

TAXONOMY OF IBERIAN ANISOLABIDIDAE (DERMAPTERA)

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An update on the taxonomy and geographic distribution of Iberian Anisolabididae (Dermaptera) is provided. Former catalogues reported in the Iberian Peninsula three genera of Anisolabididae: *Aborolabis*, *Anisolabis*, and *Euborellia*. A revision of 487 specimens of Iberian and North African Anisolabidoidea permit to exclude the genus *Aborolabis* from the Iberian fauna, the re-assignment of inland *Euborellia annulipes* Iberian records to *Euborellia moesta*, and the exclusion of *Aborolabis angulifera* from Northwestern Africa. Examination of type materials of *Aborolabis mordax* and *Aborolabis cerrobarjai* allows to propose the treatment of *A. cerrobarjai* as a junior synonym of *A. mordax*. The diagnostic characters of *Euborellia hispanica* are included within the local variability found in *E. moesta*. I propose that *E. hispanica* should be treated as a junior synonym of *E. moesta*.

Key words: earwigs, systematics, Mediterranean region, Spain, Morocco, NW Africa.

INTRODUCTION

The Iberian fauna of Dermaptera, including Anisolabididae Verhoeff, 1902, has been the subject of diverse revisionary (BOLÍVAR 1876, 1897, LAPEIRA & PASCUAL 1980, HERRERA MESA 1980, BIVAR DE SOUSA 1997) and compilatory works (HERRERA MESA 1999). These revisions together with the monograph of the Fauna of France (ALBOUY & CAUSSANEL 1990) and the on-line information included in Fauna Europaea (HAAS 2010), rendered the image of Dermaptera as a well known group in continental western Europe. However, some Iberian Anisolabididae Verhoeff, 1902 described by STEINMANN (1978, 1979, 1981a) remained ignored or included without further comments along successive catalogues (e. g. STEINMANN 1989, HERRERA MESA 1999), and field surveys revealed that some published geographic data (LAPEIRA & PASCUAL 1980, STEINMANN 1979) are incorrect or questionable.

The opportunity of revising some of the original specimens used by STEINMANN (1978, 1979) along his descriptions of Iberian taxa at the Hungarian Natural History Museum (HNHM), and the availability for study of most of the specimens used by BOLÍVAR (1897) and LAPEIRA & PASCUAL (1980) for their revisionary work, at the Museo Nacional de Ciencias Naturales (MNCN-CSIC) of Spain, allows the re-interpretation or re-identification of many of the taxonomically problematic specimens. Recent field work rendered new

materials suitable for study, including specimens from near type localities of problematic species, facilitating further taxonomic decisions.

The objective of this work is to provide an update on the taxonomy and geographic distribution of Iberian Anisolabididae. As a result, I propose the synonymy of two taxa, and I reassign some previously mistaken geographic records.

MATERIAL AND METHODS

The basis for this study are the materials ($n = 17$) and type specimens ($n = 10$) of *Aborolabis* held at Steinmann's collection in the Magyar Természettudományi Múzeum (Hungarian Natural History Museum, HNHM), plus a collection of 266 dry mounted Iberian specimens of Anisolabidoidea and 194 ethanol preserved specimens from the collections of the Museo Nacional de Ciencias Naturales (MNCN-CSIC) (Appendix 1).

Dry mounted specimens at the MNCN (acronym MNCN_Ent) have been gathered along the XIXth and XXth Centuries, and most of them are the product of the activity of well-known Spanish entomologists, including Ignacio Bolívar, Cándido Bolívar, José Arias, Ricardo Zariquiey, Manuel Martínez de la Escalera, Eugenio Morales Agacino, Francesc Español, Joaquín Mateu, Elvira Mingo and Vicenta Llorente. Specimens from the MNCN collection have been reported locally by previous authors, including some of the above mentioned. Special mention require BOLIVAR'S (1876, 1897) catalogues, which served as the starting point for the study of Spanish Dermaptera, and the revision of LAPEIRA and PASCUAL (1980). These authors used basically all the collection available at the MNCN at their time, but unfortunately, they did not provide any label to identify the material studied by them. The ethanol preserved materials, stored at -18°C (acronym MNCN_tij) (Appendix 1), were collected along the period 2010–2014, mostly by the author and members of his research team (see acknowledgements).

Morphological studies were carried on using dry mounted specimens under stereomicroscope. Male genital structures were figured by STEINMANN (1979, 1981a).

RESULTS AND DISCUSSION

Recent catalogues (STEINMANN 1989, HERRERA MESA 1999) reported the presence in the Iberian Peninsula of 7 species belonging to three genera of Anisolabididae: *Aborolabis* Srivastava, 1969, *Anisolabis* Fieber, 1853, and *Euborellia* Burr, 1909. However, data at hand do not support the presence of representatives of the genus *Aborolabis* in the Iberian Peninsula.

Aborolabis

The genus *Aborolabis* was integrated exclusively by southern Asian species (SRIVASTAVA 1969, 1972, 1976) until the addition by STEINMANN (1978, 1979, 1981b, 1984) of a set of Mediterranean and African species to the genus, adding up to a total of 13 species (SRIVASTAVA 1993). According to STEINMANN

(1979, 1984, 1989), the genus included five species in the Mediterranean Basin: *Aborolabis mauritanica* (Lucas, 1849), described from Algeria, *Aborolabis mordax* Steinmann, 1978, described from Tunisia, *Aborolabis cerrobarjai* Steinmann, 1979, described from Spain, *A. rufocapitata* Steinmann, 1984, described from Algeria, and *Aborolabis angulifera* (Dohrn, 1864) described from São Thomé, but recorded in Morocco by STEINMANN (1979, 1989). Three of them, *A. mauritanica*, *A. mordax*, and *A. cerrobarjai*, have been reported in the Iberian Peninsula by STEINMANN (1978, 1979, 1989).

I had the opportunity to revise part of the type material used by STEINMANN (1978, 1979, 1984) for the original descriptions of *A. mordax* (Fig. 1a,b) and *A. cerrobarjai* (Fig. 2a,b), plus a series of specimens of northern African *Aborolabis* studied and identified by H. Steinmann, all located at the Hungarian Natural History Museum (HNHM).

The characters used in the descriptions and the key presented by STEINMANN (1979) to discriminate species, were focussed in coloration of the tibiae and femora, and also in the relative shape of male genital structures. STEINMANN (1979) used coloration of tibiae and the relative width of the triangular process of the internal margin of the male genitalia, to separate *A. mordax* and *A. cerrobarjai*, indicating that *A. cerrobarjai* presents yellow tibiae and the maximum width at the basis of the process, while *A. mordax* and *A. mauritanica* present dark tibiae and the maximum width at the middle of the process. STEINMANN (1979) further separated *A. mordax* and *A. mauritanica* using coloration of the femora, black and yellow in *A. mauritanica*, all orange-yellow in *A. mordax*, and by relative shape of genital structures.

A direct examination of the type material of *A. mordax* and *A. cerrobarjai* (Figs 1, 2) shows that Steinmann's original descriptions were precise and accurate. However, some of the materials of *A. mordax* and *A. cerrobarjai* studied by STEINMANN (1978, 1979) correspond to immature male specimens. Immature and recently metamorphosed males in the family Anisolabididae show external secondary sexual characters and genital structures characteristically developed, but with a large variability (JAMET & CAUSSANEL 1995, KAMIMURA 2000, 2007, KAMIMURA & IWASE 2010), probably a consequence of poor sclerotization. Coloration of tibiae is highly variable in northern African *Aborolabis*, from solid black to light cream and varies in immature and recently metamorphosed individuals. Tibiae colour changes in variable manner during the drying process after death. Legs of live nymphal specimens of *A. mauritanica* show a uniform cream light coloration which become darker after subsequent moults (Fig. 3).

The external and internal characters used by STEINMANN (1978, 1979) to diagnose *A. mordax* and *A. cerrobarjai* correspond to intraspecific variability. Consequently, I propose that *A. cerrobarjai* is a junior synonym of *A. mordax*.

According to STEINMANN (1978, 1979), differentiation between *A. mordax* and *A. mauritanica* relies mostly on coloration of the femora: red and black in *A. mauritanica* (Fig. 4), totally yellow in *A. mordax* (Fig. 1). Both patterns are represented in the collection of adult specimens examined (see Appendix 1), but so far I have not observed intra-population variability for this character



in adult specimens. Populations with specimens presenting the proximal two thirds of the femora red, are scattered over Eastern Morocco (Gâada de Deb-dou), central Algeria (Batna, Constantine), and Tunisia (El Kef), while populations with entire yellow femora are distributed over coastal Algeria (Kabylie, Fedja, Foret de Tagma) and Tunisia (Ain Draham). It is likely that both morphs correspond to a single taxonomic unit, but I cannot confirm this point without the study of larger series.

The Iberian specimens of *A. mordax* (two paratypes) and *A. cerrobarjai* (the holotype and one paratype) available for study at the HNHM, are part of the same field series and bear identical labels, with the locality: "Spain, 2700 m Sierra Nevada" (Figs 1b, 2). Although, being part of the same field series could be used as a further argument to consider *A. mordax* and *A. cerrobarjai* part of a single taxon, I believe the geographic data attached to those specimens are incorrect.

Trying to obtain additional material of *Aborolabis*, I undertook three expeditions (July 2010, June 2011, June 2012) to Sierra Nevada (Granada, Spain), accompanied with experienced biologists from the national park (see acknowledgements). Our surveys included diurnal and nocturnal searches from 2500 to 3400 m along the western, southern and eastern slopes of the Sierra Nevada mountain range. We failed to find any specimen of *Aborolabis*, although we were able to find the other species of Dermaptera present at high elevations in the region (*Eulithinus*, *Forficula*).

The apparent absence of *Aborolabis* in Sierra Nevada was also stated by F. Pascual and A. Tinaut who made a fine scale prospection through all the Sierra Nevada National Park (unpubl. report) to determine the geographic distribution of *Eulithinus analis* (Rambur, 1838), a Sierran high elevation endemic earwig. They found *Eulithinus* in 127 squares of 1 × 1 km, but not a single specimen of *Aborolabis* was encountered during the surveys (A. Tinaut, pers. comm., May 2012). The revision of the collection of Iberian Dermaptera of the Museo Nacional de Ciencias Naturales (Madrid, Spain) did not provide any specimen of *Aborolabis*.

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Figs 1–7. 1–2 = *Aborolabis mordax* Steinmann, 1978 (HNHM): 1 = holotype of *A. mordax*, male, "Tunisia. Environs of Ain Draham", 2 = paratype of *A. cerrobarjai*, a male labelled as collected in "Spain, 2700 m, Sierra Nevada". 3–4 = *Aborolabis cerrobarjai* Steinmann, 1979 (= *A. mordax* Steinmann, 1978) (HNHM), 4 = holotype of *A. montana* Steinmann, in litt. (= *A. cerrobarjai* Steinmann, 1981), male, "Spain, 2700 m Sierra Nevada", 4 = paratype of *A. cerrobarjai*, female, "Spain, 2700 m Sierra Nevada". 5 = Nymph of *Aborolabis mauritanica* (Lucas, 1846), from Gâada de Deb-dou (La Oriental, Morocco) (photo: by MG-P). Note the pale coloration of legs. Nymphs were observed while attended by an adult female, with typical red and black femora. 6 = *Aborolabis mauritanica* (Lucas, 1846), "Spain, Granada" (HNHM). 7 = Nymphal specimen of *Euborellia moesta* (Gené, 1839) from an urban garden of Madrid (Spain) (photo: MG-P). Note the annulated femora and the pale antennal segments

The only published data on the presence of *Aborolabis* in Iberia are those provided originally by STEINMANN (1978, 1979, 1989) and reported again in subsequent works (see HERRERA MESA 1999, PASCUAL & BARRANCO 2013). However, *A. mauritanica* and *A. mordax* are large, conspicuous, shiny black earwigs with orange-red or yellow legs (Figs 1–2, 4), which would not pass inadvertent to the hundreds of zoologists that have collected in the Sierra Nevada mountains, one of the better explored mountain ranges in Spain (RUANO *et al.* 2013).

To complicate matters, labels on the Sierra Nevada *Aborolabis* held at the HNHM, and reported by STEINMANN (1978, 1979), were written in the same type of paper, with the same writing, and apparently at the same time, as labels of *Pseudochelidura montana* Steinmann, 1981 (= *Eulithinus montanus*). *Eulithinus montanus* was described by STEINMANN (1981a) using specimens (type series examined) that only can be found at high elevations in Sierra Nevada, because the genus *Eulithinus* is endemic to this Spanish mountain chain. Steinmann must have been confused at some point, mixing the type series of *E. montanus* and the type series of *A. cerrobarjai*, since he labelled the types of *A. cerrobarjai* as: “Holotypus *Aborolabis montana* sp. n.” and “Paratypus *Aborolabis montana* sp. n.”. It seems quite likely, that during the process of labelling the material, a part of the series of *A. mordax* from “Tunisia. Environs of Ain Draham 31.III.1977” got mixed with a series of *Eulithinus* from “Spain, 2700 m Sierra Nevada Dr. H. Steinmann // legit 18.6.1976 Dr. H. Steinmann”, and subsequently described as *A. cerrobarjai*, or included as paratypes of *A. mordax*.

Using all the above evidence, I conclude that the reports of *Aborolabis mauritanica* and *A. mordax* (= *A. cerrobarjai*) in the Iberian Peninsula (all from Granada, Spain), are erroneous, and consequently the species should be eliminated from the Iberian catalogue of Dermaptera. I believe it is highly probable that the *Aborolabis* specimens studied by Steinmann were erroneously labelled, and that the specimens were likely collected in northwestern Africa.

Some species of Dermaptera are known to settle in non-native areas after accidental dispersal by human activities (GUILLET *et al.* 2000, NISHIKAWA & KUSUI 2008, PAVÓN-GOZALO *et al.* 2011). Accidental introduction of *A. mauritanica* in southern Spain is possible, since maritime traffic is very active between the Spanish city of Almería and northern African coastal cities (CASTRO TOVAR & FERRER 2007), but so far, there is no evidence of accidental transport of *Aborolabis*.

Incidentally, the Moroccan material studied and assigned by STEINMANN (1979) to *A. angulifera* (Berkane and Taforalt; see Appendix 1) corresponds to *A. mauritanica*. Consequently, *A. angulifera* should be removed from the Moroccan fauna.

Anisolabis

Anisolabis is represented in the Iberian Peninsula and by *Anisolabis maritima* (Bonelli, 1832), an infrequent species in continental Portugal and Spain, widely distributed along the Atlantic and Mediterranean coasts (HARZ & KALTENBACH 1976, ALBOUY & CAUSSANEL 1990, BIVAR DE SOUSA 1997, HERRERA MESA 1999).

Published records, as well as collection specimens (see Appendix 1) are scarce. The species, usually associated with seashore debris, is likely suffering the overdevelopment of the Mediterranean Spanish coast. The effect of tourism is specially strong along beaches, since most of the sand surface is being constantly "cleaned" by machines all over the tourist season, from spring to fall. Probably as a consequence of these practises, the only recent records of the species in the Mediterranean coast correspond to a population found under drying masses of *Posidonia* K. Koenig, located over the tide zone on sandy soil in Cabo de Palos (Murcia) (M. Calvo pers. com., July 2014). The species is today relatively common in northern African coastal areas (Ceuta: Playa Benítez: 8-VI-2011, J.L. Ruiz & M.G.-París; Ceuta: San Amaro: 7-III-2012, J. L. Ruiz), Canary Islands (La Palma: Playa Nueva: 22-X-2010, M.G.-París), and Madeira (Porto da Cruz: 23-II-2013, N. Percino & M.G.-París; Ponta Delgada: 1-III-2013 N. Percino & M.G.-París).

Euborellia

The genus *Euborellia* is traditionally represented in the Iberian Peninsula by two widely distributed species, *Euborellia annulipes* (Lucas, 1847) and *E. moesta* (Gené, 1837) (LAPEIRA & PASCUAL 1980, HERRERA MESA 1999). STEINMANN (1981a), described a third Iberian species, *Euborellia hispanica* Steinmann, 1981, based on a single specimen from Olot (Province of Girona, Spain). The specimen, according to STEINMANN'S (1981a) description, corresponds to a recently moulted immature specimen. I examined the morphological variability of a large series of adult and juvenile specimens of *E. moesta* from three different localities in Girona (located about 40 km from the type locality of *E. hispanica*), where it is a relatively common species (see records in Appendix 1).

The diagnostic characters indicated by STEINMANN (1981a) for *E. hispanica* are included within the local variability found in *E. moesta* from Girona, and, as indicated above, immature or recently metamorphosed males in the family Anisolabididae show external secondary sexual characters and genital structures highly variable.

I propose that *E. hispanica* and *E. moesta* represent the same taxon, and therefore *E. hispanica* should be treated as a junior synonym of *E. moesta*. HER-

RERA MESA (1999) did not mention Steinmann's taxon, probably because the author considered Steinmann's *E. hispanica* a misapplication of *Forficula hispanica* Herrich-Schäffer, 1840 (= *E. moesta*), but STEINMANN'S (1981a) intention was clearly the description of a new species.

The geographic ranges of *E. moesta* and *E. annulipes* are not adequately analyzed in the Iberian territory. Along the examination of 360 specimens of Iberian *Euborellia* (see Appendix 1), I detected some misidentifications that allow us to question published reports. Those erroneous or doubtful records correspond to the presence of *E. annulipes* in central Spain. In fact, once revised the available specimens, the resulting geographic range of *E. annulipes* is mostly limited to coastal areas, or regions with a deep oceanic influence, while *E. moesta* is present over large areas in more continental situations.

The confusion might have arose from the fact that late nymphal instars of *E. moesta* (Fig. 5) present external morphological traits very similar to those retained by adult *E. annulipes*. Some of those traits, as for example, the presence of light legs annulated with dark brown rings, the presence of a whitish annuli on the distal portion of the antennae, or the absence of elytral pads, are often the only characters used for separation between *E. moesta* and *E. annulipes*. As a consequence, late nymphal instars of *E. moesta* are easily confused with adult *E. annulipes*. I believe that a large number, if not all, the reports of *E. annulipes* in central Spain correspond actually to *E. moesta*. I provide a list of confirmed localities in Appendix 1.

Checklist of Iberian Anisolabididae

According to the previous paragraphs, the Iberian fauna of Dermaptera includes four less species than previously considered: three species of *Aborolabis*, probably reported on the basis of erroneous labelling; and one species of *Euborellia*, a junior synonym of *Euborellia moesta*. The updated list of Iberian Anisolabididae remains as:

Anisolabididae Verhoeff, 1902

Anisolabidinae Verhoeff, 1902

Anisolabis Fieber, 1853

A. maritima (Bonelli, 1832)

Euborellia Burr, 1909

E. annulipes (Lucas, 1847)

E. moesta (Géné, 1837) (= *E. hispanica* Steinmann, 1981 **syn. nov.**)

Species excluded of the Iberian Fauna of Anisolabididae: *Aborolabis mauritanica* (Lucas, 1849) and *A. mordax* Steinmann, 1978 (= *A. cerrobarjai* Steinmann, 1979 **syn. nov.**)

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APPENDIX 1

Material examined. MNCN_ent = Museo Nacional de Ciencias Naturales (Entomology Collection) (Madrid). MNCN_tij = Museo Nacional de Ciencias Naturales (ethanol collection) (Madrid). HNHM = Hungarian Natural History Museum (Magyar Természettudományi Múzeum, Budapest).

Anisolabis maritima (Bonelli, 1832)

SPAIN: **Andalucía: Cádiz:** Algeciras: 1 specimen, C. Bolívar (*Anisolabis Fieber maritima* Géné [hand written by Bolívar]) (MNCN_Ent 81). **Cataluña: Barcelona:** Farola Llobregat: 9-III-1941, 1 specimen, F. Esp. [F. Español] (MNCN_Ent 109684); Garraf: 12-VII-1941, 1 specimen, J.M. (MNCN_Ent 109685); Garraf: 14-I-41, 3 specimens, E. Morales (MNCN_Ent 109686). **Murcia: Murcia:** Cabo de Palos, 6 m, 37°37'44.81"N-0°42'11.25"W: 20/21-VI-2014, 7 specimens, M. Calvo Revuelta & J. Templado (MNCN_tij 14126-132); Cartagena: II-1925, 2 specimens, M. Escalera (MNCN_Ent 109682-83); Cartagena: 1 specimen, Sánchez Gómez (*Anisolabis maritima* (Bon.) det. E. Morales Agacino) (MNCN_Ent 109679); Cartagena: 2 specimens, Sánchez Gómez (MNCN_Ent 109680-81).

Euborellia annulipes (Dohrn, 1864)

SPAIN: **Andalucía: Málaga:** Playa de Benajárf, 3 m, 36°42'57.3"N-04°11'42.0"W: 28-XII-2010, 3 specimens, M. García París & G. García Martín (MNCN_tij 10126-128); Torre del Mar, 3 m, 36°43'54.2"N-04°06'04.2"W: 28-XII-2010, 10 specimens, M. García París & G. García Martín (MNCN_tij 10150-160). **Cataluña:** "Cataluña": 1894, 1 specimen, F. Traizet (MNCN_Ent 108650). **Barcelona:** Barcelona: 10-VIII-1905, 1 specimen, Arias (*Anisolabis Fieber maritima* Géné [hand written by Bolívar]) (MNCN_Ent 80); Barcelona, 20-VII-1940, 1 specimen, A. Pardo (MNCN_Ent 108638); Garraf: 14-II-1941, 11 specimens, E. Morales (MNCN_Ent 108645, MNCN_Ent 108647-49); Laguna Remola, Prat, Llobregat: 21-XI-1940, 1 specimen, F. Esp. [F. Español] (MNCN_Ent 108643); Montseny: 1 specimen, [Navás] (*Anisolabis maritima* Bon.) (MNCN_Ent 108651). **Tarragona:** Valls: 4-IX-1940, 2 specimens, F. Español (MNCN_Ent 108644, 46). **Comunidad Valenciana: Valencia:** Valencia: San Marcelino, Río Turia, 39°26'33.73"N-0°23'30.41"W: 17-III-2012, 3 specimens, E. Recuero Gil, J. Gutiérrez Rodríguez (MNCN_tij 12617-619). **Murcia: Murcia:** Cabo de Palos, 6 m, 37°37'46"N-0°42'14"W: 20-IV-2014, 3 specimens, M. Calvo Revuelta (MNCN_tij 14055-057); Cartagena: 3 specimens, Sánchez Gómez (MNCN_Ent 108639, 41, 52); Totana: 2 specimens, Balaguer (MNCN_Ent 108640, 42). **País Vasco: Guipúzcoa:** Tolosa: VIII-1923, 1 specimen, Abajo (MNCN_Ent 108653).

Euborellia moesta (Gené, 1839)

ANDORRA: Sant Julià de Lòria: Bixessarri: Santuari de Canòlic, 1515 m, 42°28'31.5"N-1°27'12.0"E: 20-VI-2013, 5 specimens, M. García París & G. García Martín (MNCN_tij 13298-302).

PORTUGAL: Vila Real: 1 specimen, Dr. Martin (under *Anisolabis annulipes* identification label) (MNCN_Ent 109767)

SPAIN: **Andalucía: Almería:** María: IV-1948, 2 specimens, Zarco (MNCN_Ent 109729-30). **Granada:** Huéscar: 1 specimen, [Escalera] (MNCN_Ent 109727); [Pico de] La Sagra: 27-V-1950, 1 specimen, Mateu-Cobos. (MNCN_Ent 109733). **Jaén:** Arroyo de la Garganta, [Sierra de] Cazorla: 23-IV-1992, 1 specimen, C. Martín (MNCN_Ent 109754); Nava Foncu-bertha, S. [Sierra de] Cazorla: 27-VII-1956, 2 specimens, E. Mor. [E. Morales] (under *Anisolabis annulipes* identification label) (MNCN_Ent 109773, 109780); Jaén: Santiesteban [del Puerto], Sierra Sagra: 1 specimen, Juan Cabré (MNCN_Ent 109735). **Sevilla:** Sevilla, 1 specimen, Sanz (under *Anisolabis annulipes* identification label) (MNCN_Ent 109770). **Aragón: Huesca:** Almudévar: 3-V-1940, 1 specimen, E. Mor. [E. Morales Agacino] (MNCN_Ent 108659); S. [Sierra] de Guara: 1 specimen, Bolívar (MNCN_Ent 108688). **Teruel:** Albarracín: VII-1906, 5 specimens, Arias (under *Anisolabis annulipes* identification label) (MNCN_Ent 109756-760); Arcos de las Salinas, 1 specimen, Beltrán (MNCN_Ent 109741); Montalbán, 966 m, 40°48'53.92"N-0°45'21.15"W: 28-IV-2012, 3 specimens, M. García París, N. Percino Daniel & G. García Martín (MNCN_tij 12276-278); Teruel: 1-V-1935, 1 specimen, B. Muñoz (MNCN_Ent 109695); Teruel, 935 m: 20-III-1933, 1 specimen, B. Muñoz (MNCN_Ent 109701); Teruel, 935 m: 24-V-1933, 1 specimen, B. Muñoz (under *Anisolabis annulipes* identification label) (MNCN_Ent 109769); Teruel, Bezas, 935 m: X-1929, 1 specimen, B. Muñoz (under *Anisolabis annulipes* identification label) (MNCN_Ent 109766); Teruel, 935 m: III-30, 4 specimens, B. Muñoz (MNCN_Ent 109696-699); Teruel, 935 m: V-1929, 1 specimen, B. Muñoz (MNCN_Ent 109700); Teruel: 2 specimens, A. Sanz (MNCN_Ent 109694, 109702). **Zaragoza:** Bujaraloz, 326 m, 41°29'42.8"N-0°09'03.1"W: 15-VI-2013, 1 specimen, M. García París & G. García Martín (MNCN_tij 13265). **Cataluña:** "Cataluña": 1894, 1 specimen, F. Traizet (MNCN_Ent 109728). **Barcelona:** 7-IV-1941, 7 specimens, F. Esp. [F. Español] (MNCN_Ent 109745-46); Barcelona: 9-XI-1940, 1 specimen, J. Mateu (MNCN_Ent 108661); Calella: 1 specimen, Cuní (MNCN_Ent 109711); Farola Llobregat: 20-IV-1941, 2 specimens, F. Esp. [F. Español] (MNCN_Ent 109744); Farola Llobregat: 25-X-1940, 2 specimens, F. Esp. [F. Español] (MNCN_Ent 108663); Farola Llobregat: III-1941, 1 specimen, J. Mateu (MNCN_Ent 109743); Farola Llobregat: IV-1941: 1 specimen, J. Mateu (MNCN_Ent 109742); Garraf: 7-IV-1941, 3 specimens, E. Morales (MNCN_Ent 108677); Montseny: 14-X-1941, 1 specimen, J. Mateu (MNCN_Ent 108670); Rabasada: 25-II-1941, 2 specimens, J. Mat. [J. Mateu]. (MNCN_Ent 108674); San Pedro Mártir: 2-III-1941, 7 specimens, J. Mateu (MNCN_Ent 108675-76); San Sadurní de Noya: VII-1940, 2 specimens, F. Español. (MNCN_Ent 108664); Tagamanet: 26-I-1941, 2 specimens, J. Mat. [J. Mateu] (MNCN_Ent 108678); Val-lirana: VI-1941: 1 specimen (under *Anisolabis annulipes* identification label) (MNCN_Ent 109779); Vallvidriera: 11-XI-1940, 1 specimen, J. Mat. [J. Mateu] (MNCN_Ent 108660); Vall-vidriera: 29-X-1940, 3 specimens, J. Mat. [J. Mateu] (MNCN_Ent 108662). **Girona:** Arbucias: 1 specimen, Martorell (MNCN_Ent 109707); Cadaqués: IX-1941, 1 specimen, R. Zariquiey (MNCN_Ent 108656); Cabanes, 0 m, 42°17'59.9"N-02°58'46.2"E: 25-II-2011, 1 specimen, M. García París & N. Percino Daniel (MNCN_tij 11011); Camprodón, 950 m: 25-IX-1940, 1 specimen, J. Mat. [J. Mateu] (MNCN_Ent 108672); Gerona: 12-X-1940, 2 specimens, E. Mo-rales (MNCN_Ent 108665); Olot: 2 specimens, Cazorro (MNCN_Ent 109703-04); 2 km al SE de Cantallops, 148 m, 42°24'00.9"N-02°57'04.6"E: 25-II-2011, 11 specimens, M. García París & N. Percino Daniel (MNCN_tij 11048-058); 2 km al SE de Mossarac, 40 m, 42°19'14.3"N-02°58'42.4"E: 25-II-2011, 15 specimens, M. García París & N. Percino Daniel (MNCN_tij 11012-026). **Lleida:** Sierra del Cadí: VIII-1906, 5 specimens, Arias (under *Anisolabis annulipes* identification label) (MNCN_Ent 109761-765). **Tarragona:** Montblanc, 355 m, 41°22'41.3"N-01°09'36.5"E, 26-II-2011, 4 specimens, M. García París & N. Percino Daniel (MNCN_tij 11007-010); Valls: VIII-1946, 1 specimen, Español (under *Anisolabis annulipes*

identification label) (MNCN_Ent 109771); Valls: 4-IX-1940, 2 specimens, F. Español (under *Anisolabis annulipes* identification label) (MNCN_Ent 109774-775). **Castilla – La Mancha:** **Albacete:** Alto de Crucetillas, 1296 m, 38°34'09.2''N-2°21'42.4''W: 26-V-2011, 2 specimens, I. Martínez-Solano & P. Pavón Gozalo (MNCN_tij 11724-725); Cañada de Haches, 1087 m, 38°37'25.0''N 2°09'28.9''W: 26-V-2011, 8 specimens, I. Martínez-Solano & P. Pavón Gozalo (MNCN_tij 11726-733); Cotillas: Arroyo de los Lavajos, 1054 m, 38°25'44.2''N-2°28'57.6''W: 26-V-2011, 1 specimen, I. Martínez-Solano & P. Pavón Gozalo (MNCN_tij 11737); El Bonillo: Navalcudia, 1046 m, 38°56'20.5''N-2°29'19.6''W: 26-V-2011, 1 specimen, I. Martínez-Solano & P. Pavón Gozalo (MNCN_tij 11713); El Pardo: 4 specimens (MNCN_Ent 109723-26); Puerto de Crucetillas, 1126 m, 38°34'09.2''N-2°21'42.4''W: 26-V-2011, 10 specimens, I. Martínez-Solano & P. Pavón Gozalo (MNCN_tij 11714-723); 8 km al SE de Vianos, 1275 m, 38°35'26.7''N-2°25'38.7''W: 27-III-2013, 1 specimen, M. García París & N. Percino Daniel (MNCN_tij 13114). **Cuenca:** Cuenca: 3 specimens, F. Beltrán (MNCN_Ent 108701-03); Cuenca: V-1923, 10 specimens, J. Abajo (MNCN_Ent 108692-700, 734); Las Majadas, 1438 m, 40°16'15.7''N-2°02'08.1''W: 22-X-2012, 1 specimen, M. García París & G. García Martín (MNCN_tij 12524); Uclés: 1 specimen, Pantel (MNCN_Ent 109705); Uclés: 1 specimen («placa anal anormal») (MNCN_Ent 109706); Uña, 40°12'06.0''N-1°56'17.9''W: 22-VI-2012, 2 specimens, E. Recuero Gil, I. Martínez-Solano, J. Gutiérrez Rodríguez (MNCN_tij 12569-570); Villalba de la Sierra: 1978, 1 specimen, V. Llorente (MNCN_Ent 109750); 3 km al SE de Las Majadas, 1420 m, 40°16'50.4''N-1°59'38.5''W: 30-IV-2011, 14 specimens, M. García París, N. Percino Daniel & G. García Martín (MNCN_tij 11341-354); 5 km al SE de Las Majadas, 1467 m, 40°16'31.7''N-1°58'40.9''W: 30-IV-2011, 15 specimens, M. García París, N. Percino Daniel & G. García Martín (MNCN_tij 11356-370). **Guadalajara:** Azañón, 1000 m: VIII-1956, 1 specimen, J. Abajo (MNCN_Ent 109736); Azañón: 10-V-1929, 2 specimens, [Escalera] (MNCN_Ent 108671); Guadalajara: IV, 1 specimen, Uhagón (MNCN_Ent 109692); Miralrío, 1023 m, 40°53'36.7''N-2°56'22.1''W: 30-V-2002, 1 specimen, M. García París (MNCN_tij 11752); Trijueque: V-1934, 1 specimen, E. Mor. [E. Morales Agacino] (MNCN_Ent 108705); Trijueque, 996 m: 6-V-1934, 3 specimens, C. Bolívar (MNCN_Ent 109738-40). **Toledo:** Ocaña: IV-1948, 2 specimens, Zarco (MNCN_Ent 109731-32). **Castilla y León:** **Burgos:** Aranda [de Duero]: 3 specimens, Cogolludo (MNCN_Ent 109708-10). **Comunidad Valenciana:** **Alicante:** Alcoy: 11-IV-1936, 6 specimens, R. Verdú (MNCN_Ent 108667-69, 108673, 108679, 108689-90); Alcoy: 15-II-1936, 1 specimen, R. Verdú (MNCN_Ent 108666); Calpe, 38°39'01.1''N-0°04'36.9''E: 9-IV-2011, 5 specimens, J. Gutiérrez Rodríguez (MNCN_tij 11371-375); Calpe, Peñón de Ifach, 38°38'17.1''N-0°04'30.0''E: 20-VII-2013, 1 specimen, E. Recuero, J. Gutiérrez, D. Osca & I. Acevedo (MNCN_tij 13355); Denia: 19-IV-1934, 2 specimens, C. Bol. [C. Bolívar] (MNCN_Ent 109693, 109737); Orihuela: 25-VIII-1906, 1 specimen, Andreu (under *Anisolabis annulipes* identification label) (MNCN_Ent 109776); Orihuela: 5-IX-1906, 1 specimen, Andreu (under *Anisolabis annulipes* identification label) (MNCN_Ent 109777); 3 km al E de Monòver, 443 m, 38°26'56.2''N-0°51'35.5''W: 9-IV-2011, 7 specimens, M. García París & N. Percino Daniel (MNCN_tij 11221-227). **Castelló:** Atzeneta del Maestrat: Mas del Mangranar, 547 m, 40°13'02.09''N-0°12'35.65''W: 29-IV-2012, 1 specimen, M. García París, N. Percino Daniel & G. García Martín (MNCN_tij 12289); Castellfort, 924 m, 40°30'44.75''N-0°08'44.08''W: 28-IV-2012, 10 specimens, M. García París, N. Percino Daniel & G. García Martín (MNCN_tij 12279-288). **Valencia:** Valencia: 1 specimen, Boscá (*Brachylabis moesta* G. Bosca!) (MNCN_Ent 109691); Valencia: 1 specimen, C. Bolívar (under *Anisolabis annulipes* identification label) (MNCN_Ent 109778). **Extremadura:** **Badajoz:** Torrefresneda, 240 m, 38°59'30''N-6°05'46''W: 22-III-2011, 2 specimens, E. Recuero Gil, I. Martínez-Solano & J. Gutiérrez Rodríguez (MNCN_tij 11154-155). **Islas Baleares:** *Mal-*

Iorca: Molinar levante: V/VI-1936, 1 specimen, Palau (under *Anisolabis maritima* identification label) (MNCN_Ent 109781); Mallorca: Palma: 1 specimen, Taboada (under *Anisolabis annulipes* identification label) (MNCN_Ent 109768); Observatorio de Costitx, 127 m, 39°38'47.15''N-2°56'44.18''E: 27-III-2012, 1 specimen, M. García París & N. Percino Daniel (MNCN_tij 12088); 2 km al N de Ariany, 58 m, 39°40'23.01''N-3°06'48.05''E: 26-III-2012, 1 specimen, M. García París & N. Percino Daniel (MNCN_tij 12086). **Madrid:** **Madrid:** Cadarso [Cadalso] de los Vidrios: 1 specimen, J. Alvarez (*Euborellia* ♂ *moesta* (Serv.) V. Llorente det. 1964) (MNCN_Ent 109747); Cadarso [Cadalso] de los Vidrios, 2 specimens, J. Alvarez (MNCN_Ent 109748-749); Canillas, Madrid: 24-IV-1937, 1 specimen, E. Morales (MNCN_Ent 108691); Casa de Campo, Madrid, 40°24'40.2''N-3°45'50.6''W: 3-IV-2012, 2 specimens, E. Recuero Gil (MNCN_tij 12153-154); Ciudad Universitaria, Madrid: 2-III-1983, 2 specimens, M. García París (bajo piedras húmedas) (MNCN_Ent 109752-753); El Pardo, La Quinta: 21-V-1980, 1 specimen, E. Mingo (MNCN_Ent 109751); El Escorial: 3 specimens, Sanz (MNCN_Ent 108706, 109712713); Madrid: IV, 1 specimen, E. Morales (MNCN_Ent 109689); Madrid: 2 specimens, Arias (MNCN_Ent 108684-685); Madrid: 5 specimens, Bolívar (MNCN_Ent 108686-687, 109718-720); Madrid: 1 specimen, Cazorro (MNCN_Ent 109721); Madrid: 1 specimen, Dusmet (*Anisolabis moesta* ♀ Gené) (MNCN_Ent 109722); Madrid: 2 specimens, J. Abajo (MNCN_Ent 109687-688); Madrid: 4 specimens, Sanz (MNCN_Ent 109714-717); Madrid: Jardines del Museo Nacional de Ciencias Naturales, 682 m, 40°26'29.74''N – 3°41'21.26''W: 16-X-2010, 1 specimen, M. García París (MNCN_tij 10080), 18-VII-2010, 6 specimens, M. García París (MNCN_tij 10002-007), 19-VII-2010, 6 specimens, M. García París (MNCN_tij 10009-014), 7-X-2010, 2 specimens, M. García París (MNCN_tij 10017-018), 16-X-2010, 7 specimens, M. García París (MNCN_tij 10027-033); Montarco: IV-1932, 1 specimen, E. Morales (MNCN_Ent 109690); Nuevo Baztán: 5-VI-1892, 1 specimen, Escala [Escalera] (under *Anisolabis annulipes* identification label) (MNCN_Ent 109772); Tielmes: X-2002, 1 specimen, M. García París (MNCN_Ent 109755); Villaverde, 5 specimens, Arias (MNCN_Ent 108637, 108680-683); Villaverde, 1 specimen, Arias (*Anisolabis Fieber moesta* Serv. [hand written by Bolívar]) (MNCN_Ent 82). **Murcia:** **Murcia:** Murcia, Totana, 1938, 2 specimens, Balaguer (MNCN_Ent 108654-55). **Navarra:** **Pamplona:** Monteagudo: IV-1940, 4 specimens, E. Mor. [E. Morales Agacino]. (MNCN_Ent 108657-58).

Aborolabis mauritanica (Lucas, 1846)

ALGERIA: Akfadou: 1 specimen, 5-V-1979 (Gianasio [?]) (Dt 385) (HNHM); Batna – Talmet: 2 specimens (Dr. Martin) (MNCN_Ent); Batna: 1 specimen (*Forf. gigantium*) (MNCN_Ent); Batna: 2 specimens (Dr. Martin) (MNCN_Ent); Batna: 3 specimens (MNCN_Ent); Constantine: 5 specimens (MNCN_Ent).

Morocco: Berkane (M...d) [?]: 1 specimen, XI-1960 (Pardo Alcaide leg.) (*Anisolabis mauritanica* Lucas Pardo Alcaide det. 1960) [*Aborolabis angulifera* (Dohrn, 1864) det. Dr. H. Steinmann] (Dt 384) (HNHM); Taforal, Maroc Nord: 1 specimen, XII-1960 (Pardo Alcaide leg.) (gen. prep. No. 28 ant. Dr. Steinmann) (*Aborolabis angulifera* (Dohrn, 1864) det. Dr. H. Steinmann) (Dt 383) (HNHM) [specimen reported by Steinmann, 1978].

SPAIN: Granada: 2 specimens, 17-VI-1976 (Dr. H. Steinmann) (Dt 393) (HNHM) [specimen reported by Steinmann, 1978] [mislabelled]

TUNISIA Ferme Shitta Djebel Eddyr ca. 7 km N from El Kef: 3 specimens, 28-III-1977 (No 17 leg. S. Mahunka) (Dt 401) (HNHM) [specimen reported by Steinmann, 1978]; Tunis: 2 specimens, XI-1941 (Dt 397) (HNHM); Tunis: 7 specimens, XI-1947 (Dt 398) (HNHM)

Aborolabis mordax Steinmann, 1978

Type material – *Aborolabis montana* (nomen nudum) = *Aborolabis cerrobarjai* Steinmann, 1979 = *Aborolabis mordax* Steinmann, 1978 (**syn. n.**)

ALGERIA: Fedja: 3 specimens (Dr. Martin) (MNCN_Ent); Fôret de Tagma: 2 specimens (329) (MNCN_Ent); Kabylie: 3 specimens (Dr. Martin) (MNCN_Ent).

Spain, 2700 m Sierra Nevada Dr. H. Steinmann [typed] // gen. prep. No. 578 det. Dr. Steinmann [number hand written] // 18.6.1976 [hand written] // **Holotypus** *Aborolabis montana* sp. n. Dr. H. Steinmann [name hand written, white label red edges] // Dt 381 [printed] [HNHM] [specimen reported by Steinmann, 1981 as holotypus of *Aborolabis cerrobarjai*] [male] [mislabelled] (Fig. 2a).

Spain, 2700 m Sierra Nevada Dr. H. Steinmann [typed] // 18.6.1976 [hand written] // **Paratypus** *Aborolabis montana* sp. n. Dr. H. Steinmann [name hand written, white label red edges] // Dt 382 [printed] [HNHM] [specimen reported by Steinmann, 1981 as paratypus of *Aborolabis cerrobarjai*] [female] [mislabelled] (Fig. 2b).

Tunisia. Environs of Ain Draham 31.III.1977 [typed] // No 38 leg. S. Mahunka [typed] // gen. prep. No. 570 det. Dr. Steinmann [number hand written] // **Holotypus** *Aborolabis mordax* Dr. H. Steinmann [name hand written, white label red edges] // Dt 386 [printed] [HNHM] [specimen reported by Steinmann, 1978] [male] (Fig. 1a).

Tunisia. Environs of Ain Draham 31.III.1977 [typed] // No 38 leg. S. Mahunka [typed] // **Paratypus** *Aborolabis mordax* Dr. H. Steinmann [name hand written, white label red edges] // Dt 387 [printed] [HNHM] [specimen reported by Steinmann, 1978] [male].

Tunisia. Environs of Ain Draham 31.III.1977 [typed] // No 38 leg. S. Mahunka [typed] // **Paratypus** *Aborolabis mordax* Dr. H. Steinmann [name hand written, white label red edges] [HNHM] [specimens reported by Steinmann, 1978] [3 female].

Spain, 2700 m Sierra Nevada Dr. H. Steinmann [typed] // **Paratypus** *Aborolabis mordax* Dr. H. Steinmann [name hand written, white label red edges] // Dt 388 [printed] [HNHM] [specimen reported by Steinmann, 1978] [male] [mislabelled] (Fig. 1b).

Spain, 2700 m Sierra Nevada Dr. H. Steinmann [typed] // **Paratypus** *Aborolabis mordax* Dr. H. Steinmann [name hand written, white label red edges] [HNHM] [specimen reported by Steinmann, 1978] [female] [mislabelled].

Natural History of the National Parks of Hungary

Editor-in-chief

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