

THE GENUS *MOREIBA* ALONSO-ZARAZAGA, 2013 FROM THE CANARY ISLANDS (SPAIN) (COLEOPTERA: CURCULIONIDAE: ENTIMINAE)

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Abstract: The weevil genus *Moreiba*, endemic to the Canary Islands, is revised based on morphological characters and molecular data (mtCO1). Eight new taxa are added to the single previously described species, from El Hierro. These are: *Moreiba canariensis auarita* n. ssp., from La Palma; *M. canariensis nivariana* n. ssp., from Tenerife; *M. tamarana* n. sp., from Gran Canaria; *M. maxorata* n. sp. and *M. ariadnae* n. sp., from Fuerteventura; *M. lancerota* n. sp., from Lanzarote; *M. mariae mariae* n. sp., from Fuerteventura and Lanzarote; and *M. mariae oromiana* n. ssp., from Montaña Clara. An estimated age of 6 My is obtained for the first split of species. A key to the species, images of adults, and line drawings of genitalia and scales are provided.

Key words: Coleoptera, Curculionidae, Entiminae, Laparocerini, *Moreiba*, taxonomic review, new species, COI, DNA, Spain, Canary Islands.

El género *Moreiba* Alonso-Zarazaga 2013 de las islas Canarias (España) (Coleoptera: Curculionidae: Entiminae)

Resumen: Se revisa el género de gorgojos *Moreiba*, endémico de las islas Canarias, a partir de caracteres morfológicos y datos moleculares (mtCOI). A la única especie previamente descrita de la isla de El Hierro se le añaden ocho nuevos taxones: *Moreiba canariensis auarita* n. ssp., de La Palma; *M. canariensis nivariana* n. ssp., de Tenerife; *M. tamarana* n. sp., de Gran Canaria; *M. maxorata* n. sp. y *M. ariadnae* n. sp., de Fuerteventura; *M. lancerota* n. sp., de Lanzarote; *M. mariae mariae* n. sp., de Fuerteventura y Lanzarote; y *M. mariae oromiana* n. ssp., de Montaña Clara. Se ha obtenido una edad estimada de 6 Ma para la primera separación de especies. Se aporta una clave para la determinación de las especies, imágenes de los adultos y dibujos de la genitalia y escamas.

Palabras clave: Coleoptera, Curculionidae, Entiminae, Laparocerini, *Moreiba*, revisión taxonómica, especies nuevas, COI, ADN, España, Islas Canarias.

Tanonomy / Taxonomía: *Moreiba canariensis auarita* n. ssp., *Moreiba canariensis nivariana* n. ssp., *Moreiba tamarana* n. sp., *Moreiba maxorata* n. sp., *Moreiba mariae* n. sp., *Moreiba mariae oromiana* n. sp., *Moreiba ariadnae* n. sp., *Moreiba lancerota* n. sp.

Introduction

Herbert Franz (1995) described *Strophosoma canariense* with type locality Las Playas on El Hierro, the westernmost of the Canary Islands, including in the type series (82 exx) two specimens from the island of Gran Canaria. Alonso-Zarazaga (2013) used the name of the goddess of women and fertility among the aborigines of El Hierro for the genus and established the new genus *Moreiba* for this species that belongs to the Laparocerini Lacordaire, 1863 and not to the Brachyderini Schönherr, 1826, as is the case with *Strophosoma* Billberg, 1820. He mentions the existence of additional samples of *Moreiba* from Tenerife, La Palma, Lanzarote and Montaña Clara, but without any further action. Formal records were posteriorly published for La Palma (Stüben and Behne 2015) and for Fuerteventura (Stüben 2016) under the name *Moreiba cf. canariense*, highlighting in these and in other contributions (Stüben 2013, 2014, 2016), that each island seems to have its proper species or subspecies. So far, *Moreiba* has been found on all the main Canary Islands with the exception of La Gomera (Fig. 1). The purpose of the present contribution is to describe the new taxa with the concurrence of molecular data.

Material and Methods

MATERIALS. This study is based upon examination of 497 specimens which are kept in private and institutional collections, referred to with the following abbreviations.

AGC: Coll. Agustín Aguiar Clavijo. La Laguna, Spain.

AMC: Coll. Antonio Machado Carrillo. La Laguna, Spain.

DZUL: Department of Zoology. University of La Laguna, Spain.

IPNA: Instituto de Productos Naturales y Agrobiología. La Laguna, Spain

MAAZ: Coll. Miguel Ángel Alonso-Zarazaga. MNCN (CSIC), Madrid, Spain.

MNCN: Colección General. Museo Nacional de Ciencias Naturales (CSIC). Madrid, Spain.

NMW: Naturhistorisches Museum Wien. Vienna, Austria.

POM: Coll. Pedro Oromí Masoliver. La Laguna, Spain.

PST: Coll. Peter E. Stüben. Mönchengladbach, Germany.

RGB: Coll. Rafael García Becerra. Santa Cruz de la Palma, Spain.

RVLL: Coll. Roberto Valle Llarena. La Laguna, Spain.

TFMC: Museo de Ciencias Naturales. Santa Cruz de Tenerife, Spain.

MORPHOLOGY. Dissections were done according to standard entomological techniques. Genitalia and terminalia were placed in a drop of PVA (polyvinyl alcohol) on an acetate card accompanying the specimen for long-term conservation. Drawings were made using a camera lucida attached to a Leitz microscope or to an Olympus SZX12 stereo microscope, and measurements were taken with an micrometre fitted eyepiece. Photographs were taken with a Canon EOS 6D digital camera equipped with macro-lens MPE65. The program Zerene Stacker was used for stacking the digital photos and Photoshop Elements for final retouching. Body length is measured from the midpoint of the front margin

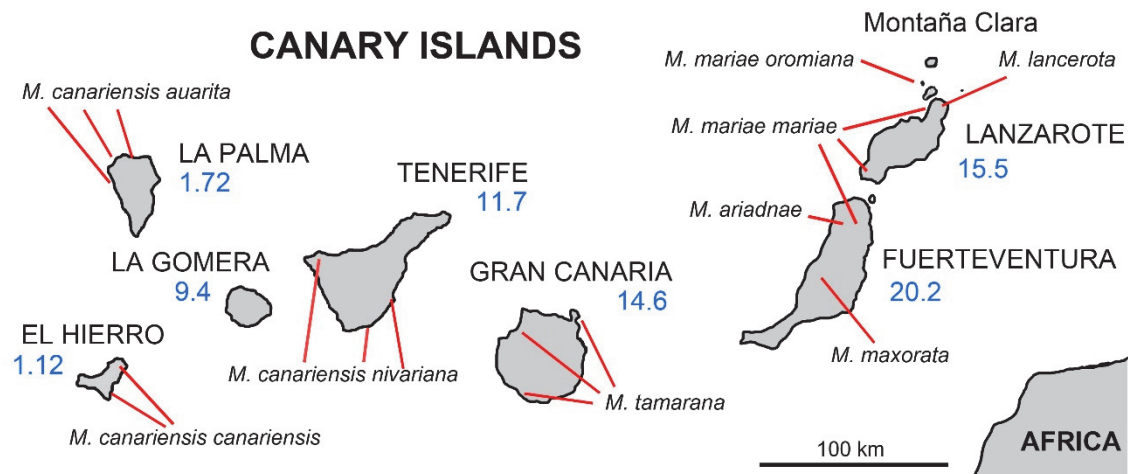


Fig. 1. Distribution of *Moreiba* species in the Canary Islands. Age of island (My) in blue taken from Carracedo & Troll (2016).

of the pronotum to the most apical point of the elytra (the apex is hidden under the overhanging declivity) in dorsal view, width is measured at the widest point of the elytra in dorsal view. In other structures, length and width are measured at the maximum points, unless otherwise stated.

The descriptions follow the usual terminology in Curculionidae (<http://www.weevil.info/>), and especially that in use in Machado (2010). Having already a detailed description of the genus (Alonso-Zarazaga 2013) for each species a brief description suffices, centred in the diagnostic characters. Symbols L and W used in ratios (e.g. L/W) refer to length and width. Length of specimens is measured without head (*s.c.*) in dorsal view. Rostral width was measured perpendicular to its dorsum across the straight-line tangent to the anterior margin of eyes (base of rostrum), and rostral length from this line to its apex (mandibles excluded). Eye convexity is expressed as the percentage of a theoretical complete ellipsoid or globe emerging from the profile of the head capsule (e.g. 50% convexity would mean a hemispherical protruding eye). It is obtained by observing the eye in profile –perfectly tangent to the head capsule– and dividing its maximum height by its length. Length of elytra is measured from their apex to the base of scutellum.

MOLECULAR ANALYSIS. DNA for each species was extracted from one leg of ethanol-preserved specimens using Chelex extraction protocol (Casquet *et al.*, 2012). A fragment of 600 pb of the mitochondrial gene cytochrome oxidase I (COI) was amplified and sequenced following López *et al.* (2007a) with primers and polymerase chain reaction conditions indicated therein. Sequencing was performed by the Sanger DNA sequencing service of Macrogen Europe in Madrid. Sequences were viewed, edited and assembled using MEGA7 software (Kumar *et al.*, 2016). Alignments were achieved using the program Muscle (Edgar, 2004), with default parameters as implemented in MEGA 7 and tuned by eye. The plausibility of the alignment was verified at the amino acid level. P-distances were calculated with MEGA7. Phylogenetic relationships were reconstructed using Bayesian Markov chain Monte Carlo inference (Yang & Rannala 1997) as implemented with MrBayes 3.2.3 (Ronquist *et al.*, 2012), applying default parameters and GTR+I+2 substitution model obtained with jModelTest 2.1.4 (Darriba *et al.*, 2012). Full convergence was tested with Tracer

v1.6 (Rambaut *et al.*, 2014). The BI final phylogram was edited with TreeGraph 2 (Stöver & Müller 2010). *Laparocerus idafe* García & Alonso-Zarazaga, 2011 was used as outgroup (1 ex La Palma: Bejenado, Cueva Los Cardos III, 8-1-2019 leg. R. García, Coll. AMC (GenBank MW013830|Lidaf7277P). Nodes with posterior probabilities below 0.90 were collapsed.

Our set of XXX *Moreiba* sequences (600 bp) are registered with accession numbers MW013820–MW013829 in GenBank (www.ncbi.nlm.nih.gov/Genbank). Voucher codes preceded by their Genbank accession numbers are included in the Material Examined section of each taxon.

SPECIES DELIMITATION. Pentisaari (2016) found an average 11.99% COI K2P distance between nearest neighbours in a dataset of 1,872 coleopteran species, which dropped down to 10.63% when 363 species were added. In our study, the latter threshold of 10.63% was used to postulate species boundaries, combined with the morphological and geographical analysis.

PLANTS. Plants mentioned in the text follow APG IV (2016) for the families and The Plant List (<http://www.theplantlist.org/>) for the authors.

- Asphodelus microcarpus* Salzm. & Viv.: Asphodelaceae
- Euphorbia balsamifera* Aiton: Euphorbiaceae
- Euphorbia regis-jubae* J. Gay: Euphorbiaceae
- Ficus carica* L.: Moraceae
- Juniperus phoenicea* L. var. *turbinata* (Guss.) Parl.: Cupressaceae
- Periploca laevigata* Aiton: Apocynaceae
- Rubia fruticosa* Aiton: Rubiaceae
- Suaeda vera* Forsk. ex J.F. Gmel.: Amaranthaceae
- Suaeda vermiculata* Forsk. ex J.F. Gmel.: Amaranthaceae

Results

• GENETIC RESULTS

The overall mean p-distance (Table I) in the dataset is 12.1%, suggesting an old origin for the genus *Moreiba*. Applying the general ratio of 2.6% per My for protein-coding mtDNA (Pons *et al.*, 2019) to the most divergent species *M. maxorata* n. sp. and *M. ariadnae* n. sp. (15.8%), a rough age estimate of 6.1 My is obtained for their basal split.

The phylogram obtained (Fig. 2) shows two well-supported subclades: one with lineages from the eastern islands,

Table I. K2P (left) and p-distance (right) among COI sequences (600 bp) of *Moreiba* species

<i>Moreiba</i>	<i>canariensis canariensis</i>	<i>canariensis auarita</i>	<i>canariensis nivariana</i>	<i>tamarana</i>	<i>maxorata</i>	<i>mariae mariae</i>	<i>mariae oromiana</i>	<i>ariadnae</i>
<i>canariensis auarita</i>	5.1 / 4.7							
<i>canariensis nivariana</i>	4.5 / 4.2	4.7 / 4.3						
<i>tamarana</i>	9.1 / 7.8	7.3 / 6.5	8.0 / 7.0					
<i>maxorata</i>	18.6 / 14.5	18.7 / 14.5	18.9 / 14.7	15.9 / 12.8				
<i>mariae mariae</i>	15.5 / 12.7	17.0 / 13.7	17.9 / 14.2	16.1 / 13.0	18.6 / 14.7			
<i>mariae oromiana</i>	16.2 / 13.0	16.6 / 13.3	17.8 / 14.0	16.1 / 13.0	19.0 / 14.8	0.79 / 0.70		
<i>ariadnae</i>	20.1 / 15.5	19.1 / 15.0	20.0 / 15.5	17.0 / 14.2	20.8 / 15.8	17.3 / 13.7	17.7 / 13.8	
<i>lancerota</i>	16.4 / 13.2	15.3 / 12.5	16.6 / 13.3	13.1 / 11.0	17.5 / 13.8	16.8 / 13.5	16.6 / 13.3	17.2 / 13.7

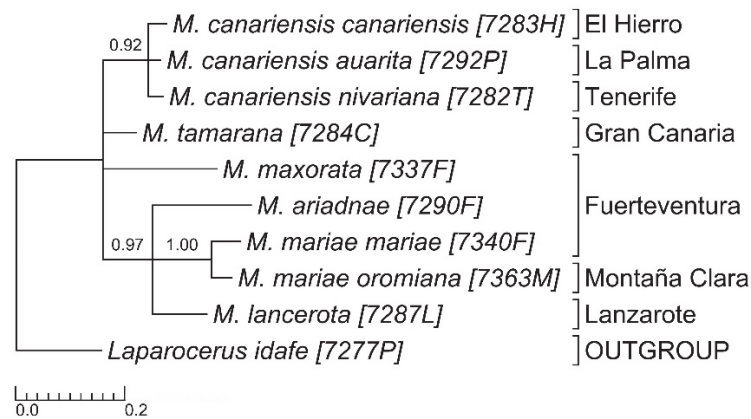


Fig. 2. Bayesian 50% majority rule consensus tree for COI (600 bp) of genus *Moreiba* Alonso-Zarazaga, 2013. Nodes showing Bayesian posterior probabilities. Scale, genetic distance.

and the other with lineages from the central and western islands. *Moreiba maxorata* n. sp. from Fuerteventura and *M. tamarana* n. sp. from Gran Canaria joined these subclades, respectively, but with low support and, therefore, the intermediate nodes have been collapsed with the basal node. The K2P distances between the lineages from the eastern islands (16.2–20.8%), are well above the species-threshold suggested, except for the lineage of Montaña Clara, an islet north of Lanzarote, which is clearly related to *L. mariae* n. sp., but with much lower K2P distance (7.9%), suggesting a subspecies status

The genetic divergence among the western lineages are lower (4.2–9.1%), in agreement with the progressive younger age of these island. The lineages from El Hierro (1.1 My) and La Palma (1.7 My) cluster with Tenerife, which is a much older island (11.7 My); however, the K2P distances among them are the lowest (4.5–5.1%) suggesting a subspecies status for each island population. The distance with the Gran Canaria lineage is higher (7.2–9.1%), but less than the distance between this latter and the eastern lineages (13.1–17.0%). The Gran Canarian lineage shows an intermediate position, same as the age of this central island (14.6 My), and being its genetic divergence is close to the average threshold of 10.63% above commented, we propose a species status for it: *M. tamarana* n.sp.

The island distribution (Fig. 1) reflects the same east-west colonization pattern as in *Laparocerus* Schönherr, 1834 (Machado *et al.*, 2017), with older species on the old islands and young species/subspecies on the younger islands. Fuerteventura and Lanzarote were a single continuous island in the past (Carracedo & Troll, 2016). *Moreiba* is an old element of the Canarian fauna and we do not know its relatives in the continental fauna.

• TAXONOMY

Family CURCULIONIDAE Latreille, 1802

Subfamily ENTIMINAE, Schoenherr, 1823

Tribe Laparocerini Lacordaire, 1863

Genus *Moreiba* Alonso-Zarazaga, 2013

<http://zoobank.org/2619B147-58F9-478F-9318-B567197CB90E>
Moreiba Alonso-Zarazaga 2013: 46; Alonso-Zarazaga *et al.*, 2016: 26; Alonso-Zarazaga *et al.*, 2017: 285. Machado *et al.*, 2017: 7.

TYPE SPECIES: *Strophosoma canariense* Franz, 1995, by original designation.

DESCRIPTION. Body (♂). Small apterous Laparocerini (length 2.4–3.10 mm); body oblong-oval, densely covered by scales; dorsum with raised broad setae, including legs, on pronotum with tips directed to midline (same as scales), and above the eye (Fig. 3A) a characteristic set of 4-5 longer setae pointing outwards (exception: *M. ariadnae* n. sp. with all setae strongly reduced, inconspicuous) (Fig. 4); ventrites with hair-like, spatulate or lanceolate setae (never covering integument); integument piceous or reddish-brown, light reddish-brown on tarsi and antennae (club and head of scape usually infuscated), on head and rostrum with a dense longitudinal strigosity (hidden by vestiture), mixed with foveoles on temples. *Head.* antennae slender, 11-segmented; scape bisinuate, thin at basal half, clavate or capitate apicad, slightly longer than funicle and reaching pronotum when folded; desmomere 1 longest and inflated, desmomeres 4-7 moniliform; club short and oval (L/W = 2.0), densely tomentose, about as long as previous four desmomeres together (Fig. 3F). *Rostrum* very short and wide (L/W <0.75),

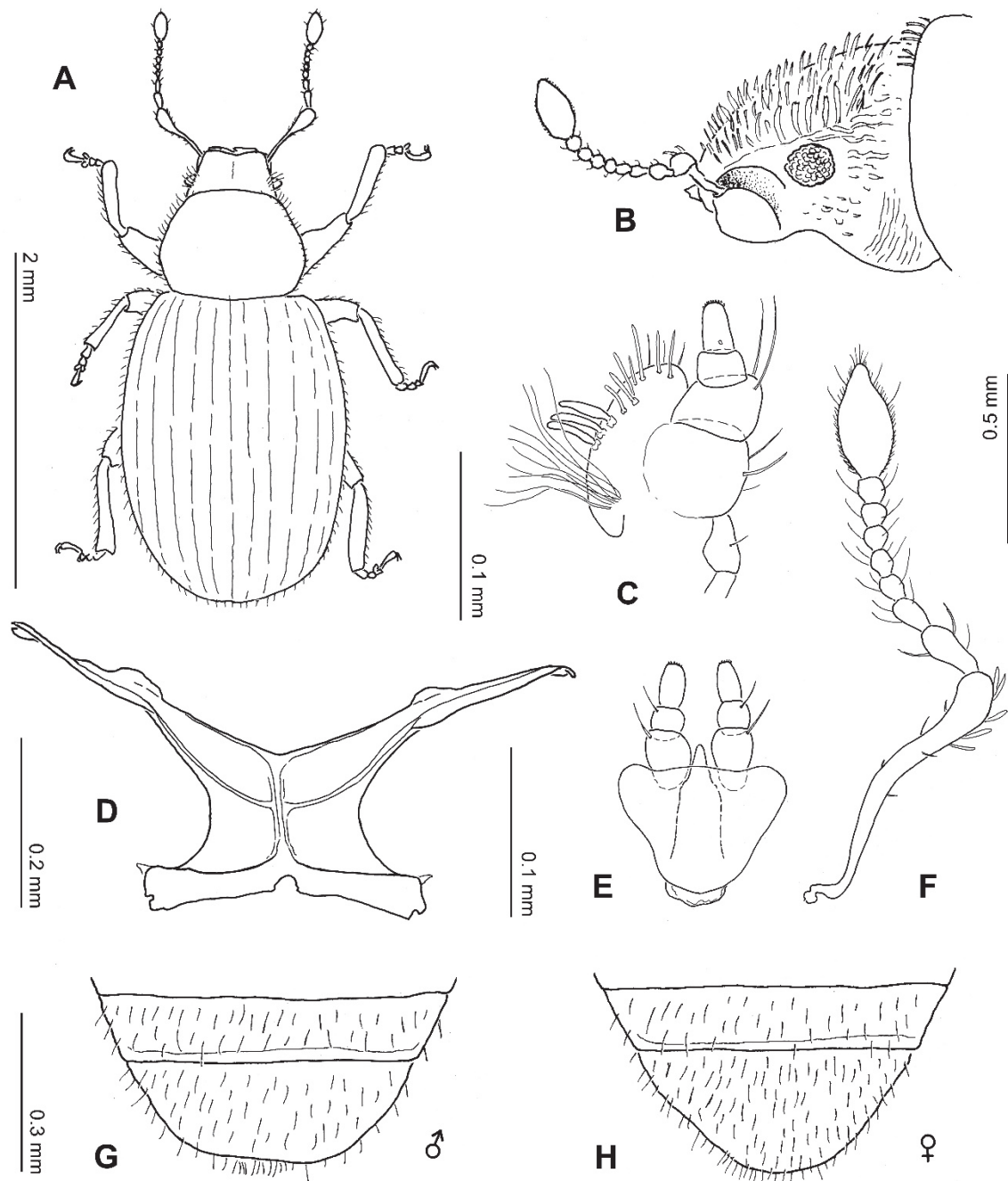


Fig. 3. Anatomy of *Moreiba canariensis canariensis*, (Franz, 1995). A = imago ♂, B = head in lateral view, C = left maxilla in dorsal view, D = metendosternite, E = labium, F = right antenna, G = male ventrites 4-5, and H = female ventrites 4-5.

epifrons at same level as head, sulcate along midline (sulcus fused with frontal fovea); epistome glabrous, emarginate (broadly V-shaped), and keeled posteriorly; scrobe deep and wide, hardly visible from above (pterygia little protruding), upper margin edged and prolonged above eye, lower margin curved downwards and widely separated from eye (by one eye diameter). Eyes small, morula-shaped, strongly prominent, eccentric (zenith displaced backwards), placed about middle of head side, with deep superior periocular sulcus. Maxillae (Fig. 3C) with 3 lacinial dents and about 7+3 malar setae; labium (Fig. 3E). *Pronotum* moderately transverse (L/W 0.7-0.8), anterior narrower than at base, with obtuse round posterior angles. *Scutellum* very small (conspicuous in *M. ariadnae* n. sp.). *Elytra* strongly coapted (not fused), oblong (L/W 1.3-1.4), more or less arcuate/parallel-sided, 2.3-2.7× as long as and 1.4-1.6× as wide as pronotum, not

sculptured, without humeral calli, with declivity overhanging apex; ten complete striae on each elytron, very narrow, not covered by scales, with one microseta on each puncture; interstriae normally with 4-5 scales across and with one row of raised setae along. *Venter*. Metanepisternum narrow, basally protruding over outer angle of metacoxa. Metendosternite (Fig. 3D) with furcal arms widely open (150°), about twice as broad as at base; stalk broad, longitudinal flange completely developed along stalk, about half length of a furcal arm, First abdominal suture curved forward at middle. *Legs* short (protibiae about 0.8× length of pronotum); femora edentate; tibiae simple, with blunt apex; emucronate in both sexes; protibiae straight, without grooming patch; metatibial corbels semi-enclosed (setae of apical fringe small); pro-tarsomere 2 short and transversal; claws equal, connate. Trochanteral setae present. Ventrite 5 apically sub-

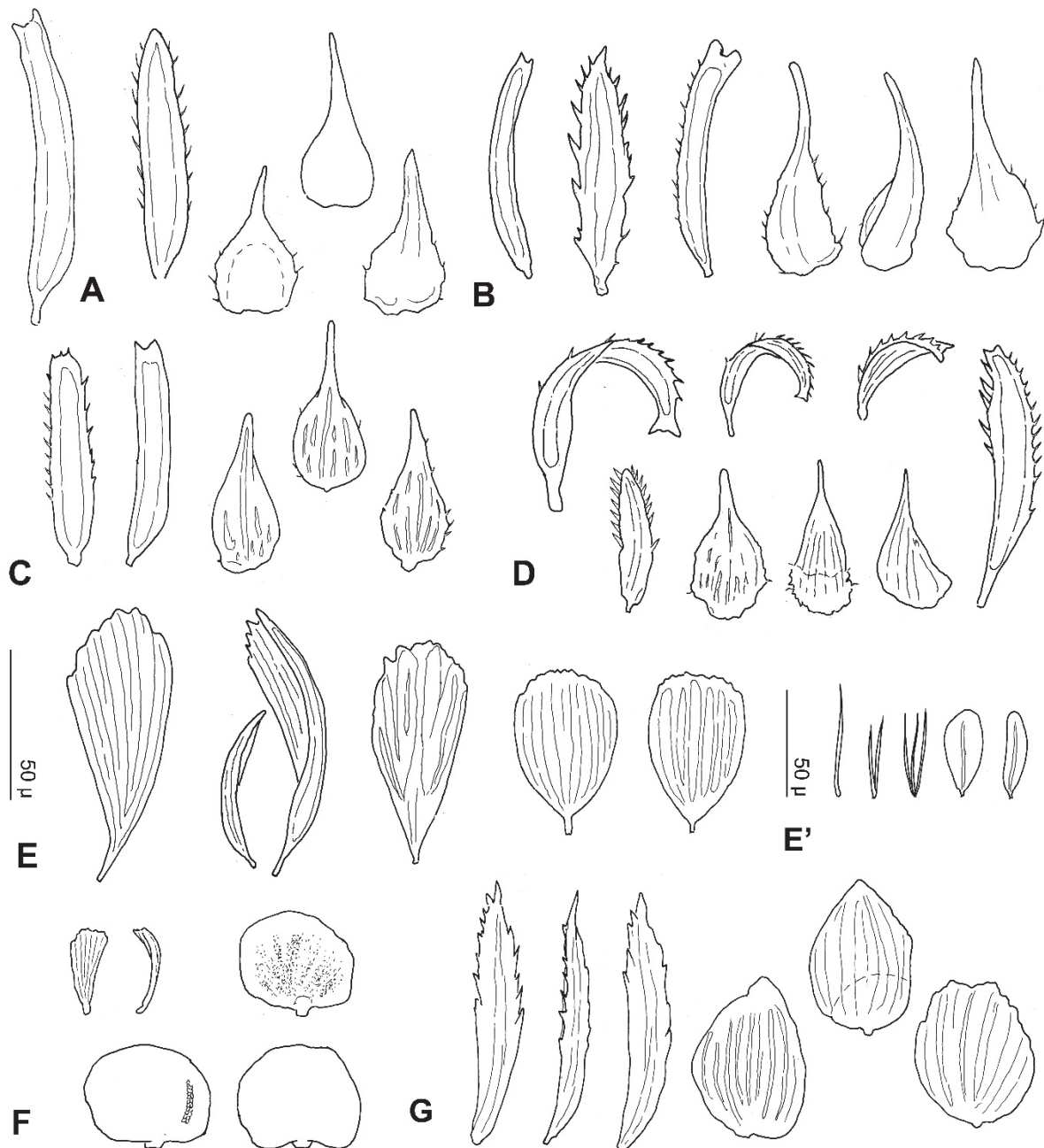


Fig. 4. Setae and scales: **A** = *Moreiba canariensis canariensis*, (Franz, 1995), **B** = *Moreiba canariensis nivariana* n. sp., **C** = *Moreiba canariensis auarita* n. ssp., **D** = idem recurved setal phenotype, **E** = *Moreiba lancerota* n. sp., **E'** = idem., of ventral side, **F** = *Moreiba ariadnae* n. sp., and **G** = *Moreiba mariae* n. sp.

truncate (Fig. 3G). Sternite VIII ♂ membranose, with small Y-shaped spiculum relictum (Fig. 5D). Spiculum gastrale long, asymmetrically Y-shaped at base, with curved or recurved apex (Fig. 5E). *Genitalia*. Penis weakly sclerotised, elongated, pointed, with temones about 2/3 length of penis body: endophallus tube-like, free of denticles or transfer apparatus, with seminal duct terminal (Fig. 5A-B). Tegmen with long parameroid lobes; manubrium short, half the length of temones.

Females very similar to males, a little more robust and elytra slightly longer; ventrite 5 apically rounded (Fig. 3H). Spiculum ventral (♀ sternite VIII) with long slender apodeme; plate sagittate. Spermatheca with small collum, elongate nodulus, large ramus, and inflated bulb-shaped cornu (Fig. 5F).

REMARKS. A detailed description of the genus *Moreiba* was provided by its author (Alonso-Zarazaga 2013). The summary description here presented has been slightly modified in order to accommodate some of the new taxa. The extreme reduction of setae and non-spine bearing scales of *M. maxorata* n. sp. are remarkable, and the general colouration varies considerably between and within species. However, a somewhat basic pattern can be recognised consisting of clearer scales (ivory, creamy or ochre) at the margins of the head dorsum, along the midline (narrow, interrupted or broadened) and two marginal bands in the pronotum, on the scutellum (if present), and mostly on the odd interstriae of elytra (more or less interrupted, chequered pattern), but also the inverse (dark instead of clear), or almost completely vanished (unicolor). Dark scales may be tanned, brown or black coloured.

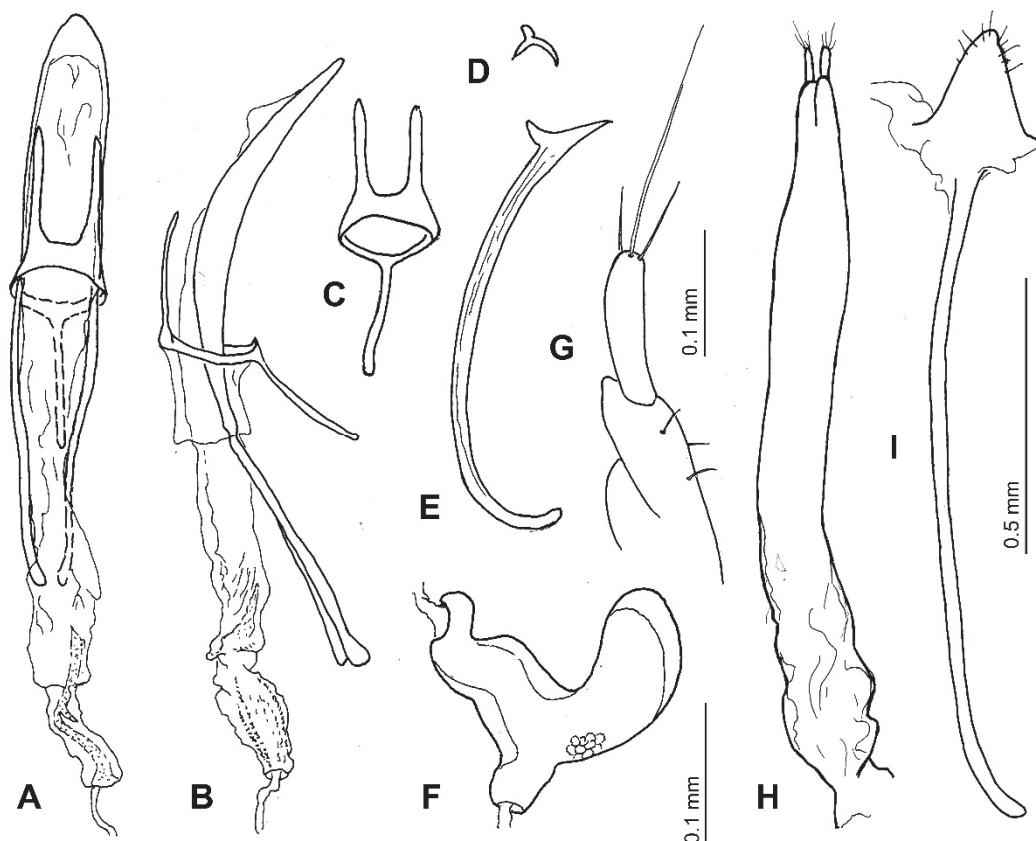


Fig. 5. *Moreiba canariensis canariensis*, (Franz, 1995). A = aedeagus in dorsal view, B = aedeagus in lateral view, C = tegmen, D = spiculum relictum, E = spiculum gastrale, F = spermatheca, G = gonocoxite, H = oviscapt, and I = spiculum ventral.

Due to its small size (< 3,5 mm) and body shape, *Moreiba* resembles at first sight a small *Strophosoma* or even more a *Trachyphloeus*. However, it was placed in the Laparocerini together with *Laparocerus* because both have a spiculum relictum in the male sternite VIII and the basal margin of the narrow metanepisternum protrudes obliquely over the outer angle of the metacoxa, hiding it in perpendicular view, so that the metacoxa does seem not to reach the elytral margin. This tribal attribution is further supported by available molecular data (Stüben *et al.*, 2015; Machado *et al.*, 2016). The gonopore of the aedeagus is not on a lateral diverticulum of the endophallus, as in most *Laparocerus*, but it is placed on a terminal differentiated sheath, more sclerified than the rest, and slightly narrower, being its base often slightly invaginated (in resting position). There are no strong denticles as happens in many *Laparocerus* species. The length of the endophallus correlates with a lengthy oviscapt in the female (0.6× elytral length), but not as long as it can be in *Laparocerus*, where the oviscapt is used as a trunk to hide the bunches of eggs in shelters (Machado & Aguiar, 2019).

Laparocerus, which is a more speciose genus (238 species and subspecies) and very diverse in habitus and sizes (16 subgenera), can be easily separated by the elytral declivity not overhanging the abdominal apex, the presence of mucro at least in the protibiae of both sexes, and by the semi-enclosed corbels of metatibiae. Most of *Laparocerus* are plant/tree climbing species, with the eyes placed near the upper lateral margin of head, but there are some ground-living species (e.g. subgenera *Lichenophagus*, *Mateuius*, *Fernandezius*) that have the eyes in the middle of the head side, as in *Moreiba*.

Moreiba canariensis canariensis (Franz, 1995)

Figs. 3, 4A, 5, 6 and 19A.

Strophosoma canariense Franz 1995: 37 figs 1-2 [holotype: Las Playas, El Hierro].

— *Strophosoma canariensis*, in Franz 1996 p. 120, 134.

— *Strophosoma? canariense*, in Machado & Oromí 2000 p. 79 [pars].

— *Strophosoma (Strophosoma) canariense*, in Pelletier 2013 p. 262.

— *Strophosoma canariense*, in Stüben & Behne 2013: figs MORcan.1M, MORcan.1F, MORcan2 [left aedeagus].

— *Moreiba canariensis*, in Alonso-Zarazaga 2013: 47 figs 1-14 [comb. nov.]; Alonso-Zarazaga *et al.*, 2016 p. 25; Alonso-Zarazaga *et al.*, 2017: 285 [cat.].

— *Moreiba canariense* [*sic*], in Stüben 2014: 106 figs MORcan.1M, MORcan.1F, MORcan2 [left aedeagus]. Stüben 2018: 47 figs MORcan1MH, MORcan2MHP.

MATERIAL EXAMINED. **El Hierro**, Las Playas 1♂ (holotype) 24-2-1978 leg. H. Franz (NMW), 12 exx id. not date (paratypes) (MAAZ) (MNCN_Ent 272855 to MNCN_Ent 282866). Valverde: Infra La Caldereta 713 m (27°47'37"N 17°55'19"W) 23 exx [GenBank MW013820|Mcana7283H] 6-12-2008 leg. A. Machado (AMC). Same data 22 exx leg. R. García (RGB), 39 exx leg. A. Aguiar (AAC): 2 exx 19-8-2020 leg. R. Valle (RVLL).

DIAGNOSIS. Length 2.3–2.85 mm. Dominant colouration dark brown; pronotum with thin median creamy line often interrupted, and lateral bands broad; elytra with watery chequered patterns; femora with some whitish scales (Fig. 6). Scales recumbent (not appressed), narrow deltoid and long caudate (not carinate), with cauda or 'spine' usually lighter



Fig. 6. *Moreiba canariensis canariensis* (Franz, 1995).



Fig. 7. Habitat of *Moreiba canariensis canariensis* with *Euphorbia* and *Asphodelus*. La Caldereta in El Hierro, at 713 m altitude (Photo J. García).

coloured, about 1/3 length of disc; scales more or less tangent and in general not overlapping; on pronotum slightly broader. Setae falcate or linear truncate at apex (bicuspid), not carinated (Fig. 4A), arcuate on head and pronotum with microscopic bristles along margins (supraorbital group more protruding than eye); arcuate or curved on elytra, in general shorter than on pronotum and as long as width of first interstria, with ca. 60° inclination (Fig. 19A), often mixed with curved setae). Elytral integument smooth, shiny, micro-punctulate. Rostrum trapezoid ($L/W \approx 0.6$); pterygia parallel, not protruding. Scape 1/3–1/2 capitate. Pronotum widest after middle ($L/W = 0.8$). Scutellum inconspicuous. Elytra $L/W = 1.3$, laterally subparallel, little concave at base, $2.5\text{--}2.6 \times$ length of pronotum. Ventrites with small pilosity (shorter than dorsal setae). Aedeagus with endophallus slightly shorter than median lobe (Fig. 5 A–B). Spermatheca. see Fig. 5F.

REMARKS. Alonso-Zarazaga (2013) did a detailed re-description of the genus type species. As the morphological differences in *Moreiba* species—except *M. ariadnae* n. sp.—are not many, we present here a diagnosis for it, and basically a differential diagnosis for the new taxa. However, the shape, structure and distribution of setae in this genus merit an extensive anatomical study with scanning microscopy. The presence of nano-bristles on their lateral margins and the development of one or more carinae along the setae are difficult to observe with an ordinary stereoscope microscope. In *Moreiba canariensis* such ‘ciliated’ setae are linear and dominate the head and pronotum, but there are also some scattered on the tibiae. Moreover, in the same series there are specimens which have only straight and arcuate setae and others that combine them with curved or even recurved setae, although only on the elytra and mostly concentrated on the basal third or on the right margin. Whether this variation in setal shape is intrinsic or depends on external environmental factors is something to be studied. Moreover, the spiny-deltoid scales of the *M. canariensis* group can be more or less raised, are convex, have the spine prolonged posteriorly in a dorsal carina or not, and their basal margin can be smooth and round or bear some tiny thin lateral denticles, possibly with a fixation function (Fig. 4A). They also deserve a more profound morphological study.

DISTRIBUTION AND ECOLOGY. Endemic to the island of El Hierro, where it is widely distributed at low and intermediate altitudes. It has been recorded from Las Playas and El Sabinal (Franz 1995), and from Tamaduste (59 m), north of Erese (333 m), La Dehesa (723 m) Punta del Cardón (67 m), Timijirque (200 m) and Las Puntas (29 m) (Stüben & Behne, 2013). It has been obtained by sifting leaf-litter of *Periploca laevigata*, *Euphorbia regis-jubae*, *Juniperus phoenicea* v. *turbinata*, and in the basal dead leaves of *Asphodelus microcarpus*, from December to April. In the latter two cases, *Euphorbia* was growing in the immediate vicinity (Fig. 7).

***Moreiba canariensis auarita* n. ssp.**

Figs. 4C, 4D, 8, 9, and 20 A–H.

— *Strophosoma* cf. *canariense*, in Stüben & Behne 2013: 43 fig. MORcan2 [right aedeagus].

— *Moreiba* cf. *canariense*, in Stüben 2014: 106 fig. MORcan2 [right aedeagus]; Stüben & Behne 2015: 75 figs. MORcan.1MLP, MORcan1FLP, MORcan.2 [right aedeagus].

— *Moreiba* / *Moreibia* cf. *canariensis*, in Stüben et al., 2015: 205 + suppl. [DNA tree].

MATERIAL EXAMINED. **La Palma.** Holotype: 1♂ Punta-gorda: Llanada del Puerto 175 m (28°45′31″N 18°00′14″W) 3-2-2019 leg. A. Machado (TFMC/CO-16044). – Paratypes. Same collecting data, 4 exx; Punta-gorda W, ca. puerto 227 m (28°45′32″N 18°00′08″W) 2 exx 17-1-2014; Santo Domingo: Mirador del Puerto 137 m (28°49′32″N 17°57′52″W) 1 ex 28-8-2014 [GenBank MW013821] Mauar 7292P] leg. A. Machado (AMC leg. A. Machado (AMC). Punta-gorda: El Puertito, 2 exx 3-2-2014, 28 exx 25-2-2014; Puerto de Santo Domingo 1 ex 21-4-2014; leg. R. García (RGB). – Non paratypes. Tijarafe: Playa del Jurado 378 m (28°42′18″N 17°58′00″W) 7 exx 30-6-2006 leg. P. Stüben (AMC). Tijarafe: Las Halconeras 2 exx 21-9-2019 leg. R. García (1 RGB, 1 AMC).

DIAGNOSIS. Length 2.4–2.75 mm. As nominotypical subspecies but of more slender appearance; elytra usually darker and disc of pronotum light coloured; scales slightly narrower (less tangent); recurved setae more frequent (occasionally over the entire body (Fig. 4C); integument of pronotum with superficial punctures (less granulate); pronotum widest about middle ($L/W = 0.7$), with anterior margin less curved; elytra more parallel-sided and longer ($2.8 \times$ length of pronotum). Ventrites with thin longer lanceolate setae (overlapping longitudinally). Aedeagus, same (Fig. 20 A–H).

ETYMOLOGY. The ‘auaritas’—also known as ‘awaritas’ or ‘benahoaritas’—were the aborigines inhabiting the island of La Palma, here used as a demonym to name this subspecies endemic to the island.

REMARKS. In the north of La Palma, 6% of the specimens ($n = 60$) have some recurved setae on the elytra (Fig. 4C), and there is a series of seven specimens from Tijarafe, on the NW (Fig. 9), that have all the setae completely recurved (tip pointing to integument) on the entire body, including legs. The variability of this character seems to be somehow related to local environmental conditions.

The morphological similarity of *Moreiba* specimens from La Palma with *M. canariensis* from El Hierro is confirmed by a moderate genetic K2P distance (5.1%). A similar close relationship among taxa from El Hierro and La Palma can be seen in species of the genus *Herpisticus* Germar, 1823 or *Laparocerus*, suggesting a sub-recent colonisation (< 1 Ma) from La Palma to El Hierro, the latter island being a little younger and placed in the NE to SW pathway of the trade-winds and the marine Canary Current. However, in the case of *Moreiba canariensis canariensis*, its distance with the morphologically more differentiated *M. canariensis nivariana* n. ssp. from Tenerife is slightly less (4.7%), and colonisations of El Hierro and of La Palma are likely to have both originated in Tenerife.

DISTRIBUTION AND ECOLOGY. Endemic to the island of La Palma. All known samples come from xerophytic habitat dominated by spurges at low altitudes in the northwestern sector of the island. It dwells in the leaf-litter of *Euphorbia balsamifera*, *Euphorbia regis-jubae*, *Rubia fruticosa*, and *Periploca laevigata* sharing niche with *Laparocerus* (*Fernandezius*) *seriesetosus* (Wollaston, 1864).



Fig. 8. *Moreiba canariensis auarita* n. ssp. from Punta Gorda (La Palma).



Fig. 9. *Moreiba canariensis auarita* n. ssp., recurved setal phenotype from Tijarafe (La Palma).

***Moreiba canariensis nivariana* n. spp.**

Figs. 4B, 10, 19B, 20 I-K, and 21A.

— *Moreiba cf. canariense* [sic], in Stüben 2014:106.

MATERIAL EXAMINED. **Tenerife.** Holotype: 1♂ Granadilla: s. Mareta del Río 35 m (28°06'02"N 16°29'22" W) 12-10-2018 leg. A. Machado (TFMC/CO-16045). – Paratypes: Same locality and date 6 exx [GenBank MW013822 | Mniva7282T] (AMC), 1 ex 12-10-2018, 2 exx 3-11-2019 leg. R. García (RGB), 1 ex 12-10-2018 leg. A. Aguiar (ACC), 7 exx 3-11-2019 leg. R. Valle (RVLL). Granadilla: Hoya Las Cañas, 70 m (28°06'05"N 16°29'36"W) 6 exx 15-12-2019 (RVLL). Barranco del Río 6 m (28°05'42"N 16°29'01"W) 6 exx 3-11-2019, 1 ex 23-1-2020 leg. A. Machado (AMC), 12 exx 3-11-2019 leg. R. García (RGB), 7 exx leg. R. Valle (RVLL), 20 exx 22-1-2020 leg. A. Aguiar (7 AMC, 13 AAC). – Médano 1 ex 8-IX-1928, 1 ex 3-VIII-1930, 1 ex 2-20-IX-1923, 1 ex 8-IX-1926, 1 ex 4-IX-1926 1 ex 18-IX-1925, 1 ex 6-IX-1926, 4 exx 18-IX-1926. El Médano 3 exx 16-XII-1926 (these specimens collected by A. Cabrera and housed in MNCN; MNCN_Ent 282867 to MNCN_Ent 282880). Non paratypes: Buenavista: El Rayo 26 m (28°24'21"N 16°50'02"W). 10 exx 28-1-2020 leg. A. Machado (AMC), idem 17 exx leg. A. Aguiar (AAC). Punta de Teno, 25 m. 24 exx. 8-2-2020, leg. A. Aguiar (14 AAC, 10 AMC).

DIAGNOSIS. Length 2.4–2.85 mm. Body shape similar to *M. canariensis*, but colouration usually much lighter and less contrasted, combining variants of light and dark khaki with creamy scales (some specimens are dark with only the three pronotal bands strikingly whitish, or median band interrupted). Scales elongate deltoid with longer whitish spine (1/2), carinate along midline, more abundant (6–7 across elytral interstriae), lumped together and overlapping (integument hidden). Raised setae of similar shape and disposition, but a little more arcuate and of light colour, and marginal bristles when present more robust, spiny (Fig. 4D); appressed setae on head occipucium broader and denser. Elytra slightly more elongate (L/W = 1.4); apical declivity more curved inwards. Ventricle pilosity short, lanceolate and denser. Aedeagus (Fig. 20I) with endophallus as long as median lobe. Spermatheca (Fig. 21A) with gibbous nodulus.

ETYMOLOGY. Adjective derived from 'Nivaria', one of the names given by the ancient Romans to the island of Tenerife, where the species lives.

REMARKS. The dominant lighter or darker colouration and high density and shape of scales helps to distinguish *M. canariensis nivariana* n. sp. from the other subspecies of *M. canariensis*. Despite these noticeable differences, we propose a subspecies status for it based on the low genetic distance in the context of the genus *Moreiba*.

DISTRIBUTION AND ECOLOGY. Endemic to the island of Tenerife. It has been sifted from leaf-litter of *Euphorbia balsamifera* (Euphorbiaceae), at least in one northern and two southern coastal localities from the island, where it ought to be more extended along the sweet spurge formations. In January – February it was abundant. It has also been collected under stones in August, September, and December.

***Moreiba tamarana* n. sp.**

Figs. 11, 19-C, 20 L-N, and 21B.

— *Strophosoma canariense* [pars], in Franz 1995 p. 37; in Oromí et al., 2001 p. 215 [pars];

— *Strophosoma? canariense*, in Machado & Oromí 2000 p. 79 [pars];

— *Strophosoma cf. canariense*, in Stüben & Behne 2013: 43 Fig. MORCan.1GC

— *Moreiba cf. canariense* [sic], in Stüben 2014: 106 Fig. MORCan.1GC.

MATERIAL EXAMINED **Gran Canaria.** Holotype: 1♂ Agaete: Barranquillo de los Moros 135 m (28°05'33"N 15°42'03"W) 26-4-2019 leg. A. Machado (TFMC/CO-16046). – Paratypes. Same locality and date 11 exx (*Euphorbia balsamifera*) leg. A. Machado (AMC), 8 exx leg. R. García (RGB), 7 exx 22-5-2019 leg. A. Aguiar (AAC). Agaete: Piso Firme 155 m. (29°06'26"N 15°41'24"W) 1 ex [GenBank MW013823 | Mtama7284C] 9-12-2018 (*Euphorbia regis-jubae*) leg. A. Machado (AMC), 1 ex 9-12-2018, 1 ex 26-4-2019 leg. R. García (RGB). – Non paratypes: La Isleta, 1 ex 3-8-1966 leg. H. Franz (NMW). Barranco de Arguineguín 73 m (27°48'21"N 15°40'06"W) 2 exx 25-3-1994 leg. F. Lange (AMC).

DIAGNOSIS. Length 2.3–2.55 mm. Body shape similar to *M. canariensis canariensis* but more parallel and shorter; same colouration pattern (some scales with slight coppery hue); antennae with club and scape less infuscate; scales a little smaller, more convex, with shorter spine, clearly carinate along midline (incipient additional carinae on each side) and less overlapping; setae less arcuate, more perpendicular (75–80°) and on elytra always separated by a distance greater than their length. Apical incrassation of scape shorter (ca. 1/4). Elytra shorter (2.3 × length of pronotum), with less arcuate sides and straighter base (1.4 × width of pronotum). Legs less robust. Aedeagus (Fig. 20L) with endophallus longer than median lobe (1.4 ×). Spermatheca Fig. 21B.

ETYMOLOGY. Adjective derived from Tamarán, one generally reported but not genuine prehispanic name attributed to the island of Gran Canaria (v. Trapero, 2015).

REMARKS. *Moreiba tamarana* n. sp. looks similar to *M. canariensis canariensis* but can be distinguished by its shorter body and the more distant setae. From the morphological point of view, it could well join the complex of *M. canariensis*, being even more similar to the nominotype subspecies than *M. canariensis nivariana* n. ssp. However, its genetic distance (7.3–9.1%) almost doubles the internal variation of *M. canariensis* and is closer to the threshold adopted so as to justify its species status. It probably represents the lineage that colonised Tenerife.

DISTRIBUTION AND ECOLOGY. Endemic to the island of Gran Canaria, where it is probably distributed along the entire coastal belt. It has already been found in the North East (La Isleta), North West (Agaete) and in the South (Arguineguín). We sifted it from leaf-litter of *Euphorbia balsamifera* and of *Euphorbia regis-jubae*, and Stüben & Behne (2013) below trees in San Pedro (200 m).



Fig. 10. *Moreiba canariensis nivariana* n. sp., from Mareta del Río (Tenerife).



Fig. 11. *Moreiba tamarana* n. sp., from Agaete (Gran Canaria).

***Moreiba maxorata* n. sp.**

Figs. 12, 20D, 21C, 21 E-G.

— *Moreiba* cf. *canariense* [sic], in Stüben 2016: 28 figs MORcan1MF, MORcan, MORcan2Fu.

MATERIAL EXAMINED. **Fuerteventura.** Holotype 1♂ Toto: Valle Izcado 328 m (28°21'48"N 14°04'16"W) leg. A. Machado (TFMC/CO-16047). – Paratypes: Same locality and date 5 exx [GenBank MW013825| Mmaxo7337F] on *Euphorbia balsamifera*, leg. A. Machado (AMC), 2 exx leg. R. García (RGB), 2 exx leg. A. Aguiar (AAC). Pájara: Barranco Aceituno (km 27) 350 m (28°22'25"N 14°06'04"W) 2 exx 12-1-2020, 4 exx 14-1-2020 (*Euphorbia balsamifera*) leg. A. Machado (AMC), 2 exx 12-1-2020, 6 exx 14-1-2020 leg. R. García (RGB), 2 exx leg. A. Aguiar (AAC). 3 exx 3-2-2020 leg. R. Valle (RVLL). 2 km NE Vega de Río Palmas (28°24'10"N 14° 3'39"W), 320 m, 2♂ 1♀ 4-1-2015 (below *Acacia*), leg. Stüben (PST). – Non paratypes. El Cotillo 21-2-1995 1♀ leg. H. Franz (NMW Sp. 1940).

DIAGNOSIS. Length 2.55–3.10 mm. Body shape and colouration similar to *M. canariensis*, but scales less dense, more slender, with long cauda and not contiguous laterally; setae of light colour, conspicuously longer (at elytral margins longer than width of tibiae), lanceolate, weakly bicuspid apically (looking sharp or blunt-pointed), single carinate, and many marginally bristled (most on pronotum and elytral apical third). Scale vestiture on head scarce; longitudinal sulci of integument visible. Pronotum moderately transverse (L/W 0.7–0.8), widest near middle or behind it. Scutellum rather small, visible, with tiny scales. Elytra with less arcuate sides (slightly broader at base); 2.4–2.5 × length and 1.4 × width of pronotum; microchaeta of elytral punctures much longer. Legs and ventral parts without scales; piles on abdominal ventrites longer, fine, and scarce. Aedeagus (Fig. 21E), endophallus 1.3 × length of median lobe, with moderately sclerotized squamulose field in middle section; penis apex acute (dorsal view), slightly constricted pre-apically (Fig. 21G); spiculum gastrale recurved and twisted distally (Fig. 21F). Spermatheca Fig. 21C.

ETYMOLOGY. ‘Maxorata’ is the name of the northern aboriginal kingdom of the island of Fuerteventura, here used in apposition to name the species.

REMARKS. *Moreiba maxorata* n. sp. has a markedly bristly appearance, bearing the densest and longest setae in the genus. The other species present in Fuerteventura are easy to separate: *M. ariadnae* n. sp. has no protruding setae, and *M. mariae* n. sp. has roundish-ovate scales. *M. maxorata* n. sp. takes a basal position in the western subclade of *Moreiba*.

DISTRIBUTION AND ECOLOGY. Endemic to Fuerteventura. At present, it has been found on the central massif of Betancuria (valley of Toto and valley of Vega de Río Palmas). It was obtained by P. Stüben sifting underneath planted *Acacia* trees, but it dwells on debris of *Euphorbia balsamifera*, which grows close to the streambed with *Acacia*. One specimen labelled by H. Franz as from El Cotillo, in the northern sector of the island, is questionable. Franz’s field book register of 1940 refers to the beach of El Castillo, which is indeed near El Cotillo [28°40'30"N 14°00'24"W], but has apparently no suitable habitat for *Moreiba*, and Franz was collecting during previous days in the massif of Betancuria.

***Moreiba mariae* n. sp.**

Figs. 4G, 13, and 21 H-J.

MATERIAL EXAMINED. **Fuerteventura.** Holotype 1♂ Vallebrón: Morro Tabaiaba (28°35'22"N 13°59'43"W) 15-1-2020 leg. A. Machado (TFMC/CO-16048). – Paratypes. Same locality and date 4 exx [GenBank MW013826| Mmari7340F] leg. A. Machado (AMC), 1 ex leg. R. García (RGB), 1 ex leg. A. Aguiar (AAC); 29 exx 11-2-2020 leg. R. García (16 RGB, 8 AMC, 4 AAG); 17 exx 3-2-2020, leg. R. Valle (RVLL). **Lanzarote** (non paratypes): Bco. de la Pocela 7 exx 24/26-12-1971 leg. G. Israelson 4759 (MAAZ; MNCN_Ent 167504–167510). Islote el Mojón 1 ex 4-2004 (tamizaje Bote 1) leg. C. Schuster (POM).

DIAGNOSIS. Length 2.35–3.00 mm. Body shape similar than in *M. canariensis*, but slightly larger and wider; colouration pattern variable, with mix of light and darker brown patches or stripes; tarsi and antennae ferruginous, except apically dark scape (incrassate part). Scales broad-ovate, with tiny tip, lemon shaped (Fig. 4G), tangent or overlapping, hiding integument; vestiture of setae less dense; setae of light or dark colour, lanceolate or oblanceolate, suberect, little arcuate (occasionally recurved on pronotum; some slightly bicuspid) 1.4 × length of scale, bearing median carina and few lateral bristles (visible only at high magnification). Scape more strongly and longly incrassate apically (bulky); club as wide. 1st desmomeere clavate, 2.25 × as long as wide, 2nd subclavate, 2.4 × as long as wide, 6th and 7th isodiametric. Pronotum moderately transverse (L/W 0.7–0.8), widest near middle. Scutellum inconspicuous. Elytra (L/W 1.2–1.3) with little arcuate sides; 2.2–2.3 × length and 1.4–1.5 × width of pronotum; microchaeta of elytral punctures as long as scales; interstriae with single regular rows (double at middle section of 3rd interstriae) of setae separated about their length among them. Abdominal sternites practically without scales, with fine piles and some suberect setae (laterally). Aedeagus (21H), endophallus with a large squamulose field at middle section; penis apex ogival in dorsal view (Fig. 21J); spiculum gastrale progressively curved distally (Fig. 21I).

ETYMOLOGY. This species is dedicated to María Aguiar, granddaughter of Agustín Aguiar, friend and colleague who assisted collecting *Moreiba*.

REMARKS. *Moreiba mariae* n. sp. has roundish scales without elongated tip similar to *M. lancerota* n. sp., but it can be distinguished from it by their lanceolate and not spatulate upstanding setae. The other *Moreiba* species present in the eastern Canaries are *M. ariadnae* n. sp. with no protruding setae at all, and *M. maxorata* n. sp. with narrower deltoid scales bearing prolonged cauda; impossible to be confused. Its sister species is *M. ariadnae* n. sp., with a K2P distance of 17.1%.

DISTRIBUTION AND ECOLOGY. Endemic to Fuerteventura and Lanzarote, two close islands that joined together during the last glaciation. The species was sifted from leaf-litter of *Euphorbia balsamifera* in the slopes of the valley of Vallebrón, in the northern part of the island, just at 2.5 km distance east of the mountain of Tindaya, where *M. ariadnae* n. sp. lives. Specimens from Lanzarote are old records, but in the localities reported *Euphorbia* is also present.



Fig. 12. *Moreiba maxorata* n. sp., from Valle Izcado (Fuerteventura).



Fig. 13. *Moreiba mariae* n. sp. from Vallebrón (Fuerteventura):



Fig. 14. *Moreiba mariae oromiana* n. ssp., from Montaña Clara

***Moreiba mariae oromiana* n. ssp.**

Figs. 14 and 22 A-H.

MATERIAL EXAMINED. **Montaña Clara.** Holotype 1♂ Caldera Interior SE 1 ex (892-CO) 24/27-11-2002 leg. A.J. Pérez (DZUL), – Paratypes Same collecting data 2 exx (894-CO, 095-CO) (DZUL); 2 ♂♂ (MNCN_Ent 167511-167512) (MAAZ: MNCN). – Montaña Clara 2 exx (893-CO, 761-CO) 2-5-1993 leg. P. Oromí (POM). – 1 ex ()(POM). – Ladera sur 60 m (29°17'69"N 13°32'08"W) 30 exx 30-7-2020, (GenBank MW013827| Morom7363m) leg. H. López (4 AAG, 12 AMC, 4 IPNA, 2 POM, 4 RGB, 4 RVLL).

DIAGNOSIS. It differs from the nominotypical subspecies by being a trifle larger in size (2.7–3.2 mm average 2.94 mm compared with 2.5–3.0 mm, average 2.89 mm); colouration usually more contrasted (dark/ light patched) with lighter median band of pronotum usually less interrupted at disk; eyes slightly more convex; antennal funicle with first desmomer 2.3 × as long as wide, weakly clavate, the 2nd 3 × as long as wide, subcylindrical, 6th and 7th transverse: elytral setae not longer than tarsal claw, slightly more bent backwards and less protruding (noticeable at lateral margins of elytra near humerus); scales lemon-shape with slightly lon-

ger basal peduncle (Fig. 22H). Aedeagus (Fig. 22A); tegminal manubrium short (Fig. 22C); spermatheca with long angled gland lobe (Fig. 22D).

REMARKS. The morphological differences between *Moreiba mariae mariae* and *Moreiba mariae oromiana* are small compared with their 7.9% of genetical K2P-distance, which is about half the distance with their nearest relatives—*M. ariadnae* (17.3–17.7%) and *M. lancerota* (16.8–16.6%)—but notably higher than the distance between *L. canariensis canariensis* and *L. canariensis nivariana* (4.5%), which are morphologically easy to distinguish. These data suggest a long-time segregated population deserving a subspecies status, although morphologically not yet very differentiated.

ETYMOLOGY. Dedicated in homage to Professor Pedro Oromí, from the University of La Laguna, who discovered the species in the remote northern Canarian islet of Montaña Clara.

DISTRIBUTION AND ECOLOGY. Endemic to Montaña Clara (2.7 km²), a uninhabited islet north of Lanzarote. It has been sifted from beneath *Euphorbia balsamifera* and *Suaeda vermiculata*. The largest series was collected in July.

***Moreiba ariadnae* n. sp.**

Figs. 4F, 15, 19E, and 23 A-H.

MATERIAL EXAMINED. Fuerteventura: Holotype, 1 ♀, La Oliva, Mtna. Tindaya, 31-1-2007 (*Asteriscus*, *Kleinia*), leg. A. Aguiar/♀ /blue: Co 7968, Coll. A. Aguiar (genitalia in glycerine vial) (MNCN; MNCN_Ent 272881). – Paratypes. 1 ♀, id., // blue: Co 7969 Coll. A. Aguiar (genitalia in glycerine vial) (MAAZ; MNCN_Ent 272882). Montaña de Tindaya (S) 222 m (28°35'36"N 13°58'35"W) 1 ex [GenBank Maria7290F|Maria7290F] 6-3-2014 3 exx 15-1-2020 leg. A. Machado (AMC), 2 exx 6-3-2014 leg. R. García (RGB). – Montaña de Tindaya (NW) 206 m (28°35'56"N 13°58'40"W) 2 exx 13-1-2020 leg. A. Machado (AMC), 5 exx 13-1-2020 leg. R. García (RGB), 2 exx 13-1-2020 leg. A. Aguiar (AAC).

DIAGNOSIS. Length 3.1–3.9 mm. Large *Moreiba* of bare appearance; vestiture of flat appressed orbicular-reniform contiguous scales (Fig. 4F and 18E) of variegate creamy, khaki, and mother-of-pearl colour; lighter coloured bands badly defined on pronotum; elytra with diffuse chequered pattern. Raised setae absent, on pronotum reduced to a stump centred on the rather conspicuous punctures, separated at least by two scales (mottled appearance); on head, elytra, and legs very small (difficult to observe), not longer than scale diameter, oblanceolate and bent, pointing backwards on elytra (1-2 irregular rows). Abdominal sternites covered with scales, with sparse small blade-like setae (not much longer than a scale). Integument on elytra with superficial transversal scale marks; on temples deep polygonal foveolate. Scape of antenna subclavate, with scales (also on desmome 1). Rostrum subparallel ($L/W = 0.63$), with moderately prominent pterygia; epifrons canaliculate, lateral margins edged and robust; sulcus and frontal fovea conspicuous. Pronotum ($L/W = 0.8$) markedly widest after middle, with sides before and after middle rather straight or with preapical sinuosity; anterior and posterior angles obtuse but angulose. Scutellum triangular, elongate, conspicuous, covered by small whitish scale. Elytra ($L/W = 1.3$) subparallel, $2.6 \times$ length of pronotum, base rather concave and humeral angles advanced; apical declivity strongly curving inwards: striae microchaetae broad and curved, not longer than punctures. Fore legs with tarsomere 2 short and transverse. Stermite VIII ♂ with spiculum relictum and spiculum gastrale (Fig. 23D), aedeagus (Fig. 23E) with endophallus longer than median lobe ($1.4 \times$). Female genitalia: gonostylus (Fig. 23F), spiculum ventral ♀ (Fig. 23G), and spermatheca (Fig. 23H).

ETYMOLOGY. This species is dedicated to Ariadna, granddaughter of the second author.

REMARKS. This species is the largest known in the genus (> 3 mm) and the most differentiated morphologically (prominent pterygia, clavate scape, shorter tarsomere 2, etc.), particularly by the extreme reduction of the setae and therefore bare appearance. Scales are orbicular /reniform, with no tip and a mesh micro-reticulation; setae on elytra, although very reduced and smaller than scales (Fig. 4F), are of spatulate shape, similar to those of *M. lancerota* n. sp. Likewise, the K2P distance with the other *Moreiba* that join in the same subclade is rather high (17.2-17.7%), suggesting an old origin for all of them.

DISTRIBUTION AND ECOLOGY. Endemic to Fuerteventura. At present, it has been found only on the Mountain of Tindaya (Fig. 16), in the north sector of the island, by sifting leaf-litter of *Euphorbia regis-jubae*, *Rubia fruticosa*, *Ficus carica* and under stones.

***Moreiba lancerota* n. sp.**

Figs. 4 E-E', 17, 19F, 21D, and 21K-L.

MATERIAL EXAMINED. Lanzarote. Holotype: 1 ♂ Malpaís de la Corona 71 m (29°09'43"N 13°26'41"W) 28-2-2019 leg. A. Machado (TFMC/CO-16049). – Paratypes. Same data 5 exx [GenBank |MW013829 Mlanc7287L] (AMC), – Malpaís de la Corona 21 m. (29°09'53"N 13°25'53"W) 13 exx 1-3-2019 leg. R. García (Coll. RGB). – Malpaís de la Corona 6 exx 15-10-2019 leg. R. Valle (RVLL).

DIAGNOSIS. Length 2.3–2.65 mm. Body shape similar to *M. canariensis*, but without bristly appearance; colouration in general dominantly darker (charcoal or dark khaki) on forebody, with watery chequered pattern (brown, beige, ivory) on elytra. Scales orbicular, multi-carinate, convex (Figs. 4E, 19F) partially raised, 4-5 scales across elytral interstriae (often covering striae); setae narrower and longer than scales, usually charcoal coloured, spatulate, also multi-carinate, curved, and not much elevated above the scales, pointing backwards on elytra. Ventrites with sparse inclined elongate- flabelliform scales mixed with bi- or tri-acicular setae, and some lanceolate ones, all of similar length (Fig. 3E'). Integument shiny, smooth, with sparse micropunctures. Pronotum markedly widest after middle and narrowing apicad (as in *M. ariadnae* n. sp.). Elytra long-ovate; punctures of striae fine, with small microchaetae; apical declivity more curved inwards. Aedeagus (Fig. 21D) with endophallus almost twice ($1.9 \times$) as long as median lobe. Spermatheca (Fig. 21K)

REMARKS. The abnormal length of the endophallus and the diversity of setae and scales present in this species are unparalleled in the genus. At high magnification, the orbicular scales (Fig. 4E) show a shell appearance (fan-like multicarinate), with short peduncle at base and apically runcinate. The spatuliform setae have the same structure but are a little narrower and more elongate, narrowing basad, and with the apical margin more strongly runcinate. *M. lancerota* n. sp. is sister to the -group of *M. ariadnae* n. sp. + *M. mariae* n. sp.

ETYMOLOGY. Adjective inspired in Lanzarote, the name of the island where the species lives, which derives itself from the Genovese navigator Lanceloto Malocello, who visited it in the 14th Century.

DISTRIBUTION AND ECOLOGY. Endemic to the island of Lanzarote. It probably lives in all the “tabaibales dulces” (sweet spurge formations) that extend on the coastal flatlands (Fig. 18). It was sifted from leaf-litter of *Euphorbia balsamifera*.



Fig. 15. *Moreiba ariadnae* n. sp., from Montaña de Tindaya (Fuerteventura)



Fig. 16. Slope of the Mountain of Tindaya (Fuerteventura), habitat of *Moreiba ariadnae* n. sp. with *Euphorbia regis-jubae*.



Fig. 17. *Moreiba lancerota* n. sp., from Malpaís de la Corona (Lanzarote)

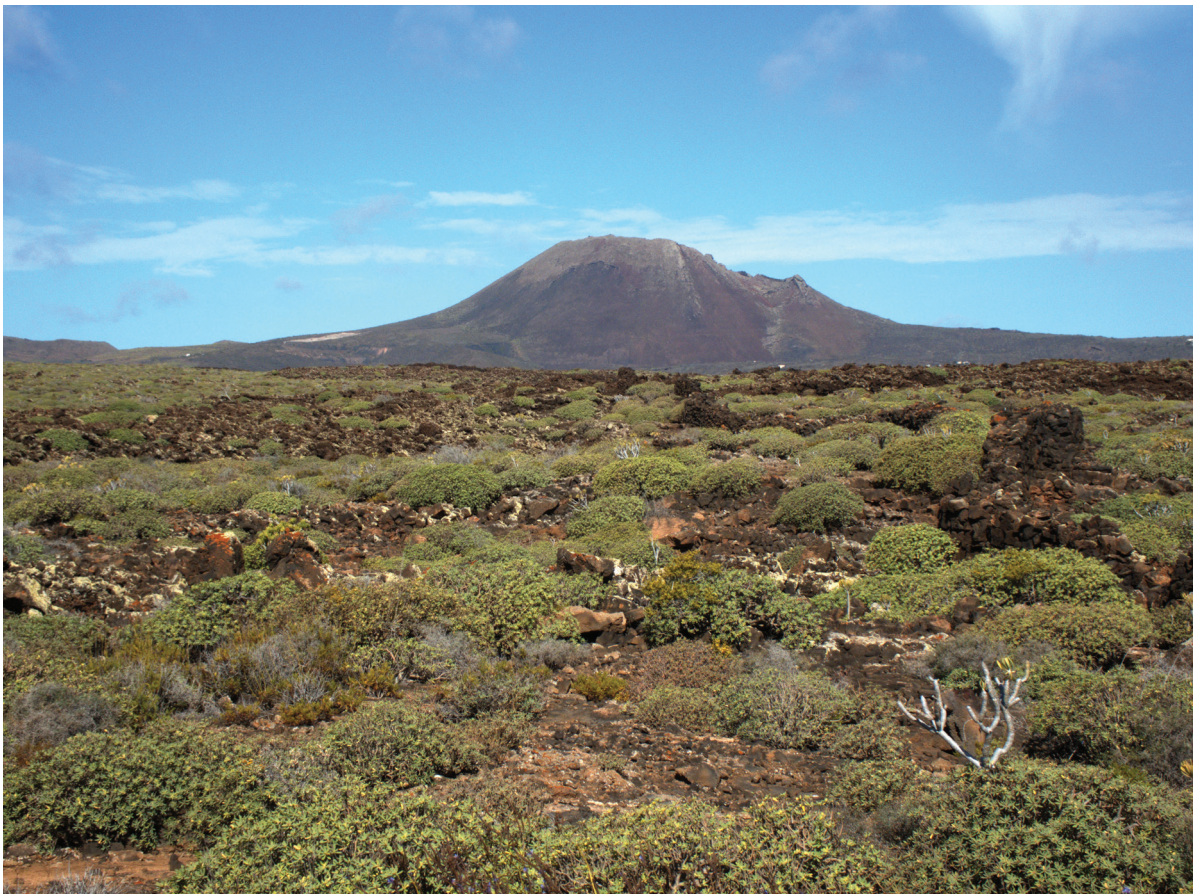


Fig. 18. Malpaís of La Corona (Lanzarote), locus typicus of *Moreiba lancerota* n. sp. with *Euphorbia balsamifera* Aiton dominating the landscape.

● KEY TO THE SPECIES OF *MOREIBA*

- 1 Scales roundish without a prolonged tip; with or without raised setae (Fig. 19 A-D) 2
 - Scales narrow deltoid and caudate (prolonged in a more or less long spine) (Fig. 19 E-F); always with raised setae 5
 - 2 Dorsum free of raised setae; scales orbicular/reniform, appressed, in tessellate disposition (Fuerteventura)
 - *Moreiba ariadnae* n. sp.
 - Dorsum with raised setae; scales spatulate, lanceolate or oblanceolate 3
 - 3 Raised setae spatulate, curved, multi-carinate, and pointing backwards on elytra, not much elevated above the cover of orbicular scales, these convex and partly raised (Lanzarote) *Moreiba lancerota* n. sp.
 - Raised setae lanceolate or oblanceolate, arcuate and suberect; scales ovate, lemon-shaped, appressed, partially overlapping (Fuerteventura) 4
 - 4 Desmomerer 2 subclavate, $2.4 \times$ as long as wide, 6-7 isodiametric. Setae at elytral lateral margins (basal third) slightly longer and more protruding (Fuerteventura, Lanzarote) *Moreiba mariae mariae* n. sp.
 - Desmomerer 2 subcylindrical, $3.0 \times$ as long as wide, 6-7 transverse. Setae protruding from elytral lateral margins (basal third), shorter, about as long as tarsal claw, and slightly more arcuate and bent backwards (Montaña Clara) *Moreiba mariae oromiana* n. ssp.
 - 5 Scales denser (6-7 across third interstriae) strongly overlapping transversally; spine of scale almost half its length. General colouration creamy and beige with few or no dark scales (Tenerife)
 - *Moreiba canariensis nivariana* n. sp.
 - Scales less dense (4-5 across third interstriae), less overlapping transversally; spine of scale usually shorter. General colouration more contrasted, with patches of clear and dark scales 6
 - 6 Elytral setae lanceolate and long (at elytral margins longer than width of tibiae), carinate, with sharp or blunt tip, but not bicuspid (Fuerteventura)
 - *Moreiba maxorata* n. sp.
 - Elytral setae linear (straight, curved or recurved), shorter (less than width of tibiae), and smooth, with truncate bicuspid apex 7
 - 7 Distance between setae at second fifth of elytral margin much longer than length of seta. Spine of scales prolonged as a carina along the scale plate. Base of elytra straight (Gran Canaria) *Moreiba tamarana* n. sp.
 - Distance between setae at second fifth of elytral margin as long or shorter than length of seta. Spine of scales not prolonged as a carina along the scale plate. Base of elytra concave 8
 - 8 Pronotum widest behind middle. Elytra laterally more arcuate. Recurved setae less frequent (El Hierro)
 - *Moreiba canariensis canariensis* (Franz, 1993)
 - Pronotum widest about middle. Elytra laterally more parallel. Recurved setae more common, sometimes dominating entire vestiture (La Palma)
 - *Moreiba canariensis auarita* n. ssp.
-
- CLAVE DE LAS ESPECIES DE *MOREIBA*
- 1 Escamas redondeadas, no prolongadas en punta alargada; presencia o no de setas emergentes (Fig. 19 E-F) 2
 - Escamas deltoides estrechas con punta prolongada más o menos espiniforme (Fig. 19 A-D); setas emergentes siempre presentes 5
 - 2 Dorso libre de setas emergentes. Escamas orbiculares / reniformes, adpresas, en disposición teselada (Fuerteventura) *Moreiba ariadnae* n. sp.
 - Dorso con setas emergentes. Escamas espatuladas, lanceoladas u oblanceoladas 3
 - 3 Setas emergentes espatuladas, curvadas, multi-careenadas, apuntando hacia atrás en los élitros, no muy elevadas sobre el recubrimiento de escamas orbiculares; éstas convexas y parcialmente levantadas (Lanzarote)
 - *Moreiba lancerota* n. sp.
 - Setas emergentes lanceoladas u oblanceoladas, arqueadas y suberectas; escamas ovales (con contorno de limón), adpresas y parcialmente solapadas (Fuerteventura) 4
 - 4 Desmómeros 2 subclavado, $2.4 \times$ tan largo como ancho, 6-7 isodiamétricos. Setas en el margen lateral del élitro (tercio basal) algo más largas y levantadas (Fuerteventura, Lanzarote) *Moreiba mariae mariae* n. sp.
 - Desmómeros 2 subcilíndrico, $3.0 \times$ tan largo como ancho, 6-7 transversos. Setas en el margen lateral del élitro (tercio basal) más cortas, aprox. de la longitud de una uña tarsal, y algo más arqueadas e inclinadas hacia atrás (Montaña Clara)
 - *Moreiba mariae oromiana* n. ssp.
 - 5 Recubrimiento de escamas más denso (6-7 a lo ancho de la 3ª interestria), muy solapadas transversalmente; espina de la escama casi la mitad de su longitud. Coloración general por lo común cremosa y beige, sin o con pocas escamas oscuras (Tenerife)
 - *Moreiba canariensis nivariana* n. sp.
 - Recubrimiento de escamas menos denso (4-5 a lo ancho de la 3ª interestria), poco solapadas transversalmente; espina de la escama normalmente más corta. Coloración general más contrastada, con grupos de escamas claras y oscuras 6
 - 6 Setas elitrales lanceoladas y largas (en el margen elitral más largas que el ancho de la tibia), carinadas, con punta aguda o roma, pero no bicúspide (Fuerteventura)
 - *Moreiba maxorata* n. sp.
 - Setas elitrales lineales (rectas, curvadas o recurvadas), más cortas (menos que el ancho de la tibia) y lisas, con ápice truncado bicúspide 7
 - 7 Distancia entre las setas en el segundo quinto del margen elitral más larga que la longitud de las setas. Espina de las escamas prolongada como una quilla a lo largo del cuerpo de la escama. Base de los élitros recta (Gran Canaria) *Moreiba tamarana* n. sp.
 - Distancia entre las setas en el segundo quinto del margen elitral tan larga o menor que la longitud de las setas. Espina de las escamas no prologada a modo de quilla a lo largo del cuerpo de la escama. Base de los élitros cóncava 8
 - 8 Máxima anchura del pronoto después de la mitad. Élitros más arqueados lateralmente. Presencia de setas recurvadas menos frecuente (El Hierro)
 - *Moreiba canariensis canariensis* (Franz, 1993)
 - Máxima anchura del pronoto hacia la mitad. Élitros más paralelos lateralmente. Presencia de setas recurvadas más común, a veces dominando todo el revestimiento (La Palma) *Moreiba canariensis auarita* n. ssp.

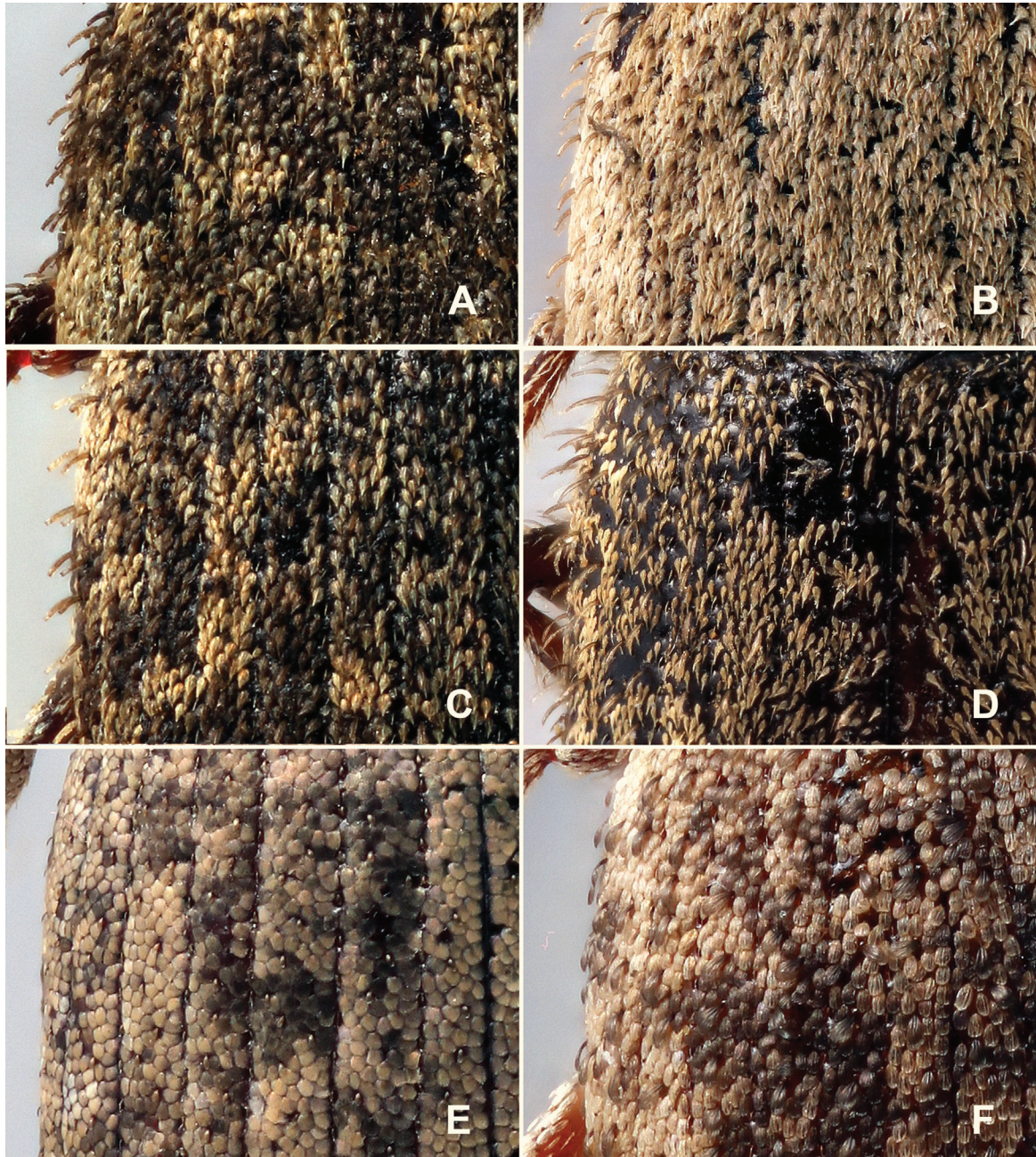


Fig. 19. Elytra vestiture of *Moreiba*. A = *M. canariensis canariensis*, B = *M. canariensis nivariana* n. sp., C = *M. tamarana* n. sp., D = *M. maxorata* n. sp., E = *M. ariadnae* n. sp., and F = *M. lancerota* n. sp.

● FINAL REMARKS

The laparocerine genus *Moreiba* is endemic to the Canary Islands, and is by large less common than *Laparocerus*, which is equally present in this archipelago, but also on the Selvagens, Madeira, and western Morocco. *Moreiba* species dwell in leaf-litter of latex-bearing plants (*Euphorbia*, *Periploca*), although not exclusively. These plants build fresh leaf-litter in the early summer, when they lose their leaves—all of them in the case of *Euphorbia*—to face the dry season. Species of *Moreiba* are mostly distributed in the lower island belt of xerophytic vegetation, except *M. canariensis canariensis*, which reaches the intermediate mountain slopes on El Hierro (600 m). Future targeted field prospections shall increase the number of one *Moreiba* species per island, as it happens in Fuerteventura and Lanzarote, with perhaps the exception of La Gomera, where *Moreiba* Roudier, 1957, seems to be replaced in its niche by three species of *Lapa-*

rocerus subgenus *Mateuius*, which are somewhat similar in appearance, although a trifle larger (3.6- 4.7 mm). Nonetheless, both genera cohabit in the island of El Hierro, with one species each.

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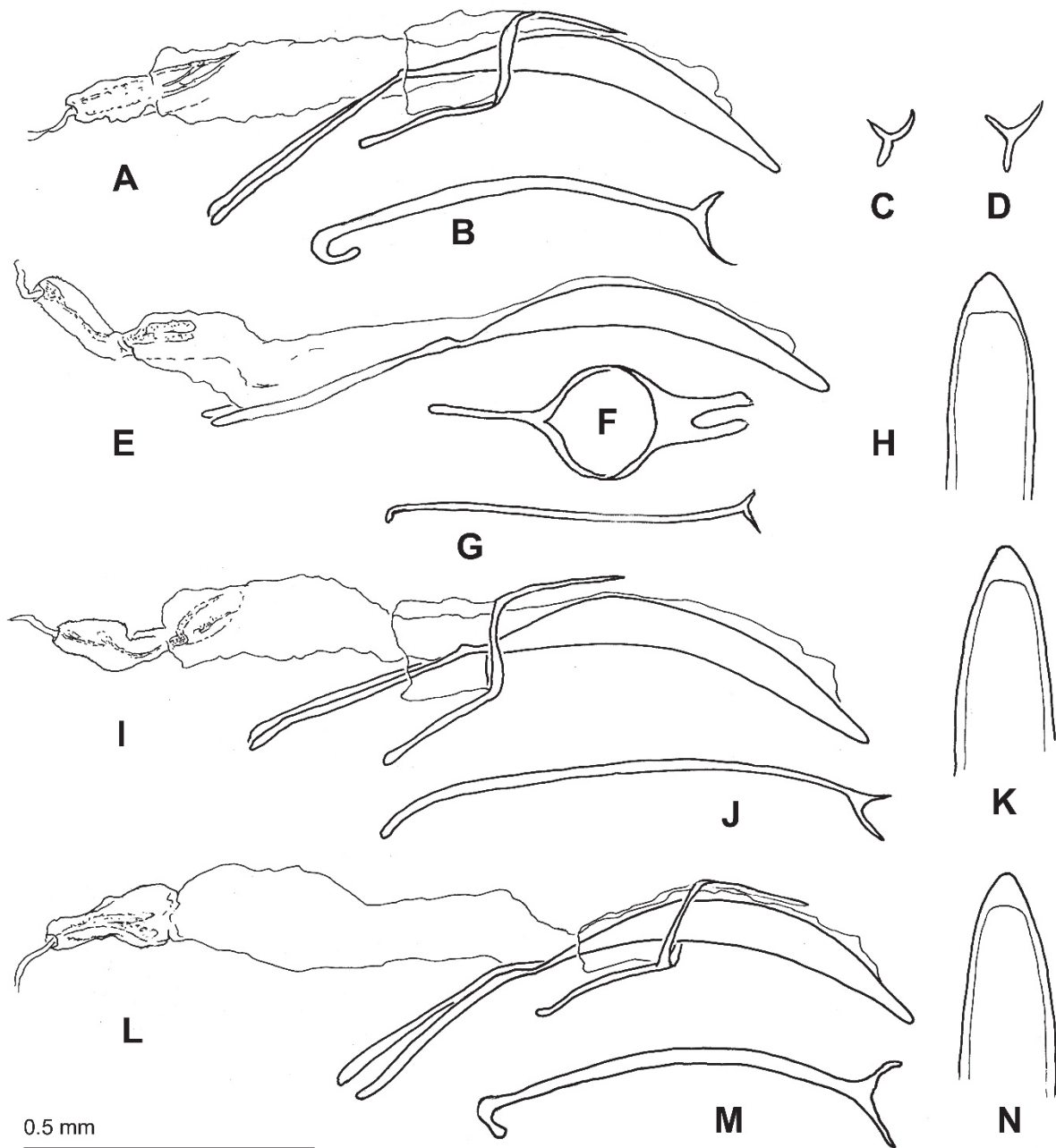


Fig. 20. Genitalia. *Moreiba canariensis auarita* n. ssp., **A** = aedeagus, **B** = spiculum relictum, and **C** = spiculum gastrale. – *Idem* forma "recurvata", **D** = spiculum relictum, **E** = aedeagus, **F** = tegmen, **G** = spiculum gastrale, and **H** = apex of penis. – *Moreiba canariensis nivariana* n. sp., **I** = aedeagus, **J** = apex of penis, and **K** = spiculum gastrale. – *Moreiba tamarana* n. sp. **L** = aedeagus, **M** = spiculum gastrale, and **N** = apex of penis.

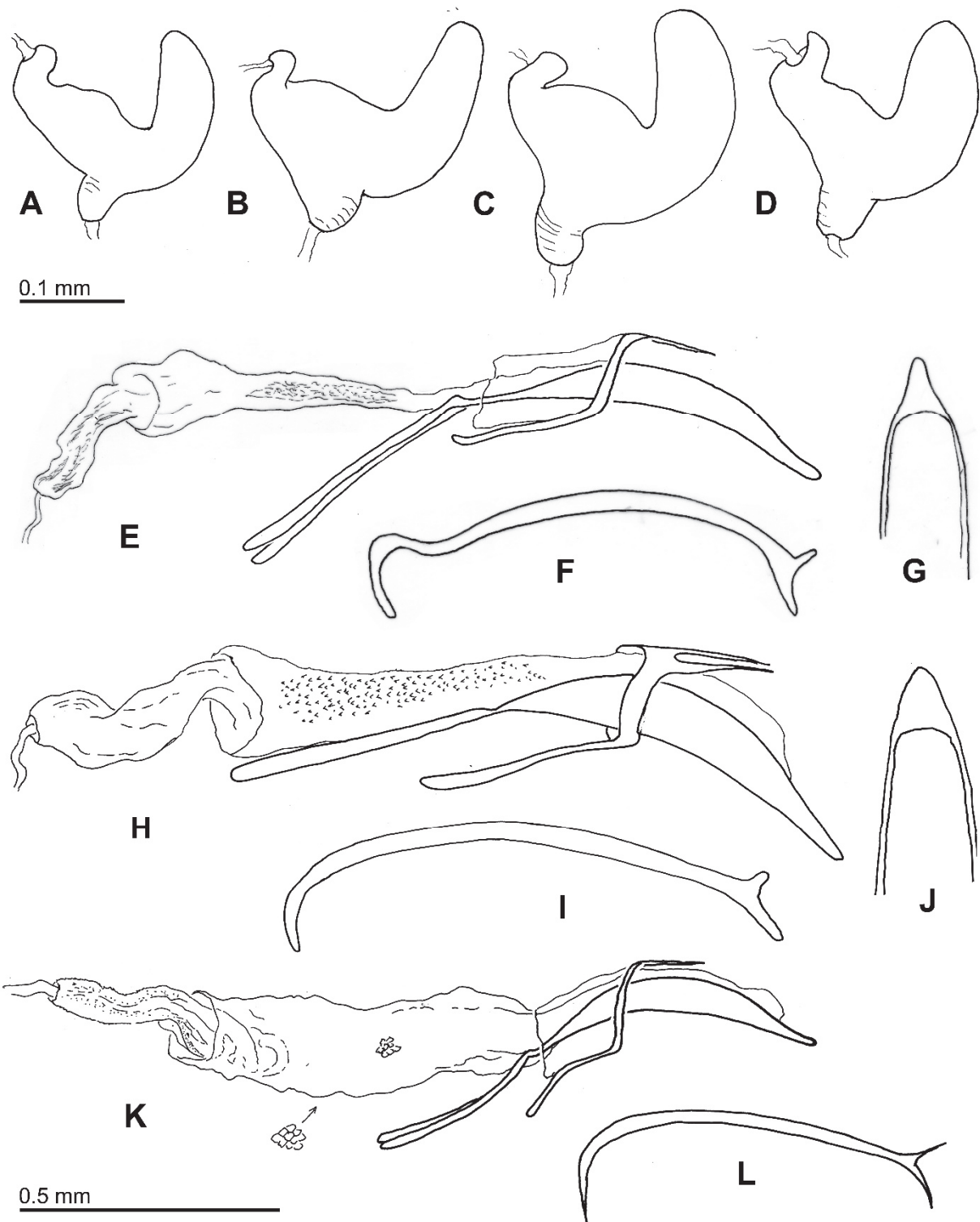


Fig. 21. Genitalia: Spermatheca of **A** = *Moreiba nivariana* n. sp., **B** = *Moreiba tamarana* n. sp., **C** = *Moreiba maxorata* n. sp., and **D** = *Moreiba lancerota* n. sp. — *Moreiba maxorata* n. sp. **E** = aedeagus, **F** = spiculum gastrale, and **G** = apex of penis.— *Moreiba mariae* n. sp., **H** = aedeagus, **I** = spiculum gastrale, and **J** = apex of penis. — *Moreiba lancerota* n. sp., **K** = aedeagus, and **L** = spiculum gastrale.

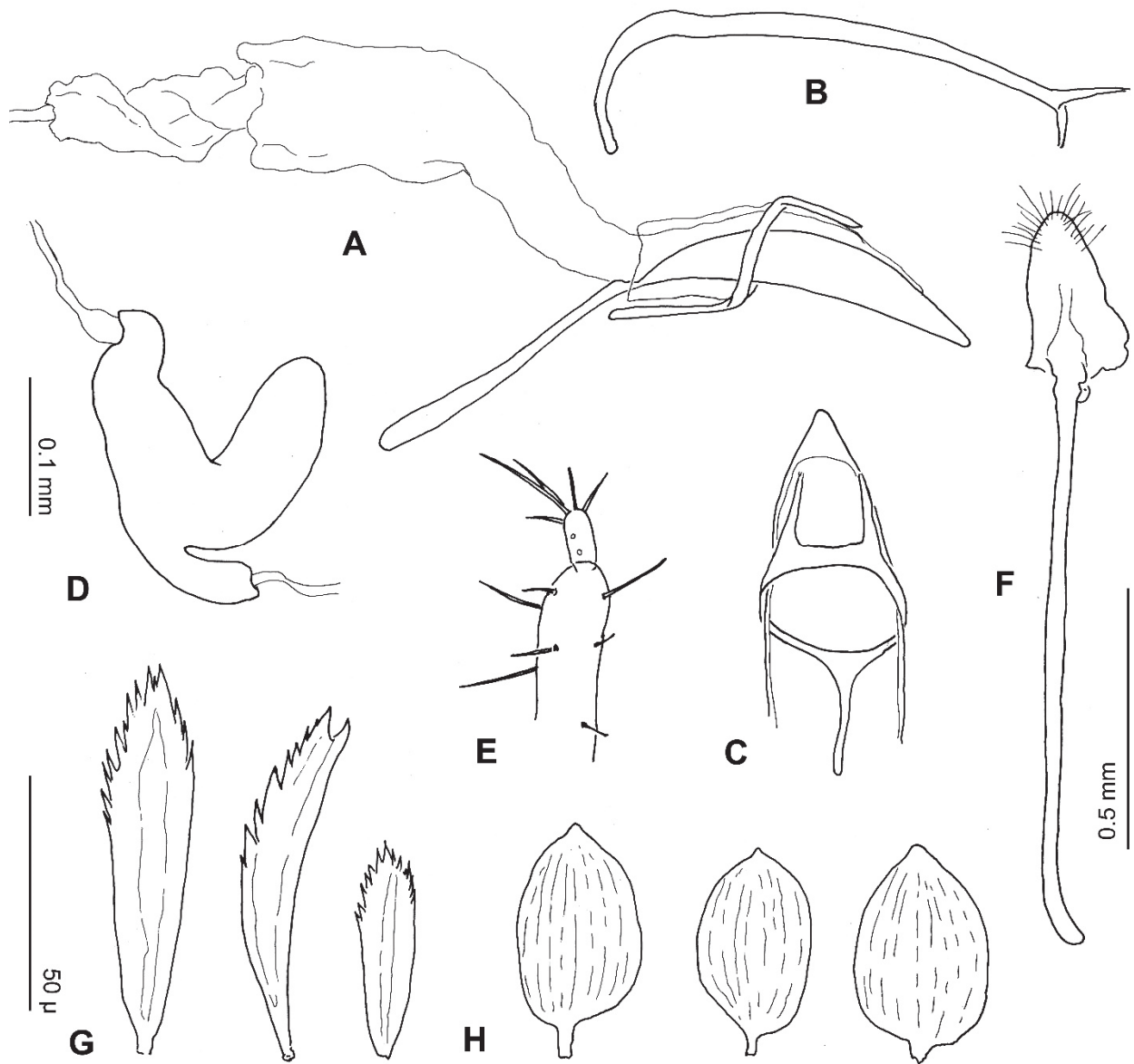


Fig. 22. *Moreiba mariae oromiana* n. ssp., **A** = aedeagus, **B** = spiculum gastrale (♂), **C** = tegmen and apex of penis (dorsal view), **D** = spermatheca, **E** = gonostylus, **F** = spiculum ventrale (♀), **G** = elytral setae, and **H** = scales.

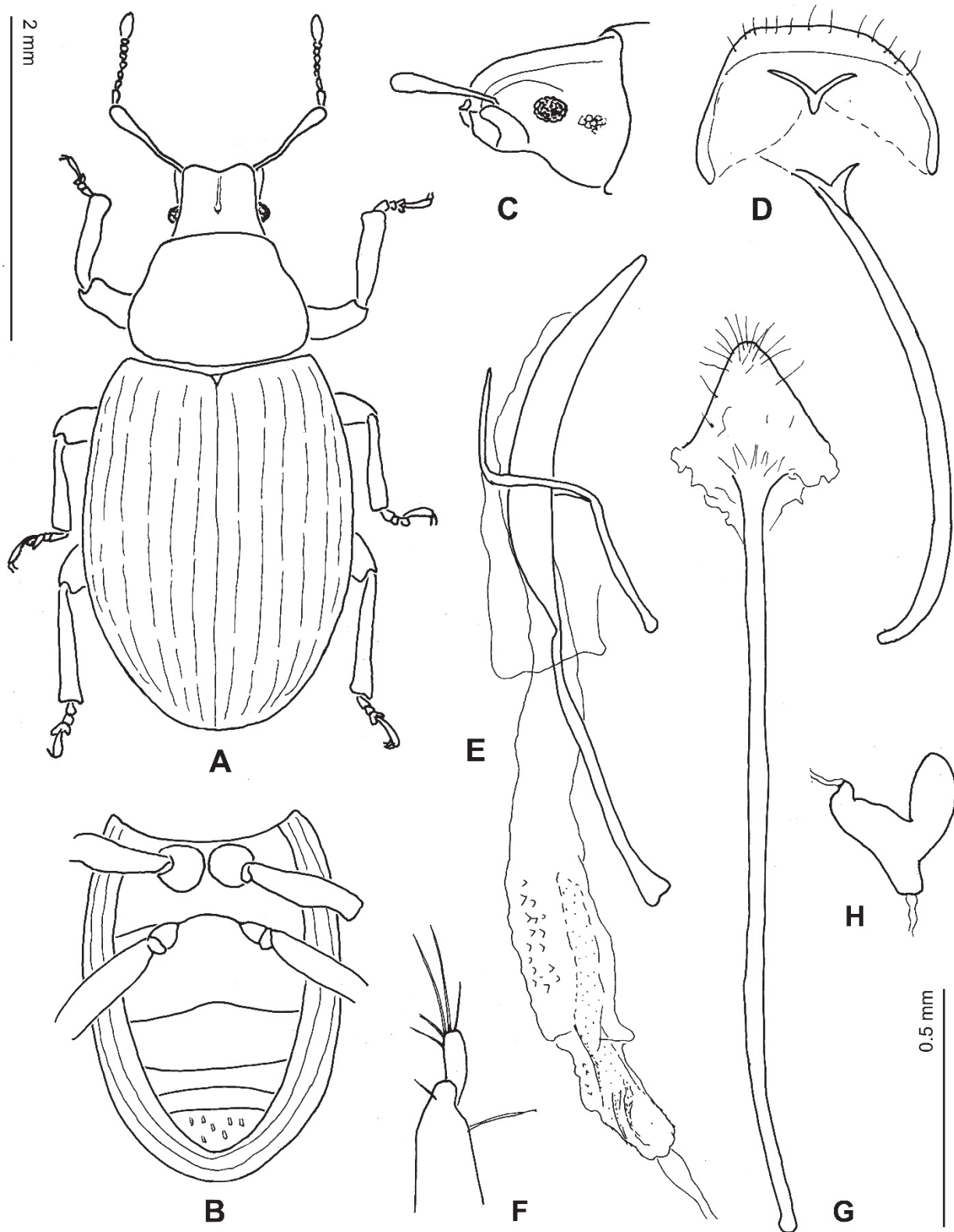


Fig. 23. *Moreiba ariadnae* n. sp., A = Imago (♀), B = venter, C = head, D = sternite VIII ♂, E = aedeagus, F = gonostylus, G = spiculum ventrale (♀), and H = spermatheca.

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