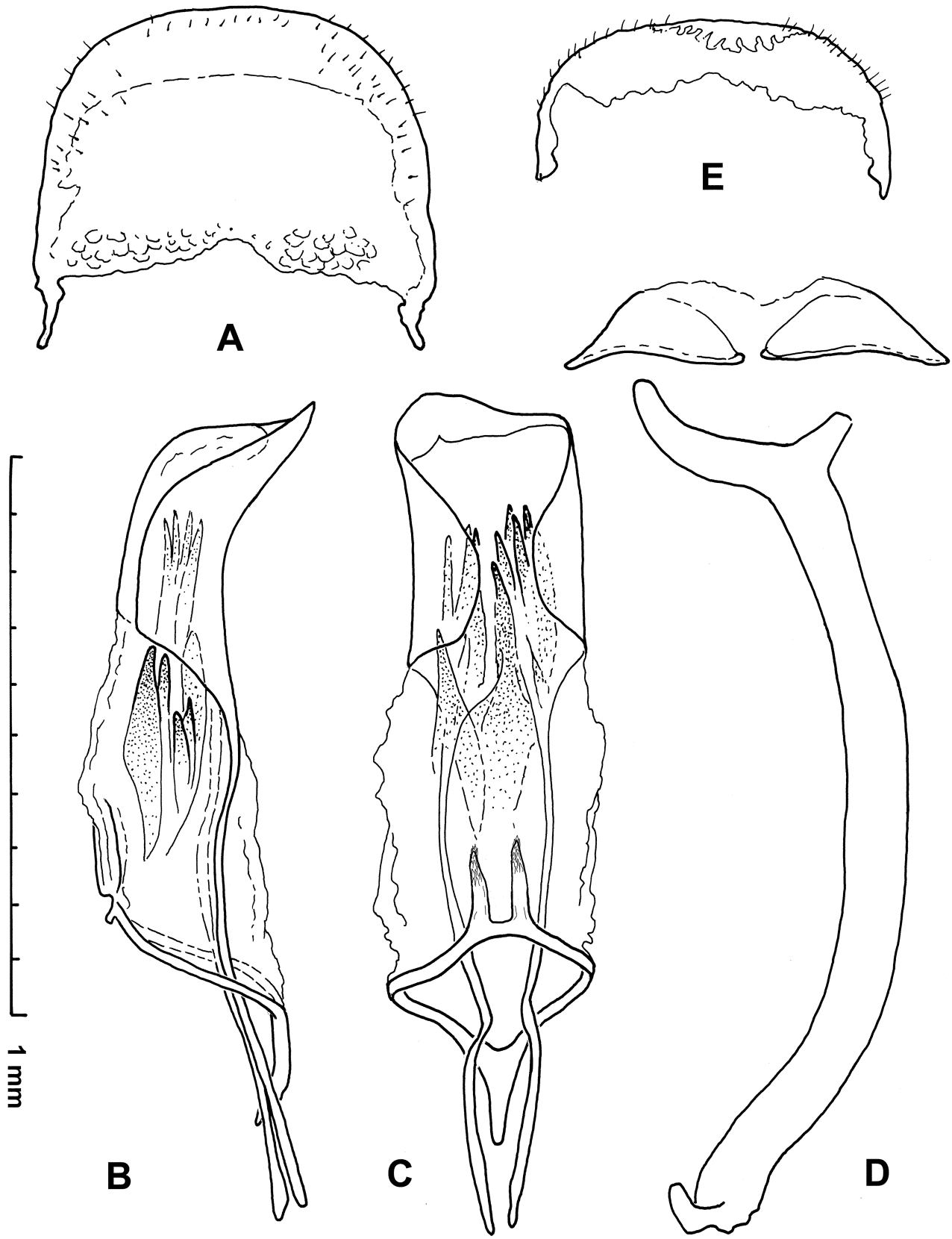

FIGURE 2. *Oromia thoracica* **n. sp.** A: male ventrite VIII. B: aedeagus in lateral view. C: edeagus in dorsal view. D: spiculum gastrale with attached basal sclerites. E: female ventrite VII.

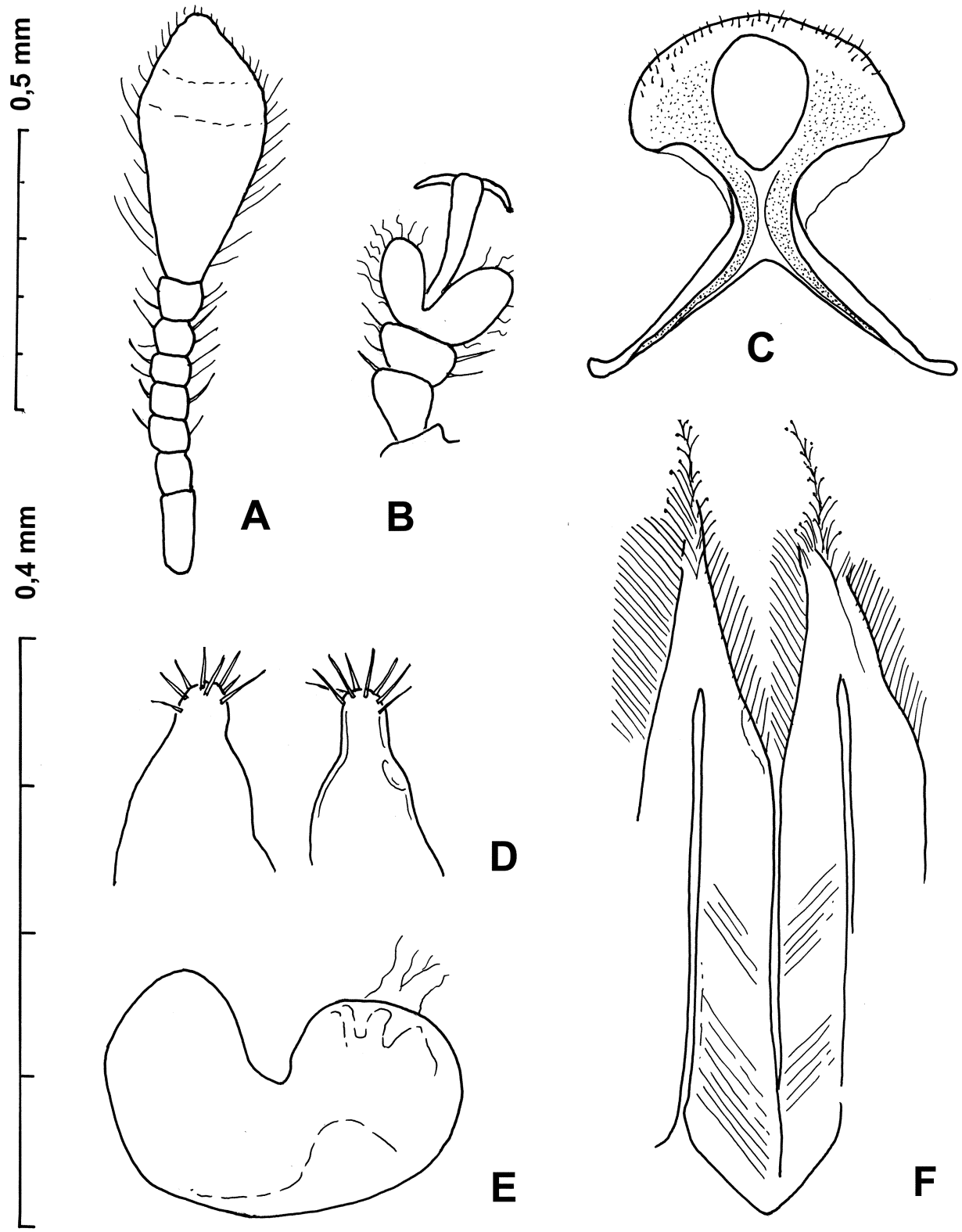

FIGURE 3. *Oromia thoracica* **n. sp.** A: antennal funicle and club. B: protarsus. C: spiculum ventrale. D:female gonostyli. E: spermatheca. F: lamina of proventriculus.

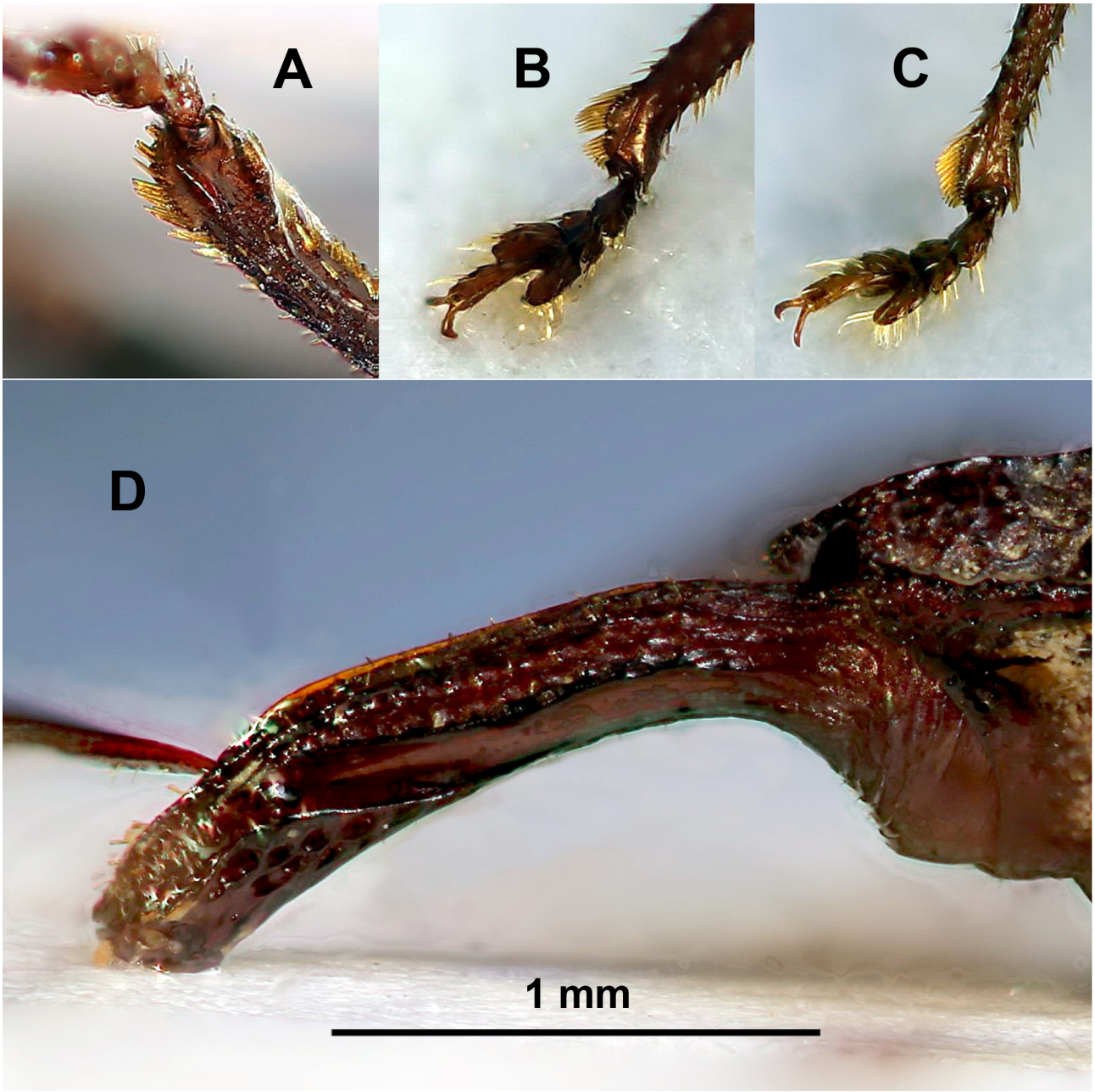

FIGURE 4. Aspect of corbels with inner flanges in protibia (A), mesotibia (B) and metatibia (C). D: Rostrum in lateral view.

Aedeagus (fig. 2b, c). Pedon short and thick, with broad and asymmetric apex (acute in profile); temones 1.3× longer. Endophallus with two parallel broad, acute endosclerites, and several narrow, more apical ones. Tegmen with very short manubrium and broad translucent parameres ending with fringes. Spiculum gastrale robust, arcuate with strongly asymmetric arms (fig. 2d).

Female genitalia. Ovipositor short, styli strongly sclerotized, fused with the coxites, with a bunch of 8 radiating setae at apex (fig. 3d). Terguite VIII scoped out at posterior margin; terguie VII short (fig 3e). Spiculum ventrale with short manubrium and long divergent arms; plate broad with a large ovate fenestra at middle (fig. 3c). Spermatheca reniform, without lobes, ducts emerging at the base of the corpus (fig. 3e).

Biology and ecology. All individuals of this new species have been collected using MSS pitfall traps installed in a scoriaceous outcrop, poorly covered by a soil layer and with vegetation mainly characterized by *Pinus canariensis*, *Euphorbia regis-jubae* and several bushes characteristic of thermophilous habitats (*Cheirolophus arbutifolius*, *Pistacia atlantica*, *Pterocephalus lasiospermus*, *Artemisia thuscula*, *Withania aristata*, *Salvia canariensis*). The collection site is located in Los Berrazales, the upper section of the Agaete valley, in an older part

of the island formed by Miocene volcanism, but the site itself is within younger terrain (represented by basanite scoria cones and lava flows) originated from a localized Holocene eruption. This part of the island was not directly affected by subsequent episodes of extensive volcanism that occurred in Gran Canaria during the Pliocene, of which one in particular, the formation of the Roque Nublo agglomerate complex, was very explosive and accompanied by extensive aerial emissions (Pérez-Torrado *et al.* 1995). The upper part of the Agaete valley probably acted as a refuge for the biota of the humid areas destroyed by this explosive Pliocene volcanism, this being a possible explanation for the presence of some local endemic plants and animals. Most of the subterranean species collected in the MSS of Los Berrazales have not been found in other nearby sites located in more recent terrains. Thus, the role of the Agaete valley as a refuge may have been particularly important for subterranean habitats. Only two troglobitic species discovered in the MSS of Los Berrazales have also been found in other younger terrains: the millipede *Dolichoiulus oromii* Enghoff, 2012 and the spider *Scotophaeus* **n. sp.**

MSS pitfall traps from Los Berrazales have been continuously sampling since 2003, being revised every year after the dry and the rainy seasons. All individuals of *O. thoracica* were collected on three occasions, and with no clear seasonal pattern. However, the presence of a big, recently dead individual of *Euphorbia regis-jubae* very close to the traps may be the reason for the occurrence of *O. thoracica* in the traps, together with an increase in the richness and abundance of other species. Root putrescence of these bushes may attract and concentrate temporally the subterranean fauna of all trophic groups, and *O. thoracica* probably feeds on these decomposed roots, given that other *Oromia* species from Tenerife have been found around rotten roots inside caves. In comparison to the other *Oromia* species, *O. thoracica* has a more troglobitic appearance due to its more elongated and stylized legs and antennae. However, this new species must also be edaphobitic according to its habitat and supposed feeding habits.

Remarks. There are several aspects in which this new taxon differs from the already described *Oromia* species. The lower margin of the antennal scrobe (fig. 4d) reaches the venter of rostrum at the mid-point (not running parallel towards its base); the pronotum is not constricted anteriorly, but expanded over the head; the metanapleural sulcus is not present, like in *Anchonidium* Bedel, 1884 and *Aparopion* Hampe, 1861; in addition, the elytra are less sculptured, abdominal ventrites 1 and 2 are almost fused (suture not or hardly visible) and separated by a thick border from the metaventrite; the last abdominal ventrite does not have a pair of subapical setae, or these are extremely reduced. The median lobe of the male genitalia are of the same type, more asymmetric at the apex than in *Oromia hephaestos* Alonso-Zarazaga, 1987 (fig. 2c), but with strongly developed endosclerites instead of fields of small denticles. However, the spiculum ventrale and spermatheca of females (fig. 3c, e) are almost identical to those of *O. hephaestos*, and clearly different from those of *Baezia* or *Styphloderes (Parastyphloderes) lindbergi*. From this latter species, which has antennae with 5 instead of 7 desmomeres, it also differs by longer apical fringes in the blades of the proventriculus (fig. 3f), in contradiction with Israelson's (1990) supposition.

We do not know the extent to which ventral structures respond in adaptation to endogean life, and *O. thoracica* could well represent a more endogean adapted form of *Oromia.* In any case, it seems more prudent to assign the new taxa to *Oromia* than separating it as a new genus. In order to clarify this question, a phylogenetic study including all species of the Molytinae in the Canary Islands is ongoing.

The most remarkable character of *Oromia thoracica* **n. sp.**, and the reason for its specific epithet (an adjective), is the thickened and reflexed anterior margin of the pronotum, which covers and protects the head like a roof, thus lacking the characteristic lateral constriction which is the generalized case within the group.

Oromia hephaestos Alonso Zarazaga, 1987

Studied material. Tenerife, Cueva de Felipe Reventón (720 m a.s.l., UTM 28R3329-31371): 1 ♂ (*Holotype*), 17-III-1984, J.L. Martín leg. (DZUL 7560); 1♀ (*Paratypus*), 23-III-1986, J.J. Hernández leg. (DZUL 7561); 1♀, 14-V-1992, P. Oromí leg.; 1ex. (remains), 09-VII-2000, GIET leg., FR-C/CO-3349 (DZUL 8067). Cueva del Sobrado (730 m a.s.l., UTM 28R3333-31366), 2exx, 27-IV-2008, H. López leg. (DZUL 8066, 8065); 1ex (remains), 14-IV-2014, S. de la Cruz leg.

Biology and ecology. Despite intense sampling of caves and MSS over decades in Tenerife, all known specimens of *O. hephaestos* have been collected in Cueva del Viento-Sobrado, the largest lava tube in the European Union. Some individuals of this blind weevil have been recently collected in Cueva del Sobrado, on the cave floor

under a large crack of the ceiling through which roots emerge and the clay from the overlying soil percolates. This seem to confirm that this species is a radicicolous edaphobiont which appears in caves accidentally, or in transit during its movements among the subterranean soil layers, such as Alonso-Zarazaga (1987) suggests. The specimens collected over last two decades are more variable in body size than those used for the description of the species, so the total length now varies from 2.80–3.56 mm (*s.r.*) and the maximum width of elytra from 1.16–1.44 mm.

Oromia aguiari Alonso Zarazaga, 1990

Studied material. Tenerife, Altos de Los Realejos, Palo Blanco (830 m a.s.l., UTM 28R3444-31379): 1 ♂ (*Holotype*), 1-XI-1985, A. Aguiar leg; 3♂, 1♀, 14-VII-2013, P. Oromí & H. López leg.; 1 ♀, 10-II-2014, P. Oromí & H. López leg.

Biology and ecology. Only two specimens of *O. aguiari* were previously known (Alonso-Zarazaga 1990), despite sampling efforts in different subterranean habitats of Tenerife over three decades. They were collected with pitfall traps placed in a colluvial MSS that was quite silted by soil sediments, on a steep hillside covered by a remnant of laurel forest and some scattered introduced trees (pine, cypress and chestnut). In order to obtain fresh material for genetic analysis, we set more effective MSS pitfall traps in the same spot and collected five individuals over the last four years, together with other blind edaphobiont weevils of the genus *Paratorneuma*. Individuals usually have their integument largely impregnated by soil particles, in some cases covering the striking complex of foveolae and ridges that characterize this species. This frequent dirt is probably acquired while crawling through the soil, confirming that *O. aguiari* is an edaphobiont. The specimens recently collected have a broader range of body size variation than those used for the description of the species, so the total length now varies from 2.35–3.90 mm (*s.r.*) and the maximum width of elytra from 1.17–1.72 mm.

Key to the species of *Oromia*

1. Pronotum not constricted anteriorly and expanded over the head; ventral margin of antennal scrobe reaching middle of rostrum; metapleurosternal sulcus absent. (Gran Canaria) . . . . . *Oromia thoracica* **n.sp.**
- Pronotum constricted anteriorly and not expanded over the head; ventral margin of antennal scrobe reaching base of rostrum; metapleurosternal sulcus present. (Tenerife) 2
2. Pronotum longer than wide, discal and marginal-lateral carina absent; prosternum without keels; elytra large and elliptic, with all interstriae costiform; profile serrated . . . . . *Oromia hephaestos* Alonso-Zarazaga
- Pronotum as long as wide, with strong discal carinae and with a bilobed marginal-lateral carina on each side; prosternum with three longitudinal keels; elytra oblong with parallel sided at middle, with odd interstriae strongly costiform; profile smooth and slightly undulate . . . . . *Oromia aguiari* Alonso-Zarazaga

Acknowledgements

We thank Pedro Oromí, Elena Morales, David Hernández, Isabel Sancibrián and Salvador de La Cruz for their help during the fieldwork. Pedro Oromí and Brent Emerson revised and helped to improve the paper. The Cabildo de Gran Canaria facilitated us all the pertinent permits to work in the field.

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