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Revision of the *Melolontha papposa*-complex from the Iberian Peninsula with description of three new species (Scarabaeidae: Melolonthinae: Melolonthini)

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Abstract

The *Melolontha papposa*-complex from the Iberian Peninsula is revised. Three new species, *Melolontha baetica* **sp. n.**, *Melolontha hidalgoi* **sp. n.** and *Melolontha llinaresi* **sp. n.**, are described from the Spanish province of Andalusia and the Portuguese province of Algarve. *Melolontha hybrida* CHARPENTIER, 1825 is reinstated as a valid taxon. Lectotypes for *Melolontha hybrida* and *Melolontha hybrida rufotestacea* KRAATZ, 1885, and a neotype for *Melolontha fucata* BLANCHARD, 1850 are designated. A character matrix and a key to the males of all members of the group are given, distributions are mapped and all relevant characters are illustrated.

Resumen

Se revisa el complejo *Melolontha papposa* en la Península Ibérica. Se describen tres nuevas especies, *Melolontha baetica* **sp. n.**, *Melolontha hidalgoi* **sp. n.** and *Melolontha llinaresi* **sp. n.**, procedentes de la Comunidad autónoma de Andalucíay y de las provincias portuguesas de Andalucía. *Melolontha hybrida* CHARPENTIER, 1825 es considerada como taxon válido. Se designan los lectotipos de *Melolontha hybrida* y *Melolontha hybrida rufotestacea* KRAATZ, 1885 así como el neotipo de *Melolontha fucata* BLANCHARD, 1850. Se presentan matriz y claves para machos de todos los miembros del grupo. Se muestran mapas de distribución e ilustraciones de todas las características relevantes.

Introduction

The genus *Melolontha* FABRICIUS, 1775 is the type genus of, and is placed in, the subfamily Melolonthinae LEACH, 1819 and the tribe Melolonthini LEACH, 1819. The genus comprises almost 50 species in the Palearctic Region. For the Mediterranean region ten species are so far known (BEZDĚK 2016). From the Iberian Peninsula, three species are recorded (BÁGUENA CORELLA 1967, BAHILIO et al. 1993, BARAUD 1977, BEZDĚK 2016), namely *Melolontha hippocastani hippocastani* FABRICIUS, 1801, *Melolontha melolontha* (LINNAEUS, 1758) and *Melolontha papposa* ILLIGER, 1803. Although *M. melolontha* and *M. papposa* are undoubtedly present in the Iberian Peninsula (see for example BAHILIO et al. 1993, *M. melolontha* for recent material), the presence of *M. h. hippocastani* remains questionable due to lack of data, according to BARAUD (1977).

According to KEITH (2003) the genus *Melolontha* is divided into three groups in the west Palearctic Region: *melolontha-, albida-* and *papposa*-groups. The groups are characterized by the shape of the pygidium, squamation of the body and shape of the parameres. The *papposa*-group is characterised by the lack of squamation on the surface, a relatively short pygidium (not or slightly prolonged) and compressed parameres with distinct lateral and medial sculpture, and a polygonal apical shape. The group currently includes four species distributed in the Mediterranean-Caucasian region: *M. papposa*, *M. aceris* FALDERMANN, 1835, *M. excisicauda* BALTHASAR, 1936 and *M. sardiniensis* DRUMONT, MURET, HAGER & PENNER, 1999.

The subgenus *Apropyga* MEDVEDEV, 1951 is currently a synonym of the genus *Melolontha* (cf. BEZDĚK 2016) and originally included five species with the same characteristics as the *M. papposa*-group. KEITH (2003) discussed species from Europe and the Middle East, and indicated only the species *Melolontha aceris* for the subgenus *Apropyga*.

ILLIGER (1803) described *M. papposa* from Portugal and gave information on its habitat and collecting circumstances. He already discussed the possibility of it being a mixture of species, and discussed some characteristic differences, and nominated a form as a hybrid. These characteristics are similar to the taxon *M. hybrida* CHARPENTIER, 1825 **stat. restit.** which is also known from Portugal as shown in the present study (Fig. 70). Later, the taxa *M. fucata* BLANCHARD, 1850 and *M. rufotestacea* KRAATZ, 1885 were described. Several authors have discussed the taxonomic position of the taxa of the Iberian *papposa*-complex. KRAATZ (1885) classified the taxon *rufotestacea* as a variety of *M. hybrida.* The taxa *M. fucata* and *M. rufotestacea* were synonymized by MARSEUL (1857) soon after their descriptions. The position of *M. hybrida* has been extensively debated. However, most authors considered this taxon as a valid species until the end of the 19th century. Notably, DIECK (1870) and METZLER (1882) treated *M. hybrida* and *M. papposa* as separate taxa, based on both characters and biology. HEYDEN et al. (1883) followed these authors. Two years later, KRAATZ (1884) commented on the uncertain position of *M. hybrida* and provided information on its collecting circumstances, known material and collectors. REITTER (1887, 1902), HEYDEN et al. (1906) and DALLA TORRE (1912) followed the taxonomic position of DIECK (1870) and METZLER (1882). Later, BÁGUENA CORELLA (1967) and BARAUD (1977, 1992) classified *M. hybrida* as a synonym of *M. papposa*, although prior to 1977, BARAUD had also noted the differentiating characters of the group and published characteristic differents of aedeagi (Figs 401, 401A), but without making taxonomic changes.

The first analysis and illustration of the aedeagi of *M. papposa* and *M. hybrida* was given by METZLER (1882, Plate IV, 41-42) together with an analysis of characters, distribution and behaviour. The changing history of the Iberian *M. papposa*-complex is indicative of the different analytical approaches of past authors regarding the taxonomic status of available taxa from the Iberian Peninsula. In this article, we will give an analysis of the *M. papposa*-group from the Iberian Peninsula.

This article is based on the study of more than 1000 specimens of this complex, from numerous localities. The taxa *Melolontha hybrida* is treated as valid taxa. Three new species *Melolontha baetica* **sp. n.**, *Melolontha hidalgoi* **sp. n.** and *Melolontha llinaresi* **sp. n.** are described. The widespread distribution of *M. hybrida* and in contrast the much more localised distributional area of the other species are illustrated. Distinguishing morphological characters and aedeagi are illustrated, distributions of each species are mapped and an identification key for the males is given. Finally, lectotypes of *Melolontha hybrida* CHARPENTIER, 1825 **stat. restit.** *Melolontha hybrida rufotestacea* KRAATZ, 1885 and a neotype of *Melolontha fucata* BLANCHARD, 1850 are designated. As no original material of *M. fucata* exists Olivier MONTREUIL (2019, pers. comm.) has confirmed us that type material is not preserved in MNHN, we here designate a neotype from specimens collected in Spain (Sevilla, prov. of Andalusia), that is within the area of its natural distribution "Andalusia", to clarify the taxonomic status of the species and for nomenclatural stability according to the Article 75.3 of the Code (ICZN 1999). We consider this taxon as junior subjective synonym of *M. hybrida* CHARPENIER, 1825.

Material and methods

The following codes identify the collections housing the material examined (curators in brackets):

IECA	Biology Centre CAS, Institute of Entomology, České Budějovice, Czech Republic (Aleš Bezděk)
AHCL	Antonio Hidalgo Fontiveros collection, Linares, Spain
BMNH	Natural History Museum, London, United Kingdom (Maxwell V. L. Barclay, Malcolm Kerley)
ERCS	Eckehard Rößner collection, Schwerin, Germany
GMCL	Geoffrey Miessen collection, Liege; Belgium
HFCB	Hans Fery collection, Berlin, Germany
HNHM	Hungarian Natural History Museum, Budapest, Hungary (Ottó Merkl, Győző Szél)
JUCS	José María Urbano collection, Sevilla, Spain
JZCM	José Luis Zapata collection, Madrid, Spain
JNCS	Jerónimo Navarro García collection, Sevilla, Spain
LHCB	Lars Hendrich collection (deposited in ZSM), Munich, Germany
MFNB	Museum für Naturkunde Berlin, Germany (Johannes Frisch, Joachim Willers)
MNHN	Muséum national d'Histoire naturelle, Paris, France (Olivier Montreuil, Antoine Mantilleri)
NMCN	Nacional Museo de Ciencias Naturales, Madrid, Spain (Mercedes París)
NMEC	Naturkundemuseum Erfurt, Germany (Matthias Hartmann)
OHCB	Oliver Hillert collection, Schöneiche bei Berlin, Germany
RSCV	Richard Sehnal collection, Velenice, Czech Republic

SDEI Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany (Lutz Behne)
WZCR Wolfgang Ziegler collection, Rondeshagen, Germany
ZFMK Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany (Dirk Ahrens)
ZSM Zoologische Staatssammlung München, Munich, Germany (Michael Balke, Lars Hendrich).

Altogether, 1047 specimens (see material below) were studied. Specimens of the newly described species are provided with one red printed label 'Name of taxon sp. nov., HOLO-TYPUS ♂, ALLOTYPUS ♀ or PARATYPUS ♂ or ♀, followed by the names of the authors and year and number'. In the case of lectotype, paralectotype or neotype designation, each specimen bears a red printed label: 'Name of taxon with author and year of original description, LECTOTYPUS ♂, PARALECTOTYPUS ♂ or ♀ or NEOTYPUS ♂ Oliver Hillert & Eckehard Rößner des. 2018 or 2019'. Authors' remarks and comments are given in brackets. Exact label data are only cited for type material; individual labels are indicated (only for types) by a double slash (//), individual lines on a label by a single slash (/), preceding data within quotation marks are printed [p], handwritten [hw] or read label [rl].

The habitus photographs were either taken by O. Hillert using a Nikon AF-S Micro Nikkor 40mm 1:2.8G Macro lens attached to a Nikon D-300 camera or using a Leica S6i for aedagi photographs. Focused images of the specimens and aedeagi were stacked using Helicon Focus 3.20.2 Pro software.

Taxonomy

Melolontha baetica sp. n.

(Figs 1, 6a-b, 11, 16, 21, 26, 31, 36, 41, 46, 51, 56, 61, 70-71)

Melolontha papposa ILLIGER: DIECK 1870: 176 (distribution).

Type locality. "Pinar del Rey, San Roque, Cádiz (España)".

Type material examined (200 specimens). **Holotypus** ♂ 'Pinar del Rey / San Roque, Cádiz / (España) / 31.iii.2018 / J. Mª. Urbano & J. Navarro lgt. [p] // Melolontha baetica sp. nov. / Holotypus / Oliver Hillert, Eckehard Rößner / Jeronimo Navarro & Jose Maria / Urbano det. 2018 [p, rl]' (NMCN). **Allotypus** ♀ 'Algeciras/Spain, 2.4., H. Roer leg. 1965 [p] // Melolontha baetica sp. nov. / Allotypus / Oliver Hillert, Eckehard Rößner / Jeronimo Navarro & Jose Maria / Urbano det. 2018 [p, rl]' (ZFMK). **Paratypes: Spain (Andalusia; Cádiz):** 'Pinar del Rey / San Roque, Cádiz / (España) / 31.iii.2018 / J. Mª. Urbano & J. Navarro lgt. [p]' 5♂♂ (ERCS) [nos. 1-5], 63♂♂ (JNCS) [nos. 6-69], 64♂♂ (JUCS) [nos. 70-133], 12♂♂ (OHCB) [nos. 134-145]; 'Pinar del Rey / San Roque / Cadiz / 30.iii.1986 / leg. ex coll. A. Verdugo [p]' 1♂ (GMCL) [no. 190]; 'Spain / 26.2.-3.3.2016 / Almoraima env. / lgt. P. Kylies [p]' 2♂♂ (RSCV) [nos. 146-147]; 'Montera del Torero / Parque de los Alcornocales / Los Barrios, Cádiz / 3.VI.2006, J. Mª Urbano lgt. [p]' 1♂ (JUCS) [nos. 148]; 'Algeciras/Spain / 2.4. / H. Roer leg. 1965 [p]' 1♂ (ERCS) [no. 149], 1♂ (OHCB) [no. 150], same data but '9.4.1965' 1♂ (ZFMK) [no. 151], same data but '4.4.1965' 2♂♂ (ZFMK) [nos. 152-153]; 'Algeciras / 11.5. [18]95, Kb [Korb], Melolontha papposa Ill., Sammlung Cl. Müller [p]' 1♂ (ZSM) [no. 154]; 'Algeciras / v.[18]95 [hw] // M. / papposa / Ill. / Hisp. [hw]' 1♂ (MFNB) [no. 155]; 'Algeciras / v.[18]95, [hw] // M. pappo / sa Ill. P.H. [hw]' 1♂ (MFNB) [no. 156]; 'Algeciras / 19.4.[18]95, Kb [Korb] [hw] // Sammlung Cl. Müller [p]' 4♂♂ (ZSM) [nos. 157-160]; 'Algeciras / 19.4.[18]95, Kb [Korb] [hw] // Sammlung Daniel [p]' 3♂♂ (ZSM) [nos. 185-187]; 'Chiclana / 6.3.[18]90, Kb [Korb] [hw]' 1♂ (ZSM) [no. 161]; 'papposa Illig. [p] // papposa / Illig. / Algeciras [hw]' 1♂ (MFNB) [no. 162]; 'Chiclana / 2/1916 [leg. Lauffer], NMCN_ENT216209 [p]' 1♂ (NMCN) [no. 163]; 'Chiclana / 30.3.[18]90, Kb [Korb] [p]' 1♂ (ZSM) [no. 164]; 'Chiclana, / Andalusien / 1890. Korb [p]' 1♂ (MFNB) [no. 165]; 'Chiclana, / Andalusien / 1890. Korb [p] // papposa / Illig. [hw]' 1♂ (MFNB) [no. 166]; 'Chiclana / [18]83, Kb [Korb] [p]' 1♀ (ZSM) [no. 167]; 'SP/Prov. / Barbata [= Barbate, prov. Cádiz] ö Vejer de la Frontera / 4.4.[20]12, W. Ziegler [leg.] [p]' 1♂ (WZCR) [no. 168]; 'W. Ziegler [leg.] / Esp. P. Andalucia, Tarifa / 13.4.[19]74 [p]' 1♂ (WZCR) [no. 169]; 'Gibraltar, Ebene / 700m Höhe 1.-3. / 1900 G. Krüger S. [p] // 700 Füfo / nigt meter [hw]' 1♂ (MFNB) [no. 170]; 'Gibraltar [p], 1♂ (SDEI) [no. 171]; 'Gibraltar / J.J. Walker [p]' 11♂♂ 1♀ (BMNH) [nos. 172-183]; '18.3.[19]83 / San Roque / Andalusien [hw] // Melolontha / papposa [hw] // Melolontha / papposa Ill. / J. Baraud det. 1986 [hw]' 2♂♂ (HFCB) [nos. 188-189]; 'El Colorao [Colorado], Conil / Cadiz, 13-Mar [19]94 / A. Verdugo leg. [hw] // Conil – Cadiz / España / 13.iii.1994 [p] // leg. & ex. coll / A. Verdugo / collection G. Miessen [p]' 2♂♂ (GMCL) [nos. 191-192]; 'El Picacho – Alcala Gles / Cadiz – 15. Mar. [19]88 / Jordan leg. [hw] // El Picacho / Alcala Gles / Cadiz España / 15.iii.1988 [p] // leg. Jordan / ex. coll A. Verdugo / collection G. Miessen [p]' 1♂ (GMCL) [no. 193]; 'Jerez de la Frontera / Cadiz – España / ii. 1991[p] // ex. coll A. Neef de Sainval / collection G. Miessen [p]' 2♂♂ (GMCL) [nos. 194-195]; 'Cabo Roche - / Conil – Cadiz / España / 13.iii.1994 [hw] // leg. A. Verdugo / collection: / G. Miessen [p]' 3♂♂ (GMCL) [nos. 196-198].

Additional material examined (47 specimens). **No further locality specified:** Andalusia, 4♂♂ (SDEI), 2♂♂ (ZSM); 59.5., Andalusia, Staudinger, 11♂♂ (BMNH); Vogel, Andalusia, 2♂♂ (SDEI), 1♂ (BMNH); Andalusien, coll. Brenske, 11♂♂ (MFNB); Andalusien, 1♂ (MFNB); Andalus[ia]., 3♂♂ (SDEI); Andalus[ia]., Kratz; coll. Haag, 1♂ (SDEI); Andalus[ia]., Schaufuss, 1♂ (SDEI); Andal[usia]., 1♂ (ZSM), 1♂ (SDEI); Hispania, coll. Brenske, 1♂ (MFNB); Hispan, 2♂♂ (BMNH); papposa Ill., Hispan[ia]. (Strl.), papposa fliegt nach Dieck des abends, 1♂ (SDEI); Hisp[ania], 1♂ (ZSM), 1♂ (SDEI). **Patria falsa:** Portugal, coll. O. Leonhard,1 ♂ (SDEI); Tunis, 1♂ (MFNB).

Deposition of holotype: NMCN.

Description (holotype): Distinctly convex, surface brownish, densely covered with squarrose setae.

Head (Figs 6, 11, 36): Clypeus distinctly transverse (1:1.7), front half with weak concave impression, anterior angles distinctly rounded, lateral margin parallel, frontal margin weakly emarginated in the middle when viewed dorsally, frontal disc more or less concave. Antenna brownish-red; clavus distinctly bent outwards approximately in the front third, more than 3 times as long as antennomers I-III combined; scapus not elongated and not inflated; antennomer III extended and flattened outwardly with tooth-like protuberance at the front (Fig. 21). Eyes moderately developed (Fig. 6).

Pronotum (Figs 6, 11, 16) distinctly transverse, brownish in colour; entirely bordered laterally and basally, broadest in the middle; lateral margin more or less sharply rounded, front half weakly serrated; setation short and smooth with squarrose setae on the entire surface of the pronotum, very limited number of fine and long vertical setae, located only in the front third beside the middle; punctation distinct, dense, simple, composed of deep impressions.

Scutellum as long as wide, broadly rounded, distinct and densely punctate, glabrous midline, shiny; setae simple, composed of squarrose and smooth setae.

Elytra (Fig. 1) approximately 3:1 long as wide, surface covered with squarrose and smooth setae, between the suture and humerus two distinct striae along the entire elytral length.

Pygidium (Fig. 26) distinctly elongate, apex bifurcate, covered with setation similar to the elytra but denser.

Legs: Protibia (Fig. 6a) bidentate; apical tooth distinct, directed forward; medial tooth extending slightly further than the level of apical tooth, basal tooth missing. Apical plane of hind tibia as in Fig. 31.

Aedeagus as in Figs 41, 46, 51, 56, 61.

Female (allotype). Head: Clypeus distinctly transverse, anterior angles broadly rounded, lateral margin weakly convergent, frontal margin emarginated at middle when viewed dorsally, front disc elevated in the middle, more or less concave on each side.

Pronotum transverse, entirely bordered, broadest just in the middle; lateral margin more or less sharply rounded (not regularly rounded); covered with short and smooth squarrose setae, intermixed with single long setae on the whole the surface.

Legs: Protibia bidentate.

Pygidium very weakly bifurcate at apex.

Measurements. Total body length 19-26 mm.

Differential diagnosis. Refer to species key.

Collection circumstances. Specimens were collected in forest of *Quercus suber* L. with sandy soil. Observed flying by Navarro & Urbano, 2018 between 1:00 and 2:00 p.m. Comments are given by DIECK (1870) "von Ende Januar ab in den späten Nachmittagsstunden" [from late January in the late afternoon].

Etymology. The name "Baetica" referred to the historical region from Roman times which is located today the south-central part of Andalusia and include the typelocality of the new species.

Distribution. Endemic of the Province of Cádiz, Autonomous Community Andalusia, Spain (Fig. 70).

Melolontha hidalgoi sp. n.

(Figs 2, 7a-b, 12, 17, 22, 27, 32, 37, 42, 47, 52, 57, 62, 70, 72)

Type locality. "Garruchena, Hinojos, Huelva (España)".

Type material examined (195 specimens). **Holotypus** ♂ 'Garruchena, Hinojos / Huelva / (España), 20.iv.2018 / J. Mª. Urbano & J. Navarro lgt. [p] // Melolontha hidalgoi sp. nov. / Holotypus / Oliver Hillert, Eckehard Rößner / Jeronimo Navarro & Jose Maria / Urbano det. 2018 [p, rl] // NMCN_ENT 241152 [p]' (NMCN). **Allotypus** ♀ 'Niebla / Huelva / (España), 9.iv.1998 / J. Mª Urbano lgt. [p] // Melolontha hidalgoi sp. nov. / Allotypus / Oliver Hillert, Eckehard Rößner / Jeronimo Navarro & Jose Maria / Urbano det. 2018 [p, rl]' (JUCS). **Paratypes: Spain (Andalusia; Huelva):** 'Garruchena, Hinojos / Huelva / (España), 20.iv.2018 / J. Mª. Urbano & J. Navarro lgt. [p]' 18♂♂ (JNCS) [nos. 1-18], 19♂♂ (JUCS) [nos. 19-37], same data but '6.iv.2018' 19♂♂ (JNCS) [nos. 38-56], 18♂♂ (JUCS) [nos. 57-74], same data but '28.iii.2018' 9♂♂ (JNCS) [nos. 75-83], 9♂♂ (JUCS) [nos. 84-92], same data but '26.iii.2016' 3♂♂ (AHCL) [nos. 93-95], 4♂♂ (ERCS) [nos. 96-99], 4♂♂ (OHCB) [nos. 100-103], same data but '4.iv.2016' 12♂♂ (JNCS) [nos. 104-115], same data but '7.iv.2016' 3♂♂ (AHCL) [nos. 116-118], 3♂♂ (JNCS) [nos. 119-121], 1♂ (OHCB) [no. 122], same data but '5.iv.2008' 1♂ (GMCL) [no. 193]; 'Camino de Hinojos / La Palma del Condado, Huelva / (España), 7.iv.2016 / J. Navarro & J. Mª Urbano lgt. [p]' 27♂♂ (JUCS) [nos. 123-148], same data but '26.iii.2016' 2♂♂ (ERCS)

[nos. 149-150], 5♂♂ (OHCB) [nos. 151-155], same data but '3.v.2015' 9♂♂ (JUCS) [nos. 156-164]; 'Esp./Prov. Huelva, Lepe, 2.4.2002, W. Ziegler [leg.] [p]' 1♂ (WZCR) [no. 165]; 'Matalascañas, Almonte / Huelva / (España), 26.iii.2000 / J. Navarro lgt. [p]' 2♂♂ (JNCS) [166-167]; 'Spanien / Andalusien / Matalascañas bei Huelva / 29.03.-05.04.2006 a.l. / leg. Schellhorn, Stadie, Drechsel, Löbel [p]' 1♂ (OHCB) [no. 168]; 'Matalascañas / Huelva / 28.III.86, M. G. París // Melolontha papposa // NMCN_ENT 216254 [p]' 1♂ (NMCN) [no. 169]; 'Spanien/Andalusien / Matalascañas / 8.3.[19]85 / leg. Hendrich|Herzig [p, hw] // Melolontha papposa [hw]' 1♂ (LHCB) [no. 170]; 'C. Doñana, Matalascañas / Huelva / (España), 22.iii.[19]86 / José Luis Zapata lgt. [p]' 5♂♂ (JZCM) [nos. 171-175]; 'Doñana, I. Alvard [leg.] / 9-IV-1981 [p] // Melolontha papposa Illig. / F. M. Piera det. // NMCN_ENT 216227 [p]' 1♂ (NMCN) [no. 176]; 'Coto Doñana / Huelva. III-1981 / F. Hiraldo leg. [p] // Melolontha papposa Ill. / A. Compte det. 1986 [p] // NMCN_ENT 216248 [p]' 1♂ (NMCN) [no. 177]. **(Andalusia; Cádiz):** 'Spanien (Andalucia) / Rota bei Cadiz / 08.03.1998, leg. Hillert [p]' 1♂ (OHCB) [no. 178]; 'Matalascañas, Almonte / Huelva / (España), 28.iii.2017 / J. Mª. Urbano & J. Navarro lgt. [p]' 3♂♂ (JNCS) [nos. 179-181], 2♂♂ (JUCS) [nos. 182-183].
Portugal (Algarve): 'Faro (Lusit[ania].) / Brandeiro, [18]84 [hw] // Smmlung / J. Daniel [p]' 1♂ (ZSM) [no. 185]; 'Faro / Algarvia / Korb [hw] // coll. L.V. Heyden / DEI Müncheberg [p] // DEI Müncheberg / Col. - 10008 [p]' 1♂ (SDEI) [no. 186]; 'Algarve / Südportugal / Linnaea / Du Maltzan [hw] // A Silves / 8 4 79 [08.iv.1879] [p] // coll. Metzler [p] // DEI Müncheberg / Col. – 09989 [p]' 1♂ (SDEI) [no. 187]; 'A Silves / 8 4 79 [08.iv.1879] [p] // Maltzan [hw] // coll. Metzler [p] // DEI Müncheberg / Col. – 10013 [p]' 1♂ (SDEI) [no. 188]; 'A Silves / 8 4 79 [08.iv.1879] [p] // coll. Metzler [p] // DEI Müncheberg / Col. – 09998 [p]' 1♂ (SDEI) [no. 189], same data but 'Col. – 09989 [p], 1♀ (SDEI) [no. 190], same data but 'Col. – 09999 [p]' 1♀ (SDEI) [no. 191]; 'A Silves / 8 4 79 [08.iv.1879] [p] // Maltzan [hw] // DEI Müncheberg / Col. – 10012 [p]' 1♀ (SDEI) [no. 192].
Additional material examined (2 specimens). **No further locality specified:** Hisp[ania]., Merkl, 1♂ (SDEI); Alferce, (Portugal), V-1909, Exp. Del Museo, NMCN_ENT 215576, 1♀ (NMCN).

Deposition of holotype: NMCN.

Description (holotype): Distinctly convex, surface brownish, covered with dense squarrose setae.

Head (Fig. 7): Clypeus distinctly transverse (1:1.7), front half with weakly concave impressions, anterior angles distinctly rounded, lateral margin parallel, frontal margin not emarginated in the middle when viewed dorsally, frontal disc more or less concave. Antenna brownish-red; clavus distinctly bent outwards approximately in frontal third, more than 3 times as long as antennomeres I-III combined; scapus not elongated and not inflated; antennomere III extended and flattened outwardly, toothlike protuberance at the front (Fig. 22). Eyes moderately developed (Fig. 7).

Pronotum (Fig. 7) distinctly transverse, brownish in colour; entirely bordered laterally and basally, broadest just at middle; lateral margin regularly rounded, front half weakly serrated; setation short and smooth with squarrose setae on the whole surface of the pronotum, very few fine and long vertical setae, located only in front third beside the middle; punctation distinct, dense, simple, composed of deep impressions.

Scutellum transverse broadly rounded, with distinct and dense punctuation, midline glabrous and shiny; setae simple, composed of squarrose and smooth setae.

Elytra approximately 3:1 long as wide, surface covered with squarrose and smooth setae, two distinct striae along the entire elytral length between the suture and the humerus.

Pygidium (Fig. 27) not elongate, very weakly bifurcate at apex, covered with setation similar to the elytra but denser.

Legs (Fig. 7): Protibia tridentate; apical tooth distinct, directed forward; medial tooth moderately extend further than the level of apical tooth, basal tooth visible. Apical plane of hind tibia as in Fig. 32.

Aedeagus as in Figs 42, 47, 52, 57, 62.

Female (allotype): Head. Clypeus distinctly transverse, anterior angles broadly rounded, lateral margin weakly convergent, frontal margin emarginated at middle when viewed dorsally, front disc elevated in the middle, more or less concave on each side.

Pronotum transverse, entirely bordered, broadest just in the middle; lateral margin more or less sharply rounded (not regularly rounded), covered with short and smooth squarrose setae, intermixed single long setae absent.

Legs: Protibia bidentate.

Pygidium very weakly bifurcate at apex.

Measurements. Total body length 20-26 mm.

Differential diagnosis. Refer to species key.

Collection circumstances. Specimens where collected in forest of *Quercus ilex* L. with sandy soil. Observed flying at dusk by Navarro & Urbano, 2018, at approximately 9:00 p.m.

Etymology. Patronymic; named in honour of our good friend Antonio HIDALGO-FONTIVEROS (Linares, Spain), a good collector of and specialist on the family Scarabaeidea.

Distribution. Portugal (Algarve); Spain (Andalusia: Cádiz and Huelva) (Fig. 70).

Melolontha hybrida CHARPENTIER, 1825 stat. restit.

(Figs 3, 8a-b, 13, 18, 23, 28, 33, 38, 43, 48, 53, 58, 63, 69, 66-67, 70, 73)

Melolontha hybrida CHARPENTIER, 1825: 212 (original description); MARSEUL 1857: 87 (catalogue), 1863: 128 (catalogue, synonym of *M. papposa*); DIECK 1870: 182 (biology); MULSANT & REY 1871: 542 (characters, distribution); METZLER 1882: 233 (characters, distribution); HEYDEN et al. 1883: 99 (catalogue); KOLBE 1884: 76 (characters); KRAATZ 1885: 70, 72 (catalogue, characters); BEZDĚK 2006: 196 (catalogue; synonym of *M. papposa*), BEZDĚK 2016: 233 (catalogue; synonym of *M. papposa*).

Melolontha hybrida var. *rufotestacea* KRAATZ, 1885: 70 (original description).

Melolontha hybrida var. *fuscata* BLANCHARD: KRAATZ 1885: 70 [incorrect subsequent spelling] (catalogue); REITTER 1887: 541 (list).

Melolontha fucata BLANCHARD 1850: 160 **nov. syn.** (original description); MARSEUL 1857: 87 (catalogue, synonym of *M. hybrida*), 1863: 128 (catalogue; synonym of *M. papposa*); METZLER 1882: 233 (synonym of *M. hybrida*); HEYDEN et al. 1883: 99 (catalogue; synonym of *M. hybrida*), 1906: 737 (catalogue; synonym of *M. papposa*); DALLA TORRE 1912: 49 (catalogue; synonym of *M. papposa*); BEZDEK 2006: 196 (catalogue; synonym of *M. papposa*), 2016: 233 (catalogue; synonym of *M. papposa*).

Melolontha fuscata BLANCHARD: REITTER 1902: 264 [incorrect subsequent spelling] (synonym of *M. papposa hybrida*); BARAUD 1977: 262 (synonym of *M. papposa*), 1992: 447 (synonym of *M. papposa*).

Melolontha papposa hybrida CHARPENTIER: REITTER 1887: 541 (characters, distribution), 1902: 264 (key).

Melolontha papposa hybrida var. *rufotestacea* KRAATZ: REITTER 1887: 541 (list), 1902: 264 (key).

Melolonta papposa var. *hybrida* CHARPENTIER: HEYDEN ET AL, 1906: 737 (catalogue); DALLA TORRE 1912: 49 (catalogue); WINKLER 1929: 1091 (catalogue).

Melolontha papposa var. *rufotestacea* KRAATZ: DALLA TORRE 1912: 49 (catalogue).

Melolontha papposa ab. *rufotestacea* KRAATZ: WINKLER 1929: 1091 (catalogue); BÁGUENA CORELLA 1967: 406 (characteristic); BARAUD 1977: 262 (characters), BARAUD 1992: 447 (characters).

Melolonta papposa ab. *hybrida* CHARPENTIER: BÁGUENA CORELLA 1967: 406 (characters); BARAUD 1977: 262 (synonym of *M. papposa*), BARAUD 1992: 447 (synonym of *M. papposa*).

Melolontha rufotestacea KRAATZ: BEZDĚK 2006: 196 (catalogue; synonym of *M. papposa*), BEZDĚK 2016: 233 (catalogue; synonym of *M. papposa*).

Type locality. "Lusitania".

Type material examined (3 specimens). *Melolontha hybrida* CHARPENTIER, 1825, **Lectotypus** ♂ '11189 [hw] // fucata / Ziegl. litt. / Hisp. Ziegl. [hw] // Melolontha hybrida / Carp. Hor. Ent. p. 212 / t.q.f.5 [hw] // Lectotypus / Melolontha hybrida / Charpentier, 1825 / O. Hillert & E. Rößner des. 2018 [p, rl]' (MFNB).
Melolontha hybrida rufotestacea KRAATZ, 1885, **Lectotypus** ♀ 'coll. Kraatz [p] // Madrid [hw] // Typus [p, rl] // papp. var. / hybr. var. / rufotestacea / Kraatz [hw] // DEI Müncheberg / Col. – 10001 [p], // Lectotypus / Melolontha / hybrid var. rufotestacea / Kraatz, 1885 / O. Hillert & E. Rößner des. 2018 [p, rl]' (SDEI).
Melolontha fucata BLANCHARD, 1850, **Neotypus** ♂ 'Seville / Dr. Martin [p] // Museum Paris / ex. Coll. / R. Oberthur [p] // Neotype [p, rl] // MNHN / EC 10155 [p] // Neotypus / Melolontha fucata / Blanchard, 1850 / O. Hillert & E. Rößner des. 2019 [p, rl]' (MNHN).
Additional material examined (182 specimens). **Portugal (Beja):** Sierra de Malhao, 8.V.[19]66, Portugal, Wattinson coll., B. M. 1949-283, (Purchased), 1♂ (BMNH). **Portugal (Coimbra):** Cïmbra, coll. Camille, Van Voixem, M. R. Belg., 1♂ (MFNB); Coimbra, Paulino, 2♂♂ (SDEI); Coimbra, Portugal, april-1902, C. Rodroguez, NMCN_Ent 216281, 1♂ (NMCN). **Portugal (Guarda):** Portugal, or. Guarda reg., Valhelhas env. 10.v., Sierra de Estrela 800 m, lgt. F. & L. Kantner 2003, 3♂♂ (IECA). **Portugal (Porto):** Aregos, Portugal, Wattinson coll., B. M. 1949-283, (Purchased), 1♂ (BMNH). **Portugal (Vila Real):** 14.5.[19]26, Pedras salgadas, Portugal, Wattinson coll., B. M. 1949-283, (Purchased), 1♂ (BMNH).
No further locality specified: Portugal, de Oliviera, M. R. Relg., 1♂ (NMHB); Portugal, de Oliviera, M. R. Relg., M. R. Belg., coll. Brenske, 1♂ (MFNB); Portugal, de Oliviera, M. R. Belg., coll. Brenske, 2♂♂ (MFNB); Portugal, 2♀♀ (SDEI), 1♂ (BMNH); Portugal, NMCN_Ent 216221, 1♂ (NMCN); Portugal, Wattinson coll., M. B. 1949-283, (Purchased), 10♂♂ 2♀♀ (BMNH).
Spain (Andalusia; Córdoba): Cordoba, Sammlung Cl. Müller, 1♂ 1♀ (ZSM); Cordoba, coll. Brenske, 1♂ 1♀ (MFNB); hybrida, Cordoba, Dieck, fliegt in der Mittagshitze, 1♀ (SDEI); hybrida, Cord[oba]., 1♀ (ZSM); Coll. Haag, Cardova, Gaugelet, 1♂ (SDEI); Melolontha hybrida Charp., Cordoba!, NMCN_Ent 216215, 1♂ (NMCN); Córdoba, Amor [leg.], NMCN_Ent 215574, 1♀ (NMCN); hybrida, Cordoba, Sammlung Cl. Müller, 1♂ (ZSM). **(Huelva):** La Rivera de Montemayor, Cañaveral de León, Huelva, (España), 26.v.2018, J. Mª. Urbano & J. Navarro lgt., 4♂♂ 12♀♀ (JNCS), 11 ♀♀ (JUCS), same data but 01.iv.2017, 3♂♂ (JUCS), 2♂♂ (JNCS). **(Jaén):** El Piélago, Linares (Jaén),

03.iii.2017, A. Hidalgo lgt., 1♂ (JNCS); same data but 25.iv.2009, Urbano lgt., 1♂ (OHCB); Estatión Linares-Baeza, Jaén (España), 27.iv.2016, J. Lora lgt., 1♀ (JNCS); La Aliseda, Santa Elena (Jaén) (C-3), 01.v.2014, A. Hidalgo lgt., 1♂ (JNCS); Linares city (Jaén) (C-1), Junio 1994, A. Hidalgo lgt., 2♂♂ (JNCS). **(Sevilla):** Parque Maria Luisa, (Sevilla) 16.-29.iii.2017, J. Navarro lgt., 1♀ (GMCL), same data but 22.iii.2003 1♂ (GMCL), same data but 07.iv.2003 4♂♂ (JUCS), same data but 16.iii.1997, 3♂♂ (GMCL); Parque Maria Luisa, (Sevilla), (D-5), same data but 18.iii.2001, Navarro lgt., 1♂ (RSCV) same data but 08.iv.1995, J. Navarro lgt., 2♂♂ (JNCS), same data but 26.iii.1995, 6♂♂ (JNCS), same data but 25.iii.1995, 5♂♂ (JNCS), 2♂♂ 2♀♀ (OHCB), 1♂ 2♀♀ (ERCS); La Zamarrona, Castillana, Sevilla (España), 16.iv.1995, J. Navarro lgt., 1♂ 2♀♀ (JNCS); San Nicolas del Puerto, Sevilla (España), 12.vi.1993, J. Navarro lgt., 1♂ (JNCS); Sevilla, IV-1909, Exp. Del Museo, NMCN_Ent 216237, 1♀ (NMCN). **(Aragon; Zaragoza):** Grisén (Z.), 2.V.14 (Navás), NMCN_Ent 216208, 1♂ (NMCN); Melolontha papposa (Zaragoza), NMCN_Ent 216173, 1♂ (NMCN); Villarroya de la Sierra (Zaragoza), 14-V-907, Aranda, NMCN_Ent 216178, 1♂ (NMCN); hybrida, Zaragossa, 1♂ (ZSM).
(Basque country; Álava): Vitoria, J. Ardois, NMCN_Ent 216175, 1♂ (NMCN). **(Castilla-La Mancha; Albacete):** Loc. Fecha, Lagunas Ruidera, 7.6.86, Melolontha papposa, det. Coca Abia, NMCN_Ent 216279, 1♀ (NMCN). **(Ciudad Real):** Spanien, Sa. [Sierra] Morena, Rio Magana, 7.5.[19]55, (Bahnbrücke) Mannhs., 2♂♂ (ZFMK); Sa. [Sierra] Morena, 7.5.1955, 1♂ (ERCS), 1♂ (OHCB), 2♂♂ (ZFMK); Fuencaliente, Sierra Morena, Juan Cabre, NMCN_Ent 216220, 1♂ (NMCN). **(Cuenca):** Villalba de la Sierra, Cuenca, España, 01.vii.[19]84, José Mª Hernando lgt., 2♂♂ 2♀♀ (JZCM); Cuenca, 11.6.[18]99, Kb [Korb], 1♀ (ZSM); Cuenca, 22.5.[18]96, Kb [Korb], 1♂ (ZSM); Castilien, Cuenca, Korb, 1896, 1♂ (MFNB); Cuenca, 15.6.[18]90, Kb [Korb], 1♀ (ZSM); Cuenca, 18.6.[18]90, Kb [Korb], 1♀ (ZSM); M. hybrida Charp., Cuenca, Castro! NMCN_Ent 216203, 1♂ (NMCN). **(Guadalajara):** Aragoncillo, Guadalajara, España, 16.vii.[19]82, José Luis Zapata lgt., 2♂♂ (JZCM). **(Castilla y León; Burgos):** 15469, 18-V-90, Cuevas de San Clemente, Burgos, F. de la Torre leg., ex Col. de la Torre, NMCN_Ent 216286, 1♂ (NMCN); 98, Hortigüela, BU, 22-05-1976, F. de la Torre leg., ex Col. F. de la Torre, 98, NMCN_Ent 216285, 1♂ (NMCN); Spain, Burgos, Barbadillo de Mercado, 22.iv.1964, I. & E. Yarrow, B.M. 1964-639, 1♂ (BMNH); Huerta de arriba, NMCN_Ent 216207, 1♂ (NMCN). **(Salamanca):** Porqueriza, Jul 902, NMCN_Ent 216205, 1♂ (NMCN); Salamanca, NMCN_Ent 3341, 1♂ (NMCN). **(Segovia):** Castilnovo a Castroserna (Segovia), 25.-28.V.78, F. M. Piera leg., NMCN_Ent 216226, 1♂ (NMCN); Espinar, G. Carrasco [leg.], G. Melolontha, M. papposa, M. Coca Abia det., NMCN_Ent 215560, 1♀ (NMCN); La Granja, Spain, 1♂ (BMNH); **(Soria).** Spain, Soria, Herreros-Embalse, 12.-13.iv.2013, Z. Laštůvka lgt., 2♂♂ (IECA); Garray (Soria), M. v. Loro, NMCN_Ent 215577, 1♂ (NMCN); Soria, Loro, NMCN_Ent 216179, 1♂ (NMCN).
(Catalonia; Barcelona): Barcelona, NMCN_Ent 215541, 1♀ (NMCN). **(Tarragona):** hybrida Charp., Tortosa, Goya! NMCN_Ent 216172, 1♂ (NMCN). **(Galicia; Lugo):** Bernandez [leg.], Mayo 1922, Lugo, NMCN_Ent 216176, 1♂ (NMCN). **(Madrid):** El Pardo (El Goloso), 15-IV-99, I. L. Nieves leg. Sobre Q. super L., NMCN_Ent 216228, 1♂ (NMCN); Guadarama, Madrid, España, 05.vi.[19]94, Clara Fuentes lgt., 2♂♂ (JZCM); C. Campo, 28.5.78, Fdez. Santarén [leg.], NMCN_Ent 216288, 1♀ (NMCN); Alcala [Alcalá de Henares], v.[18]92, Melolontha hybrida; Sammlung Cl. Müller, var. Hybrida, 1♂ (ZSM); Madrid, fucata, Madrid, 1♂ (SDEI); Casa de Campo, NMCN_Ent 216194, 1♂ (NMCN); El Pardo, Arias [leg.], NMCN_Ent 215565, 1♀ (NMCN). **(Murcia: Alicante):** Provincia de Alicante. J. Lauffer [leg.], prep. Genital N. 164 M. paposa [sic!], det. I. Sanmartin, NMCN_Ent 216243, 1♂ (NMCN).
No further locality specified: Espagne, 1♂ (BMNH); papposa, Lusitania, Paulino, 1♂ (SDEI); papposa, Lusitan[ia]., 1♂ (MFNB); Lusit[ania], 1♂ (ZSM); Hispania, Ziegler, Nr. 1189, 1♂ 1♀ (MFNB); Hispania, Mel. papposa, 1♂ (MFNB); Hispania, 1♂ (MFNB); Hispania, coll. Gheor., 2♂♂ (MFNB); Hispan[ia]., 2♀♀ 3♂♂ (SDEI); papposa Ill., Hispan[ia]. Bonvoulet, 1♂ (SDEI); Hisp[ania]., 1♂ (ZSM), 1♀ (SDEI); Spanien, 1♂ (SDEI); S. Spain, April, col. Yerbury, 1901-242, 1♂ (BMNH); Spain, 2♂♂ (BMNH).

Redescription (lectotype) (Fig. 66): Distinctly convex, surface brownish, pronotum often with a greenish tinge, densely covered with squarrose setae.

Head (Fig. 8): Clypeus distinctly transverse (1:1.8), weak concave impression in front half, anterior angles distinctly rounded, lateral margin parallel, frontal margin not emarginated in the middle when viewed dorsally, frontal disc less concave. Antenna brownish-red; clavus weakly bent outwards approximately at the middle, twice as antennomeres I-III combined; scapus weakly elongated and not inflated; antennomere III extended and flattened outwardly, toothlike protuberance at the front (Fig. 23). Eyes moderately developed (Fig. 8).

Pronotum (Fig. 8) distinctly transverse, brownish with distinct greenish tinge; entirely bordered laterally and basally, broadest in the middle; lateral margin regularly rounded, front half distinctly serrated; setation short and smooth with squarrose setae on the whole surface of the pronotum, very limited number of fine and long vertical setae, located only in the front third beside the middle; punctuation distinct, dense, simple, composed of deep impressions.

Scutellum as long as wide, broadly rounded, distinct and dense punctuation, midline glabrous, shiny; setae simple, composed of squarrose and smooth setae.

Elytra approximately 3:1 long as wide, surface covered with squarrose and smooth setae, two distinct striae along the entire elytral length between the suture and humerus.

Pygidium (Fig. 28) not elongate, apical very weakly bifurcate, covering with setation similar to the elytra but denser.

Legs (Fig. 8): Protibia bidentate; apical tooth distinct, directed forward; medial tooth moderate extend above the level of the apical tooth, basal tooth missing. Apical plane of hind tibia as in Fig. 33.

Aedeagus as in Figs 43, 48, 53, 58, 63.

Female. Head: Clypeus distinctly transverse, anterior angles broadly rounded, lateral margin weakly convergent, frontal margin emarginated in the middle when viewed dorsally, front disc elevated in the middle, more or less concave on each side.

Pronotum transverse, entirely bordered, broadest in the middle; lateral margin distinct sharply rounded, covered with short and smooth squarrose setae, intermixed with single long setae lonely in the front third.

Legs: Protibia tridentate.

Pygidium very weakly bifurcate at apex.

Measurements. Total body length 17-27 mm.

Differential diagnosis. Refer to species key.

Collection circumstances. No preferences are known, collected under various circumstances.

Distribution. Portugal (Beira); Spain (Andalusia: Córdoba, Huelva, Jaén, Sevilla), (Aragon: Zaragoza), (Basque country: Álava), (Castilla-La Mancha: Albacete, Ciudad Real, Cuenca, Guadalajara), (Castilla y León: Burgos, Salamanca, Segovia, Soria), (Catalonia: Barcelona, Tarragona), (Galicia: Lugo, La Coruña), (Community of Madrid), (Murcia: Alicante) (Fig. 70).

Melolontha llinaresi sp. n.

(Figs 4, 9a-b, 14, 19, 24, 29, 34, 39, 44, 49, 54, 59, 64, 70, 74)

Melolontha papposa ILLIGER: ALVARADO et al. 1996: 321 (distribution, illustration); DURAN et al. 1996: 309 (biology).

Type locality. "España, Sevilla, El Arahal".

Type material examined (319 specimens). **Holotypus** ♂ 'Urbanización Santa Elo, El Arahal / Sevilla / (España), 26.iii.2018 / J. Mª. Urbano & J. Navarro lgt. [p] // Melolontha llinaresi sp. nov. / Holotypus / Oliver Hillert, Eckehard Rößner / Jeronimo Navarro & Jose Maria / Urbano det. 2018 [p, rl] // NMCN_ENT 241153 [p]' (NMCN). **Allotypus** ♀ 'Urbanización Santa Elo, El Arahal / Sevilla / (España), 30.iii.2019 / J. Mª. Urbano & J. Navarro lgt. [p] // Melolontha llinaresi sp. nov. / Allotypus / Oliver Hillert, Eckehard Rößner / Jeronimo Navarro & Jose Maria / Urbano det. 2018 [p, rl]' (JNCL). **Paratypes: Sain (Andalusia; Sevilla):** 'Urbanización Santa Elo, El Arahal / Sevilla / (España), 1.iii.2019 / J. Mª. Urbano & J. Navarro lgt. [p]' 1♂(JNCS) [no. 292], same data but '23.iii.2019' 1♀ (JUCS) [no. 293], same data but '30.iii.2019' 12♂♂ 1♀ (JNCS) [nos. 294-306], 11♂♂ (JUCS) [nos. 307-317], same data but '26.iii.2018' 40♂♂ (JNCS) [nos. 1-40], 42♂♂ (JUCS) [nos. 41-82], same data but '22.iii.2018' 31♂♂ (JNCS) [nos. 83-113], 31♂♂ (JUCS) [nos. 114-144], same data but '2.iv.2016' 23♂♂ (JNCS) [nos. 154-167], same data but '24.iii.2017' 53♂♂ (JUCS) [nos. 168-220], 11♂♂ (OHCB) [nos. 221-230], 6♂♂ (ERCS) [nos. 231-236], same data but '10.iii.2017' 15♂♂ (JUCS) [nos. 237-251], same data but '24.iii.2016' 6♂♂ (AHCL) [nos. 252-257], 31♂♂ (JNCS) [nos. 258-288]; 'Utrera (Sevilla) / 24-III-1995 / M. Alvarado leg // NMCN_Ent 216256 [p]' 1♂ (NMCN) [no. 289]; 'Morón / 24-III-95 / (forma obscura) / leg M. Alvarado // Melolontha / paposa [sic!] / det. I. Sanmartin // prep. genital / N. 163 / M. paposa / [sic!] / det. I. Sanmartin // NMCN_Ent 216277 [p]' 1♂ (NMCN) [no. 290]; 'Gravera del Acebuchal, Alcalá de Guadaira / Sevilla / (España), 6.iv.1993 / J. Navarro lgt. [p]' 1♂ (JNCS) [no. 291].

Deposition of holotype: NMCN.

Description (holotype): Distinctly convex, surface brownish, densely covered with squarrose setae.

Head (Fig. 9): Clypeus weakly transverse (1:1.5), front half with a distinct concave impression, anterior angles distinctly rounded forming a nearly semi-circular outline, lateral margin divergent, frontal margin not emarginated in the middle when viewed dorsally. Antenna brownish-yellow, to light brownish-yellow; clavus distinctly bent outwards in the middle, more than 4 times long as antennomeres I-III combined; scapus not elongate weakly inflated; antennomere III extended and flattened outwards, toothlike protuberance at front (Fig. 24). Eyes well developed (Fig. 9).

Pronotum (Fig. 9) distinctly transverse, brownish; entirely bordered laterally and basally, broadest in front third; lateral margin regularly rounded, front half not serrated; setation short and smooth with squarrose setae on the whole surface of pronotum, and very dense fine and long setae also over the entire surface of pronotum; punctation distinct, dense, simple, composed of deep impressions.

Scutellum as long as wide, broadly rounded, distinct and dense punctuation, midline glabrous, shiny; setae double, composed of squarrose and smooth setae intermixed with fine and long vertical ones.

Elytra approximately 3:1 long as wide, surface covered with squarrose and smoothly setae, between suture and humerus two distinct striae along the entire elytral length.

Pygidium (Fig. 29) not elongate, apical regularly rounded, covering with setation as like elytra but denser.

Legs (Fig. 9): Protibia tridentate; apical tooth distinct, directed forward; medial tooth distinct extending further than the level of apical tooth, small basal tooth. Apical plane of hind tibia as in Fig. 34.

Aedeagus as in Figs 44, 49, 54, 59, 64.

Female (allotype). Head: Clypeus distinct transverse, anterior angles broadly rounded, lateral margin parallel approximately, frontal margin not emarginated in the middle when viewed dorsally, disc evenly convex on it entire surface.

Pronotum transverse, entirely bordered, broadest just in the in frontal quarter; lateral margin more or less parallel at middle, broadly rounded in frontal quarter.

Legs: Protibia tridentate.

Pygidium evenly rounded at apex.

Measurements. Total body length 23-30 mm.

Differential diagnosis. Refer to species key.

Collection circumstances. Specimens where collected in groves of cultivated of *Olea europea* L. on sandy loam soil, observed flying at dusk by Navarro & Urbano, 2018, at approximately 9:30 PM. Pictured by ALVARADO et al. (1996), DURAN et al. (1996).

Etymology. Patronymic; named in honour of our good friend Antonio LLINARES (Sevilla, Spain), a prolific collector of various families of Coleoptera.

Distribution. Endemic to the Province of Sevilla, Autonomous Community Andalusia, Spain (Fig. 70).

Melolontha melolontha (LINNAEUS, 1758)

Scarabaeus melolontha LINNAEUS 1758: 215 (original description).

Melolontha melolontha (LINNAEUS): BÁGUENA CORELLA 1967: 407 (characters, distribution, key); BAHILIO et al. 1993: 179 (characters, distribution); BARAUD 1977: 446 (characters, distribution); BEZDĚK 2016: 232 (catalogue).

Material from Spain examined (2 specimens). Asturia, Oviedo, 10.VI.1991, leg. Zerche, 1♀ (SDEI); Asturia, Mierés, NMCN_Ent 21644, 1♂ (NMCN).

Melolontha papposa ILLIGER, 1803

(Figs 5, 10a-b, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 68, 70, 75)

Melolontha papposa ILLIGER, 1803: 215 (original description); SCHÖNHERR 1817: 168 (catalogue); CHARPENTIER 1825: 210 (characteristics, distribution, illustration); BURMEISTER 1855: 416 (characters, distribution); MARSEUL 1857: 87 (catalogue), 1863: 128 (catalogue), 1867: 56 (catalogue); METZLER 1882: 233 (characters, distribution, taxonomic note); HEYDEN et al. 1883: 99 (catalogue), 1906: 737 (catalogue); KOLBE 1884: 76 (characters); KRAATZ 1885: 70, 72 (catalogue, note); REITTER 1887: 534, 541 (key, note); 1902: 263 (key); DALLA TORRE 1912: 49 (catalogue); WINKLER 1929: 1091 (catalogue); BAGUENA CORELLA 1967: 406 (characters, distribution); BARAUD 1977: 262 (characters, distribution, key), 1992: 447 (characters, distribution, key); BEZDEK 2006: 196 (catalogue), 2016: 233 (catalogue).

Melolontha pepposa ILLIGER: LAPORTE, 1840: 131 [incorrect subsequent spelling] (characters); BLANCHARD 1850: 160 (characters).

Type locality. "Fichtenholzungen und Heiden an der linken Seite des Tejo" [conifer forests and heaths on the left bank of the river Tejo], Portugal.

Type material examined (7 specimens). **Lectotypus** ♂ '11188 [hw] // Typus [p, rl] // Papposa Ill. * / Lsit [hw] // Melolontha papposa / Illiger, 1803 / Lectotypus (♂) / des. T. Branco, 1982 [hw, rl]' (MFNB). **Paralectotypes**: 'Melol. papposa Charp. / Hor. Ent. p. 210. t.q.f.2 [hw] // Lusitania / Hist. coll. Nr. / 11188 [p] // Typus [p, rl] // Zool. Mus. / Berlin [p] // Melolontha papposa / Illiger, 1803 / Paralectotypus Nº 1 (♂) / des. T. Branco, 1982 [hw, rl]' (MFNB); 'Lusitania / Hist. coll. Nr. / 11188 [p] // Typus [p, rl] // Zool. Mus. / Berlin [p] // Melolontha papposa / Illiger, 1803 / Paralectotypus Nº 2 (♂) / des. T. Branco, 1982 [hw, rl]' (MFNB); 'Lusitania / Hist. coll. Nr. / 11188 [p] // Typus [p, rl] // Zool. Mus. / Berlin [p] // Melolontha papposa / Illiger, 1803 / Paralectotypus Nº 3 (♂) / des. T. Branco, 1982 [hw, rl]' (MFNB); 'Lusitania / Hist. coll. Nr. / 11188 [p] // Typus [p, rl] // Zool. Mus. / Berlin [p] // Melolontha papposa / Illiger,

1803 / Paralectotypus Nº 4 (♂) / des. T. Branco, 1982 [hw, rl]' (MFNB); 'Lusitania / Hist. coll. Nr. / 11188 [p] // Typus [p, rl] // Zool. Mus. / Berlin [p] // Melolontha papposa / Illiger, 1803 / Paralectotypus Nº 5 (♂) / des. T. Branco, 1982 [hw, rl]' (MFNB); 'Lusitania / Hist. coll. Nr. / 11188 [p] // Typus [p, rl] // Zool. Mus. / Berlin [p] // Melolontha papposa / Illiger, 1803 / Paralectotypus Nº 6 (♂) / des. T. Branco, 1982 [hw, rl]' (MFNB).

Additional material examined (92 specimens). **Portugal (Faro):** Portugal, Algarve 34, Aljezur, 5 km W Küste, Pt. de Atalaia 50 km NN, Fritzlar lgt., 4.iii.2010, 4♂♂ (NMEC). **Portugal (Lisbon):** Lisbon, 2♂♂ (BMNH). **Portugal (Santarém):** Portugal, 8.3.2014, Muge env., Sejkora lgt., ♂ (RSCV); Portugal- Santarem, Ribatejo - Muge, 20.-26.2.2011, P. Kyllies lgt., 7 ♂♂ (RSCV). **Portugal (Setúbal):** Portugal (Alentejo), distr. Setubal, Melides, 10 km W of Grandola, 20.-27.ii.2012, O. Hillert lgt., 15♂♂ (OHCB), 2♂♂ (ZSM); Portugal (Estremadura), Lagoa de Melides, S of Lisabon, 38°07'558"N 008°47'268"W, 22.02.2009, leg. O. Hillert, 2♂♂ (OHCB); Portugal, Sines, 22.3.[19]81, 23♂♂ 4♀♀ (MFNB); Portugal, Setubal, 3.4.[19]79, 8♂♂ (ZSM); Portugal (Setubal), N of Alfarim, Sesimbra env., S of Lisbon, 06.03.2010, leg. O. Hillert, 4♂♂ 1♀ (OHCB); 06.03.2010, leg. H. Kalz, N of Afarim, 30 km S of Lisbon, Portugal, 3♂♂ (ERCS); Portugal (Setubal), N of Santiago de Cacem, 06.03.2010, leg. O. Hillert, 2♂♂ 1♀ (OHCB); 05.03.2010, leg. H. Kalz, Santo Andre, 10 km N Santiago de Cacem, Portugal, Alentejo, 1♂ (ERCS); Portugal: Estrematura, Almada, Aroeira, 2.iii.2009, A. Zuzarte legit, 1♂ (ERCS). **No further locality specified:** Portugal, 1♂ (BMNH); Setubal, 1♂ (BMNH); Portugal, Wattinson coll., B. M. 1949-283, (Purchased), 1♂ (BMNH).

Spain (**Extremadura; Cáceres):** Caceres, km 185 N-V, España, 09.iv.[19]90, Jesús Gª Moreno lgt., 2♂♂ (JZCM); **(Castilla y León; Ávila):** Candeleda (Avila). 26-4-84, leg.: Mozos, Suelo (Noche), ex Colección M. de los Mozos, Melolontha papposa Illiger, det. Mozos, 1988, NMCN_Ent 174150, 1♂ (NMCN). **No further locality specified:** Lusitania, 3♂♂ (SDEI); Spain, 2♂♂ (BMNH).

Redescription (lectotype Fig. 68): Distinctly convex, surface brownish, densely covered with squarrose setae.

Head (Fig. 10): Clypeus weakly transverse (1:1.5), front half with distinct concave impression, anterior angles distinctly rounded, lateral margin divergent, frontal margin not emarginated in the middle when viewed dorsally. Antenna brownish-red to brownish-yellow; clavus distinctly bent outward approximately in the middle, more than 4 times long as antennomeres I-III combined; scapus not elongated weakly inflated; antennomere III extended and flattened outwardly, toothlike protuberance at front (Fig. 25). Eyes moderately developed (Fig. 10).

Pronotum (Fig. 10) distinctly transverse, brownish; entirely bordered laterally and basally, broadest just in middle; lateral margin regularly rounded over the whole length, front half weakly serrated; setation short and smooth with squarrose setae over the whole surface of pronotum, fine long setae very dense over whole surface of pronotum; punctation distinct, dense, simple, composed of deep impressions.

Scutellum as long as wide, broadly rounded, distinct and dense punctuation, midline glabrous, shiny; setae double, composed of squarrose and smooth setae intermixed with fine and long vertical ones.

Elytra approximately 3:1 long as wide, surface covered with squarrose and smooth setae, two distinct striae along the entire elytral length between suture and humerus.

Pygidium (Fig. 30) not elongate, apex regularly rounded, covered with setation similar to elytra but denser.

Legs (Fig. 10): Protibia bidentate; apical tooth distinct, directed forwardly; medial tooth not extending past the level of apical tooth, often limited to a very small elevation, basal tooth missing. Apical plane of hind tibia as in Fig. 35.

Aedeagus as in Figs 45, 50, 55, 60, 65.

Female. Head: Clypeus only weakly transverse, anterior angles broadly rounded, lateral margin weakly convergent, frontal margin not emarginated in the middle when viewed dorsally, disc evenly convex on it entire surface.

Pronotum transverse, entirely bordered, broadest just in the middle; lateral margin regularly rounded over whole length, covered with short and smoot squarrose setae, intermixed with single long setae only in the front.

Legs: Protibia tridentate.

Pygidium evenly rounded at apex.

Measurements. Total body length 20-24 mm

Differential diagnosis. Refer to species key.

Collection circumstances. Specimens were collected in extensive vegetation or open fields in sandy areas. Observed during daylight, before and after 12:00 o'clock by Hillert 2009, 2010, 2012. Comments are given by ILLIGER (1803) "Fichtenholzungen und Heiden an der linken Seite des Tejo" [conifer forests and heaths on the left bank of the river Tejo].

Distribution. Portugal (Setúbal), Spain (Extremadura: Cáceres, Castilla y León: Ávila) (Fig. 70).

Table 1. Character matrix for the differential diagnosis of males of the *Melolontha papposa*-complex

	***M. baetica* sp. n.**	***M. hidalgoi* sp. n.**	***M. hybrida* stat. restit.**	***M. llinaresi* sp. n.**	***M. papposa***
apical segment of maxillar palpus	not elongated, not inflated (3.8:1) (Fig. 6b)	not elongated, not inflated (3.8:1) (Fig. 7b)	not elongatedd, not inflated, truncate apically (3.5:1) (Fig. 8b)	elongated (4:1) (Fig. 9b)	inflated (3:1) (Fig. 10b)
shape of clypeus	distinctly transverse (1:1.7), angles distinctly rounded, lateral parallel (Fig. 6)	distinctly transverse (1:1.7), angles distinctly rounded, lateral parallel (Fig. 7)	distinctly transvers (1:1.8), angles distinctly rounded, lateral parallel (Fig. 8)	only weakly transverse (1:1.5), angles distinctly rounded nearly semi-circular, front laterally divergent (Fig. 9)	only weakly transverse (1:1.5), angles distinctly rounded, front lateral divergent (Fig. 10)
disc of clypeus	in front half more or less weakly concave (Figs 6, 36)	in front half more or less weakly concave (Figs 7, 37)	in front half weakly concave (Figs 8, 38)	in front half distinctly concave (Figs 9, 39)	in front half distinctly concave (Figs 10, 40)
shape of antennomere I (scapus)	not elevated (Fig. 6)	not elevated (Fig. 7)	not elevated (Fig. 8)	not elevated (Fig. 9)	elevated (Fig. 10)
shape of clavus	distinctly bent outwards (Fig. 6)	distinctly bent outwards (Fig. 7)	weakly bent outwards (Fig. 8)	very strongly bent outwards (Fig. 9)	very strongly bent outwards (Fig. 10)
length of clavus	3 times as long as antennomeres together	3.5 times as long as antennomeres together	2.5 times as long as antennomeres together	4 times as long as antennomeres together	4 times as long as antennomeres together
colour of pronotum	red-brown to black	red-brown to black	black with distinct greenish tinge some times	black to dark red-brown	black, sometimes with a weak coupper tinge
setae on pronotum	pronotum with short and smooth, more or less squarrose setae combined with long and fine vertical-oblique setae but limited to front quarter (Figs 11, 16)	pronotum with short and smooth, more or less squarrose setae combined with long and fine vertical-oblique setae but limited to front quarter (Figs 12, 17)	pronotum with short and smooth, more or less squarrose setae combined with long and fine vertical-oblique setae but limited to front quarter (Figs 13, 18)	short and smooth setae or squarrose setae combined with long and fine vertical-oblique setae on the whole surface (Figs 14, 19)	short and smooth setae or squarrose setae combined with long and fine vertical-oblique setae of variable density (Figs 15, 20)
shape of pronotum	broadest in the middle, lateral margin in front half weakly serrated (Fig. 6)	broadest in the middle, lateral margin in front half weakly serrated (Fig. 7)	broadest in the middle, lateral margin in front half distinctly serrated (Fig. 8)	broadest in front third, lateral margin in front half not serrated (Fig. 9)	broadest in the middle, lateral margin in front half weakly serrated (Fig. 10)
scutellum	as long as wide, setae simple	transverse, setae simple	as long as wide, setae simple	as long as wide, double setae	as long as wide, double setae
eyes	moderately developed (Fig. 6)	moderately developed (Fig. 7)	moderately developed (Fig. 8)	well developed (Fig. 9)	moderately developed (Fig. 10)
shape of pygidium	distinctly elongated, clearly bifurcated at apex (Fig. 26)	not elongated, very weakly bifurcated at apex (Fig. 27)	not elongated, very weakly bifurcated at apex (Fig. 28)	not elongated, apically radiused (Fig. 29)	not elongated, apically radiused (Fig. 30)
external teeth on protibia	bidentate, medial tooth well developed, basal tooth missing (Fig. 6a)	tridentate, medial tooth well developed, small basal tooth (Fig. 7a)	bidentate, medial tooth well developed, basal tooth missing (Fig. 8a)	tridentate, medial tooth well developed, small basal tooth (Fig. 9a)	bidentate, medial tooth only weakly developed, basal tooth missing (Fig. 10a)
apical plane of hind tibia	as in Fig. 31	as in Fig. 32	as in Fig. 33	large (Fig. 34)	small (Fig. 35)

Key to the species of *Melolontha papposa*-complex (Iberian Peninsula), ♂♂

1 Clypeus transverse (Figs 9-10), disc distinctly convex in front half (Figs 39-40); clavus very strongly bent outwards (Figs 4-5); pronotum with short, smooth, more or less squarrose setae combined with fine, long, vertical or vertical-oblique setae of variable density on the whole surface (Figs 14-15, 19-20); scutellum approximately as long as broad with double setae..... 2

− Clypeus only weakly transverse (Figs 6-8), disc more or less convex in front half (Figs 36-38); clavus more or less bent outwardly (Figs 1-3); pronotum with short, smooth, more or less squarrose setae, the intermixed vertical or vertical-oblique long and fine setae limited to the front third (Figs 11-13, 16-18); scutellum different in proportion, with only simple and smooth setae..... 3

2 Anterior clypeal angles distinctly rounded (Figs 10, 15), disc strongly convex in front half (Fig. 40); eyes moderately developed (Fig. 10); apical segment of maxillar palpus inflated (Fig. 10b); scapus elevated; pronotum broadest in the middle (Fig. 10); protibia bidentate, medial tooth only weakly developed, basal tooth missing (Fig. 10a); apical plane of hind tibia reduced (Fig. 35); aedeagus as in Figs 45, 50, 55, 60, 65; distributed in the south half of Portugal to the Extremadura and Castilla y León autonomous communities of Spain (Fig. 70)..... *papposa* ILLIGER, 1803

− Anterior clypeal angles strongly rounded forming a semi-circular outline (Figs 9, 14), disc distinctly convex in front half (Fig. 39); eyes well developed (Fig. 9); apical segment of maxillar palpus distinctly elongate (Fig. 9b); scapus not elevated; pronotum broadest in front third (Fig. 9); protibia tridentate, medial tooth well developed, extending laterally past the apical tooth level, basal tooth hardly visible (Fig. 9a); apical plane of hind tibia extended (Fig. 34); aedeagus as in Figs 44, 49, 54, 59, 64; distributed in the Sevilla province of Spain, east of the river Guadalquivir (Fig. 70)..... *llinaresi* **sp. n.**

3 Clavus very short, 2.5 times long as antennomeres I-III combined, only very weakly bent outwardly (Figs 3, 8); scapus elongate; clypeus only weakly concave to frontal margin (Fig. 38); serrated pronotal lateral margin in front half, distinctly sculptured (Fig. 8); scutellum approximately as long as wide; small species (17-27 mm); apical plane of hind tibia as in Fig. 33; aedeagus as in Figs 43, 48, 53, 58, 63; distributed across large areas of the Iberian Peninsula (Fig. 70)..... *hybrida* CHARPENTIER, 1825 **stat. restit.**

– Clavus long, 3 to 3.5 times long as antennomeres I-III combined, distinctly bent outwardly (Figs 1-2, 6-7); scapus not elongate; clypeus more or less weakly concave to frontal margin (Figs 36-37); serrated pronotal lateral margin in front half, weakly sculptured (Figs 6-7); scutellum as long as wide or transverse; body size 20-26 mm; apical plane of hind tibia as in Figs 31-32; aedeagus with different characters; distributed in Spain, Andalusia (Sevilla, Cádiz) only (Fig. 70)..... 4

4 Pygidium distinctly elongated apically, bifurcate (Fig. 26); scutellum as long as wide; aedeagus as in Figs 41, 46, 51, 56, 61; distributed in Spain, Andalusia (Cádiz) only (Fig. 70)..... *baetica* **sp. n.**

– Pygidium not elongated apically, sometimes very weakly bifurcate (Fig. 27); scutellum transverse, aedeagus as in Figs 42, 47, 52, 57, 62; distributed in south-west of the Iberian Peninsula (Spain: south and west of Huelva; Portugal: Algarve Fig. 70)..... *hidalgoi* **sp. n.**

Clave para las especies del complejo *Melolontha papposa* (Península ibérica), ♂♂

1 Clípeo transverso (figs 9-10), disco claramente convexo en su mitad frontal (figs 39-40); escapo fuertemente curvado hacia afuera (figs 4-5); pronoto con sedas cortas y gruesas no erectas, casi escamosas, combinadas con otras largas y finas verticales u oblicuas más o menos densamente situadas en toda la superficie (figs 14-15, 19-20); escudete aproximadamente tan largo como ancho, con doble setación 2

− Clípeo débilmente transverso (figs 6-8), disco más o menos transverso en su mitad frontal (figs 36-38); escapo más o menos curvado hacia afuera (figs 1-3); pronoto con sedas cortas y gruesas no erectas, casi escamosas, las largas y finas verticales u oblicuas quedan limitadas al tercio frontal (figs 11-13, 16-18), escudete de proporción diferente, solamente con setación corta y gruesa 3

2 Ángulos anteriores del clípeo claramente redondeados (figs 10,15), disco fuertemente convexo en su mitad frontal (fig 40), ojos moderadamente desarrollado (fig 10); segmento apical de los palpos maxilares ensanchado (fig 10b); escapo elevado; pronoto más amplio solamente en la mitad (fig 10); protibia bifurcada, diente medio débilmente desarrollado, diente basal ausente (fig 10a); peine apical de las tibias posteriores reducido (fig 35); parámeros como en las figuras 45, 50, 55, 60, 65; se distribuye en la mitad sur de Portugal hasta Extremadura y Castilla León (España) (fig 70) .... *papposa* ILLIGER, 1803

– Ángulos anteriores del clípeo fuertemente redondeados formando un contorno semicircular (figs 9-14); disco claramente convexo en su mitad frontal (fig 39); ojos bien desarrollados (fig 9); segmento apical de los palpos maxilares claramente elongado (fig 9b); escapo no elevado; pronoto más amplio solo en el tercio frontal (fig 9); protibia tridentada, diente medial bien desarrollado, lateralmente prominente sobre el nivel del diente apical, diente basal superficialmente visible (fig 9a); peine apical de las tibias traseras amplio (fig 34); parámeros como en las figuras 44, 49, 54, 59, 64; se distribuye en Sevilla, al este del rio Guadalquivir (España) (fig 70) ..... *llinaresi* **sp. n.**

3 Maza antenal muy corta, 2.5 veces tan larga como los antenómeros I-III combinados, solo débilmente curvada hacia afuera (figs 3, 8); escapo elongado; clípeo solo débilmente cóncavo en el margen frontal (fig 38); margen lateral del pronoto serrado en la mitad frontal, claramente esculpido (fig 8); escudete tan largo como ancho aproximadamente; tamaño pequeño (17-27 mm); peine apical de la tibias posteriores como en la fig 33; edéago como en las figuras 43, 48, 53, 58, 63; se distribuye a lo largo de grandes áreas en la Península Ibérica (fig 70) ..... *hybrida* CHARPENTIER, 1825 **stat. restit.**

– Maza antenal larga, de 3 a 3.5 veces más larga que los antenómeors I-III combinados, claramente curvada hacia afuera (figs 1-2, 6-7); escapo no elongado; clípeo más o menos débilmente cóncavo en el margen frontal (figs 36-37); margen lateral serrado del pronoto en la mitad frontal, débilmente esculpido (figs 6-7); escudete tan largo como ancho o transverso; tamaño de 20-26 mm; peine apical de las tibias posteriores como en las figs 31-32; edéago con características diferentes; se distribuye en Cádiz y Sevilla, Andalucía (España) solamente (fig 70) 4

4 Pigidio claramente elongado, claramente bifurcado en el extremo apical (fig 26); escudete tan largo como ancho; edéago como en las figs 41, 46, 51, 56, 61; se distribuye solamente en Cádiz, Andalucía (España) (fig 70) ..... *baetica* **sp. n.**

– Pigidio no elongado, a veces muy débilmente bifurcado en el extremo apical (fig 27); escudete transverso, edéago como en las figs 42, 47, 52, 57, 62; se distribuye en el Sur de la Península Ibérica (Spain: sur y oeste de Huelva; Portugal: Algarve) fig 70 ..... *hidalgoi* **sp. n.**

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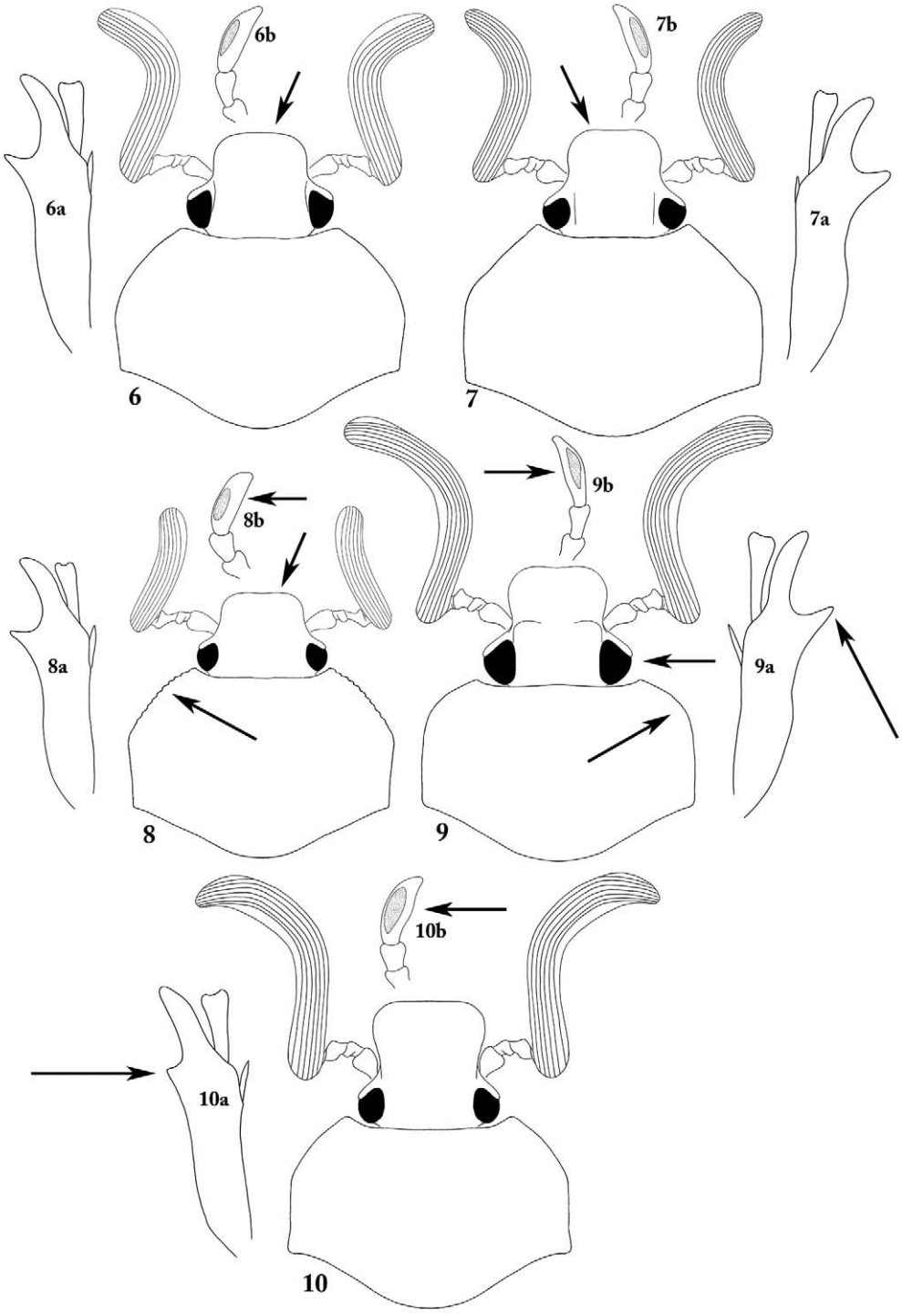
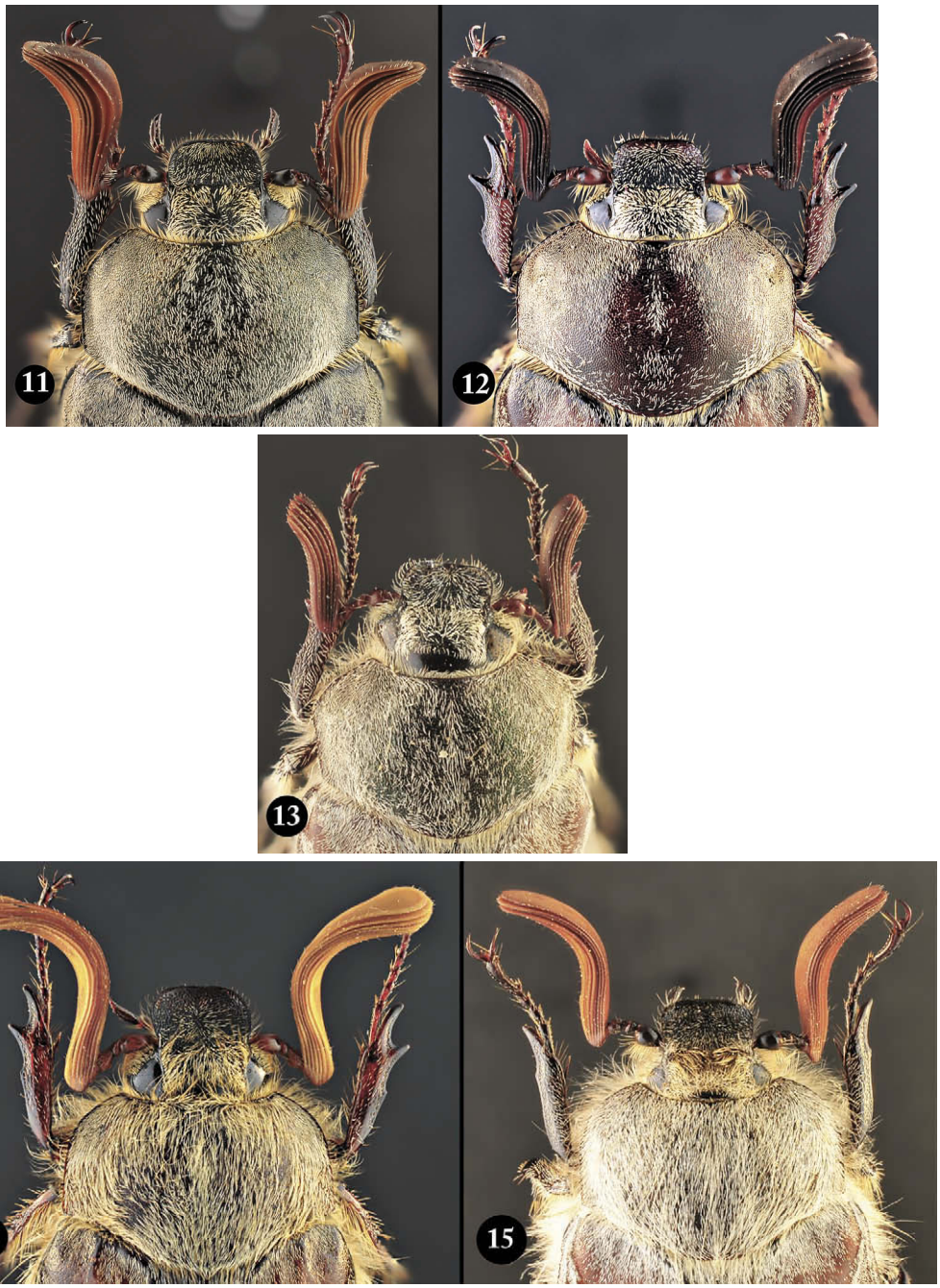
Zusammenfassung

Der *Melolontha papposa*-Komplex von der Iberischen Halbinsel wird revidiert. Drei neue Arten, *Melolontha baetica* **sp. n.**, *Melolontha hidalgoi* **sp. n.** und *Melolontha llinaresi* **sp. n.**, aus der spanischen Provinz Andalusien und der portugiesischen Provinz Algarve werden beschrieben. *Melolontha hybrida* CHARPENTIER, 1825 wird als valides Taxon restituiert. Lectotypen für *Melolontha hybrida* und *Melolontha hybrida rufotestacea* KRAATZ, 1885, sowie ein Neotypus für *Melolontha fucata* BLANCHARD, 1850 werden festgelegt. Eine Merkmalstabelle und ein Bestimmungsschlüssel für die Männchen aller Arten des *Melolontha papposa*-Komplexes werden vorgelegt, die Verteilungen in einer Karte gezeigt und alle relevanten morphologischen Eigenschaften illustriert.

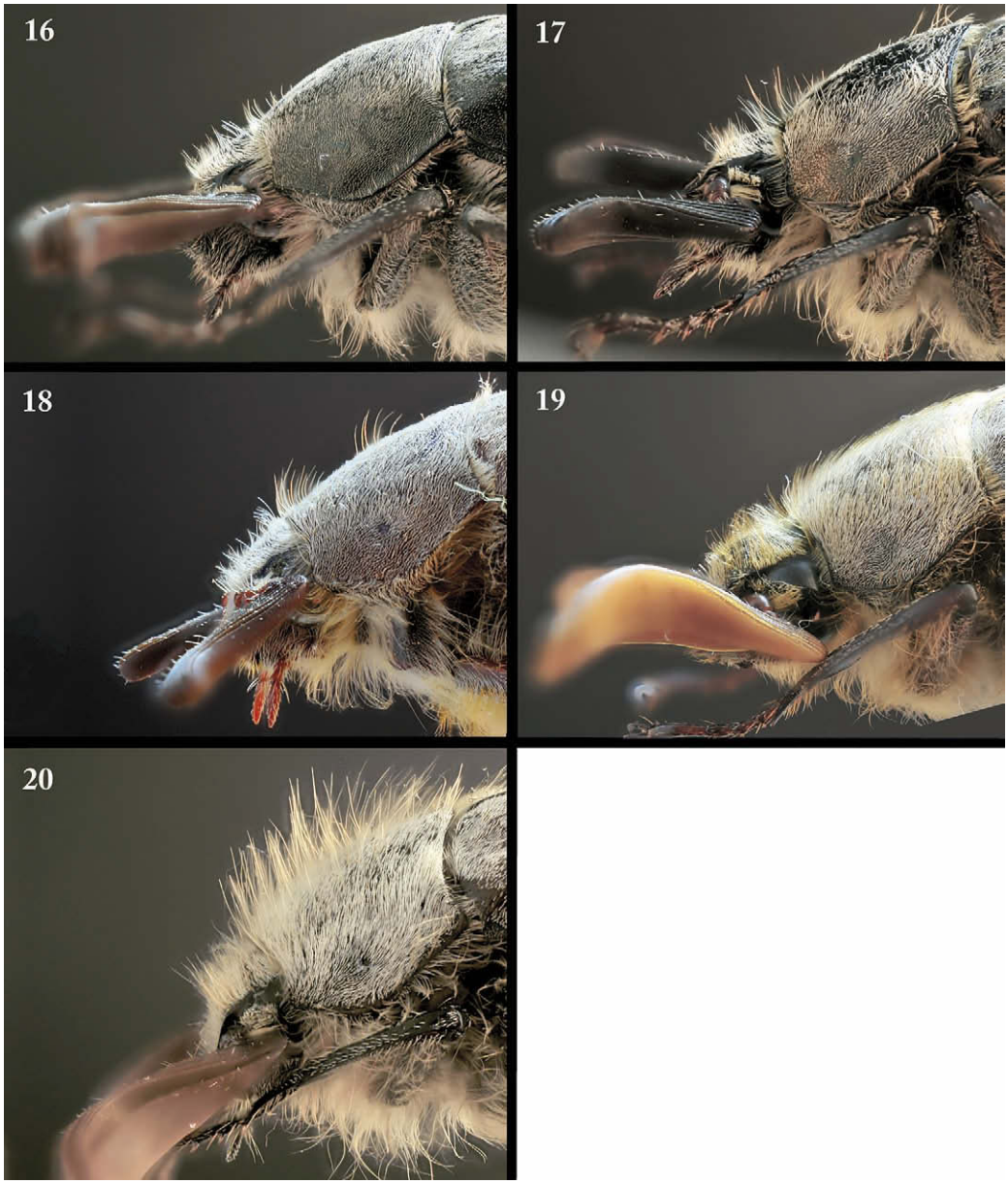
Figs 1–5. Habitus photographs (dorsal view) of the males (*Melolontha papposa*-complex) from the Iberian Peninsula. **1** – ***M. baetica* sp. n.** (paratypus no. 134, Pinar del Rey, San Roque, Province of Cádiz, Andalusia, Spain), **2** – ***M. hidalgoi* sp. n.** (paratypus no. 154, Camino de Hinojos, Province of Huelva, Andalusia, Spain), **3** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.** (Sierra Morena, Province of Ciudad Real, Andalusia, Spain), **4** – ***M. llinaresi* sp. n.** (paratypus no. 221, El Arahal, Province of Sevilla, Andalusia, Spain), **5** – ***M. papposa*** ILLIGER, 1803 (Melides, Municipality of Setubal, Portugal).



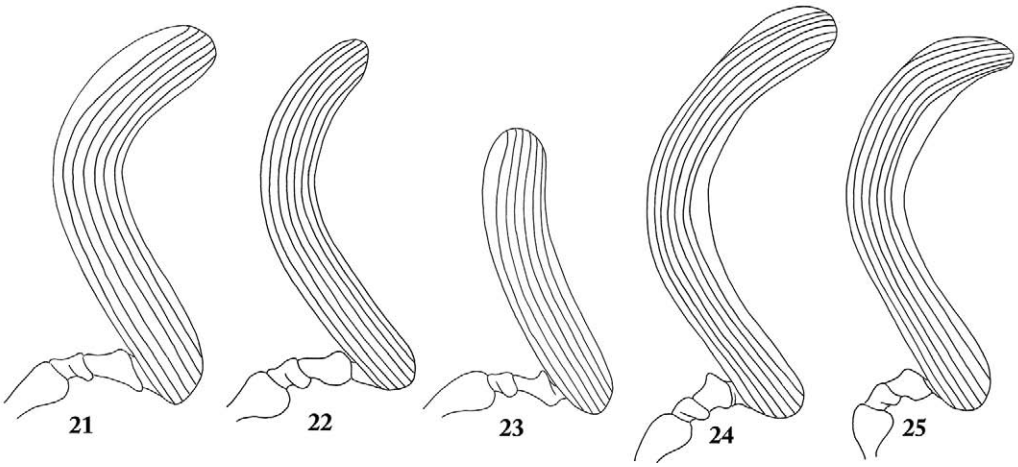
Figs 6–10. Pronotum, head, a – protibial and b – maxillar palpus (dorsal view) of the males (*Melolontha papposa*-complex) from the Iberian Peninsula. **6** – ***M. baetica* sp. n.**, **7** – *M. hidalgoi* **sp. n.**, **8** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.**, **9** – ***M. llinaresi* sp. n.**, **10** – ***M. papposa*** ILLIGER, 1803.



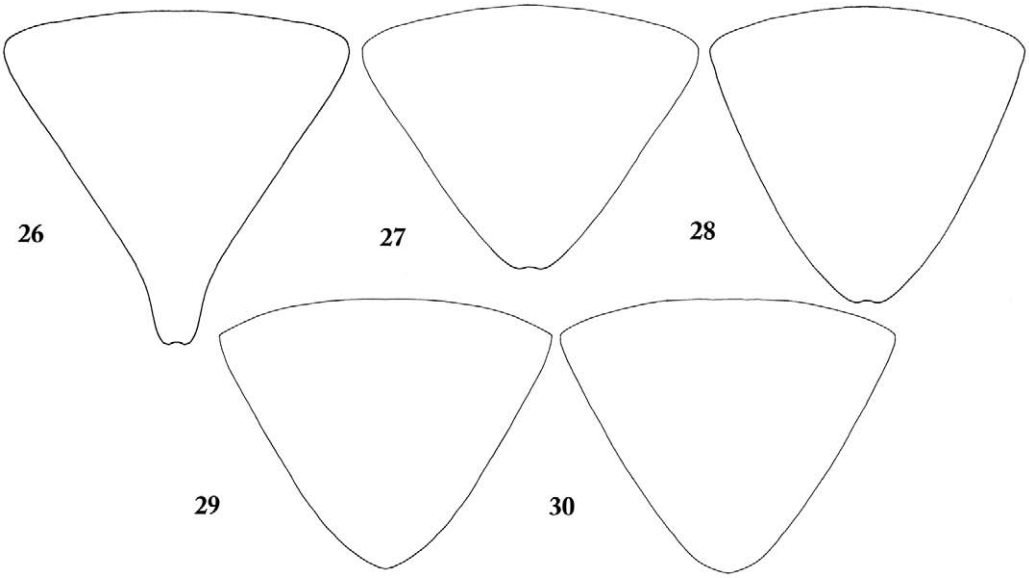
Figs 11–15. Photographs of the pronotum and head (dorsal view) of males (*Melolontha papposa*-complex) from the Iberian Peninsula. **11** – ***M. baetica* sp. n.** (paratypus no. 134, Pinar del Rey, San Roque, Province of Cádiz Cádiz, Andalusia, Spain), **12** – ***M. hidalgoi* sp. n.** (paratypus no. 154, Camino de Hinojos, Province of Huelva Huelva, Andalusia, Spain), **13** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.** (Sierra Morena, Province of Ciudad Real, Andalusia, Spain), **14** – ***M. llinaresi* sp. n.** (paratypus no. 221, El Arahal, Province of Sevilla, Andalusia, Spain), **15** – ***M. papposa*** ILLIGER, 1803 (Melides, Municipality of Setubal, Portugal).



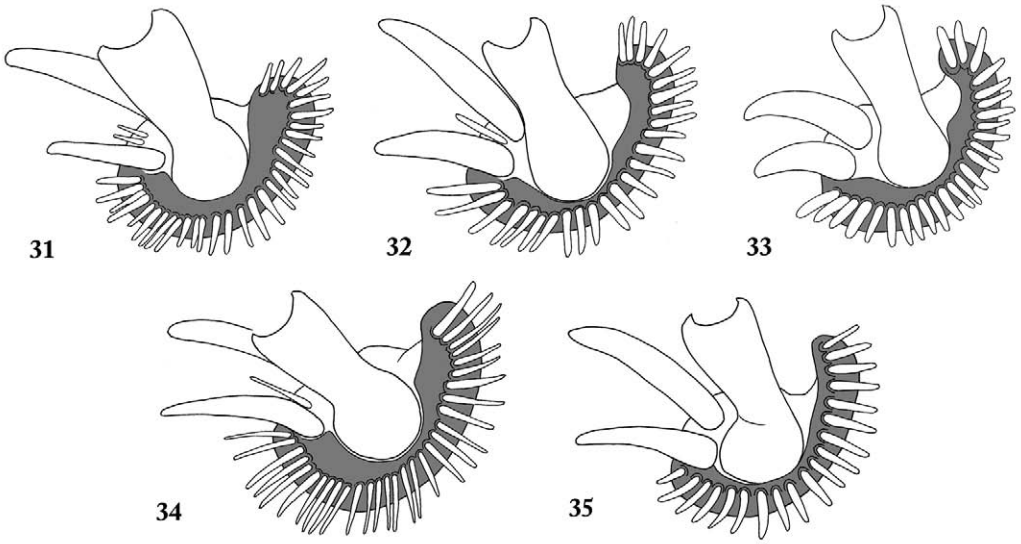
Figs 16–20. Photographs of the pronotum and head (lateral view) of males (*Melolontha papposa*-complex) from the Iberian Peninsula. **16** – ***M. baetica* sp. n.** (paratypus no. 134, Pinar del Rey, San Roque, Province of Cádiz, Andalusia, Spain), **17** – ***M. hidalgoi* sp. n.** (paratypus no. 154, Camino de Hinojos, Province of Huelva, Andalusia, Spain), **18** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.** (Sierra Morena, Province of Ciudad Real, Andalusia, Spain), **19** – ***M. llinaresi* sp. n.** (paratypus no. 221, El Arahal, Province of Sevilla, Andalusia, Spain), **20** – ***M. papposa*** ILLIGER, 1803 (Melides, Municipality of Setubal, Portugal).



Figs 21–25. Antennae (scapus, clavus) of the males (*Melolontha papposa*-complex) from the Iberian Peninsula. **21** – ***M. baetica*** **sp. n.**, **22** – ***M. hidalgoi*** **sp. n.**, **23** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.**, **24** – ***M. llinaresi*** **sp. n.**, **25** – ***M. papposa*** ILLIGER, 1803.

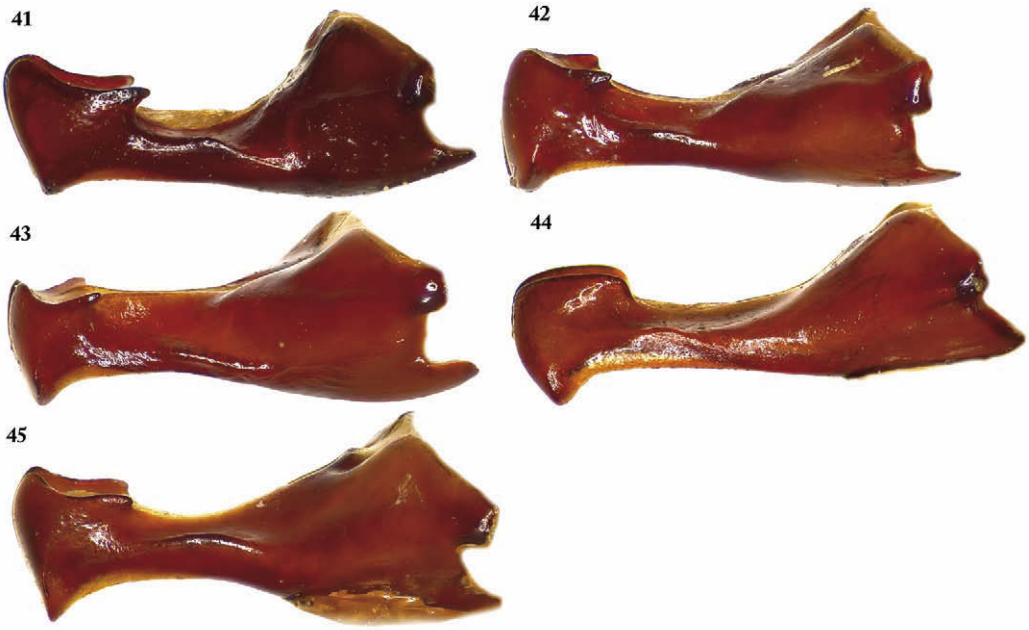


Figs 26–30. Pygidium of the males (*Melolontha papposa*-complex) from the Iberian Peninsula. **26** – ***M. baetica*** **sp. n.**, **27** – ***M. hidalgoi*** **sp. n.**, **28** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.**, **29** – ***M. llinaresi*** **sp. n.**, **30** – ***M. papposa*** ILLIGER, 1803.

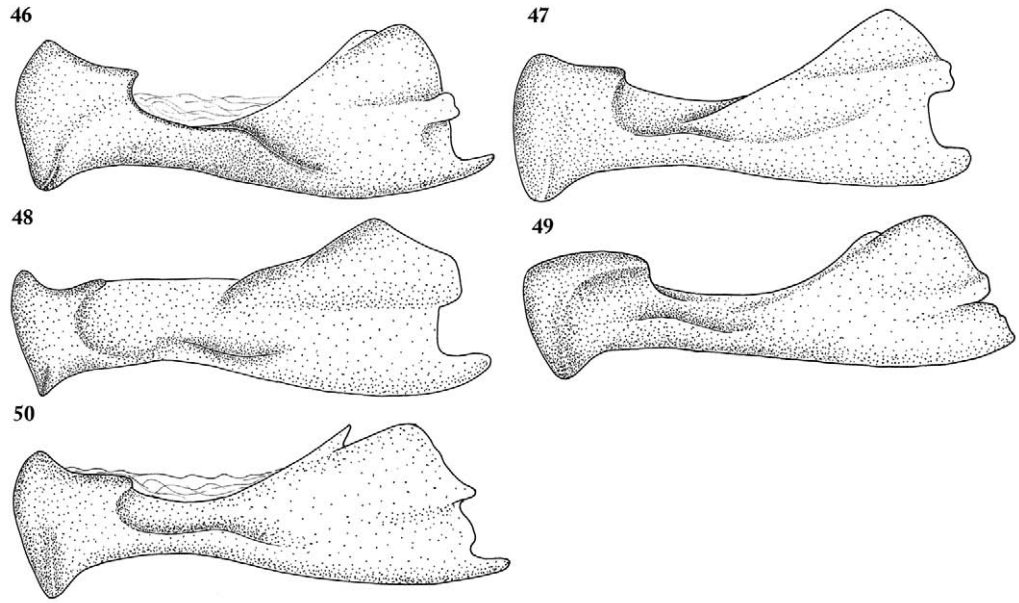


Figs 31–35. Apical plane of the hind tibia of males (*Melolontha papposa*-complex) from the Iberian Peninsula. **31** – ***M. baetica* sp. n.**, **32** – ***M. hidalgoi* sp. n.**, **33** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.**, **34** – ***M. llinaresi* sp. n.**, **35** – ***M. papposa*** ILLIGER, 1803.

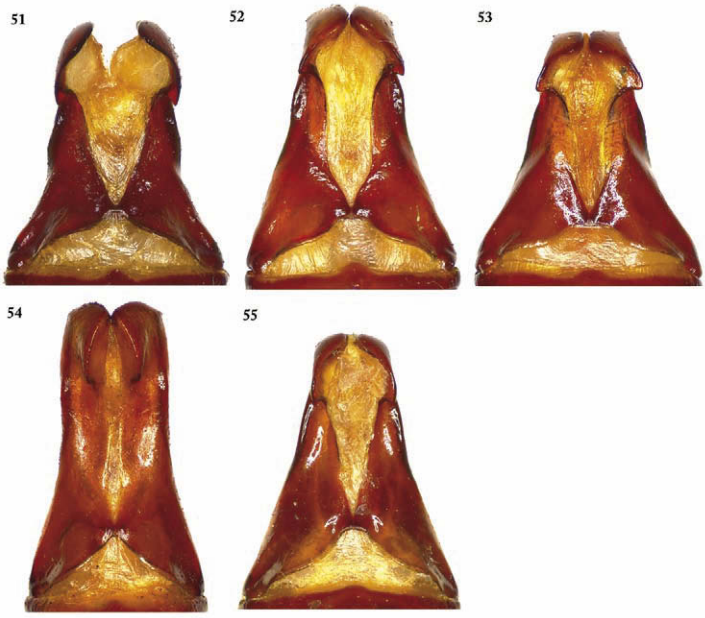
Figs 36–40. Photographs of the clypaeus of the males (*Melolontha papposa*-complex) from the Iberian Peninsula. **36** – ***M. baetica* sp. n.** (paratypus no. 134, Pinar del Rey, San Roque, Province of Cádiz, Andalusia, Spain), **37** – ***M. hidalgoi* sp. n.** (paratypus no. 155, Camino de Hinojos, Province of Huelva, Andalusia, Spain), **38** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.** (Sierra Morena, Province of Ciudad Real, Andalusia, Spain), **39** – ***M. llinaresi* sp. n.** (paratypus no. 222, El Arahal, Province of Sevilla, Andalusia, Spain), **40** – ***M. papposa*** ILLIGER, 1803 (Melides, Municipality of Setubal, Portugal).



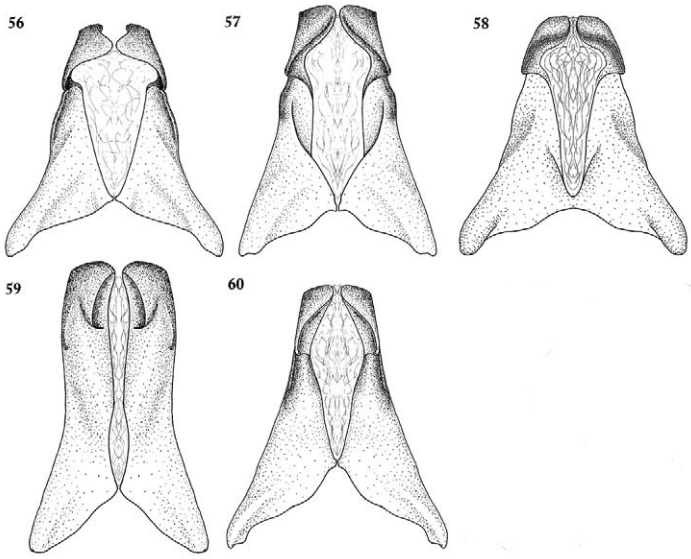
Figs 41–45. Photographs of the aedeagus in dorsal view (*Melolontha papposa*-complex) from the Iberian Peninsula. **41** – ***M. baetica* sp. n.** (paratypus no. 134, Pinar del Rey, San Roque, Province of Cádiz, Andalusia, Spain), **42** – ***M. hidalgoi* sp. n.** (paratypus no. 155, Camino de Hinojos, Province of Huelva, Andalusia, Spain), **43** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.** (Sierra Morena, Province of Ciudad Real, Andalusia, Spain), **44** – ***M. llinaresi* sp. n.** (paratypus no. 222, El Arahal, Province of Sevilla, Andalusia, Spain), **45** – ***M. papposa*** ILLIGER, 1803 (lectotype).



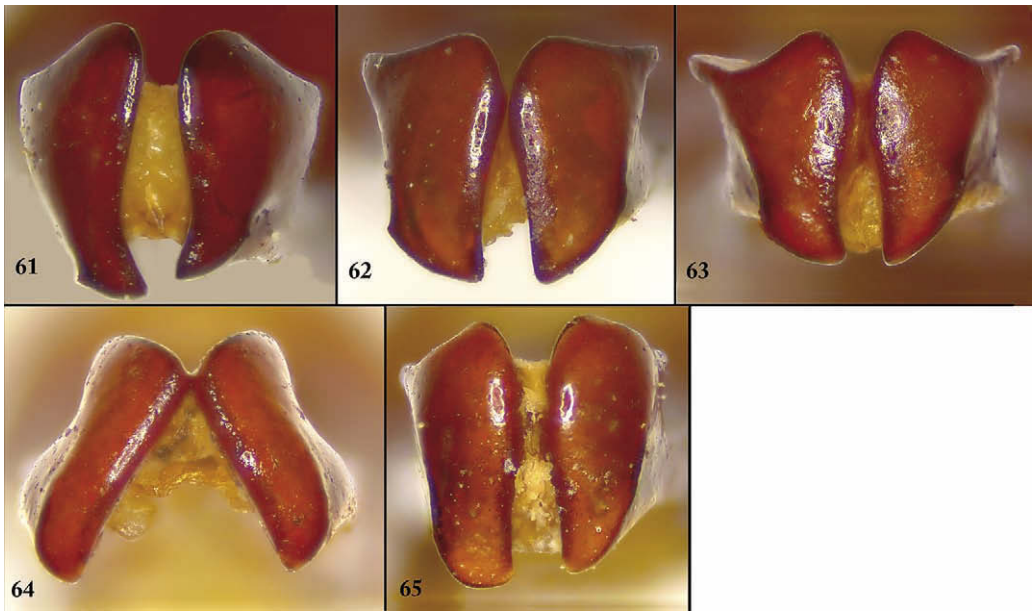
Figs 46–50. Aedeagus schematically in dorsal view (*Melolontha papposa*-complex) from the Iberian Peninsula. **46** – ***M. baetica* sp. n.**, **47** – *M. hidalgoi* **sp. n.**, **48** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.**, **49** – ***M. llinaresi* sp. n.**, **50** – ***M. papposa*** ILLIGER, 1803.



Figs 51–55. Photographs of the aedeagus in side view (*Melolontha papposa*-complex) from the Iberian Peninsula. **51** – ***M. baetica* sp. n.** (paratypus no. 134, Pinar del Rey, San Roque, Province of Cádiz, Andalusia, Spain), **52** – ***M. hidalgoi* sp. n.** (paratypus no. 155, Camino de Hinojos, Province of Huelva, Andalusia, Spain), **53** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.** (Sierra Morena, Province of Ciudad Real, Andalusia, Spain), **54** – *M. llinaresi* **sp. n.** (paratypus no. 222, El Arahal, Province of Sevilla, Andalusia, Spain), **55** – ***M. papposa*** ILLIGER, 1803 (Melides, Municipality of Setubal, Portugal).



Figs 56–60. Aedeagus schematically in side view (*Melolontha papposa*-complex) from the Iberian Peninsula. **56** – ***M. baetica* sp. n.**, **57** – ***M. hidalgoi* sp. n.**, **58** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.**, **59** – ***M. llinaresi* sp. n.**, **60** – ***M. papposa*** ILLIGER, 1803.



Figs 61–65. Photographs of the aedeagus in front view (*Melolontha papposa*-complex) from the Iberian Peninsula. **61** – ***M. baetica*** **sp. n.** (paratypus no. 134, Pinar del Rey, San Roque, Province of Cádiz, Andalusia, Spain), **62** – ***M. hidalgoi*** **sp. n.** (paratypus no. 155, Camino de Hinojos, Province of Huelva, Andalusia, Spain), **63** – ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.** (Sierra Morena, Province of Ciudad Real, Andalusia, Spain), **64** – ***M. llinaresi*** **sp. n.** (paratypus no. 222, El Arahal, Province of Sevilla, Andalusia, Spain), **65** – ***M. papposa*** ILLIGER, 1803 (Melides, Municipality of Setubal, Portugal).

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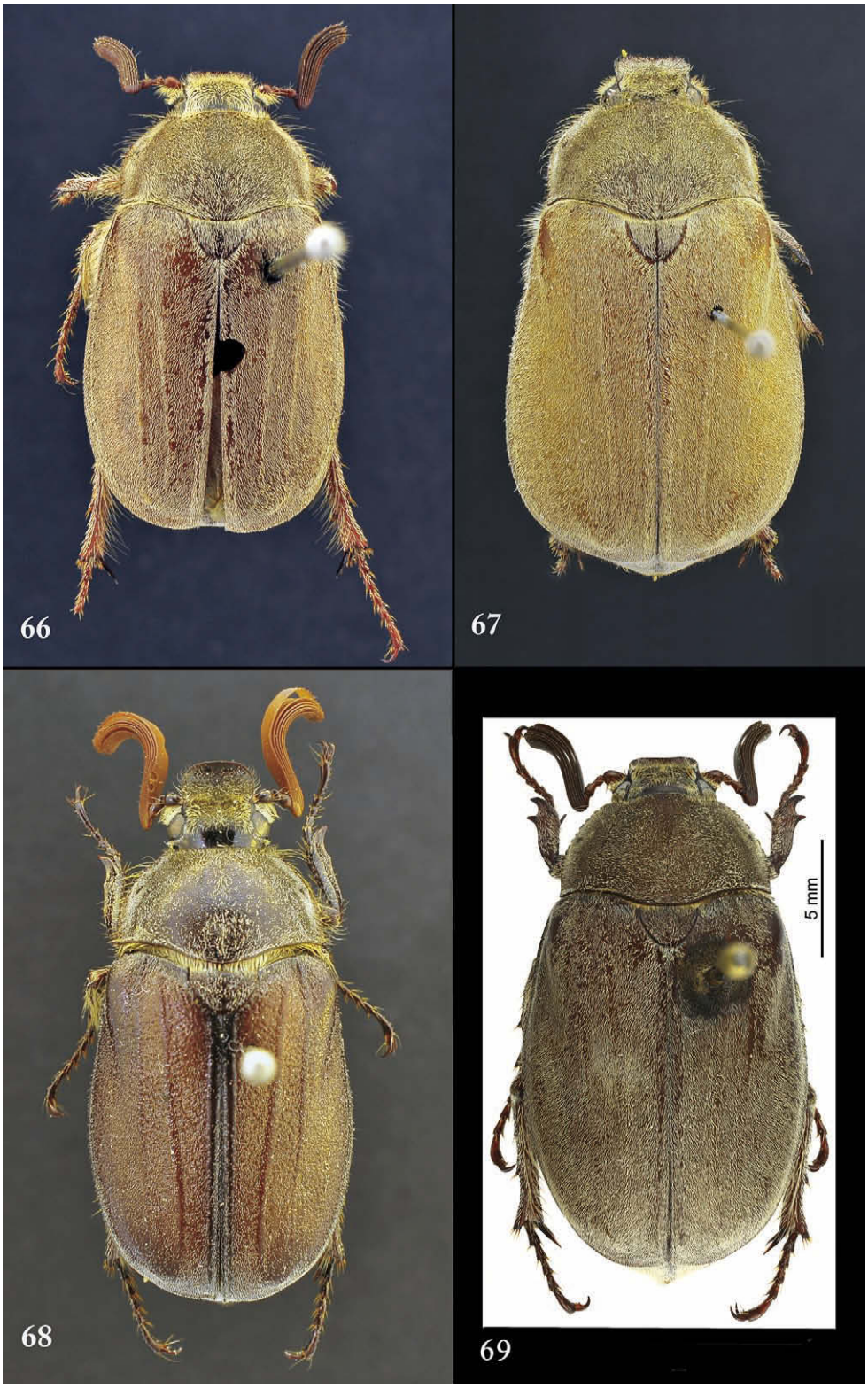
Figs 66–69. Habitus photographs (*Melolontha papposa*-complex) from the Iberian Peninsula (dorsal view), **66** – lectotype ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.**, **67** – lectotype ***M. hybrida*** **var.** ***rufotestacea*** KRAATZ, 1885 (syn. of *M. hybrida*), **68** – lectotype ***M. papposa*** ILLIGER, 1803, **69** – neotype ***M. fucata*** BLANCHARD, 1850 [© MNHN/A. Rivier].


66
67
68
69
5 mm

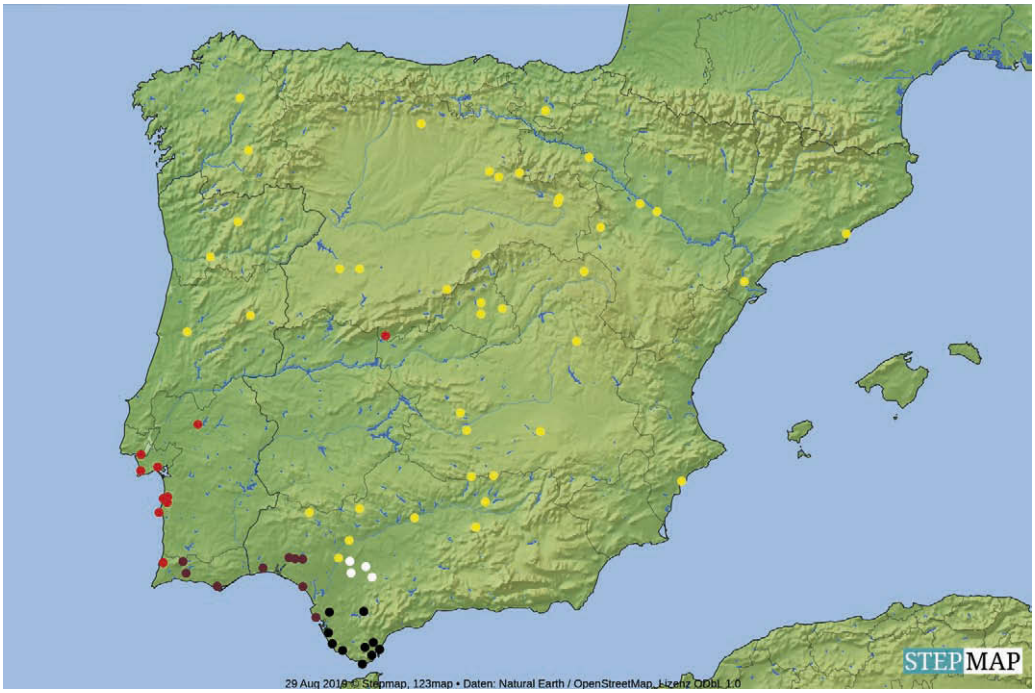


Fig 70. Distribution map with known localities (*Melolontha papposa*-complex) in the Iberian Peninsula. **Black** circle = ***M. baetica* sp. n.**, **brown** circle = *M. hidalgoi* **sp. n.**, **yellow** circle = ***M. hybrida*** CHARPENTIER, 1825 **stat. restit.**, **white** circle = ***M. llinaresi* sp. n.**, **red** circle = ***M. papposa*** ILLIGER, 1803.

Fig 71. Habitat of ***Melolontha baetica* sp. n.**: San Roque, Province of Cádiz, Andalusia, Spain (picture by NAVARRO & URBANO).

Fig 72. Habitat of ***Melolontha hidalgoi*** **sp. n.**: La Palma del Condado, Province of Huelva, Andalusia, Spain (picture by NAVARRO & URBANO).

Fig 73. Habitat of ***Melolontha hybrida*** CHARPENTIER, 1825 **stat. restit.**: La Rivera de Montemayor, Cañaveral de León, Province of Huelva, Andalusia, Spain (picture by NAVARRO & URBANO).

Fig 74. Habitat of ***Melolontha llinaresi* sp. n.**: El Arahal, Province of Sevilla, Andalusia, Spain (picture by NAVARRO & URBANO).

Fig 75. Habitat of ***Melolontha papposa*** ILLIGER, 1803: Melides, Municipality of Setubal, Portugal (picture by HILLERT).

Fig 76. ***Melolontha baetica*** **sp. n.**: San Roque, Province of Cádiz, Andalusia (picture by HERMANN).

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