

## The genus *Bolbelasmus* in the western and southern regions of the Mediterranean Basin (Coleoptera: Geotrupidae: Bolboceratinae)

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**Abstract.** The *Bolbelasmus* Boucomont, 1911 species of the western and southern regions of the Mediterranean Basin (Northern Africa, Iberian Peninsula and France) are revised. The following three new species are described: *Bolbelasmus brancoi* Hillert & Král sp. nov. and *Bolbelasmus howdeni* Hillert & Král sp. nov., both from Spain and Gibraltar, and *Bolbelasmus nikolajevi* Hillert, Arnone, Král & Massa sp. nov. from Egypt, Libya and Tunisia. *Bolbelasmus vaulogeri* (Abeille de Perrin, 1898) stat. restit. is removed from synonymy with *B. bocchus* (Erichson, 1841) and reinstated as a separate species. *Bolbelasmus romanorum* Arnone & Massa, 2010 is considered a junior subjective synonym of *B. vaulogeri*. Lectotypes for *Bolboceras bocchus* Erichson, 1841 and *Bolboceras vaulogeri* Abeille de Perrin, 1898 are designated. Relevant diagnostic characters (head, pronotum, elytron, external male genitalia) are illustrated. Identification keys for both males and females, and an annotated list of the Western Palaearctic representatives of the genus *Bolbelasmus* are presented. Finally, first records are given for *B. gallicus* (Mulsant, 1842) from Corsica and the Midi-Pyrénées region of France, *B. keithi* Miessen & Trichas, 2011 from the Greek island of Rhodes, and *B. unicornis* (Schränk von Paula, 1789) from the Tuscany province of Italy.

**Key words.** Coleoptera, Scarabaeoidea, Geotrupidae, Bolboceratinae, Bolbelasmini, *Bolbelasmus*, taxonomy, revision, new species, synonymy, species restitution, lectotype designation, key, distribution, annotated list, Mediterranean Region, Palaearctic Region

## Introduction

The bolboceratine genus *Bolbelasmus* was erected by BOUCOMONT (1911) in his study 'Contribution à la classification des Geotrupidae', where he designated the following three species: *Bolboceras bocchus* Erichson, 1841, *Bolboceras gallicus* Mulsant, 1842 and *Bolboceras unicornis* (Schränk von Paula, 1789) as 'species typicae'. In the same study, BOUCOMONT (1911) erected the genus *Kolbeus* with 'species typicae' *Bolboceras arcuatum* Bates, 1887 and *Bolboceras coreanum* Kolbe, 1886. Type species were designated by LUCAS (1920) for *Kolbeus*, namely *Bolboceras coreanus*, while 30 years later, CARTWRIGHT (1953) designated *Bolboceras gallicus* for *Bolbelasmus*. In addition, CARTWRIGHT (1953) synonymized *Kolbeus* under *Bolbelasmus* in the same article. In a recent taxonomic study, NIKOLAJEV (1996) described the tribe Bolbelasmini with three genera: *Bolbelasmus* Boucomont, 1911, *Bolbotrypes* Olsoufieff, 1907 and *Bolbogonium* Boucomont, 1911. Later on NIKOLAJEV (2003) placed *Kolbeus* at the rank of subgenus of *Bolbelasmus*. SCHOLTZ & BROWN (1996) have proposed that the group of genera related to *Bolboceras* Kirby, 1819 belongs to the rank of family (Bolboceratidae). However, in accordance with recent studies based on molecular data (e.g. SMITH et al. 2006) and with phylogeny of the Geotrupidae based on larval morphology (VERDÚ et al. 2004), the group is treated as a subfamily of Geotrupidae in this study (see also BOUCHARD et al. 2011).

Currently, we recognize 27 species of the genus *Bolbelasmus* (including subgenus *Kolbeus*) from the Holarctic Region, including three new species described in this study. Eight taxa are distributed throughout the New World, eleven are known from Europe and the Mediterranean Region and eight are native to the Himalaya, Far East, China and south-eastern Asia (e.g. REITTER 1895, HOWDEN 1964, PETROVITZ 1968, KRIKKEN 1977, MASUMOTO 1984, HOWDEN & SOLIS 1995, NIKOLAJEV 2005, KRÁL et al. 2006, LI et al. 2008). According to KRIKKEN (1977), ARNONE & MASSA (2010), MIESSEN (2011) and MIESSEN & TRICHAS (2011) and to the results of the present study, eleven species of the genus *Bolbelasmus* are distributed in Europe, Middle East and North Africa.

The new species in this genus were described thanks to the study of a large number of specimens from almost 70 institutional and private collections and series of specimens recently collected by the authors.

## Material and methods

The habitus photographs were either taken by D. Král using a Canon MP-E 65mm/2.8 Macro lens with 5:1 optical magnification on bellows attached to a Canon EOS 550D camera or by M. Romano using a Canon EOS 450D digital camera mounting a Sigma 70 mm 1:2.8 DG macro. Partially focused images of the specimen were stacked using Helicon Focus 3.20.2 Pro software.

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

ABCB Alberto Ballerio collection, Brescia, Italy;

AHCL Antonio Hidalgo Fontiveros collection, Linares, Spain;

ARCL Andreas Reichenbach collection, Leipzig, Germany;

- BMCP Bruno Massa collection (deposited in MSNG);
- BMNH Natural History Museum, London, United Kingdom (Maxwell V. L. Barclay, Malcolm Kerley);
- BNCP Bohuslav Němec collection, Praha, Czech Republic;
- CMNC †Henry F. & Anne T. Howden collection, Entomology Division, Museum of Nature Canada, Ottawa, Canada (Aleš Smetana);
- CUPC Department of Zoology, Charles University, Prague, Czech Republic (Petr Šípek);
- DJCP Daniel Juřena collection, Prostějov, Czech Republic;
- DKCC Denis Keith collection, Chartres, France;
- DKCP David Král collection (deposited in NMPC);
- ERCS Eckehard Rößner collection, Schwerin, Germany;
- GMCL Geoffrey Miessen collection, Liège, Belgium;
- GNCA Georgy V. Nikolajev collection, Almaty, Kazakhstan;
- GSCT Guido Sabatinelli collection, Tunis, Tunisia;
- HFCB Hans Fery collection, Berlin, Germany;
- HKCS Harald Kaltz collection, Schlabendorf, Germany;
- HNHM Hungarian Natural History Museum, Budapest (Ottó Merkl, Győző Szél);
- IBCF Ivo Boščík collection, Frýdek-Místek – Skalice, Czech Republic;
- IECA Institute of Entomology, Biology Centre CAS, České Budějovice, Czech Republic (Aleš Bezděk);
- IMCO Ivo Martinů collection, Olomouc, Czech Republic;
- JBCP Jan Batelka collection, Prague, Czech Republic;
- JCCL Javier Castillo collection, Linares, Spain;
- JDCC Jiří Dvořák collection, Čelčice, Czech Republic;
- JHCP Jiří Háva collection, Únětice, Czech Republic;
- JMCH Jan Matějčík collection, Hradec Králové, Czech Republic;
- JMCP Jiří Mička collection, Prague, Czech Republic;
- JUCS José María Urbano collection, Sevilla, Spain;
- JNCS Jerónimo Navarro García collection, Sevilla, Spain;
- JSCP Jan Schneider collection, Prague, Czech Republic;
- JSCS Joachim Schönfeld collection, Sinzig, Germany;
- JZCJ Jaroslav Žák collection, Jezernice, Czech Republic;
- LHCB Lars Hendrich collection (deposited in ZSMC);
- JLCM José Ignacio López Colón collection, Madrid, Spain;
- LMCT Ladislav Mencl collection, Týnec nad Labem, Czech Republic;
- LSCN Ludger Schmidt collection, Neustadt, Germany;
- MACP Marcello Arnone collection, Palermo, Italy;
- MECI Manfred Egger collection, Innsbruck, Austria;
- MHNL Muséum d'histoire naturelle, Lyon, France (Harold Labrique);
- MLCD Mike Liebscher collection, Dresden, Germany;
- MNHB Museum für Naturkunde, Berlin, Germany (Johannes Frisch, Joachim Willers);
- MNHM Muséum national d'Histoire naturelle, Paris, France (Olivier Montreuil, Antoine Mantilleri);
- MSNT Museo Regionale Scienze Naturali, Turin, Italy (Luca Picciau);
- MSAP Museo Scienze Agrarie, Portici, Naples, Italy (Antonio Garonna);
- MSNG Museo Civico di Storia Naturale 'G. Doria', Genoa, Italy (Maria Luisa Tavano);
- MSNM Museo Civico di Storia Naturale, Milan, Italy (Fabrizio Rigato);
- MZUC Museo di Zoologia dell'Università of Catania, Catania, Italy (Giorgio Sabella);
- MZUF Museo di Zoologia La Specola dell'Università of Florence, Italy (Luca Bartolozzi);
- NMEC Naturkundemuseum, Erfurt, Germany (Matthias Hartmann);
- NHMB Naturhistorisches Museum, Basel, Switzerland († Michel Brancucci, Eva Sprecher-Uebersachs, Matthias Bohrer);
- NMPC National Museum (Natural History), Prague, Czech Republic (Jiří Hájek);
- OBCB Olivier Boilly collection, Marcq en Baroeul, France;

OHCB Oliver Hillert collection, Schöneiche bei Berlin, Germany;  
 PJCL Pavel Jáchymek collection, Luhačovice, Czech Republic;  
 PKCS Petr Kyliès collection, Slaný, Czech Republic;  
 TCP Pavel Turek collection, Lanškroun, Czech Republic;  
 RCCP Radek Červenka collection, Prague, Czech Republic;  
 RMC M Radoslav Muczka collection, Mikulov, Czech Republic;  
 SJCP Stanley Jákli collection, Prague, Czech Republic;  
 SMTD Staatliches Museum für Tierkunde, Dresden, Germany (Olaf Jäger);  
 SZCM Stefano Ziani collection, Meldola, Italy;  
 TVCP Tomáš Vendl collection, Prague, Czech Republic;  
 VACP Vittorio Aliquò collection, Palermo, Italy;  
 VKCB Vítězslav Kubáň collection, Brno, Czech Republic;  
 VKCC Václav Krivan collection, Chaloupky, Czech Republic;  
 VMCP Vladislav Malý collection, Prague, Czech Republic;  
 VRCH Vladislav Řebíček collection, Hradištko, Czech Republic;  
 VTCZ Václav Týr collection, Žihle, Czech Republic;  
 ZFMK Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany (Dirk Ahrens);  
 ZLCK Zdeno Lucbauer collection, Kattering, United Kingdom;  
 ZSMC Zoologische Staatssammlung, München, Germany (Michael Balke, Lars Hendrich).

Altogether, 1332 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 name of the authors and the year’. In the case of lectotype or paralectotype designation, each specimen bears a red printed label: ‘Name of a taxon with author and year of original description, LECTOTYPUS ♂ or PARALECTOTYPUS ♂ or ♀ David Král & Oliver Hillert des. 2014’. Remarks of the authors and comments are indicated in brackets. Exact label data are cited for the type material. Information in quotation marks (‘’) indicates the original spelling. Coordinates and altitude are assigned to each locality mentioned in the text (material examined in each species) (see Appendix 1). These data were used in the construction of distribution map (see Fig. 59).

## Taxonomy

### *Bolbelasmus bocchus* (Erichson, 1841)

(Figs 1, 8, 14, 21, 27, 33, 39, 45–51, 59–60)

*Bolbocerus Bocchus* Erichson, 1841: 170 (original description). GORY (1841): table 71, figs 1, 1A (list); MARSEUL (1857): 83 (list); JACQUELIN DU VAL (1863): 434 (catalogue); BOUCOMONT (1902): 4 (catalogue); HEYDEN et al. (1906): 725 (catalogue); WINKLER (1927): 1035 (catalogue).

*Bolbelasmus bocchus*: BOUCOMONT (1912): 17 (catalogue); WINKLER (1927): 1035 (catalogue); KOCHER (1958): 77 (catalogue); RUIZ (2000): 84 (distribution).

*Bolbelasmus bocchus* [partim, populations from Morocco]: BARAUD (1977): 160 (monograph); MARTÍN-PIERA & LÓPEZ-COLÓN (2000): 179 (monograph).

*Bolbelasmus bocchus bocchus* [partim, populations from Morocco]: KRIKKEN (1977): 290, figs 16–17 (revision); BARAUD (1985): 53, fig. 8 (monograph); BARAUD (1992): 44 (monograph); KRÁL et al. (2006): 82 (catalogue).

*Bolboceras Fissicornis* Mulsant, 1843: 280 (original description). Type locality: ‘Algérie’. MARSEUL (1857): 83 (synonymy).

**Type locality.** ‘Algier, [Bona = Annaba]’ (see Type material for details).

**Type material examined** (3 specimens). **ALGERIA:** LECTOTYPE (present designation): ♂ (MNHB), ‘Hist. – coll. (Coleoptera), Nr. 25569, Bolboceras Bocchus Er. – Kl., Bona, Wagner, Zool. Mus. Berlin, Syntypus, Bolbelasmus



bocchus Erichson, 1841, labelled by MNHUB 2013'. **PARALECTOTYPES**: No. 1, ♀ (MNHB), 'Hist. – coll. (Coleoptera), Nr. 25569, Bolboceras Bocchus Er. – Kl., Bona, Wagner, Zool. Mus. Berlin, Syntypus, Bolbelasmus bocchus Erichson, 1841, labelled by MNHUB 2013'; No. 2, ♂ (MNHB), 'Hist. – coll. (Coleoptera), Nr. 25569, Bolboceras Bocchus Er. – Kl., Bona, Wagner, Zool. Mus. Berlin, Syntypus, Bolbelasmus bocchus Erichson, 184, labelled by MNHUB 2013'; see Figs 45–51.

**Additional material examined** (183 specimens). **ALGERIA**: Algeria, 2 ♂♂ 1 ♀ (SMTD), 1 ♀ (MNHN), 2 ♂♂ 2 ♀♀ (BMNH); Algerie, 1 ♂ 2 ♀♀ (MHNL); Algerien, 3 ♂♂ (SMTD). **ALGIERS PROV.**: Alger (city), vi.1996, 1 ♂ (DKCP); Alger, 1 ♂ (MNHN); Algier, 2 ♂♂ (MNHB); L. Arba, 1 ♂ 1 ♀, Reitter [lgt.] (MNHN), 1 ♂ (VMCP). **SIDI BEL ABBÈS PROV.**: Chanzy, [18]90, 1 ♂, Vaulog[er] lgt. (ZSMC); Chanzy, 1890, 1 ♀, de Vauloger lgt. (MNHN). **DJELFA PROV.**: Takersan, iv.1893, 2 ♂♂ 3 ♀♀, A Ben Yacoub [lgt.] (MNHN); Takersan, Djelfa, 17.v.1924, 1 ♂ (DKCC). **EL BAYADH PROV.**: Region de Geryville, vi.1910, 3 ♂♂ 8 ♀♀, Harold Powell lgt. (MNHN); Le Kreider, v.[18]96, 1 ♂ 1 ♀ (MNHN); El Kreider, v.1896, 4 ♂♂ 2 ♀♀, Dr. A. Chobaut lgt. (MNHN), 2 ♂♂ 1 ♀ (LHCB); El-Kreider (Oran), 1 ♂, L. Bleuse [lgt.] (ZFMK); Kreider, 1 ♂, Bedel [lgt.] (MNHB), 1 ♀ (ZSMC), 1 ♂ 2 ♀♀ (MNHN); Kreider, 4 ♂♂ 4 ♀♀, Bedel lgt. (MNHN); Kreider, 3 ♂♂ 4 ♀♀ (MNHN), 1 ♂ (NMPC), 4 ♀♀ (ZFMK). **LAGHOUAT PROV.**: Aflou, 4.iv.1981, 1 ♂, H. Pierotti [lgt.] (MSNG). **MASCARA PROV.**: Oran, Mascara, iv.–v.1913, 24 ♂♂ 9 ♀♀, G. Le Comte lgt. (MNHN); Mascara, 1 ♂, Dr. A. Cobos lgt. (MNHN); Mascara, 1 ♂ (NHMB), 1 ♂ 1 ♀ (VMCP). **M'SILA PROV.**: Ain-Ograb, 1 ♀, Dr. Martin [lgt.] (ZFMK). **NAĀMA PROV.**: Mecheria, 1 ♀ (MNHN). **ORAN PROV.**: Magenta (prov. d'Oran), 1 ♂, E. Duroux [lgt.] (ZFMK); Magenta (Oran), 1 ♂ (DKCC); Oran, R. J. 3.xi.1903 1 ♂, B. [?] lgt. (MNHN); Oran, 1 ♂, coll. R. Paulian (MNHN); Oran, Magenta, 1915, 1 ♂, M. Rotrou lgt. (MNHN); Magenta, 1 ♀ (MNHN). **TLEMCEEN PROV.**: Lambaze, vi.1885, 2 ♂♂, L. Bleuse lgt. (MNHN); Sebduou, 1903, 1 ♂ (MNHN). **MOROCCO**: GHARB-CHRARDA-BĒNI HSEN REG.: KĒNITRA PROV.: s.[south of] Oujda, Ain-el Kerma, v.1972, 2 ♂♂ 1 ♀, D. Bernh[auer] lgt. (JSCS). **MEKNÈS-TAFILALET REG.**: **IFRANE PROV.**: Mittlerer Atlas, Ifrane, 1700 m, 8.–9.vi.[19]96, 1 ♀, A. Kallies lgt. (OHCB); Middle Atlas, Azrou, 18.–19.vi.1936, 1 ♂, K.H. Chapman & G.A. Bisset [lgt.] (BMNH); Moyen-Atlas, near Jbel Hebri, 12.v.1980, 1 ♂, J. Gourvès rec. [lgt.] (MHNL); Azrou, Foret de Cedres, 10.v.[19]95, 1 ♂, Jiří Hájek lgt. (JSCP), 1 ♂ (NMPC); Azrou, 10.v.1995, 1 ♀, M. Rozsival lgt. (JZCJ); Ifrane env., 3.v.1995, 1 ♂, J. Bechr lgt. (PJCL); Ifrane, v.[19]95, 1 ♂, J. Holíš lgt. (JZCJ); Ifrane, Dayet Iffer, 26.iv.2014, 11 ♂♂ 5 ♀♀, O. Boilly lgt. (OBCB); Ifrane, 8.vi.1973, 2 ♀♀ (SJCP); Ifrane, 1.v.68, 1 ♂, J. Gallet lgt. (MNHN); Ifrane, 11.v.[19]67, 2 ♂♂ 1 ♀, Y. Lajonquier lgt. (MNHN); NE of Ifrane, Dayt-Ifrane, 17.v.2003, 1 ♀, M. Snižek lgt. (VKCC); Taforalt (Oujda), 11.iv.1992, 1 ♂ 1 ♀, G. Chavanon lgt. (IECA); Zad Pass, 2180 m, 24.iv.2014, 1 ♂, O. Boilly lgt. (OBCB). **ORIENTAL REG.**: **BERKANE PROV.**: Taforalt, Beni Snassen (Parc Naturel), iii.[19]51, 1 ♀, Antoine lgt. (MNHN). **JERADA PROV.**: W [of] Touissite, Jbel Mahsor, 34°29'46"N 01°46'50"W, 1050 m, 2 ♀♀, R. Rejzek lgt. (JSCP). **OUJIDA-ANGAD PROV.**: Torf. Ouazane, pr.[prope] Oujda, vi.[19]35, (Lacous), 1 ♂ 1 ♀ (MNHN). **TAOURIRT PROV.**: Gaada de Debdou plat[eau], E of Rchida, 33°52'N 3°10'W, ca. 1420–1550 m, 20.–21.iii.2013, 1 ♂ 1 ♀, D. Král lgt. (DKCP); Gaada de Debdou plat[eau], E of Rchida, 33°52'N 3°10'W, ca. 1420–1550 m, 20.–21.iii.2013, 3 ♂♂ 1 ♀, O. Hillert lgt. (OHCB). **SPAIN (territory in Morocco)**: **MELILLA AUTONOM. COMM.**: 1 ♂ 1 ♀, Melilla, Pardo Alcaide [lgt.] (MSNG); 2 ♂♂ 2 ♀♀, Rostrogardo, Melilla, Pardo Alcaide lgt. (MNHN); 1 ♀, same label data (MSNT); Taurirt (Beni Sicar), Melilla Maruecos, 1 ♂ 1 ♀, Pardo Alcaide lgt. (MNHN). **NOT LOCATED**: Borkine, 10.vi.[19]29, Le Cerf, 1 ♂ (MNHN); Daya, 1 ♂ 1 ♀, Bedel lgt. (MNHN); Daja, 1 ♀ (MNHN).

**Redescription. Male (lectotype)** (Figs 45–47). Remarkably convex, hemispherical; dorsal surface brownish, remarkably shiny.

Head (Figs 45–47). Clypeus broadly rounded, almost semicircular, anterior angles vague, posterior angles elevated. Frontal horn well developed, long, distinctly furcate apically; its base outline elliptic in dorsal aspect, posterior edge of base situated at level of anterior part of eye; lateral margin of horn distinctly, sharply keeled from base to middle of tubercle. Clypeal disc with simple, coarse punctation. Oblique keels above eyes reaching approximately to half of eyes. Punctation of frons and vertex approximately same as on clypeus. Fronto-clypeal suture present. Eyes well developed, distinctly elliptic; genae exceeding eyes, arcuate posteriorly.

Pronotum (Figs 45–47) distinctly transverse, broadest just in basal quarter, entirely bordered; lateral margin evenly rounded, marginal carina not crenate, distinctly widened and elevated; lateral fovea nearly missing. Pronotal punctation distinct, double, consisting of coarse, deeply impressed punctures, punctures separated by approximately 2–3 times their diameter and intermixed with very fine ones. Pronotal base glabrous; lateral hornlike apophyses well developed, directed forwardly in dorso-lateral view; cavity between lateral and apical apophyses remarkably deep, kidney-shaped. Apical hornlike apophysis well developed, distinctly elevated, angled, directed upwards, subapical protrusion situated on outer side, basally.

Scutellar shield elongate triangular, very finely punctate, shiny.

Elytra approximately as long as wide, surface shiny; humeral umbone weak; between humerus and elytral suture seven distinctly impressed striae along entire elytral length, striae with coarse, regularly spaced punctures; intervals flat, impunctate.

Aedeagus. Parameres as in Fig. 60.

**Variability in males.** Surface black to brownish; pronotal hornlike apophyses in medium developed and underdeveloped (hypothelic) specimens short, more or less straight, only simply rounded to almost acute apically.

**Female (Paralectotype No. 1).** Head (Fig. 48). Clypeus broadly rounded, semicircular with straight anterior margin, anterior angles evenly rounded. Posterior angles of clypeal margin very weakly elevated. Frontal carina well developed, distinctly interrupted at middle, bituberculate at internal interruption, keeled laterally. Punctuation of clypeus, frons, vertex and occiput simple, distinct; oblique keel above eyes distinct, extended to half of eyes; eyes well developed, distinctly elliptic, genae well developed, regularly arcuate.

Pronotum (Fig. 48) distinctly transverse, lateral margin weakly widened, broadest just at base, surface distinctly and deeply punctate, punctuation double except impunctate base, punctures separated by distance equal to their diameter and intermixed with very fine ones. Anterior protrusion distinctly transverse, sharply semicircular, lateral apophyses present.

**Measurements.** Total body length 11.0–14.8 mm (lectotype, ♂: 13.5 mm; paralectotype No.1, ♀: 14.0 mm).

**Differential diagnosis.** Refer to species key.

**Collecting circumstances.** Prefers calcareous soils.

**Distribution.** Mediterranean parts of Algeria and northern Morocco (Fig. 59).

**Remarks.** The type locality of *B. bocchus* is ‘Algier’, the species has been recorded also from Spain (not Portugal: BRANCO 2005), northern Algeria and northern Morocco (cf. e.g. KRIKKEN 1977; BARAUD 1977, 1985, 1992; KRÁL et al. 2006; MARTÍN-PIERA & LÓPEZ-COLÓN 2000; RUIZ 2000). Regarding the presence in Spain, we consider the Iberian populations to belong to another species, described in this paper as *B. brancoi* sp. nov. The populations distributed in northern Tunisia and probably also in eastern parts of Algeria were at first referred to another species, *Bolbelasmus vaulogeri*, later synonymized with *B. bocchus* by BOUCOMONT (1911) and considered a subspecies of *B. bocchus* by KRIKKEN (1977). We consider these populations to represent a valid species and identical to populations of Sicily described recently as *B. romanorum* Arnone & Massa, 2010 (syn. nov.). We also consider the populations native to Middle and South Tunisia, Libya (Tripolitania, Cyrenaica) (SCHATZMAYR 1946) and Egypt (Mariout) (PIC 1924) to be a distinct species, *B. nikolajevi* sp. nov., described in this paper.

Finally, CHIKATUNOV & PAVLÍČEK (1997) reported *B. bocchus* from Israel, but we did not have the opportunity to study any *Bolbelasmus* material from the Levant countries. ERICHSON (1841) described *Bolboceras bocchus* based on a series of unknown number of specimens. He did not establish a type; thus in this study, we designated a lectotype (♂) (Figs 45–47, 49) and two paralectotypes for fixation of this taxon (Figs 48, 50–51). *Bolboceras fissicornis* Mulsant, 1843 was also described from ‘Algérie’ based on the same morphological characters of *B. bocchus* (‘tête armée d’une corne non mobile, bifide au sommet [= head armed with immobile horn, furcate apically]’) (MULSANT 1843) and later synonymized with *B. bocchus* by MARSEUL (1857). This important character of *B. bocchus* is shown also in GORY (1841: table 71, figs 1, 1A).

***Bolbelasmus brancoi* Hillert & Král sp. nov.**

(Figs 2, 9, 15, 22, 28, 34, 40, 59, 61)

*Bolboceras Bocchus* [partim, populations from Spain]: JACQUELIN DU VAL (1863): 131 (catalogue).

*Bolboceras Bocchus*: FUENTE Y MORALES (1926): 146 (distribution).

*Bolbelasmus bocchus* [partim, populations from Spain]: WINKLER (1927): 1035 (catalogue); SEABRA (1943): 50 (catalogue); BARAUD (1977): 159 (monograph); RUANO MARCO et al. (1988): 40, fig. p. 41 (distribution); LÓPEZ-COLÓN et al. (1996): 3, 8, 10 (distribution, key); MARTÍN-PIERA & LÓPEZ-COLÓN (2000): 179, figs 44 A,C, 45 (monograph); MIESSEN & TRICHAS (2011): 182 (remarks).

*Bolbelasmus bocchus*: BAGUENA CORELLA (1967): 262 (monograph); GONZÁLEZ PEÑA (1979): 23, figs 4–6, 8 (key, biology); VERDÚ et al. (1998): 245, figs 1–12 (larval description); AGOIS-BUSTAMANTE (1998): 19 (distribution); AGOIS-BUSTAMANTE (2003): 190 (distribution); VERDÚ et al. (2004): 514, fig. 1; 515, fig. 20; 518, fig. 42 (larval illustrations).

*Bolbelasmus bocchus bocchus* [partim, populations from Spain]: KRIKKEN (1977): 290 (revision); BARAUD (1985): 53 (monograph); BARAUD (1992): 44 (monograph); BRANCO (2005): 54 (taxonomic comments); KRÁL et al. (2006): 82 (catalogue); ARNONE & MASSA (2010): 407 (remarks, distribution).

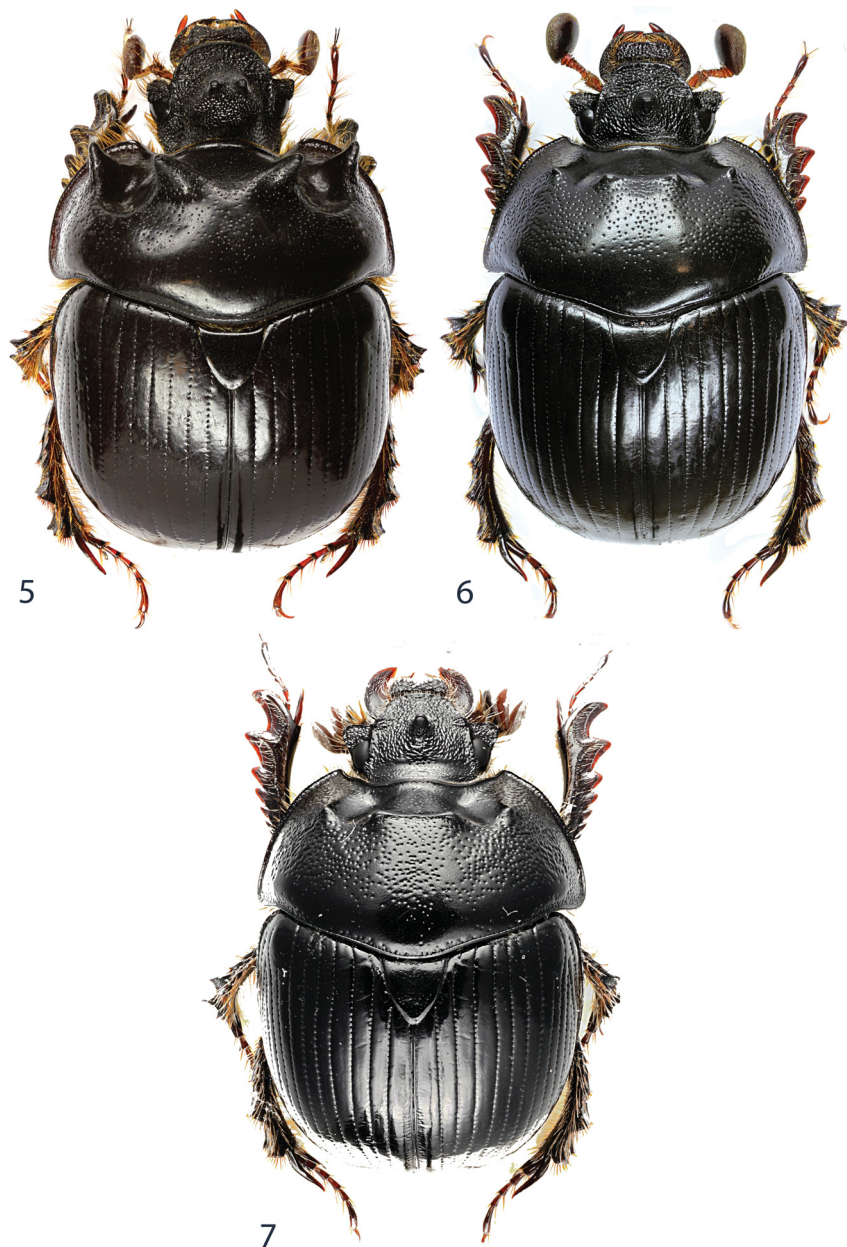
**Type locality.** Spain, Andalusia, Los Jesos, N slope of Sierra de Alhamilla, 37°05'N 02°17'W, 500 m a.s.l.

**Type material** (143 specimens). **SPAIN: ANDALUSIA AUTONOM. COMM.: ALMERIA PROV.: HOLOTYPE:** ♂ (DKCP), ‘Spain, (Andalusia), Los Jesos, N slope of Sierra de Alhamilla, 28.ii.2009, O. Hillert lgt.’ **ALLOTYPE:** ♀ (DKCP), same data. **PARATYPES: ALMERIA PROV.:** ‘España, U. Almería, Garrucha, Salzlachenufer, 07.iv.1986’, 1 ♀ (LSCN); ‘Spain, (Andalusia), Los Jesos, N slope of Sierra de Alhamilla, 13-27.ii.2013, O. Hillert lgt.’, 7 ♂♂ 5 ♀♀ (OHCB); ‘Spain (Andalusia), Los Jesos, N slope of Sierra de Alhamilla, 30 km NE of Almería, 28.ii.2009, O. Hillert lgt.’, 1 ♂ 1 ♀ (ABCB), 1 ♀ (AHCL), 1 ♂ 1 ♀ (ARCL), 1 ♂ 1 ♀ (ERCS), 1 ♂ 1 ♀ (GMCL), 1 ♂ 1 ♀ (GNCA), 1 ♂ 1 ♀ (HHCO), 1 ♂ 1 ♀ (HKCS), 1 ♂ 1 ♀ (LSCL), 4 ♂♂ 6 ♀♀ (OHCB); ‘Spanien – Andalusien, Provinz Almería, Umgebung Tabernas, a.L. [at light], 21.-28.iv.2004, leg. Steffen Schellhorn’, 1 ♂ 1 ♀ (OHCB). **GRANADA PROV.:** ‘Spain, Granada, Andalucía, Hoya de Baza mts., 850 m asl., Salazar, 37°31.87'N 2°40.94'W, 4.v.2009, lgt. J. Darebník’, 1 ♀ (JSCP), 1 ♂ (PKCS); ‘Bco. del Espartal, Baza (Granada), 30SWG2854, F.S. Piñero leg., 3-iii-[19]90’, 1 ♂ 1 ♀ (SZCM); ‘ESPAÑA, Granada, Bco. del Espartal, Baza, 3-iii-[19]90, F.S. Piñero’, 1 ♂ 1 ♀ (SZCM); ‘Bananco del Espartal, BAZA 8.X.[19]89, GRANADA (España)’, F. S. Piñero leg.’, 1 ♂ (DKCP); ‘Bco. del Espartal, BAZA 8.X.[19]89, GRANADA (España), F. S. Piñero leg.’, 1 ♀ (DKCP); ‘Espagne (Granada), Lanjaron, 28.iii.[19]67, Baraud lgt.’, 1 ♂ (MNHN); ‘E, Prov. Granada, Los Olmos, 14.v.2002, H. Rietz lgt.’, 1 ♂ (ERCS); ‘Spain, Granada, Orgiva 12.iv.1960’, 1 ♂ 1 ♀ (BMCP). **ARAGON AUTONOM. COMM.: SARAGOSSA PROV.:** ‘España, La Playa - Sastago - Zaragoza, 1.vi.2013’, 2 ♂♂ (GMCL); ‘SPAIN, Aragon, Zaragoza, Candasnos, 13.vi.2011’, 1 ♂ (IECA); ‘España, Bujaraloz, Zaragoza, 18.v.2013’, 2 ♂♂ (GMCL); ‘España 17.v.2011, Bujaralos, Zaragoza, Leg. Rafael Soler’, 1 ♀ (DJCP); ‘Spain, Zaragoza, Sastago 12.v.2010’, 1 ♂ (OBCB); ‘España, Bujaraloz, Zaragoza, v.2009’, 1 ♂ 1 ♀ (GMCL); ‘España, Zaragoza, Sastago, 12.v.2007’, 1 ♂ (GMCL); ‘ESPAÑA, Zaragoza, Bujaraloz, 11.V.[19]91, M. TOMÁS [legit]’, 4 ♂♂ (SZCM); ‘Espagne – 30/V/1973, Bujaraloz (Zaragoza), C. Dufay rec.’, 1 ♂ (MHNL); ‘Espagne, prov. Zaragoza, Bujaralos env., 18.5.2013, 1 ♂ (IBCF); ‘Ejea de los Caballeros (Zaragoza), 7.v.1982, J.



Figs 1–4. Male habitus in dorsal aspect. 1 – *Bolbelasmus bocchus* (Erichson, 1841) (Morocco: Azrou, Forêt de Cedres, body length: 14.0 mm, NMPC); 2 – *B. brancoi* Hillert & Král sp. nov. (holotype); 3 – *B. gallicus* (Mulsant, 1842) (France: Bouches-du-Rhône, Barbentane, body length 13.7 mm, DJCP); 4 – *B. howdeni* Hillert & Král sp. nov. (holotype).





Figs 5–7. Male habitus in dorsal aspect. 5 – *Bolbelasmus nikolajevi* Hillert, Arnone, Král & Massa sp. nov. (holotype); 6 – *B. vaulogeri* (Abeille de Perrin, 1898) (Tunisia: Cap Bon peninsula, 6 km W of El Hawariah, 11.8 mm, DKCP); 7 – *B. vaulogeri* (Italy: Sicily, Menfi (Agrigento), Cinquanta, body length: 11.6 mm, MAPC).



Figs 8–11. Female habitus in dorsal aspect. 8 – *Bolbelasmus bocchus* (Erichson, 1841) (Morocco: Gaada de Debdou plateau., E of Rchida, 13.5 mm, DKCP); 9 – *B. brancoi* Hillert & Král sp. nov. (allotype); 10 – *B. gallicus* (Mulsant, 1842) (Spain: Andalusia, Aljaraque vill. env., 13.6 mm, JSCP); 11 – *B. howdeni* Hillert & Král sp. nov. (allotype).





Figs 12–13. Female habitus in dorsal aspect. 12 – *B. nikolajevi* Hillert, Arnone, Král & Massa sp. nov. (allotype); 13 – *B. vaulogeri* (Abeille de Perrin, 1898) (Tunisia: Cap Bon peninsula, 6 km W of El Hawariah, 12.0 mm, DKCP).

I.Lopez-Colon leg.', 1 ♂ (JLCM); 'Spain, La Retuerta, Pina de Ebro, Zaragoza, 375 m, 3-ix-[19]93, Josep Muñoz leg.', 1 ♂ (RCCP); 'España, Montes de Torrero, Zaragoza, 4.vi.1996', 1 ♂ (GMCL). **CASTILE-LA MANCHA AUTONOM. COMM.: ALBACETE PROV.:** 'Molinicos, 10.v.[18]95', 1 ♂ (ZFMK); 'Tobarra, Prov. Albacete, Spain, 25.IV.2012, M. Martínez leg.', 1 ♀ (PKCS). **CUENCA PROV.:** 'Spain, Tarancón (Cuenca) 30.v.1982', 3 ♂♂ (VACP). **TOLEDO PROV.:** 'Sa del Romeral, Villacañas (Toledo), 8-v-2010, Juan de la Rosa leg.', 1 ♂ (DJCP); 'Spain, Toledo, Villacanas, Sa del Romeral, 24.iv.2010, JJ de la Rosa lgt.', 2 ♂♂ 2 ♀♀ (OBCB). **MADRID AUTONOM. COMM.:** 'Spain, Parque de los Cerros, Alcalá de Henares, Madrid, 13-vi-2008, A. Hidalgo leg.', 1 ♀ (AHCL); 'Chinchón (Madrid), 13.iii.2009, Juan de la Rosa leg.', 1 ♀ (DJCP); 'Spain (Madrid), villa CONEJOS, 23.iv.2011', 1 ♂ 1 ♀ (JSCP); 'Spain, Madrid, 3.iii.1987, J. Plaza', 1 ♂ (MSNG); 'Madrid, G. Schramm', 1 ♂ (MSNG); 'Morata', 1 ♀ (ZFMK); 'España, „Montarco“, Madrid, leg. M. Toribio, 27.iii.1987', 1 ♂ (GMCL); 'España, El Regajal, Aranjuez, Madrid, leg. Crespo, 11.v.1991', 1 ♂ (GMCL); 'E, Comunidad de Madrid, Valdaracete, Fuensauco, 30TVK8348, 18.4.2013, José Luis Gómez lgt.', 1 ♂ (DJCP); 'España, Fuensauco, Valdaracete, Madrid, J. L. Gomez lgt., 29.iv.2011', 1 ♀ (GMCL); 'España – Madrid, Valdaracete env., Fuensauco, 4.v.2010, Cosar Mora lgt.', 1 ♂ (DJCP); 'Spain, Madrid, Valdaracete, Fuensauco, 04.v.2010, Jose Luis Gomez lgt.', 1 ♂ 1 ♀ (OBCB); 'España, Fuensauco, Valdaracete, Madrid, J. L. Gomez lgt., 4.v.2010', 1 ♂ (GMCL); 'España 12.5.2010, Fuensauco, Valdaracete, Madrid, Leg. Cesar S. Mora', 2 ♂♂ (DKCP), 2 ♂♂ (PTCL); 'Fuensauco – 30TVK8348, Valdaracete, 18-4-2013, Madrid - España', 1 ♂ 3 ♀♀ (PTCL); 'Spain, Madrid, Valdarecete v-[19]93', 1 ♂ (JSCP); 'Hispania centrealis, Villaconecos (Madrid), 23.iv.2011, J. de la Rosa lgt.', 1 ♂ 1 ♀ (DJCP); 'E, Villaconejos, (Com de Madrid), 23.4.2011, J de la Rosa lgt.', 1 ♂ 1 ♀ (DJCP); 'E, Villaconejos, (Com de Madrid), 2.iv.2010, J de la Rosa lgt.', 1 ♂ 1 ♀ (DJCP); 'España, Villaconejos, (Com. de Madrid), M. Alvarez lgt.', 1 ♂ (DJCP); 'Villaconejos, Prov. Madrid, Spain; 6-IV-2014, J. Corominas leg.', 1 ♂ (PKCS); 'España, 23.4.2008, Villaconejos (Madrid), Leg. Juan de la Rosa', 2 ♂♂ (PTCL); 'Spain, 21.4.2013,



Chincón (Madrid), Leg. Juan de la Rosa', 1 ♂ 1 ♀ (PTCL). **MURCIA AUTONOM. COMM.:** 'Algezares, 30.iii.[18]94, Kb [Korb] [lgt.]', 1 ♂ 2 ♀♀ (ZSMC); 'Murcia, Algezares, 1894, M. Korb [lgt.]', 1 ♀ (MNH); 'Murcia, Algezares, 1894, M. Korb [lgt.]', 1 ♂ 1 ♀ (HFCB); 'Spain, Murcia, Caravala, 10.v.1980, R. Mourglia', 1 ♂ (MRSNT), 1 ♂ 1 ♀ (MSNM); 'Murcia, 10.v.1980', 1 ♂ (MSNG); 'Espagne (Murcia), Alhama de Murcia, Tonana, 23.x.[19]65, de Lajonquiere lgt.', 1 ♂ (MNH). **NAVARRA AUTONOM. COMM.: NAVARRA PROV.:** 'Carcar, Navarra', 2 ♀♀ (MNH). **VALENCIAN AUTONOM. COMM.: ALICANTE PROV.:** 'Spanien, Alicante, 14.vi.1960, Sattler-Remane lgt.', 1 ♂ (ZSMC); 'Spanien, Calpe, 15.x.[19]76, Klaue lgt.', 1 ♀ (ZFMK); 'España, Pantano del Amadorio, Villajoyosa, Alicante, leg. J. M. Beltrán, 13.iii.1987', 1 ♂ (GMCL); 'Spain, Villa Joyosa (Alicante) 13.iv.1950', 1 ♂ (VACP); 'Elche, 6.vi.[18]94, Kb [Korb] [lgt.]', 1 ♀ (ZSMC). **No further locality specified:** 'Andalusia', 1 ♀ (NHMB); 'Espagne, (Zaragosa), mts. SE of Torres, 10.v.80, C. Gonzalez lgt.', 2 ♂♂ (MNH); 'Spain', 1 ♀ (OHC); 'Spanien', 1 ♀ (SMTD); 'Spanien, ex. coll. V. Balthasar, National Museum, Prague, Czech Republic', 1 ♂ (NMPC).

**Description. Male (holotype).** Remarkably convex, surface black, shiny, pronotum covered with double punctuation, elytra microsculptured to smooth apically.

Head (Figs 2, 15, 22, 28, 34). Clypeus broadly rounded, almost semicircular, anterior angles vague, posterior angles elevated. Frontal horn well developed, short, distinctly furcate apically; base weakly keeled on each side of anterior part of eyes. Clypeal disc with simple, coarse punctuation. Oblique keels above eyes reaching approximately to eyes. Punctuation of frons and vertex approximately same as on clypeus. Fronto-clypeal suture present. Eyes well developed, distinctly elliptic; genae extending eyes, arcuate posteriorly. Pronotum (Figs 2, 15, 22, 28) distinctly transverse; broadest just in basal quarter, entirely bordered; lateral margin evenly rounded, marginal carina not crenate, distinctly widened and elevated; lateral fovea almost missing. Pronotal punctuation distinct, double, consisting of well and deeply impressed punctures with exception of basal part; punctures separated approximately by distance equal to their diameter, intermixed with very fine ones. Lateral hornlike apophyses well developed, remarkably cone-shaped, bent up and directed to sides. Apical hornlike apophysis distinct, but only weakly elevated, obtuse-angled, directed 30° frontoapically.

Scutellar shield triangular, weakly longer than wide, microsculptured, alutaceous.

Elytra approximately as long as wide, surface shiny, microsculptured, microsculpture vanishing apically; humeral umbone weak, between suture and humerus seven distinct striae along entire elytral length, all striae with distinctly confluent punctures; intervals convex.

Parameres as in Fig. 61.

**Variability in males.** Surface black to brownish; pronotal hornlike apophyses in medium developed and underdeveloped (hypothelic) specimens short, more or less straight, only simply rounded to almost acute apically.

**Female (allotype).** Head (Figs 9, 40). Clypeus broadly rounded, nearly semicircular, anterior angles vague. Posterior angles of clypeal margin very weakly elevated. Frontal carina well developed, distinctly interrupted in middle, bituberculate on internal interruption. Punctuation of clypeus, frons, vertex and occiput simple, distinct; oblique keels above eyes distinct, extended to half of eyes; eye well developed, distinctly elliptic, genae well developed, arcuate anteriorly and posteriorly.

Pronotum (Fig. 9) distinctly transverse, lateral margin weakly widened, broadest just basally, surface distinctly deeply punctate, doubly except basally, punctures consisting of well and deeply impressed punctures, separated approximately by distance equal to their diameter, intermixed with very fine, pinned punctures. Anterior transverse protrusion distinct, sharply semicircular, lateral apophyses present.

Elytron surface shiny, microsculptured, microsculpture vanishing to apex; humeral umbone weak.

**Measurements.** Total body length 11.2–15.1 mm (holotype, ♂: 14.8 mm; allotype, ♀: 14.9 mm).

**Differential diagnosis.** Refer to species key.

**Etymology.** Patronymic; named in honour of our colleague Tristão Branco (Porto, Portugal), an excellent specialist in Scarabaeoidea.

**Collecting circumstances.** Prefers calcareous soils.

**Distribution.** North-eastern, Central and South-eastern parts of Spain (Fig. 59).

**Remarks.** The historical faunal conception of *B. bocchus* based on MARSEUL (1857) and JACQUELIN DU VAL (1863) was inaccurate, and for 150 years, the distribution area of this species was reported incorrectly. The first theoretical analysis of this situation was published by BRANCO (2005). In the present study, we confirm, in all details, and follow Branco's analysis. The Spanish specimens show distinct differences in morphological characters, as described in the identification key.

### *Bolbelasmus gallicus* (Mulsant, 1842)

(Figs 3, 10, 16, 23, 29, 35, 41, 59, 62)

*Bolboceras Gallicus* Mulsant, 1842: 350 (original description). BOUCOMONT (1902): 4 (catalogue); HEYDEN et al. (1906): 725 (catalogue); FUENTE Y MORALES (1926): 146 (distribution).

*Bolboceras Gallicus* Var. *Conjunctus* Mulsant, 1842: 351 (original description). Type locality: 'France meridionale'. BOUCOMONT (1912): 17 (synonymy).

*Bolboceras Gallicus* Var. *Provincialis* Mulsant, 1842: 351 (original description). Type locality: 'France meridionale'. BOUCOMONT (1912): 17 (synonymy).

*Bolboceras gallicus*: MARSEUL (1857): 83 (catalogue); JACQUELIN DU VAL (1863): 434 (catalogue).

*Bolbelasmus gallicus*: BOUCOMONT (1912): 17 (catalogue); WINKLER (1927): 1035 (catalogue); PAULIAN (1941): 38 (monograph); SEABRA (1943): 50 (catalogue); GONZÁLEZ PEÑA (1979): 27, figs 1–3, 7 (key, biology); PAULIAN & BARAUD (1982): 69 (monograph); RUANO MARCO et al. (1988): 41 (distribution); LUMARET (1990): 362 (distribution, atlas); LÓPEZ-COLÓN et al. (1996): 4, 8, 10 (distribution, key); FABRA (2004): 38 (biology); PESLIER (2004): 1 (key, distribution); ARNONE & MASSA (2010): 410 (distribution, note).

*Bolbelasmus gallicus* [partim, populations from France, Portugal and Spain (excl. of Andalusia)]: BÁGUENA CORELLA (1967): 262 (monograph); KRIKKEN (1977): 284 (revision); BARAUD (1977): 159 (monograph); BARAUD (1992): 45 (monograph); MARTÍN-PIERA & LÓPEZ-COLÓN (2000): 180 (monograph); KRÁL et al. (2006): 82 (catalogue).

**Type locality.** 'exclusivement [France] méridionale; Draguignan, Saint-Tropez, environs de Marseille'.

**Material examined** (441 specimens). **FRANCE: PROVENCE-ALPES-CÔTE D'AZUR REG.:** Aix, 1 ♂ (ZFMK); Bouches-du-Rhône, Barbentane, 1.iv.2010, 4 ♂♂, J. Bidault lgt. (DJCP); Nîmes (Gard), 10.iv.2008., 1 ♂, A. Hidalgo lgt. (AHCL); Jorques, B.[Bouches] du Rhone, 23.v.[19]90, 1 ♂, Michod lgt. (SZCM); Barbentane, 19.v.[19]85, 2 ♂♂, L. Pélissier lgt. (SZCM); Beausset (Var), iii.[19]06, 1 ♀, Baizet [lgt.] (NMPC); Beausset (Var), iv.[19]05, 1 ♂, Baizet [lgt.] (NMPC); Var, Le Beausset, 4.v.1905, 1 ♂ 1 ♀ (LHCB); Le Beausset, i.1901, 1 ♀ (DKCP), 1 ♀ (SMTD); Ollioules, 12.v.[18]91, 2 ♂♂ 1 ♀, Masel [?lgt.] (ZSMC); Ollioules, [18]91, 6 ♂♂, Masel [?lgt.] (ZSMC); Beausset, Var, iii.[19]05, 1 ♂, Baizet [lgt.] (NMEC); Beausset, Var, 1 ♀, Baizet [lgt.] (NMPC), 1 ♂ (ZSMC), 1 ♂ (ARCL), 2 ♂ 1 ♀ (ZFMK); Hyères, 1 ♂ 1 ♀ (BMCP); La Sayne, 1 ♀ (ZFMK); Le Beausset, 1 ♂, H. Sietti [lgt.] (OHCB); Le Beausset, 1 ♂ 1 ♀ (MSNG), 1 ♂ 2 ♀♀ (MSNM), 1 ♂ (NMEC); La Seyne, 1 ♂ (NMPC); Marseille, 1 ♂ (MSNG), 1 ♂ 1 ♀ (MSNM), 1 ♂ (SMTD), 1 ♂ (VMCP), 1 ♂ 1 ♀ (ZFMK), 4 ♂♂ 1 ♀ (ZSMC), 11 ♂♂ (BMNH); Mars.[Marseille], 1 ♂ (ZSMC); Marseille, 1 ♂, Mol de Boissy [lgt.] (SMTD); Marseilles, 2 ♂♂ 1 ♀ (BMNH); Mars lle [Marseille], 3 ♂♂ (BMNH); Basses Alpes, 1 ♂, Riez [lgt.] (MSNM); Saint Gervazy (30), 21.iii.1995, 1 ♂, J. Angles lgt. (RCCP); Provence, 1 ♂, Riez [lgt.] (MSNG); Alpes Maritimes, Station Martin Vasubie, 1 ♂, coll. J. Clermont (MSNM); Toulon, 1 ♂ (MSNG). **LANGUEDOC-ROUSSILLON REG.:**

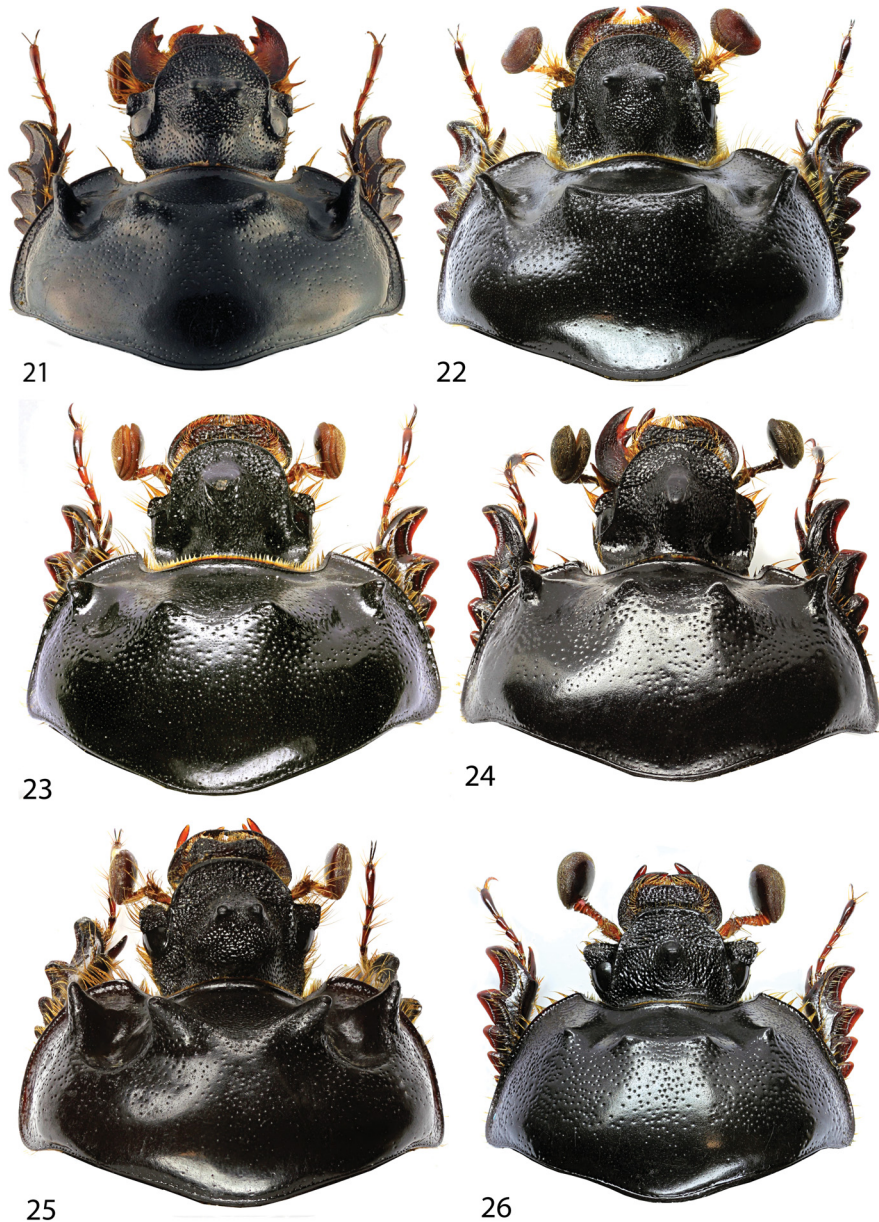
Beziers, 1 ♂ (ZFMK); Chusclan, 1 ♀ (ZFMK). **MIDI-PYRÉNÉES REG.:** Pyrenaei, Bagnères, 1 ♂ (NMPC). **CORSICA REG.:** Corse, 1896, 1 ♂, coll. Brazier (MNHN); Corsica, 1 ♂ (SMTD). **No further locality specified:** Camargue, 1 ♂ V. M. Duchon [lgt.] (NMPC); France, 1 ♂ 1 ♀ (MRSNT); France mer., 1 ♂ (BMNH); [Süd]. Frankreich, 6 ♂♂ 2 ♀♀ (SMTD); Gall[ia]. mer, Mulsant, 1 ♀ (SMTD), 1 ♂ (BMNH); Gall[ia]. m. Mulsant, 2 ♂♂ 1 ♀ (SMTD); Gallia, 1 ♂ (ARCL), 1 ♂ (DKCP), 4 ♂♂ 2 ♀♀ (MSNM), 1 ♂ (SMTD), 2 ♂♂ 1 ♀ (ZFMK); Gallia, 1 ♂, coll. De Marchi (MSNG); Gallia, 1 ♂, ex coll. Kelecsenyi (NMPC); Gallia, Bass[es]. Alp[es]., 1 ♂, Reitter [lgt.] (NMPC); Gallia, 1 ♂ 1 ♀, Kirsch [lgt.] (SMTD); Gallia, 17 ♂♂ 1 ♀, Reitter [lgt.] (NMPC), 1 ♂ (VMCP); Gallia mer., 1 ♂ (NMPC); Gallia mer., det. Boucomont, 2 ♂♂ (SMTD); Gallia mer., 1 ♂, Reitter [lgt.] (VTCs); Gallia Merid, 1 ♂ (BMNH); Gallia var, 2 ♂♂, A. Otto [lgt.], (ZFMK); Gallia, 1 ♂ (ZSMC), 3 ♂♂ (NMEC); Var, Port du Doin, 17.vi.1963, 1 ♂ (MSNG). **PORTUGAL: ALGARVE PROV.:** Algarve, 5 km NW Vila do Bispo, 2.iii.2014, 1 ♂, Z. Lucbauer lgt. (ZLCK); Armacao de Pera, 16.–20.ii.2013, 2 ♂♂ 1 ♀ (PKCS); Carrapateira, S. of Aljezur, 1.iii.2010, 2 ♀♀, H. Kalz lgt. (HKCS); Faro, 1 ♂ (MSNM); Faro, Sagres, 21.–25.ii.2011, 1 ♂ 1 ♀, Petr Kyliès lgt. (DJCP), 7 ♂♂ 3 ♀♀ (PKCS); Momchique, 1 ♂ (NMPC); Sagres, 37°00'53"N 08°57'10"W, 24.ii.2014, 1 ♂ 1 ♀, V. Řebíček, M. Turčín & M. Mařík lgt. (DKCP), 8 ♂♂ 4 ♀♀ (VRCH); 4 km S Vila Do Bispo, SW of Lagos, 1.iii.2010, 1 ♂, H. Kalz lgt. (HKCS); 1 km E of Juniqueira, Vila Real de Sto António env., 37°15'15"N, 07°27'37"W, 2.–4. iv.2004, 1 ♀, Jiří Skuhrovec lgt. (DKCP). **ALTO-ALENTEJO PROV.:** Paraisé da Mata, 29.iii.1984, 1 ♂ (MSNM). **BAIXO ALENTEJO PROV.:** Santiago de Cacem, Quinta de Ortiga, 12.xi.2005, 1 ♂ 1 ♀, A.M. & T. Branco lgt. (OHCB). **SETÚBAL PROV.:** S Póceirao, E Pinhal Novo, 25.ii.2014, 2 ♂♂ 2 ♀♀, Z. Lucbauer lgt. (DKCP), 7 ♂♂ 3 ♀♀ (ZLCK); Lisbonne, Póceirao, 21.i.2013, 1 ♂, O. Boilly lgt. (OBCB); Lisabon – Póceirao, 24.ii.2012, 1 ♂ 1 ♀ (PKCS); Setubal, Rio Frio env., 40 km E of Lisabon, 5.iii.2010, 3 ♂♂ 2 ♀♀, O. Hillert lgt. (OHCB); Setúbal, Póceirao vill.env., 38°37'39.2"N 08°43'73.9"W, 21.ii.2009, 2 ♀♀, Jan Schneider lgt. (DJCP), 4 ♀♀ (JSCP). **No further locality specified:** Setubal, 9.iv.1992, ex coll. A. Drumont, 1 ♂ (GMCL). **SPAIN: ANDALUSIA AUTONOM. COMM.:** **HUELVA PROV.:** Andalusia, W Huelva, W El Rincon, 26.ii.2014, 1 ♂ 2 ♀♀, Z. Lucbauer lgt. (ZLCK); Aljaraque, 10 km W of Huelva, 23.ii.2011, 4 ♂♂ 5 ♀♀, O. Hillert lgt. (OHCB); Aljaraque, 10 km W of Huelva, 02.iii.2010, 2 ♂♂, O. Hillert lgt. (OHCB), 2 ♂♂ but H. Kalz lgt. (HKCS); Aljaraque vill.env., 37°15.425'N 07°04.078'E, 25.ii.2009, 3 ♂♂ 4 ♀♀ David Král lgt. (DKCP), 2 ♂♂ 1 ♀ (JSCP); Aljaraque, 10 km W of Huelva, 25.ii.2009, 1 ♂, O. Hillert lgt. (OHCB), 1 ♂ (GNCA); El Aljaraque, 3.ii.2001, 10 ♂♂, J. Navarro lgt. (JUCS); Bonares, 20 km E of Huelva, 04.iii.2008, 2 ♂♂, O. Hillert lgt. (OHCB); 12 km N of Cartaya, 3.–14.ii.2007, 2 ♂♂, Petr Kyliès lgt. (DJCP), 2 ♂♂ 2 ♀♀ (PKCS), 1 ♂ (LMCT), 1 ♂ (RCCP), 1 ♂ (VTCZ); 6 km N of Cartaya, 16.–20.ii.2013, 2 ♂♂ 3 ♀♀, Petr Kyliès lgt. (PKCS); 5 km SE Moguer, 19.i.2013, 1 ♂ 1 ♀, O. Boilly lgt. (OBCB); Punta Umbria, 12.ii.2010, 2 ♂♂, A. del Barco lgt. (VTCZ); 13 km S of Targuejo, 11.ii.2008, 1 ♂, Jiří Klícha lgt. (VMCP). **SEVILLA PROV.:** Aznalcázar env., 14.ii.2010, 1 ♂ 2 ♀♀, Petr Kyliès lgt. (DJCP), 1 ♂ (JSCP), 1 ♂ (VMCP), 2 ♂♂ (PKCS), 1 ♂ (VTCZ); Pinar de Aznalcázar & Puebla del Río, 1.ii.2014, 18 ♂♂ 13 ♀♀, J. Navarro lgt. (JUCS), same data but 5.i.2013, 2 ♂♂ 8 ♀♀ (JUCS), same data but 17.ii.2013., 2 ♂♂ 2 ♀♀ (AHCL); Pinar Forestal del Boyal, Villamanrique de la Condesa, 1.iii.2010, 1 ♂, J. Navarro lgt. (JUCS); Pinar de Aznalcázar, 21.ii.2009, 19 ♂♂ 6 ♀♀, J. Navarro lgt. (JUCS), same data but 15.ii.2009, 5 ♂♂ 5 ♀♀ (JUCS), same data but 21.ii.2010, 3 ♂♂ 3 ♀♀ (JUCS), same data but 3.ii.2010, 2 ♂♂ (JUCS), same data but 11.ii.2012, 4 ♂♂ 3 ♀♀ (JUCS), same data but 24.xi.2012, 7 ♂♂ 3 ♀♀ (JUCS); Poblado Colinas, Puebla del Río, capturas a la luz, 23.iii.2002, 1 ♂ 1 ♀, J. Navarro lgt. (JUCS). **ARAGON AUTONOM. COMM.:** **SARAGOSSA PROV.:** Los Monegros-Monegrillo, 250 m, 24.v.1996, 1 ♀, M. Dvořák lgt. (DKCP), 1 ♂ (JSCP); Zaragoza, Los Monegros-Castejon, 23.v.1996, 400 m, 1 ♂, M. Dvořák lgt. (RCCP). **TERUEL PROV.:** Albarracin, 11.–13.vi.2007, 1 ♂ 1 ♀, Z. Laštůvka leg. (IECA); same data but 23.–25.vi.2008, 2 ♂♂ 2 ♀♀ (IECA). **ASTURIAS AUTONOM. COMM.:** **ASTURIAS PROV.:** Asturien, 1 ♂ (NMPC). **CASTILLE AND LEÓN AUTONOM. COMM.:** **ÁVILA PROV.:** Sierra de Grados, Avila, v.1904, 1 ♂ (MSNG). **SALAMANCA PROV.:** Aldehuela de la Boveda (Salamanca), 18.vi.1984, 1 ♂, J. C. Orella leg. & J. I. Lopez-Colon leg. (OHCB). **CATALUNYA AUTONOM. COMM.:** **BARCELONA PROV.:** Umg. Barcelona, 15.ii.1996, 2 ♂♂, J. Blümel lgt. (ARCL); Lérida, Pavia nr. Talavera, 1.v.2013, 1 ♂, M. Tomás Rafael lgt. (DJCP); Lerida, Pavia, 1.v.2013, 2 ♂♂, Z. Lucbauer lgt. (ZLCK); Pavia, Lerida, 3.v.2003, 1 ♂, M. Tomas lgt. (GMCL); Lérida, Pavia, 28.v.[19]93, 2 ♂♂, M. Tomas lgt. (SZCM). **GIRONA PROV.:** Vidreras, Lichtfang, 29.iv.–6.v.1989, 1 ♀, F. Bahr lgt. (LSCN). Can Cast[ells] [near Vidreras], 1 ♀ (DKCP); Vidreras, Puig Ventos, 16.vii.1992, 1 ♀, Brunk lgt. (HKCS); Vidreras, Girona, Puig Ventos, 8.vii.[19]89, 1 ♀, Erhard Bodj lgt. (DKCP). **LÉRIDA PROV.:** Catalunya, Coll del Rat, 7 km SW of Ponts, 41°53'58.9"N 1°05'35.9"E, 17.v.1992, 1 ♀, V. Valenta lgt. (LMCT). **EXTREMADURA AUTONOM. COMM.:** **BADAJOS PROV.:** Cheles, Badajoz env., border to Portugal, 13.–27.ii.2013, 3 ♂♂ 2 ♀♀, O. Hillert lgt. (OHCB). **CACERES PROV.:** Sierra de Tormantos, Piornal, Caceres, alt.: 1000 m, 6.v.1991, 1 ♂, M. Tarrier lgt.

(GMCL); NE of Jaraicejo, 12.v.2011, 39°41'51"N 05°44'10"W, 598 m, 1 ♂, P. Kylies lgt. (PKCS). **MADRID AUTONOM. COMM.:** Cercedilla, 1 ♀, Dr. Martin [lgt.] (ZFMK); Colmensar Viego, 4.v.[19]90, 1 ♀, S. Sobrino lgt. (SZCM); V. le de Odon, 21.iv.1983, 1 ♂ (MSNM); Fuensauco, Valdaracete, Madrid, 4.v.2010, 1 ♀, J. L. Gomez lgt. (GMCL); Loeches, 8.vi.2010, 1 ♀, A. Hidalgo lgt. (AHCL); Manzanare, 5.v.1982, 1 ♂ (MSNM); Valverde de Alcalá, 18.vi.2014., 1 ♀, A. Hidalgo lgt. (AHCL); Guadarrama, 10.v.1934, 1 ♂, P. Navacerrad lgt. (MSNM); Guadarrama, 8.v.1934, 1 ♂, P. Navacerrad (MSNM); Villaviciosa le de Odon, 3.iii.1987, 1 ♂ (MSNG); Villavi-



Figs 14–20. Male habitus in lateral aspect. 14 – *Bolbelasmus bocchus* (Erichson, 1841) (Morocco: Azrou, Foret de Cedres, body length: 14.0 mm, NMPC); 15 – *B. brancoi* Hillert & Král sp. nov. (holotype); 16 – *B. gallicus* (Mulsant, 1842) (France: Bouches-du-Rhône, Barbentane, 13.8 mm, DJCP); 17 – *B. howdeni* Hillert & Král sp. nov. (holotype); 18 – *B. nikolajevi* Hillert, Arnone, Král & Massa sp. nov. (holotype); 19 – *B. vaulogeri* (Abeille de Perrin, 1898) (Tunisia: Cap Bon peninsula, 6 km W of El Hawariah, body length: 11.8 mm, DKCP); 20 – *B. vaulogeri* (Italy: Sicily, Menfi (Agrigento), Cinquanta, body length: 11.6 mm, MAPC).





Figs 21–26. Pronotum of male in dorsal aspect. 21 – *Bolbelasmus bocchus* (Erichson, 1841) (Morocco: Azrou, Forêt de Cedres, NMPC); 22 – *B. brancoi* Hillert & Král sp. nov. (holotype); 23 – *B. gallicus* (Mulsant, 1842) (France: Bouches-du-Rhône, Barbentane, DJCP); 24 – *B. howdeni* Hillert & Král sp. nov. (holotype); 25 – *B. nikolajevi* Hillert, Arnone, Král & Massa sp. nov. (holotype); 26 – *B. vaulogeri* (Abeille de Perrin, 1898) (Tunisia: Cap Bon peninsula, 6 km W of El Hawariah, DKCP).



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28



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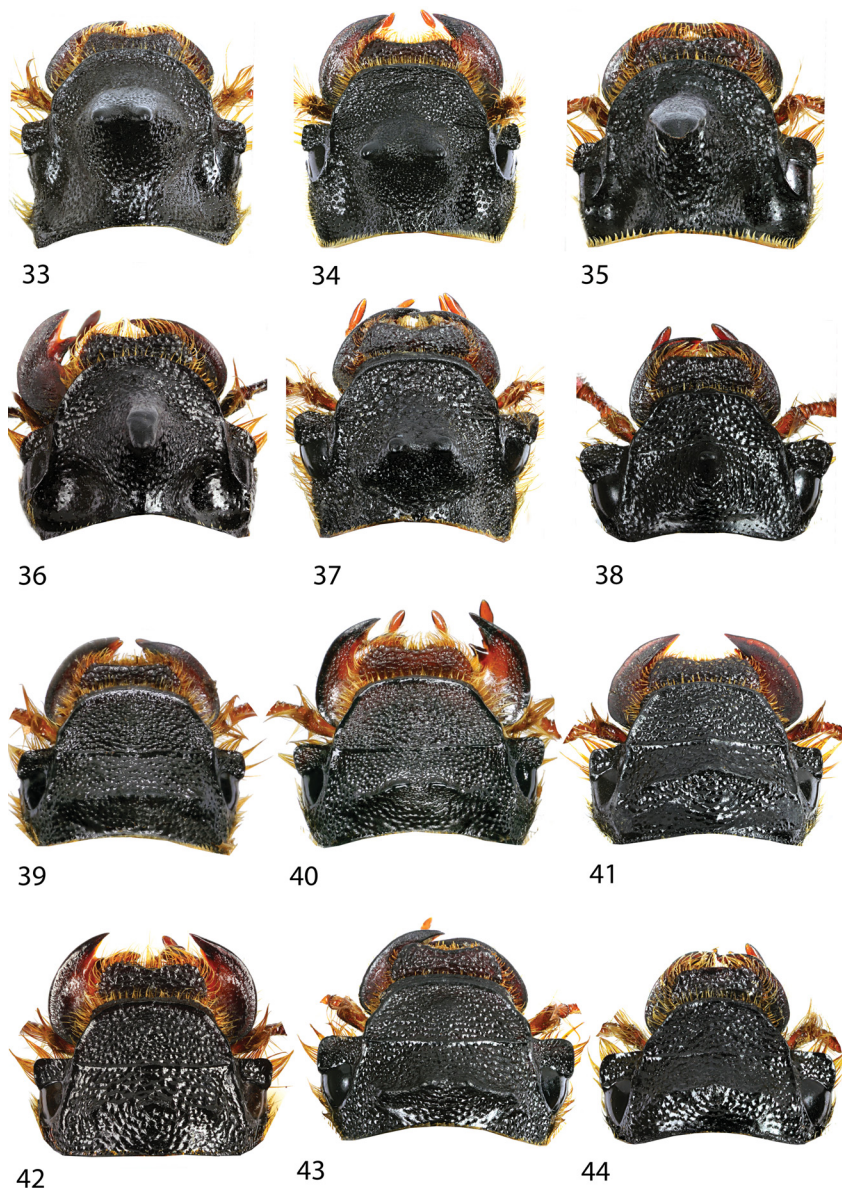
31



32

Figs 27–32. Pronotum of male in frontal aspect. 27 – *Bolbelasmus bocchus* (Erichson, 1841) (Morocco: Azrou, Foret de Cedres, NMPC); 28 – *B. brancoi* Hillert & Král sp. nov. (holotype); 29 – *B. gallicus* (Mulsant, 1842) (France: Bouches-du-Rhône, Barbantane, DJCP); 30 – *B. howdeni* Hillert & Král sp. nov. (holotype); 31 – *B. nikolajevi* Hillert, Arnone, Král & Massa sp. nov. (holotype); 32 – *B. vaulogeri* (Abeille de Perrin, 1898) (Tunisia: Cap Bon peninsula, 6 km W of El Hawariah, DKCP).





Figs 33–44. Head in dorsal aspect, 33–38 – ♂♂; 39–44 – ♀♀. 33 – *Bolbelasmus bocchus* (Erichson, 1841) (Morocco: Azrou, Foret de Cedres, NMPC); 34 – *B. brancoi* Hillert & Král sp. nov. (holotype); 35 – *B. gallicus* (Mulsant, 1842) (France: Bouches-du-Rhône, Barbantane, DJCP); 36 – *B. howdeni* Hillert & Král sp. nov. (holotype); 37 – *B. nikolajevi* Hillert, Arnone, Král & Massa sp. nov. (holotype); 38 – *B. vaulogeri* (Abeille de Perrin, 1898) (Tunisia: Cap Bon peninsula, 6 km W of El Hawariah, DKCP); 39 – *B. bocchus* (Morocco: Gaada de Debdou plateau, E of Rchida, DKCP); 40 – *B. brancoi* (allotype); 41 – *B. gallicus* (Spain: Andalusia, Aljaraque vill. env., JSCP); 42 – *B. howdeni* (allotype); 43 – *B. nikolajevi* (allotype); 44 – *B. vaulogeri* (Tunisia: Cap Bon peninsula, 6 km W of El Hawariah, DKCP).



cosa le de Odon, 2.iii.1986, 1 ♂ (MSNG); Villaviciosa le de Odon, 21.iv.1983, 1 ♂ (MSNG); Villaviciosa de Odon (Madrid), 27.v.1977, 2 ♂♂, J. I. López-Colón & Antonio Perucho lgt. (OHCB). VALENCIA AUTONOM. COMM.: VALENCIA PROV.: Ayora (Valencia), 16.v.1979, 1 ♀, López-Colón lgt. (OHCB); La Vallesa, 2.iii.1997, 1 ♂ 1 ♀ (GMCL). No further locality specified: Espagne, 1 ♂ (NMPC); Hisp[ania], 1 ♂ (NMPC); Spanien, 1 ♂ (SMTD).

**Redescription.** Distinctly convex, surface black, shiny, pronotum covered with double punctation, elytra glabrous.

**Male.** Head (Figs 3, 16, 23, 29, 35). Clypeus broadly rounded, nearly semicircular, anterior angles vague. Posterior angles of clypeal margin not elevated. Frontal horn well developed, long, conical, apex widened, triangular in frontal view, base conical, not keeled, apex simple, unmodified. Punctuation of clypeal disc simple, distinct. Oblique keels above eyes approximately reaching eyes. Punctuation of frons and vertex same as the one on clypeus; fronto-clypeal suture present. Eyes distinctly elliptic, well developed; genae evenly rounded, semicircular.

Pronotum (Figs 3, 16, 23, 29) distinctly transverse; broadest just in basal quarter, entirely bordered; lateral margin evenly rounded, marginal carina not crenate, distinctly widened and elevated; lateral fovea almost missing. Pronotal punctation distinct and double, consisting from well and deeply impressed punctures, except on basal part; punctures separated approximately by distance equal to their diameter, intermixed with very fine pinned punctures. Lateral hornlike apophyses well developed, conical, bent upwards and sideways. Apical hornlike apophyses distinct but weakly elevated, obtuse-angled, directed 30° frontoapically. Both apical hornlike apophyses joined in keel.

Scutellar shield triangular, as long as wide, shiny, densely punctate.

Elytra approximately as long as wide, surface shiny, not punctate; humeral umbone weak; between suture and humerus seven distinct striae along entire elytral length, all striae with confluent punctures; intervals convex.

Parameres as in Fig. 62.

**Variability in males.** Surface black to brownish; pronotal hornlike apophyses in medium developed and underdeveloped (hypothelic) specimens short, more or less straight, only simply rounded to almost acute apically.

**Female.** Head (Figs 10, 41). Clypeus broadly rounded, nearly semicircular, anterior angles vague. Posterior angles of clypeal margin not elevated. Frontal carina well developed, not interrupted in middle, doubly s-shaped. Punctuation of clypeus, frons, vertex and occiput simple, distinct; oblique keels above eyes distinct, elongated to base of eyes; eyes well developed, distinctly elliptic, genae well developed, arcuate anteriorly.

Pronotum (Fig. 10) distinctly transverse, lateral margin weakly widened, broadest just basally, surface distinctly deeply punctate, punctuation double except for base, punctures consisting of well and deeply impressed punctures, separated approximately by distance equal to their diameter, intermixed with very fine, pinned punctures. Anterior transverse protrusion distinct, sharply semicircular, lateral apophyses present.

Elytron surface shiny, glabrous; humeral umbone weak.

**Measurements.** Total body length 11.0–14.6 mm.

**Differential diagnosis.** Refer to species key.

**Collecting circumstances.** Prefers sandy soils.

**Distribution.** Southern and south-western France, Portugal, North-western and Central Spain (Fig. 59). We provide first records from Corsica and the Midi-Pyrénées Region of France.

***Bolbelasmus howdeni* Hillert & Král sp. nov.**

(Figs 4, 11, 17, 24, 30, 36, 42, 59, 63)

*Bolbelasmus gallicus* [partim, populations from SE Spain (approximately Andalusia)]: BAGUENA CORELLA (1967): 262 (monograph); KRIKKEN (1977): 284 (revision); BARAUD (1977): 159 (monograph); BARAUD (1992): 45 (monograph); MARTÍN-PIERA & LÓPEZ-COLÓN (2000): 180 (monograph); KRÁL et al. (2006): 82 (catalogue).

**Type locality.** Spain, Andalusia, Castillo de Castillar, Algeciras env., 10 km N of San Roque, 36°12'N 05°23'W, 78 m a.s.l.

**Type material** (271 specimens). **SPAIN: ANDALUSIA AUTONOM. COMM.: CÁDIZ PROV.: HOLOTYPE:** ♂ (DKPC), 'Spain, Andalusia, Castillo de Castillar, Algeciras env., 10 km N of San Roque, 27.ii.2011, O. Hillert lgt.' **ALLOTYPE:** ♀ (DKCP), same data. **PARATYPES:** 'Spain, 22.-28.2.2015, San Roque, Almoraima, N36°17'24.94" W5°23'40.77", 136 m, lgt. P. Kylies', 3 ♂♂ 1 ♀ (DKCP), 22 ♂♂ 7 ♀♀ (PKCS); same data but lgt. I. Martinů, 1 ♂ 1 ♀ (DKCP), 9 ♂♂ 4 ♀♀ (IMCO); same data but lgt. R. Muczka, 3 ♂♂ (RMCM); 'Spain, Andalusia, Alcala de los Gazules, E of Cadiz, 01.-11.iii.2014, Hillert lgt.', 4 ♀♀ (OHCB); 'Spain, Andalusia, E of Alcala, Sierra del Aljibe, E of Cadiz, 01.-11.iii.2014, Hillert lgt.', 1 ♂ 1 ♀ (OHCB); 'España, Arcos de la Frontera, Cadiz, ex coll. A. Drumont, 9.xii.1989', 1 ♀ (GMCL); 'Spain, Arcos de la Frontera, Cádiz – B. Jordan leg., 9.xii.1989', 1 ♂ (JNCS); 'Spain, Andalusia, Castillo de Castillar, Algeciras env., 10 km N of San Roque, 13.-20.i.2015, Hillert lgt.', 4 ♂♂ 2 ♀♀ (OHCB); 'Spain, Andalusia, Castillo de Castillar, Algeciras env., 10 km N of San Roque, 01.-11.iii.2014, Hillert lgt.', 3 ♂♂ (OHCB); 'Spain, Andalusia, Castillo de Castillar, Algeciras env., 10 km N of San Roque, 20.-27.ii.2012, O. Hillert lgt.', 1 ♂ (OHCB); 'Spain, Andalusia, Castillo de Castillar, Algeciras env., 10 km N of San Roque, 27.ii.2011, O. Hillert lgt.', 5 ♂♂ (OHCB); 'Spain, Cádiz distr., CASTILLO DE CASTILLAR vill.env., 36°18.186 N 05°25.401 E, 27.ii.2009, David Král lgt.', 1 ♂ 2 ♀♀ (DKCP); 'Spain, Andalusia, Castillo de Castillar, Algeciras env., 10 km N of San Roque, 26.ii.2009, O. Hillert lgt.', 1 ♀ (GNCA), 1 ♂ (HHCO), 2 ♂♂ 1 ♀ (OHCB); 'Spain - Cadiz, 13.1.2009, San Roque - Castillar env., lgt. P. Kylies', 1 ♂ (PKCS); 'Spain, Andalusia, Castillo de Castillar, Algeciras env., 10 km N of San Roque, 02.iii.2008, O. Hillert lgt.', 4 ♂♂ (OHCB); 'ESPAÑA Cadiz, Perros del Rey. S. Roque, 21.i.[19]87, M. SALER', 6 ♂♂ (SZCM); '1.3.2014, N Castellar de la Frontera, Andalusia, Spain', 1 ♂ 1 ♀ (DKCP), 3 ♂♂ 1 ♀ (ZLCK); 'Chiclana, 6.iii.[18]90, Korb [lgt.], 1 ♀ (ZSMC); 'Chiclana, [18]83, Korb [lgt.] 1 ♂ (ZSMC); 'Spain, 22.-28.2.2015, Facinas env., lgt. P. Kylies', 1 ♀ (PKCS); 'Spain, La Suara, Jerez de la Frontera, Cádiz – A. Verdugo leg., 5.v.1988', 2 ♂♂, same data but 18.x.1987, 1 ♂ (JUCS); 'Spain, Andalusia, 10 km NE of Medina, E of Cadiz, 01.-11.iii.2014, O. Hillert lgt.', 3 ♂♂ 2 ♀♀ (OHCB); 'Spain, Pinar del Rey, San Roque, Cadiz, 26-i-2013., J. Navarro leg.', 1 ♂ 1 ♀ (AHCL), 1 ♂, 1 ♀ (OBCB), same but '27-xii-2014, J. M<sup>o</sup> Urbano leg.', 1 ♂ 1 ♀ (JUCS), same but '20-xii-2014, J. M<sup>o</sup> Urbano & J. Navarro leg.', 6 ♂♂ 3 ♀♀ (JNCS), 4 ♂♂ 2 ♀♀ (AHCL), 11 ♂♂ 8 ♀♀ (JUCS), same but '10-xi-2014, J. Navarro leg.', 1 ♂ (JUCS), same but '13-iii-2014, J. Navarro leg.', 1 ♂ (JUCS), same but '26-i-2014, J. M<sup>o</sup> Urbano leg.', 2 ♂♂ 2 ♀♀ (JUCS), same but '14-XI-2015, J. Navarro & J. M<sup>o</sup> Urbano leg.', 4 ♂♂ 3 ♀♀ (JUCS), 4 ♂♂ 3 ♀♀ (JNCS); 'Spain, Pinar del Rey, Tajo del Pajarraco, San Roque, Cádiz – J. Navarro leg., 22.xii.2012' 5 ♂♂ 2 ♀♀ (JNCS), 2.iv.2011, 2 ♂♂ (JNCS); 'Spain, 22.-28.2.2015, Tarifa, Punta Paloma, N36°04'03.96" W5°42'08.47", 56 m, lgt. P. Kylies', 2 ♂♂ (PKCS); same data but lgt. I. Martinů, 3 ♂♂ 1 ♀ (IMCO); same data but R. Muczka, 3 ♂♂ 1 ♀ (RMCM); 'Spain - Cadiz, 14.-16.2.2008, San Roque, Almoraima, lgt. P. Kylies', 1 ♂ (PKCS); 'E - Cádiz / San Roque / 13.xi.[19]93 Ramirez lg.', 1 ♂ (SZCM); 'Espania, San Roque, Cadiz, 13.xi.1988, Jose Luis Torres lgt.', 1 ♂ 1 ♀ (OHCB); 'Esp., SAN ROQUE, Cádiz, 6.1987, J. Ramirez lgt.', 2 ♂♂ 1 ♀ (RCCP); 'E, Andalusia, Cadiz, Pinar de San Roque, 2.iii.86, Hendrich/Mendez lgt.', 2 ♂♂ (OHCB), 1 ♂ (VTCZ); 'E, Andalusia, Cadiz, Pinar d. San Roque, b. San Roque, 2.iii.86, lgt. Hendrich/Mendez', 4 ♂♂ (LHCB); 'SPAIN-Cádiz, S. Roque, 26.i.1984', 1 ♂ (SZCM); 'San Roque – Cadiz, España sur, leg. Mendez T., 17.iii.[19]84', 1 ♂ (JHCP); 'Spanien, Andalusien, San Roque, 17.iv.1983, J.L. Torres-Mendez lgt.', 4 ♂♂ 1 ♀ (LHCB); 'San Roque, Cadiz, Spain, 30-I.1983, V. Ortuño lgt.', 1 ♀ (VMCP); 'Spain, Andalusia, NW of Tarifa, Algeciras env., 13-20.i.2015, O. Hillert lgt.', 6 ♂♂ 2 ♀♀ (OHCB); 'Spain, Andalusia, NW of Tarifa, pine forest, Algeciras env., 01.-11.iii.2014, Hillert lgt.', 2 ♂♂ 2 ♂♂ (OHCB); 'Spain, Andalusia, NW of Tarifa, beach sand, Algeciras env., 01.-11.iii.2014, Hillert lgt.', 5 ♂♂ 10 ♀♀ (OHCB); 'Spain, Andalusia, NW of Tarifa, Algeciras env., 13-27.ii.2013, O. Hillert lgt.', 3 ♂♂ (OHCB); 'Spain, Montehumada, Tarifa, Cádiz – J. Navarro leg., 22.xii.2012', 2 ♂♂ 1 ♀ (JNCS); 'Spain, Andalusia, Sanlucar de Barrameda, NW of Jerez, 26.ii.2011, O. Hillert lgt.', 1 ♂ 2 ♀♀ (OHCB); 'Tarifa (Cadiz), 11.iv.1980, Lopez Colon leg.', 1 ♂ (JLCM). **GRANADA PROV.:** 'Spain, Andalusia, 5 km E

of Granada, Sierra de la Yedra, 01.-11.iii.2014, Hillert lgt.', 1 ♂ (OHCB); 'España, La Sagra, Granada, Andalucía, v.1988', 1 ♂ 1 ♀ (GMCL). – **JAÉN PROV.:** 'Spain, Las Minas. Arrayanes. Linares, Jaén, ii-1997, A. Hidalgo leg.', 1 ♀ (AHCL); 'Spain, Miranda del Rey, Jaén, 13-xi-2015, Javier Castillo & Antonio Hidalgo leg.', 4 ♂♂ 2 ♀♀ (JCCL), 3 ♂♂ 2 ♀♀ (AHCL). 'Spain, Reserva las Viboras, Sierra Morena. Montizón, Jaén, 9-iv-1995, A. Hidalgo leg.', 1 ♂ (AHCL). **MÁLAGA PROV.:** 'Spain, Andalucía, Sierra Palmitera, Puerto de Alíjar, W of Mabella, 01.-11.iii.2014, Hillert lgt.', 1 ♀ (OHCB). **CASTILE-LA MANCHA AUTONOM. COMM.:** **ALBACETE PROV.:** 'Molinicos, 10.v.[18]95', 1 ♂ 2 ♀♀ (ZFMK). **GIBRALTAR:** 'Gibraltar, J. J. Walker [lgt.]' 1 ♂, 2 ♀♀ (BMHN).

**Description. Male (holotype).** Distinctly convex, surface black, shiny, pronotum covered with double punctuation, elytra glabrous.

Head (Figs 4, 17, 24, 30, 36). Clypeus broadly rounded, nearly semicircular, anterior angles vague. Posterior angles of clypeal margin not elevated. Frontal horn well developed, long, base conical, not keeled, apex simple, unmodified. Punctuation of clypeal disc simple, distinct. Oblique keels above eyes approximately reaching eyes. Punctuation of frons and vertex same as on clypeus; fronto-clypeal suture present. Eyes distinctly elliptic and well developed; genae evenly rounded, semicircular.

Pronotum (Figs 4, 17, 24, 30) distinctly transverse; broadest just in basal quarter, entirely bordered; lateral margin evenly rounded, marginal carina not crenate, distinctly widened and elevated; lateral fovea almost missing. Pronotal punctuation distinct, double, consisting of well and deeply impressed punctures except for basal part, punctures separated approximately by distance equal to their diameter, intermixed with very fine, pinned punctures. Lateral horn-like apophyses well developed, conical, bent up and sideways. Apical hornlike apophyses distinct but weakly elevated, obtuse angled, directed 45° frontoapically. Both apical hornlike apophyses joined together in keel-like seam.

Scutellar shield triangular, approximately as long as wide, shiny, densely punctate.

Elytra approximately as long as wide, surface shiny, glabrous; humeral umbone weak; between suture and humerus seven distinct striae along entire elytral length, all striae with confluent punctures; intervals convex.

Parameres as in Fig. 63.

**Variability in males.** Surface black to brownish; pronotal hornlike apophyses in medium developed and underdeveloped (hypothelic) specimens short, more or less straight, only simply rounded to almost acute apically.

**Female (allotype).** Head (Figs 11, 42). Clypeus broadly rounded, nearly semicircular, anterior angles vague. Posterior angles of clypeal margin not elevated. Frontal carina well developed, not interrupted in middle, doubly s-shaped. Punctuation of clypeus, frons, vertex and occiput simple, distinct; oblique keels above eyes distinct, elongated to base of eyes; eye well developed, distinctly elliptic, genae well developed, arcuate anteriorly.

Pronotum (Fig. 11) distinctly transverse, lateral margin weakly widened, broadest just basally, surface distinctly deeply punctate, doubly except for basal part, punctures consisting of well and deeply impressed punctures, separated approximately by distance equal to their diameter, intermixed with very fine, pinned punctures. Anterior transverse protrusion distinct, sharply semicircular, lateral apophyses present.

Elytron surface shiny, glabrous; humeral umbone weak.

**Measurements.** Total body length 11.3–15.2 mm (holotype, ♂: 14.6 mm; allotype, ♀: 15 mm).

**Differential diagnosis.** Refer to species key.

**Etymology.** Patronymic; named in honour of our friend, the late Henry F. Howden (Ottawa, Canada), a renowned specialist in world Scarabaeoidea.

**Collection circumstances.** Prefers sandy soils.

**Distribution.** South-eastern parts of Spain and Gibraltar (Fig. 59).

***Bolbelasmus nikolajevi* Hillert, Arnone, Král & Massa sp. nov.**

(Figs 5, 12, 18, 25, 31, 37, 43, 57, 59, 64)

*Bolbelasmus bocchus*: PIC (1924): 126 (note, distribution); SCHATZMAYR (1946): 50 (distribution); ALFIERI (1976): 206 (distribution).

*Bolbelasmus bocchus vaulogeri*: KRIKKEN (1977): 290, figs 18–19 (revision); BARAUD (1992): 53 (monograph); KRÁL et al. (2006): 82 (catalogue); ARNONE & MASSA (2010): 411, fig. 12 (distribution, note).

**Type locality.** NW Tunisia, Sidi Bouzid gov., 7.5 km SWW of Hajeb el Ayoun, by road, 35°22'N, 09°28'E, 340 m a.s.l.

**Type material** (126 specimens). **TUNISIA: SIDI BOUZID PROV.:** HOLOTYPE: ♂ (DKPC), 'NW Tunisia, Sidi Bouzid gov., 7.5 km SWW of, HAJEB EL AYOUN, by road, 29.iii.2014, 35°22'N, 09°28'E, 340 m, David Král lgt.' ALLOTYPE: ♀ (DKCP), same data. PARATYPES: **EGYPT: ALEXANDRIA PROV.:** 'Egypt, Alexandria, 1958', 1 ♀ (NMPC); 'Egypt, Mariout, 4.iii.1924, coll. Alfieri', 1 ♀ (NHMB). **LIBYA: AZ ZAWIAH PROV.:** 'Afrika, Libye, SURMAN - viii.[19]88, Č. Sobota lgt.', 1 ♂ 1 ♀ (JDCC). **BENGHAZI PROV.:** 'Libya, Benghazi, 8.3.1987, lgt. Háva [p]', 1 ♀ (DKCP), 1 ♀ (JHCP); 'Libia, Benghazi, 1986 V. Poláček lgt. [p]', 1 ♂ (SJCP). **BUTNAN PROV.:** 'Libya, Cirenaica, Tobruk III, 32°5'1" N, 23°58' 35" E, Geo C. Kruger lgt., R.U. Agrario', 2 ♂♂ 2 ♀♀ (MSNG). **TRIPOLI PROV.:** 'Afr. Libya – Tadjura, 04.1986, Houška lgt.', 2 ♂♂ (JMCH); 'Libya, Tagiura, červenec [= July], [19]85, Voleman [lgt.], 2 ♂♂ (VTCZ); 'Libya, Tagiura, srpen [= August], [19]85, Voleman [lgt.], 1 ♀ (VTCZ); 'AFRIKA, Libya, Tarabulus vii.[19]88, V. Poláček lgt.', 1 ♂ (JMCP); Foulgha, 8.4.1983, M. Dudycha [lgt.] [handwritten]', 1 ♂ (RCCP). **Not located:** 'Libya, Takadria, srpen [= August], [19]84, Voleman [lgt.], 1 ♀ (VTCZ). **TUNISIA: BIZERTE PROV.:** 'Biserta, Tunisia, De Vauloger, Nevinston Coll., 1918-14, Bolboceras, vaulogeri Ab., types, Type, H. T.', 1 ♂ (BMNH) [not syntype of *B. vaulogeri*, type label added later; M. Barclay pers. comm.]. **GABÈS PROV.:** 'Gabes, 1897', 2 ♂♂ (MNHN); 'Tunisie, Mareth, R. Demoflys lgt., i. [19]49', 1 ♂ (MNHN); 'Tunisia, Gov. Gabes, Matmata, 19.iv.2013, Leg. G.Sabatinelli, At light', 1 ♂ 1 ♀ (GSCT); 'Matmata, iii.2014', 1 ♂ 1 ♀ (GSCT); 'TUNISIA: 15.4.1996, TAMEZRET, 13 km W of Matmata, J. BATELKA lgt.', 2 ♀♀ (JBCEP); 'E Tunisia, Gabes, 5 km NEE of Oudref, Matwiya plage, 24.–25.iii.2014, 34°01'N 10°00'E, O. Hillert lgt.', 7 ♂♂ 8 ♀♀ (OHCB); 'E Tunisia, Gabes gov., 5 km NEE of Oudref, MATWIYA plage, ca. 20 m, 24.–25.iii.2014, 34°01'N, 10°00'E, David Král lgt.', 2 ♂♂ 3 ♀♀ (DKCP), same data but Petr Šípek lgt., 3 ♂♂ 2 ♀♀ (CUPC), 1 ♀ [in pure alcohol] (CUPC); 'TN-Gabes, dintorni, 13.IV.[19]95 leg. S. Ziani', 1 ♂ (SZCM). **GAFA PROV.:** 'Tunisie, Gafsa, Chretien [lgt.], 1910', 1 ♂ (MNHN); 'Tunisie, Gafsa, A. Weiss [lgt.], 1904', 1 ♀ (MNHN); 'Gafsa, 1897', 1 ♂ (OHCB); 'Tunis, Métaoui, C. Dumont', 1 ♀ (DKCC). **KASSERINE PROV.:** 'T., Thelepte, Mai 1941, R. Demoflys [lgt.], 2 ♂♂ 1 ♀ (MNHN); 'Tun., Sbeitla, Mars 1941, R. Demoflys [lgt.], 2 ♀♀ (MNHN). **KEBILI PROV.:** 'TUNISIA, 3.-4. iv.2008 / 45 km E of Douz, Wadi Raml, / N33°31' E09°30' / J. Batelka & J. Straka lgt.', 1 ♀ (JBCEP). **KEF PROV.:** 'Tunisia NW, Le Kef, NABEUR env., 16.4.2001, lgt. M. Snižek', 1 ♂ (VKCC). **MEDENINE PROV.:** 'E Tunisia, Medenine, Djerba island, 5 km E of Midoun, sea coast, 26.iii.2014, 33°49'N 11°02'E, O. Hillert lgt.', 1 ♂ (OHCB); 'TN-Medenine, str. per Toujan, 13.IV.[19]95 leg. S. Ziani', 4 ♀♀ (SZCM). **NABEUL PROV.:** 'Tunisia, (Nabeul), Cap Bon peninsula, 6 km W of El Hawariah, sea coast, 23.iii.2014, 37°03'N 10°57'E, O. Hillert lgt.', 4 ♂♂ (OHCB); 'NE Tunisia, Nabeul gov., Cap Bon peninsula, 6 km W of EL HAWARIAH, sea coast, 23.iii.2014, 37°03'N, 10°57'E, ca. 3 m, David Král lgt.', 2 ♂♂ 4 ♀♀ (DKCP), same data but Petr Šípek lgt., 1 ♂ 1 ♀ [partially damaged spec. in pure alcohol] (CUPC); 'Tunisia, Cap Bon IV.1960, G. Frey', 1 ♀ (NHMB). **SFA PROV.:** 'Tunisie, Ketana [Bir Ketana], iv.[19]50, R. Demoflys [lgt.], 1 ♀ (MNHN); 'Tunisie, La Hencha, iii.[19]42, R. Demoflys [lgt.], 1 ♂ (MNHN); 'Tunisia 1896, Sfax, de Vauloger [lgt.], Nevinston Coll., 1918-14', 1 ♂ 1 ♀ (BMNH). **SIDI BOUZID PROV.:** 'NE Tunisia, Sidi Bouzid, 7.5 km SWW of Hajeb el Ayoun by road, 29.iii.2014, 35°22'N 09°28'E, O. Hillert lgt.', 7 ♂♂ 8 ♀♀ (OHCB); 'NW Tunisia, Sidi Bouzid gov., 7.5 km SWW of, HAJEB ELAYOUN, by road, 29.iii.2014, 35°22'N, 09°28'E, 340 m, David Král lgt.', 4 ♂♂ 2 ♀♀ (DKCP), 1 ♂ 1 ♀ (CUPC); 'Tunisie, Maknassy, A. Dumont [lgt.], 1928', 5 ♂♂ 2 ♀♀ (MNHN); 'Tunisia, Bled Gamouda [Bilad

Gamouda], de Vauloger [lgt.], Nevinson Coll., 1918-14.', 1 ♂ (BMNH). **TOZEUR PROV.:** 'Tunis, Tozeur, C. Dumont [lgt.], 1929', 2 ♂♂ (MNHN). **No further locality specified:** 'Tunisie, Septentrionalis], Schaedlin', 1 ♂ (MNHN).

**Description. Male (holotype).** Distinctly convex, surface brownish or light-brown, shiny, pronotum covered with double punctation, elytron very fine microsculptured basally, microsculpture missing apically.

Head (Figs 5, 18, 25, 31, 37, 57). Clypeus broadly rounded, nearly semicircular, anterior angles vague. Posterior angles of clypeal margin elevated. Frontal horn well developed, long, distinctly furcate, base triangularly shaped in dorsal view, posterior edge of base situated at height of center of eye, side margin of tubercle keeled from base to apex. Punctuation of clypeal disc simple, distinct. Oblique keels above eyes reaching approximately to half of eyes. Punctuation of frons and vertex same as on clypeus; frontoclypeal suture present. Eyes distinctly elliptic and well developed; genae arcuate posteriorly, extending eyes laterally.

Pronotum (Figs 5, 18, 25, 31, 37, 57) distinctly transverse; broadest just in basal quarter, entirely bordered; lateral margin evenly rounded, marginal carina not crenate, distinctly widened and elevated; lateral fovea almost missing. Pronotal punctation distinct, double, consisting of deeply impressed punctures, punctures separated by approximately 2–3 times their diameter, intermixed with very fine, pinned punctures. Base of pronotum glabrous. Lateral hornlike apophyses well developed, bent distinctly upwards and sideways in lateral and dorsal view; between lateral and apical apophyses distinct, deeply oval concavity. Apical hornlike apophyses distinctly elevated, angled, directed 30° frontoapically, subapical protrusion of apical apophyses laterally near apex on outside.

Scutellar shield triangular elongate, very finely punctate, shiny.

Elytra approximately as long as wide, surface shiny, glabrous; between suture and humerus 7 distinct striae along entire elytral length, all striae with distinctly separated punctures; intervals flat; humeral umbone weak.

Parameres as in Fig. 64.

**Variability in males.** Surface black to brownish; pronotal hornlike apophyses in medium developed and underdeveloped (hypothelic) specimens short, more or less straight, only simply rounded to almost acute apically.

**Female (allotype).** Head (Figs 12, 43). Clypeus broadly rounded, semicircular with straight anterior margin, anterior angles evenly rounded. Posterior angles of clypeal margin very weakly elevated. Frontal carina well developed, distinctly interrupted in middle, bituberculate on internal interruption, laterally keeled on each side. Punctuation of clypeus, frons, vertex and occiput simple, distinct; oblique keels above eyes distinct, elongated to half of eyes; eye well developed, distinctly elliptic, genae well developed, arcuate anteriorly and posteriorly.

Pronotum (Fig. 12) distinctly transverse, lateral margin weakly widened, broadest just basally, surface distinctly deeply punctate, double except of basal part, punctures consisting of well and deeply impressed punctures, separated approximately by distance equal to their diameter, intermixed with very fine, pinned punctures. Anterior transverse protrusion distinct, sharply semicircular, lateral apophyses present.

Elytron surface shiny, glabrous; humeral umbone weak.

**Measurements.** Total body length 12.0–15.1 mm (holotype, ♂: 14.6 mm; allotype, ♀: 14.8 mm).



**Differential diagnosis.** Refer to species key.

**Etymology.** Patronymic; named in honour of our friend Georgy V. Nikolajev (Al-Farabi State University, Almaty, Kazakhstan), a renowned specialist in world Scarabaeoidea.

**Collection circumstances.** Prefers sandy and/or loess soils.

**Distribution.** Mediterranean Egypt, Libya (Tripolitania, Cyrenaica) and Tunisia (Fig. 59).

***Bolbelasmus vauloegeri* (Abeille de Perrin, 1898) stat. restit.**

(Figs 6, 7, 13, 19, 20, 26, 32, 38, 44, 52–56, 58, 59, 65)

*Bolboceras Vauloegeri* Abeille de Perrin, 1898: 254 (original description).

*Bolbelasmus Vauloegeri*: BOUCOMONT (1912): 17 (catalogue, as synonym of *B. bocchus*); WINKLER (1927): 1035 (catalogue, synonym of *B. bocchus*).

*Bolbelasmus romanorum* Arnone & Massa, 2010: 403, figs 1–5, 8 (original description). Type locality: ‘Sicily, Balestrate, fovea Calatubo (Palermo)’. **New synonym.**

*Bolbelasmus unicornis*: BALLERIO (2008): 32 (distribution).

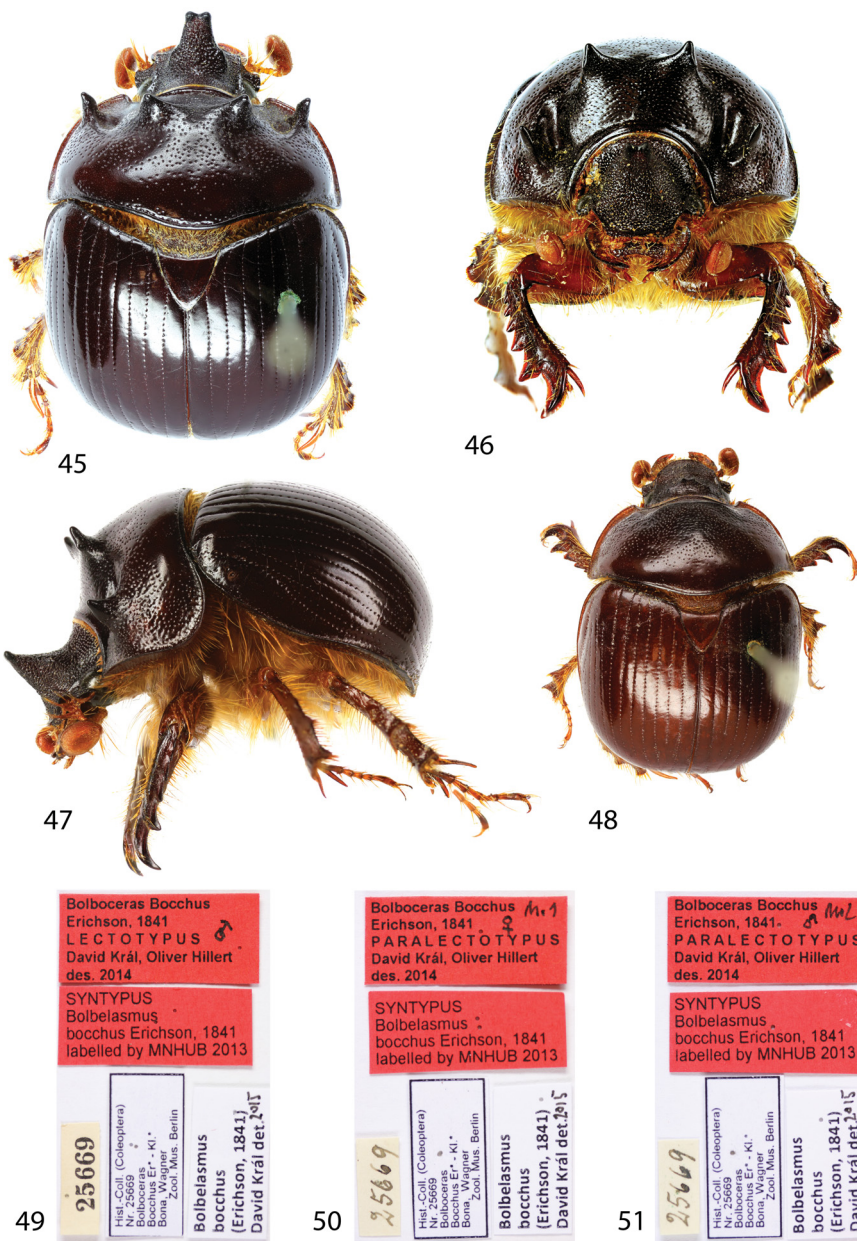
**Type locality.** Tunisia, ‘Bizerte’.

**Type material examined** (20 specimens). *Bolbelasmus vauloegeri*: **TUNISIA: BIZERTE prov.:** LECTOTYPE (present designation): ♂ (MNHN), ‘Bizerte, de Vauloger, Bolboceras Vauloegeri ab., Museum Paris 1919, coll. A de Perrin, Bolboceras Vauloegeri ab., Museum Paris, 1942 coll. Dr. A Chobaut’. PARALLECTOTYPES: No. 1, ♀ (MNHN), ‘Bizerte, de Vauloger, Vauloegeri Ab., Type’; No. 2, ♀ (MNHN), ‘Bizerte de Vauloger sp. nov??, tunisus Vul. (sp. litteus), Museum Paris 1942, coll. Dr. A Chobaut, Bolboceras Vauloegeri ab.’; Nos 3–4, ♀♀ (MNHN), ‘Bizerte, de Vauloger, Vauloegeri Ab., Type’; No. 5, ♀ (ZSMC), ‘Bizerte [18]93 Vaulog[er].’; No. 6, ♀ (BMNH), ‘Bizerte, de Vauloger, Nevinson Coll., 1918–14., Cotype’; No. 7, ♀ (BMNH), ‘Bizerte, de Vauloger, Nevinson Coll., 1918–14., Cotype’; see Figs 52–56.

*Bolbelasmus romanorum*: **ITALY: SICILY Prov.:** HOLOTYPE: 1 ♂ (MSNG), ‘Italy, Sicily, Balestrate, fovea Calatubo (Palermo), 17.iii.1974, B. Massa lgt.’. ALLOTYPE: 1 ♀ (MSNG), ‘Sicily, Pedalino (Ragusa) 1.v.1972, A. Monastera lgt.’. PARATYPES: 1 ♂ 5 ♀♀ (MAPC), ‘Menfi (Agrigento), loc. Cinquanta, 13.xi.2010, 4.iv.2010, 28.iii.2010, 20.iii.2010, 14.xi.2009, 6.xi.2009, A. Carapezza lgt.’; 1 ♂ (MACP), ‘Vendicari Nature Reserve (Siracusa) 18.iv.2009, B. Massa lgt.’; 1 ♂ (VACP), ‘Marausa (Trapani) 18.xii.1983, V. Aliquo lgt.’; 1 ♀ (OHCb), ‘Bosco Santo Pietro Nature Reserve (Catania), M. Zafarana lgt.’; 1 ♂ 1 ♀ (MZUC) ‘Sicily’.

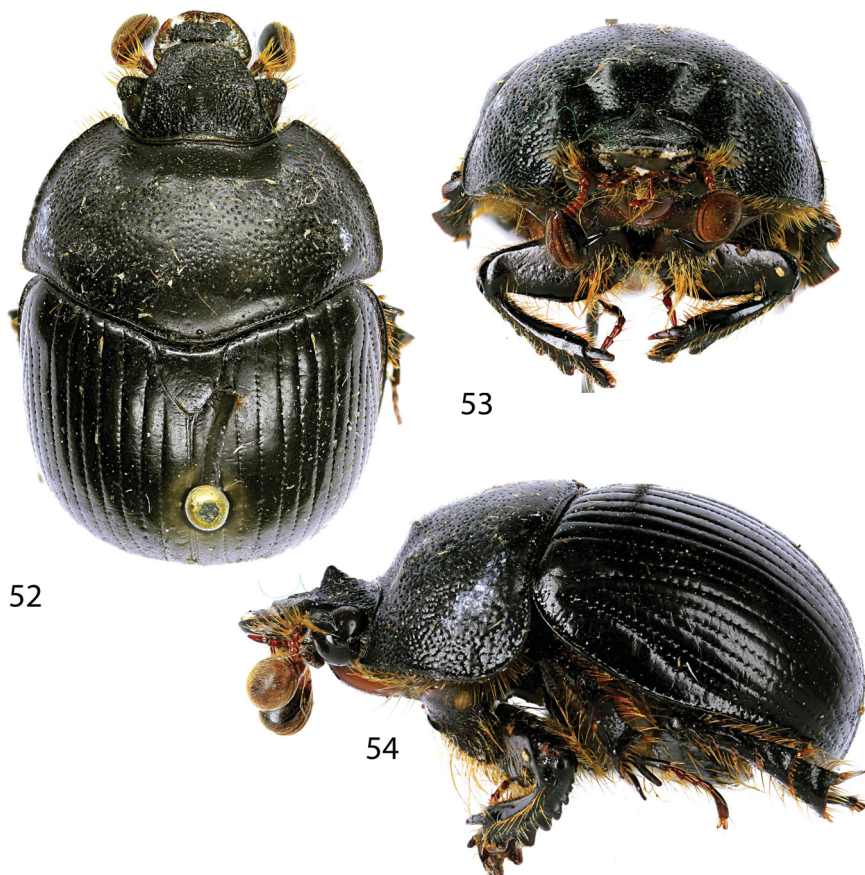
**Additional material examined** (77 specimens). **ALGERIA: No further locality specified:** Algeria, Dr. Thiébault, 1 ♂ (MNHN). **ITALY: SICILY Prov.:** Menfi (Agrigento), loc. Cinquanta, 19.iii.[20]13, 1 ♂, M. Arnone lgt. (MAPC); Terrasini, Capo Rama Nature Reserve 27.iii.[20]12, 1 ♀, R. Lo Duca lgt. (MAPC); Menfi, loc. Cinquanta, 10.iv.2011, 1 ♂, A. Carapezza lgt. (DJCP); Niscemi (Caltanissetta), 1 ♂, M. Zafarana lgt. (MSNM); Palermo, 1 ♀ (MZUC); Piazza Armerina (Enna), 1 ♂ (MZUC); Termini Imerese (Palermo), 1 ♀ (MZUC). **TUNISIA: BIZERTE Prov.:** SW env. of Edahra, 31.iii.2014, 37°12'N 09°20'E, 3 ♂♂ 5 ♀♀, O. Hillert lgt. (OHCb); SW env. of Edahra, 37°12'N 09°20'E, ca. 65 m, 31.iii.2014, 4 ♂♂ 3 ♀♀, David Král lgt. (DKCP), 3 ♂♂ 2 ♀♀ (CUPC). **JENDOUBA Prov.:** Tabarka, Zone touristique, 2.v.2005, 1 ♂, M. Liebscher lgt. (MLCD). **NABEUL Prov.:** Cap Bon peninsula, 6 km W of El Hawarith, sea coast, 23.iii.2014, 37°03'N 10°57'E, 3 ♂♂ 2 ♀♀, O. Hillert lgt. (OHCb); Cap Bon peninsula, 6 km W of El Hawarith, sea coast, 37°03'N 10°57'E, ca. 3 m, 23.iii.2014, 3 ♂♂ 6 ♀♀, David Král lgt. (DKCP); Cap Bon peninsula, 2 km NW of Douela by road, 23.–24.iii.2014, 36°50'N 10°35'E, 13 ♂♂ 2 ♀♀, O. Hillert lgt. (OHCb); Cap Bon peninsula, 2 km NW of Douela by road, 36°49'N 10°35'E, ca. 130 m, 23.–24.iii.2014, 4 ♂♂ 2 ♀♀, David Král lgt. (DKCP), 1 ♂ [partially damaged, in pure alcohol] (CUPC); Cap Bon peninsula, 6 km SW of Zouiet el Mgaiez by road, 23.iii.2014, 36°58'N 10°55'E, 3 ♂♂ 2 ♀♀, O. Hillert lgt. (OHCb); Cap Bon peninsula, 6 km SW of Zouiet el Mgaiez by road, 36°49'N 10°55'E, ca. 45 m, 23.iii.2014, 1 ♂ 2 ♀♀, David Král lgt. (DKCP); Cap Bon, 1960, 1 ♀, G. Frey [lgt.] (NHMB); Cap Bon, 1894, Museum Paris, 1919, 1 ♀, coll. A. de Perin (MNHN). **No further locality specified:** Tunisia, Salt Lake, Kveten [May] 2005, 1 ♀, Volcano lgt. (OHCb); Tunisia, Solunan, Museum Paris 1993, 1 ♂, coll. J. Baraud (MNHN).

**Redescription. Male (lectotype)** (Figs 52–54). Distinctly convex, surface black, shiny, pronotum covered with double punctuation, elytron glabrous.



Figs 45–51. Types and labels of *Bolbelasmus bocchus* (Erichson, 1841), deposited in MNHB. 45 – male habitus in dorsal aspect (lectotype); 46 – male habitus in frontal aspect (lectotype); 47 – male habitus in lateral aspect (lectotype); 48 – female habitus in dorsal aspect (paralectotype); 49 – labels of lectotypes; 50 – labels of paralectotype No. 1; 51 – labels of paralectotype No. 2.





Figs 52–56. Lectotype and labels of *Bolbelasmus vaulogeri* (Abeille de Perrin, 1898), male, deposited in MNHN. 52 – habitus in dorsal aspect, 53 – same but frontal aspect, 54 – same but lateral aspect, 55 – labels of lectotype, 56 – labels of paralectotype No1.



Figs 57–58. Living specimens. 57 – *Bolbelasmus nikolajevi* Hillert, Arnone, Král & Massa sp. nov. (paratype, ♂, Tunisia, Cap Bon peninsula, 6 km W of El Hawariah); 58 – *B. vauloegeri* (Abeille de Perrin, 1898) (♂, Tunisia, Cap Bon peninsula, 2 km NW of Douela). Photos by Petr Šípek.



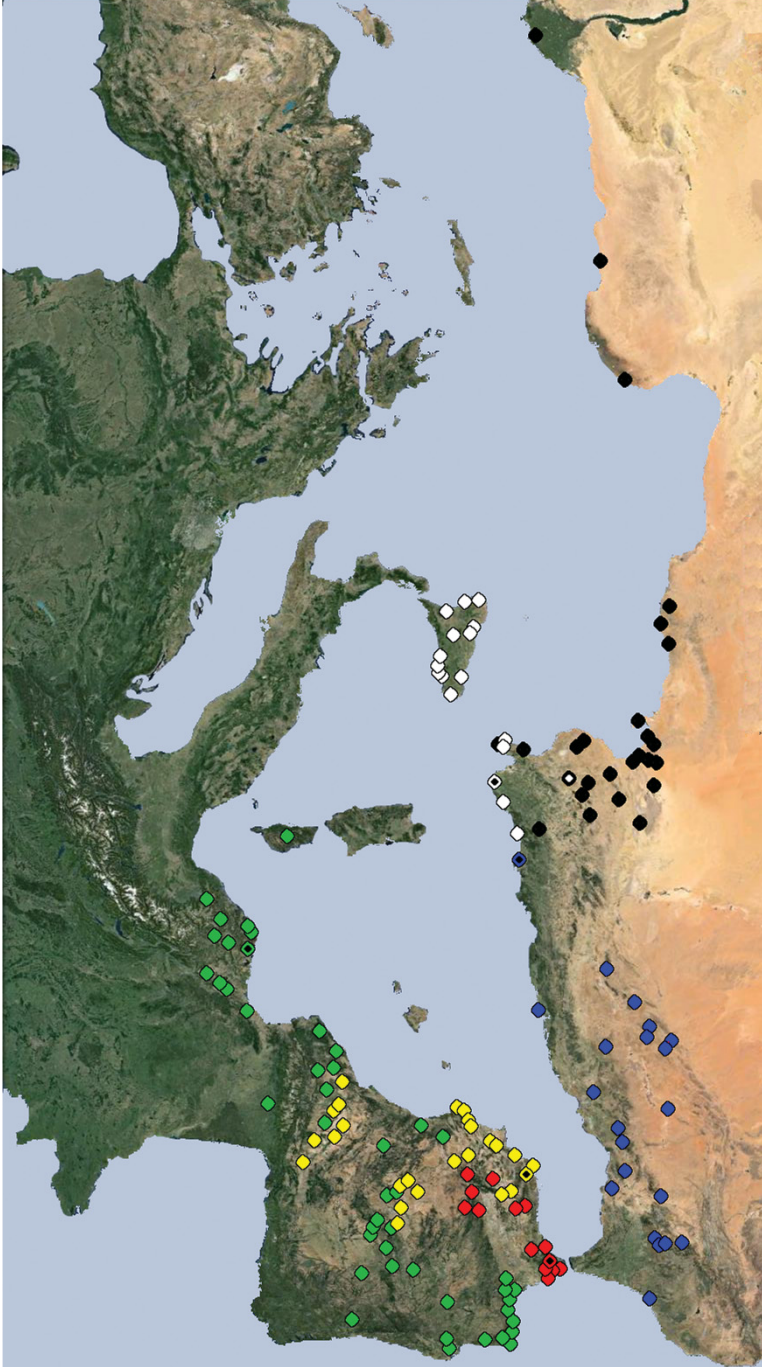


Fig. 59. Map of the Mediterranean with known distribution of *Bolbelasmus* species discussed. *B. bocchus* (Erichson, 1841) – blue, black centre = type locality; *B. brancoi* Hillert & Král sp. nov. – yellow, black centre = type locality; *B. gallicus* (Mulsant, 1842) – green, black centre = type locality; *B. howdeni* Hillert & Král sp. nov. – red, black centre = type locality; *B. nikolaqjevi* Hillert, Arnone, Král & Massa sp. nov. – black, white centre = type locality; *B. vaulogeti* (Abeille de Perrin, 1898) – white, black centre = type locality.

Head (Figs 52–54). Clypeus broadly rounded, nearly semicircular, anterior angles vague. Posterior angles of clypeal margin elevated. Frontal horn weakly developed, short, simple, conical. Punctuation of clypeal disc simple, distinct. Oblique keels above eyes reaching to approximately posterior part of eyes. Punctuation of front and vertex same as on clypeus; fronto-clypeal suture present. Eyes weakly elliptic and well developed; genae evenly rounded, distinctly extending eyes laterally.

Pronotum (Figs 52–54) distinctly transverse; broadest just at basal quarter, entirely bordered; lateral margin evenly rounded, marginal carina not crenate, distinctly widened and elevated; lateral fovea almost missing. Pronotal punctuation distinct, double, consisting of well and deeply impressed punctures, separated by less than their diameter, intermixed with very fine, pinned punctures. Lateral hornlike apophyses weakly tuberculate. Apical hornlike apophyses weakly elevated, joined in keel-like seam.

Scutellar shield triangular, finely punctate, shiny.

Elytra approximately as long as wide, surface shiny, glabrous; between suture and humerus 7 distinct striae along entire elytral length, all striae with distinctly confluent punctures; intervals convex; humeral umbone weak.

Aedeagus. Parameres as in Fig. 65.

**Variability in males.** Surface black to brownish; pronotal hornlike apophyses in medium developed and underdeveloped (hypothelic) specimens short, more or less straight, only simply rounded to almost acute apically.

**Female (Paralectotype No. 1).** Head: Clypeus broadly rounded, nearly semicircular, anterior angles vague. Posterior angles of clypeal margin very weakly elevated. Frontal carina well developed, not interrupted, in middle and on each side tuberculate. Punctuation of clypeus, frons, vertex and occiput simple, distinct; oblique keels above eyes distinct, elongated to posterior part of eyes; eyes well developed, nearly rounded, genae well developed, evenly rounded and distinct, extending eyes laterally.

Pronotum distinctly transverse, lateral margin weakly widened, broadest just basally, surface distinctly deeply punctate, doubly except of basal part, punctures consisting of well and deeply impressed punctures, separated by less than their diameter, intermixed with very fine, pinned punctures. Anterior transverse protrusion distinct, sharply semicircular, in middle emarginated, lateral apophyses present, but almost invisible.

Elytron surface shiny, glabrous; humeral umbone weak.

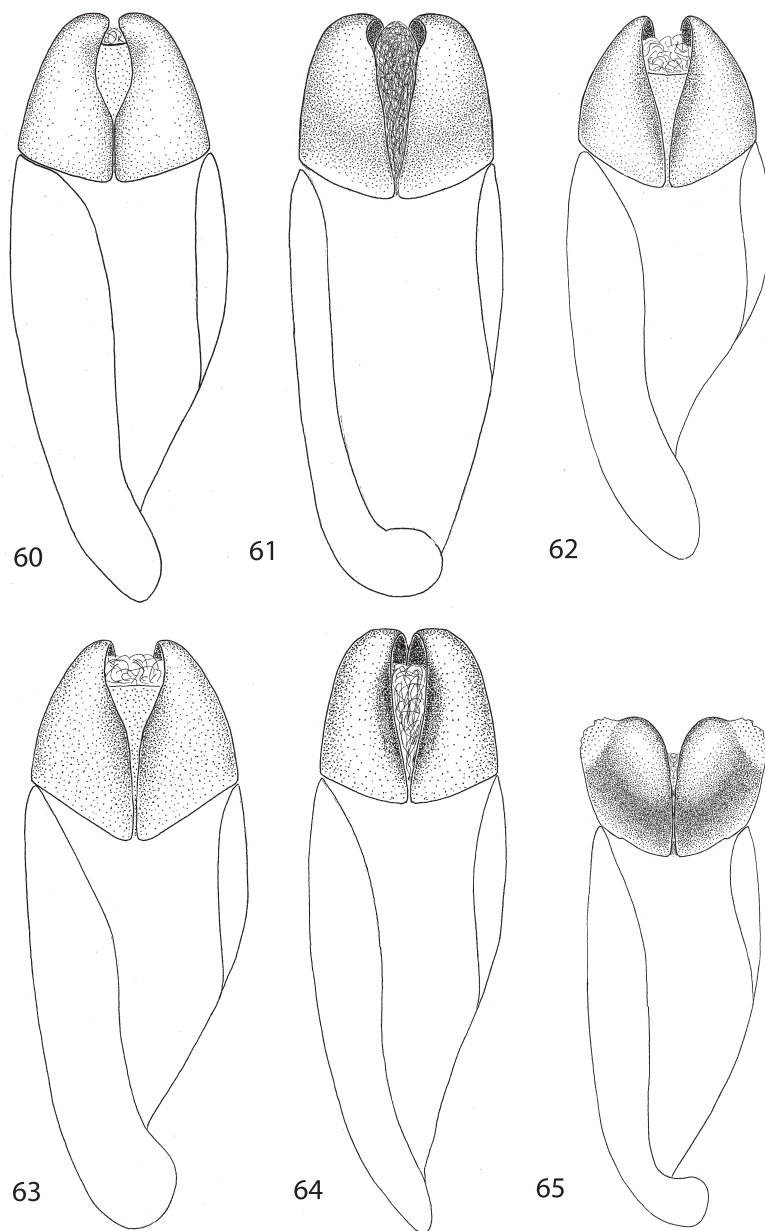
**Measurements.** Total body length 10.5–12.2 mm (lectotype, ♂: 11.5 mm; paralectotype No.1, ♀: 12.0 mm).

**Differential diagnosis.** Refer to species key.

**Collection circumstances.** Prefers sandy soils.

**Distribution.** Algeria (with no locality specified), northernmost Tunisia and Sicily (Italy) (Fig. 59).

**Remarks.** ABEILLE DE PERRIN (1898) described *Bolboceras vaulogeri* based on a series of male and female specimens ('plusieurs sujets') from Bizerte (Tunisia). He did not establish a holotype; thus in this study, we here designate a lectotype (♂) (Fig. 55) and seven paralectotypes for fixation of this taxon (Fig. 56). BOUCOMONT (1902: 6) listed this species as valid, while BOUCOMONT (1912: 17) as a synonym to *Bolbelasmus bocchus*. PIC (1924) disagreed with BOUCOMONT (1902)



Figs 60–65. Aedeagus of *Bolbelasmus* species, ventral aspect, schematically. 60 – *B. bocchus* (Erichson, 1841), 61 – *B. brancoi* Hillert & Král sp. nov., 62 – *B. gallicus* (Mulsant, 1842), 63 – *B. howdeni* Hillert & Král sp. nov., 64 – *B. nikolajevi* Hillert, Arnone, Král & Massa sp. nov., 65 – *B. vaulogeri* (Abeille de Perrin, 1898).

and considered that the character given to differentiate *B. vauloger*i (horn bifid vs. simple horn) was not valid: ‘(à corne simple) avec *bocchus* Er. (à corne entaillee) ♂, inscrite au Catalogus 46, ne me paraît pas justifiée’. KRIKKEN (1977) studied a series of ten males and six females from Tunisia (from Biserta, Hammamet, Maktar and Sousse, however, no types were included), and resurrected the taxon as a subspecies of *B. bocchus*. BRANCO (2005) believes Krikken was mistaken as ABEILLE DE PERRIN (1898) gave a body size of 5 mm for *B. vauloger*i. However, the description by ABEILLE DE PERRIN (1898) certainly refers to a *Bolbelasmus*, the type series exists, and males are 7.5–9.5 mm long; thus the name *B. vauloger*i is available, but the measure recorded by ABEILLE DE PERRIN (1898) was just smaller than the actual ones.

Concerning the status in Sicily, the story is intricate. RAGUSA (1893) was the first entomologist to collect a species of *Bolbelasmus* in Sicily. He sent the specimen, a female, to E. Reitter, who tentatively identified it as *Bolboceras gallicus*, and wrote on a label that a study of the male was needed to confirm his identification (ARNONE & MASSA 2010). When Ragusa obtained a male, he was convinced that it belonged to *B. gallicus* and decided to publish the record without re-consulting with Reitter. Thus, this species was reported in different catalogues, without checking the specimens preserved in the Ragusa collection. In 1974, B. Massa collected another male on the sandy coast of Balestrate (Palermo), finding that characters of the scutellar shield and the head pattern did not match with the characteristics of *B. gallicus*. That specimen was examined and identified by Jacques Baraud as *B. unicornis* (BARAUD 1977). Since 1974, a few specimens of *Bolbelasmus* were found (cf. ALIQUÒ 1988, who recorded it as *B. gallicus*; AGOGLITTA et al. 2006, who identified two specimens as *B. unicornis*). In 2009–2010, it was possible to have access to some males and females to compare them with the two species previously reported from Sicily and the other known species in the Mediterranean area; thus, ARNONE & MASSA (2010) described it as *Bolbelasmus romanorum*, following KRIKKEN (1977) in considering *B. vauloger*i a species related to *B. bocchus*.

Altogether, for a very long time the taxonomic status of the species *B. vauloger*i was confused and the taxonomic status changed many times. Remarkably, no one possesses the type material examined in the description of 1898 for the taxonomic status to be clarified. The fact that this species is with simple tubercle on frons and not bifurcate ‘...corne frontale du ♂ en forme de tubercule conique émoussé, très courte...’ was not considered by all authors.

Thus, we examined the series of specimens of *B. romanorum* and compared them with *B. vauloger*i and are now able to establish the following synonymy: *Bolbelasmus romanorum* Arnone & Massa, 2010, syn. nov. = *Bolbelasmus vauloger*i (Abeille de Perrin, 1898).

### Identification key for well and medium developed males

- 1 (10) Scutellar shield impunctate or indistinctly shallowly punctate, frontal horn simple or furcate apically.
- 2 (5) Frontal horn simple; genae evenly rounded; oblique keel above eyes over whole eyes length; head strongly constricted behind eyes.
- 3 (4) Frontal horn directed forwards and upwards in lateral view; clypeus with short transversal carina; scutellar shield triangular, approximately as long as wide; body

- surface brownish, maximal body length 14 mm. Southern parts of Central Europe, Alsace, Italy, Balkan Peninsula, Poland, Russia and Ukraine. .... *B. unicornis* (Schränk von Paula, 1789)
- 4 (3) Frontal horn bending not forwards (Figs 19–20); transversal clypeal carina absent; scutellar shield triangular longer than wide; body surface blackish, maximal body length 13 mm (Figs 6–7, 38); aedeagus as in Fig. 65; Algeria, Italy (Sicily) and Tunisia (Fig. 59). .... *B. vaulogerii* (Abeille de Perrin, 1898)
- 5 (2) Frontal horn furcate apically; genae more or less angulate anterolaterally; oblique keel above eyes reaching only to anterior part of eyes; head not strongly constricted behind eyes.
- 6 (7) Frontal horn short and not longer than broad, horn apex approximately as wide as horn base (Figs 2, 15, 22); pronotal punctation denser with exception of basal part, punctures separated approximately by distance equal to their diameters; pronotal base with distinct visible but fine, regularly pinned points; elytral striae well impressed, visible as complete lines; elytral intervals moderately convex; aedeagus as in Fig. 61; Spain (Fig. 59). .... *B. brancoi* Hillert & Král **sp. nov.**
- 7 (6) Frontal horn long, longer than broad, horn becoming gradually thinner from base to apex (Figs 1, 5, 14, 18, 21, 25, 27, 31, 33, 37, 57); pronotal punctation sparser, punctures separated by approximately three times their diameters; pronotal base with very fine, weakly visible and well separated pinned points; elytral striae not impressed, visible as row of punctures; elytral intervals flat; northern Africa.
- 8 (9) Base of frontal horn situated at level of anterior part of eyes; horn sharply keeled from base to half of its length in dorsal aspect (Figs 1, 14, 21, 27, 33); medial hornlike apophysis of pronotum directed vertically upwards in lateral aspect, subapical protrusion situated basally; lateral hornlike apophyses of pronotum directed forwards and weakly divergent; aedeagus as in Fig. 60; Algeria and Morocco (Fig. 59). .... *B. bocchus* (Erichson, 1841)
- 9 (8) Base of frontal horn situated at level of posterior part of eyes; horn broadly keeled from base to apex in dorsal view (Figs 5, 18, 25, 31, 37, 57); medial hornlike apophysis of pronotum directed obliquely forwards in lateral aspect, subapical protrusion situated near apex; lateral hornlike apophyses of pronotum directed forwards; aedeagus as in Fig. 64; Egypt, Libya and Tunisia (Fig. 59). .... *B. nikolajevi* Hillert, Arnone, Král & Massa **sp. nov.**
- 10 (1) Scutellar shield densely punctate; frontal horn simple apically.
- 11 (12) Apex of frontal horn approximately as wide as horn base, apex broadly acute-angled, strongly flattened on front part of apex (Figs 3, 16, 23, 29, 35); aedeagus as in Fig. 62; France (including Corsica), Portugal and Spain (Fig. 59). .... *B. gallicus* (Mulsant, 1842)
- 12 (11) Apex of frontal horn becoming gradually thinner from base to apex, apex acute-angled, only weakly flattened on front part of apex (Figs 4, 17, 24, 30, 36); aedeagus as in Fig. 63; Spain, Gibraltar (Fig. 59). .... *B. howdeni* Hillert & Král **sp. nov.**



### Identification key for less developed males

- 1 (10) Scutellar shield impunctate or weakly shallowly punctate, frontal horn simple or furcate apically.
- 2 (5) Frontal horn simple; genae regularly rounded; oblique keel above eyes extending over whole eyes length; head strongly constricted behind eyes.
- 3 (4) Scutellar shield triangular, approximately as long as wide; body surface brownish, maximal body length 12 mm. Southern parts of Central Europe, Alsace, Italy, Balkan Peninsula, Poland, Russia and Ukraine. .... ***B. unicornis*** (Schrank von Paula, 1789)
- 4 (3) Scutellar shield triangular, longer than wide; body surface blackish, maximal body length 11 mm; aedeagus as in Fig. 65; Algeria, Italy (Sicily) and Tunisia (Fig. 59). ..... ***B. vaulogeri*** (Abeille de Perrin, 1898)
- 5 (2) Frontal horn furcate apically; genae more or less angulate anterolaterally; oblique keel above eyes reaching only to anterior part of eyes; head not strongly constricted behind eyes.
- 6 (7) Pronotal punctation denser with exception of basal part, punctures separated approximately by distance equal to their diameters; pronotal base with distinct visible but fine, regularly spaced pinned points, elytral striae well impressed, visible as complete lines; elytral intervals moderately convex; aedeagus as in Fig. 61; Spain (Fig. 59). ..... ***B. brancoi*** Hillert & Král **sp. nov.**
- 7 (6) Pronotal punctation sparser, punctures separated by approximately three times their diameters pronotal base with very fine, weakly visible and well separated pinned points; elytral striae not impressed, visible as row of punctures; elytral intervals flat; northern Africa.
- 8 (9) Base of frontal horn situated at level of anterior part of eyes; horn sharply keeled basally only; aedeagus as in Fig. 60; Algeria and Morocco (Fig. 59). ..... ***B. bocchus*** (Erichson, 1841)
- 9 (8) Base of frontal horn situated at level of posterior part of eyes; horn broadly keeled from base to apex in dorsal view; aedeagus as in Fig. 64; Egypt, Libya and Tunisia (Fig. 59). ..... ***B. nikolajevi*** Hillert, Arnone, Král & Massa **sp. nov.**
- 10 (1) Scutellar shield densely punctate; frontal horn simple apically.
- 11 (12) Apex of frontal horn flattened on front part of apex; aedeagus as in Fig 62; France (including Corsica), Portugal and Spain (Fig. 59). ..... ***B. gallicus*** (Mulsant, 1842)
- 12 (11) Apex of frontal horn regularly arcuate, not flattened on front part of apex; aedeagus as in Fig. 63; Spain, Gibraltar (Fig. 59). ..... ***B. howdeni*** Hillert & Král **sp. nov.**

### Identification key for females

- 1 (10) Scutellar shield impunctate, or weakly shallowly punctate.
- 2 (5) Frontal tubercle simple (Figs 41, 42, 44); genae regularly rounded; oblique keel above eyes over whole length of eyes; head strongly constricted behind eyes.

- 3 (4) Scutellar shield triangular, approximately as long as wide; body surface brownish, minimal body length 12 mm. Southern parts of Central Europe, Alsace, Italy, Balkan Peninsula, Poland, Russia and Ukraine. .... ***B. unicornis*** (Schrank von Paula, 1789)
- 4 (3) Scutellar shield triangular longer than wide; body surface blackish, minimal body length 11 mm (Fig 13); Algeria, Italy (Sicily) and Tunisia (Fig. 59). ..... ***B. vaulogerii*** (Abeille de Perrin, 1898)
- 5 (2) Frontal tubercle furcate apically (Figs 39–40, 43); genae more or less angulate anterolaterally; oblique keel above eyes reaching only to anterior part of eyes; head not strongly constricted behind eyes.
- 6 (7) Pronotal punctation denser with exception of basal part, punctures separated approximately by distance equal to their diameters; pronotal base with distinct visible but fine, regularly pinned points; elytral striae well impressed, visible as complete lines; elytral intervals moderately convex (Fig. 9); Spain (Fig. 59). ..... ***B. brancoi*** Hillert & Král **sp. nov.**
- 7 (6) Pronotal punctation sparser, punctures separated by approximately three times their diameters pronotal base with very fine weak visible and well separated pinned points; elytral striae not impressed, visible as row of punctures; elytral intervals flat; northern Africa.
- 8 (9) Base of frontal tubercle situated at level of anterior part of eyes; tubercle sharply keeled basally only in dorsal view (Fig. 8); Algeria and Morocco (Fig. 59). ..... ***B. bocchus*** (Erichson, 1841)
- 9 (8) Base of frontal tubercle situated at level of posterior part of eyes; horn broadly keeled from base to apex in dorsal view (Fig. 12); Egypt, Libya and Tunisia (Fig. 59). ..... ***B. nikolajevi*** Hillert, Arnone, Král & Massa **sp. nov.**
- 10 (1) Scutellar shield densely punctate.
- 11 (12) France (including Corse), Portugal and Spain (see distribution map on Fig. 59 for details). ..... ***B. gallicus*** (Mulsant, 1842)
- 12 (11) Spain, Gibraltar (see distribution map on Fig. 59, for details). ..... ***B. howdeni*** Hillert & Král **sp. nov.**

### Annotated list of the Western Palaearctic *Bolbelasmus* species with new records

#### ***Bolbelasmus bocchus* (Erichson, 1841)**

*Bolboceras Bocchus* Erichson, 1841: 170 (original description).

= *Bolboceras fissicornis* Mulsant, 1843: 280 (original description). Synonymized by MARSEUL (1857: 83).

**Type localities.** *Bolboceras Bocchus*: 'Algier [Bona = Annaba]'; *B. fissicornis*: 'Algérie'.

**Distribution.** Algeria, Morocco (present paper).

#### ***Bolbelasmus brancoi* Hillert & Král **sp. nov.****

**Type locality.** Spain (Andalusia), Los Jesus, N slope of Sierra de Alhamilla, 37°05'N 02°17'W, 500 m a.s.l.

**Distribution.** Spain.

***Bolbelasmus gallicus* (Mulsant, 1842)**

*Bolboceras Gallicus* Mulsant, 1842: 350 (original description).

= *Bolboceras Gallicus* Var. *Conjunctus* Mulsant, 1842: 351 (original description). Synonymized by BOUCOMONT (1912: 17).

= *Bolboceras Gallicus* Var. *Provincialis* Mulsant, 1842: 351 (original description). Synonymized by BOUCOMONT (1912: 17).

**Type localities.** *Bolboceras gallicus*: France, ‘exclusivement méridionale; Draguignan, Saint-Tropez, environs de Marseille’; *B. conjunctus*: ‘France méridionale’; *B. provincialis*: ‘France méridionale’.

**Distribution.** France (including Corsica – first records), Portugal, Spain (present paper).

***Bolbelasmus howdeni* Hillert & Král sp. nov.**

**Type locality.** Spain, Andalusia, Castillo de Castillar, Algeciras env., 10 km N of San Roque, 36°12'N 05°23'W, 78 m a.s.l.

**Distribution.** Spain, Gibraltar (present paper).

***Bolbelasmus keithi* Miessen & Trichas, 2011**

*Bolbelasmus keithi* Miessen & Trichas, 2011: 183 (original description), figs on pp. 187–188 [not numbered].

**Type locality.** Greece, ‘env. Ag. Paraskevi (church), Agia Marina, Kasos island, (Lat: 35°24'10.71"N, Long: 26°54'27.59"E)’.

**Type material examined** (2 specimens). PARATYPES: GREECE: CRETE: 1 ♂ 1 ♀, ‘ELAFONISI (Life), 30/12/96–14/3/97, Leg. Trichas 321 [white printed label], Elafonisi (Life), = Elafonisos, S.-O. Kriti, 30.XII.→ 14.III.1997, leg.: A. Trichas 321, collection: G. Miessen det. 2011, PARATYPUS [printed, red label]’ (GMCL).

**Additional material examined** (9 specimens). GREECE: CRETE: Plakias, 1.iv.1988, 1 ♀, Winkelmann-Köck lgt. (LHCB), 1 ♀ (OHCB); Kastellakia [= Kastellos], 35°22'N, 24°29'E, 4.iv.1978, at light, 1 ♂, Malicky lgt. (DKCP); Mirabella, 1 ♂ Maltzan [?lgt.] (OHCB). RHODES: Falirakion, Ladiko, 22.iv.–5.v.1990, 2 ♂♂ 1 ♀, L. Egger lgt. (ABCB) and (MECI); Villanova, 7.ii.1934, 1 ♂ (MSNM); Marizza, 13.i.1934, 1 ♂ (MSAP).

**Remarks.** After the description of *B. keithi* from Crete and Kasos Islands by MIESSEN & TRICHAS (2011), the record of *B. unicornis* from Rhodes by SCHATZMAYR (1936) and MIKŠIĆ (1959) needed to be confirmed. Actually, following MIESSEN & TRICHAS (2011), we identified the Rhodes specimens as *B. keithi*, thus definitively excluding the presence of *B. unicornis* in the Mediterranean islands (see also ARNONE & MASSA 2010, MIESSEN 2011, MIESSEN & TRICHAS 2011). Therefore the above mentioned specimens constitute the first record of *B. keithi* from the island of Rhodes.

**Distribution.** Greece: Crete, Kasos and Rhodes (MIESSEN & TRICHAS 2011).

***Bolbelasmus makrisi* Miessen, 2011**

*Bolbelasmus makrisi* Miessen, 2011: 111 (original description), figs on pp. 116, 118–119 [not numbered].

**Type locality.** ‘Kourion, Lemesos, alt.: 50 m, Cyprus’.

**Type material examined** (2 specimens). PARATYPES: CYPRUS: 1 ♂ 1 ♀, ‘Rizoelia nat. for. Park, Larnaka – CYP-RUS, leg.: E. Kakouris, collection: G. Miessen, *Bolbelasmus makrisi* nov. sp., G. Miessen det. 2011, PARATYPUS [printed, red label]’ (GMCL).

**Additional material examined** (64 specimens). CYPRUS: PAPHOS: Akamas NP, 5 km N of Lara, 13.–20.iii.2015, 1 ♂ 1 ♀, O. Hillert lgt. (OHCB); Akamas NP, Lara, 13.–20.iii.2015, 1 ♂, O. Hillert lgt. (OHCB); Miliou, N of

Paphos, 13.–20.iii.2015, 1 ♂, O. Hillert lgt. (OHCb); Miliou, 34°56'22.23"N, 32°27'35.90"E, vivant dans piscine [alive in pool], 7.vi.2014, 1 ♂, G. Miessen lgt. (OHCb); Miliou, 34°56'21.66"N 32°27'35.59"E, attiré par lampe UV [attracted by UV light], 7.vi.2014, 1 ♀, G. Miessen lgt. (OHCb); 5 km NE of Pegeia, Paphos env., 13.–20.iii.2015, 16 ♂♂ 15 ♀♀, O. Hillert lgt. (OHCb), 1 ♂ 1 ♀ (ERCS), 1 ♂ 1 ♀ (HKCS), 2 ♂♂ 1 ♀ (JSCP), 2 ♂♂ 2 ♀♀ (DKCP), 4 ♂♂ 2 ♀♀ (OBCb), 2 ♂♂ 2 ♀♀ (GMCL), 3 ♂♂ 3 ♀♀ (BMCP).

**Distribution.** Cyprus (MIESSEN 2011).

***Bolbelasmus nikolajevi* Hillert, Arnone, Král & Massa sp. nov.**

**Type locality.** NW Tunisia, Sidi Bouzid gov., 7.5 km SWW of Hajeb el Ayoun, by road, 35°22'N, 09°28'E, 340 m a.s.l.

**Distribution.** Egypt, Libya and Tunisia (present paper).

***Bolbelasmus nireus* (Reitter, 1895)**

*Bolboceras nireus* Reitter, 1895: 81 (original description).

**Type locality.** Turkey, 'Akbes' [= Maydān Akbis].

**Material examined** (6 specimens). **TURKEY:** ADANA PROV.: Adana, 1 ♂, 1 ♀ (JMCP); İçel, Çamlıyayla, Sebil, 24.–26.v.1995, 1 ♀, J. Mička lgt. (JMCP). **ANTALYA PROV.:** Korkuteli, 11.vi.1991, 1 ♀, B. Němec lgt. (BNCP); Side, 27.iv.1973, 1 ♂, K. Warncke lgt. (OHCb). **IRAN:** FARS PROV.: pass 140 km NE Širāz, 20.–21.iv.2002, 1 ♂, S. Kadlec lgt. (NMPC).

**Distribution.** Iraq, Iran, Syria, Turkey (KRIKKEN 1977, KEITH 2005, KRÁL et al. 2006, ARNONE & MASSA 2010, MIESSEN 2011).

***Bolbelasmus unicornis* (Schränk von Paula, 1789)**

*Scarabaeus unicornis* Schränk von Paula, 1789: 61 (original description).

= *Scarabaeus aeneas* Panzer, 1793: pl. 5 (original illustration).

= *Scarabaeus quadridens* Panzer, 1795: 2 (original description), figs 1–4.

**Type localities.** *Scarabaeus aeneas*: Germany, 'Bavariae'; *S. quadridens*: 'Austriae, Bavariae'; *S. unicornis*: Austria, 'Aus der Sammlung des Hrn. Rathes Schiffermüller'.

**Material examined** (85 specimens). **AUSTRIA:** Austria, 2 ♂♂ 1 ♀ (MSNG); Oesterreich, 1 ♂ (OHCb); Österr.[eich], 1 ♂ (ZFMK). **WIEN:** Umg. Wien, 1 ♀, Ad. Hoffmann [lgt.] (ZFMK). **BOSNIA & HERZEGOVINA:** Herzegovina, 1 ♂ (ZFMK). **CZECH REPUBLIC:** MORAVIA: Čejč, 'Manson's steppe', 16.vi.1995, 1 ♂, Vít Kubáň lgt. (VKCB); 2 km SE of Čejč, 'Manson steppe', 29.vi.1999, 1 ♀, Vít Kubáň lgt. (VKCB); Prossnitz [= Prostějov], 1 ♂, K. Kysely lgt. (NHMB). **HUNGARY:** Hungaria, 1 ♂ 2 ♀♀ (NMPC). **PEST:** Budapest Hármashatár-hegy, autos hálózás 31.v.2004, 1 ♂, O. Merkl lgt. (HNHM); Budapest, Martonhegy 17.iii.1949, 1 ♂ (HNHM); Isaszeg, 19.i.2008, 1 ♀ (HNHM); Keszthely, 47°43'N, 18°47'E, 17.x.2014, 1 ♀, Tomáš Vendl lgt. (TVCP); Pest, 1 ♀ (NMEC); Csévharaszt 14–16.viii.2001, 1 ♂, Szél lgt. (HNHM); Blatorbagy, 27.vi.99, 1 ♂, G. András lgt. (HNHM); Budakeszi Hosszú-dűlő, 200 m, Cynodonto-Festucetum, on *Glomus macrocarpum*, 8.vi.1991, 1 ♀, L. Ádám lgt. (HNHM). **SOMOGY:** Kaposvár 8.vii.1931, 1 ♂, M. Nattán lgt. (HNHM); Kaposvár, 1 ♀, M. Nattán lgt. (HNHM). **TOLNA:** Bábaapáti Nagy-Mórággyi-völgy Ezüsthársas-tolgyes, 1 ♀ (HNHM). **GERMANY:** BAYERN: Bavaria, 1 ♂, ex. coll. Veselý (NMPC). **ITALY:** **PIEDMONT:** Piemont, 1 ♂ (NMPC); Piedmont, 1 ♂, Baudi [lgt.] (MZUF); Piedmont, 1 ♂, L. Carrara [lgt.] (MZUF); Piedmont, 4 ♂♂ 2 ♀♀ (MSNG). **LOMBARDY:** Milan 1 ♂ 1 ♀ (MSNG). **TUSCANY:** Toscana, 1 ♀ (OHCb). **ROMANIA:** **TULCEA:** Babadag, 11.vii.1985, 1 ♂, Jaromír Hanuš lgt. (VKCB). **SÁLAJ:** Z. [Zaláu], erdő [forest], 3.viii.1973, 1 ♀ (OHCb). **SERBIA:** Serbia, 1 ♂, coll. Matcha (NMPC). **VOJVODINA:** Ruma, 1 ♂ (MSNG); **ŠUMADIJA:** Đerdap, 5 km WSW of Tekija, 27.–28.v.2014, 2 ♂♂ 1 ♀ (DKCP). **SLOVAKIA:** **BANSKÁ BYSTRICA REG.:** Banská Bystrica, 18.v.1979, 1 ♂ (VKCC); Kiarov, vi.1936, 1 ♀, Dr. R. Schwarz lgt. (NMPC). **KOŠICE REG.:** Hrhov, E of Okružle hill, 4.vii.1988, 2 ♂♂, David Král lgt. (DKCP); Silická planina [plateau], Raká'ta env., 5.vii.1988, 1 ♀, David Král lgt. (DKCP); **NITRA REG.:** Kamenica nad Hronom, Čierna hora [hill], 11.viii.2011, 1 ♂, D. Juřena lgt. (BMCP). **PREŠOV**



**REG.:** Snina, vii.1965, 1 ♂, M. Sláma lgt. (DKCP); **TRENČÍN REG.:** Brunovce, 1 ♀ (NMEC); Trenčín, Zlatovce, 27.vi.1935, 1 ♀ (NMPC); Trenčín, v.[19]31, 1 ♀, Dr. A. Richter (NMPC); Trenčín, Zlatovce, vi.[19]26, 1 ♀, Čepelák lgt. (NMPC); Trenčín, 2 ♂♂ 3 ♀♀, Čepelák lgt. (DKCP), 9 ♂♂ 8 ♀♀ (NMPC), 2 ♂♂ 1 ♀ (OHCB); Trenčín, 1 ♂ 1 ♀ (NMPC); Trenčín, 1 ♀, V. Steidl lgt. (NMPC); Trenčín, 1 ♂ 1 ♀, Dr. A. Richter lgt. (NMPC); Trenčín. Inovec, 1 ♂, Čepelák lgt. (NMPC); Trencszen, 1 ♂ 1 ♀ (OHCB). **TRNAVA REG.:** Hlohovec, 1 ♀, Varkonyi [lgt.] (DKCP); Pustá Ves, 22.vii.1984, 1 ♀, Máslo lgt. (NMPC). **TURKEY (European):** **EDİRNE PROV.:** ca. 15 km east of Edirne, 27.iii.[19]88, 1 ♀, Heinz lgt. (DKCP). **(Asian):** **DENİZLİ PROV.:** Anatolien, Goundely [= Denizli], v. [19]56, 1 ♂, Kulzer lgt. (ZSMC). **UKRAINE:** **CHERNIHIV PROV.:** Bukowina, Chernowitz, 1 ♀ (NMPC).

**Remarks.** *Bolbelasmus unicornis* has so far been reported from France and Italy, across southern parts of Central Europe to the Balkan Peninsula, Ukraine and southern parts of European Russia (cf. e.g. ÁDÁM 1994, 2003; ALLENSPACH 1970; BALLERIO et al. 2010; BARAUD 1977, 1992; BUNALSKI et al. 2013; ENDRÖDI 1957; HORION 1958, GUÉORGUIEV & BUNALSKI 2004; JUŘENA et al. 2008; KÖHLER & KLAUSNITZER 1998; KRÁL & MALÝ 1993; MIKŠIĆ 1970; LUMARET 1990; NÁDAI 2006; PAILL 2008; PETROVITZ 1956; SHOKHIN 2007). It has also been recorded from Crete and Rhodes, but actually these islands are inhabited by *B. makrisi* (see above) (SCHATZAMAYR 1936, PETROVITZ 1959, MIESSEN 2011, MIESSEN & TRICHAS 2011, present paper). Italian records of *B. unicornis* cover Piedmont, Lombardy, Trentino, Tuscany, Veneto and Friuli (BALLERIO 2008, BENASSO 1971, ZANDIGIACOMO 2006, present data). The presence in Sicily, first reported by BARAUD (1977), has to be referred to *B. vaulogerii* (present study). First record from the Tuscany province of Italy.

**Distribution.** Austria, Bosnia & Herzegovina, Bulgaria, Croatia, Czech Republic, France (Alsace), Germany, Greece, Hungary, Italy, Moldavia, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Switzerland, Turkey (European and Asian) and Ukraine (KRÁL et al. 2006, present data).

### *Bolbelasmus tauricus* Petrovitz, 1973

*Bolbelasmus tauricus* Petrovitz, 1973: 338 (original description).

**Type locality.** Turkey, ‘Cilicischer Taurus, Südhang, Namrun’.

**Distribution.** Turkey (Asian) (KRÁL et al. 2006, ARNONE & MASSA 2010, MIESSEN 2011).

### *Bolbelasmus vaulogerii* (Abeille de Perrin, 1898) stat. restit.

*Bolboceras Vaulogerii* Abeille de Perrin, 1898: 254 (original description).

= *Bolbelasmus romanorum* Arnone & Massa, 2010: 403, figs 1–5, 8 (original description), **syn. nov.**

**Type localities.** *Bolboceras Vaulogerii*: Tunisia, ‘Bizerte’; *Bolbelasmus romanorum*: Italy, ‘Sicily, Balestrate, foce Calatubo (Palermo)’.

**Distribution.** Algeria, Italy (Sicily), Tunisia (present paper).

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## Appendix: Gazetteer

Locality	Aprox. coordinates	Altit.
Aflou	34°07'N 02°05'E	1430
Ain-el Kerma	34°0'N 06°39'W	132
Ain-Ograb	34°59'N 04°06'E	1050
Aix	43°32'N 05°27'E	330
Albarracin	40°24'N 01°27'W	1114
Alcalá de Henares	40°28'N 03°21'W	600
Alcala de los Gazules	36°27'N 05°43'W	96
Alcala, see Alcala de los Gazules		
Aldehuela de la Boveda	40°51'N 06°02'W	800
Alexandria	31°12'N 29°55'E	16
Algezars	38°08'N 01°44'W	430
Algier	36°45'N 03°02'E	80
Alhama de Murcia	37°50'N 01°25'W	200
Alicante	38°20'N 00°29'W	20
Aljaraque	37°16'N 07°01'W	20
Almeria	36°51'N 02°20'W	0
Almoraima	36°16'N 05°25'W	28
Annaba	36°52'N 07°44'E	10
Aranjuez	40°01'N 03°36'W	510
Arcos de la Fontera	36°45'N 05°48'W	140
Armacao de Pera	37°06'N 08°21'W	0

Locality	Aprox. coordinates	Altit.
Arrayanes, see Carretera Arrayanes		
Ayora	39°04'N 01°03'W	640
Aznalcázar	37°18'N 06°14'W	33
Azrou	33°26'N 05°13'W	1260
Babadag	44°54'N 28°44'E	36
Bagneres	43°04'N 00°09'E	575
Balestrate	38°03'N 13°00'E	44
Bananco del Espartal		
Banská Bystrica	48°44'N 19°08'E	376
Barbentane	43°54'N 04°44'E	90
Barcelona	41°23'N 02°10'E	20
Baza	37°29'N 02°46'W	870
Beausset; see Le Beausset		
Ben Yacoub	34°28'N 02°46'E	45
Benghazi	32°06'N 20°03'E	2
Beni Sicar	35°23'N 02°59'W	110
Beni Snassen	34°48'N 02°23'W	730
Beziers	43°20'N 03°13'E	37
Bilad Gamouda	34°59'N 09°19'E	383
Bir Ketana	34°47'N 10°50'E	1
Biserta, see Bizerte		

Locality	Aprox. coordinates	Altit.
Bizerte	37°17'N 09°52'E	2
Bled Gamouda, see Bilad Gamouda		
Bona [Bône], see Annaba		
Bonares	37°19'N 06°40'W	100
Bosco Santo Pietro Nature Reserve	37°08'N 14°31'E	300
Brunovce	48°40'N 17°51'E	221
Budapest	47°30'N 19°02'E	146
Bujaraloz	41°29'N 00°09'W	340
Chernowitz, see Černivci		
Calpe	38°39'N 00°03'W	50
Candasnos	41°30'N 00°03'W	207
Cárcar	42°23'N 01°58'W	340
Cárcar, see Cárcar		
Carrapateira	37°11'N 08°54'W	18
Carretera Arrayanes	38°07'N 03°37'W	430
Cartaya	37°17'N 07°09'W	18
Castillio de Castillar	36°19'N 05°27'W	240
Catania	37°30'N 15°05'E	23
Čejč	48°56'N 16°57'E	211
Cercedilla	40°47'N 04°04'W	1760
Černivci	48°17'N 25°56'E	270
Chanzy, see Sidi Ali Ben Youb		
Cheles	38°30'N 07°16'W	190
Chiclana de la Frontera	36°25'N 06°08'W	37
Chiclana, see Chic-lana de la Frontera		
Chinchón	40°08'N 03°25'W	737
Chusclan	44°10'N 04°41'E	70
Col du Zad	33°00'N 05°04'W	2180
Colmensar Viego	40°39'N 03°46'W	900
Dayet Iffer	33°36'N 04°54'W	1500
Denizli	37°47'N 29°05'E	354
Đerdap	44°31'N 21°58'E	446
Douela	36°49'N 10°36'E	83
Douz	33°27'N 09°01'E	67
Edahra	37°12'N 09°20'E	65
Edirne	41°40'N 26°33'E	60
Ejea de los Caballeros	42°05'N 01°08'W	426

Locality	Aprox. coordinates	Altit.
El Aljaraque, see Aljaraque		
El Bayadh	33°40'N 01°01'E	1325
El Hawariah	37°03'N 11°01'E	47
El Hencha	35°07'N 10°44'E	56
El Kreider, see Le Kheither		
El Rincon	37°14'N 07°03'W	28
Elche	38°16'N 00°43'W	100
Enna	37°33'N 14°16'E	900
Facinas	36°08'N 05°42'W	68
Faro	37°01'N 07°55'W	9
Foualgha, see Qasr bin Ghasir	32°28'N 13°25'E	250
Fuensauco	40°11'N 03°10'W	708
Gaada de Debdou plateau	33°52'N 03°10'W	1500
Gabes	33°53'N 10°06'E	2
Gafsa	36°57'N 40°49'E	0
Garrucha	37°15'N 01°47'W	50
Gibraltar	36°08'N 05°21'W	0
Granada	37°10'N 03°35'W	720
Hajeb el Ayoun	35°22'N 09°28'E	340
Hammamet	36°24'N 10°37'E	0
Hlohovec	48°26'N 17°47'E	207
Hoya de Baza mts., see Baza		
Hrhov	48°36'N 20°44'E	390
Huelva	37°15'N 06°56'W	23
Hyères	43°06'N 06°10'E	9
Ifrane	33°32'N 05°06'W	1626
Isaszeg	47°32'N 19°23'E	146
Jaraicejo	39°40'N 05°49'W	530
Jbel Hebri	33°21'N 05°08'W	2080
Jerez de la Frontera	36°40'N 06°07'W	38
Jorques	43°38'N 05°38'E	266
Juniqueira	37°15'N 07°28'W	27
Kamenica nad Hronom	47°50'N 18°44'E	140
Kaposvár	46°21'N 17°47'E	151
Keszötléc	47°43'N 18°47'E	193
Ketana, see Bir Ketana		
Kiarov	48°06'N 19°24'E	208

Locality	Aprox. coordinates	Altit.
Kreider, see Le Kheither		
La Hencha, see El Hencha		
La Retuerta	41°30'N 00°31'W	164
La Sayne	43°06'N 05°52'E	19
La Seyne	43°06'N 05°52'E	15
La Suara	36°38'N 05°54'W	62
La Vallesa	39°32'N 00°29'W	98
Lambaze	35°28'N 06°15'E	1220
Lanjaron	36°55'N 03°28'W	680
Le Beausset	43°13'N 05°48'E	260
Le Kef	36°11'N 08°42'E	710
Le Kheither	34°09'N 00°04'E	1000
Le Kreider, see Le Khaither		
Lérida	41°36'N 00°37'E	180
Lerida, see Lérida		
Lisabon	38°43'N 09°08'W	38
Lisbonne, see Lisabon		
Loeches	40°22'N 03°23'W	650
Los Jesus, see Los Yesos		
Los Monegros-Castejon	41°39'N 00°13'W	474
Los Monegros-Monegrillo	41°39'N 00°23'W	580
Los Olmos	37°20'N 02°44'W	1220
Los Yesos	37°05'N 02°17'W	500
Madrid	40°25'N 03°42'W	650
Magenta	34°42'N 00°45'W	1000
Mailand	45°28'N 09°11'E	122
Maknassy	34°35'N 09°36'E	267
Manzanare	40°25'N 03°44'W	600
Marausa	37°55'N 12°33'E	60
Mareth	33°38'N 10°18'E	39
Mariout	31°09'N 29°53'E	0
Marseille	43°18'N 05°22'E	18
Marseilles, see Marseille		
Mascara, see Muascar		
Matmata	33°27'N 09°46'E	265
Mecheria	33°33'N 00°17'W	1200

Locality	Aprox. coordinates	Altit.
Melilla	35°17'N 02°56'W	12
Menfi	37°35'N 12°58'E	80
Midoun	33°48'N 10°59'E	11
Miranda del Rey	38°41'N 03°34'W	760
Moguer	37°16'N 06°50'W	50
Molinicos	38°36'N 02°13'W	1200
Molinicos	38°27'N 02°15'W	1033
Momchique	37°20'E 08°35'W	280
Montarco	40°29'N 03°45'W	640
Montes de Torrero	41°34'N 00°55'W	350
Montizón	38°20'N 03°05'W	730
Morata	40°15'N 03°25'W	680
Muascar	35°24'N 00°09'E	650
Murcia	37°59'N 01°07'W	47
Navacerrad, see Navacerrada		
Navacerrada	40°43'N 04°01'W	1230
Nimes	43°49'N 04°23'E	39
Niscemi	37°08'N 14°23'E	320
Ollioules	43°10'N 05°50'E	144
Oran	35°42'N 00°37'W	115
Orgiva	36°54'N 03°25'W	470
Oudref	33°59'N 09°57'E	29
Oujda	34°41'N 01°54'W	550
Palermo	38°07'N 13°21'E	22
Paraisé da Mata	40°58'N 08°21'W	253
Pavia	41°36'N 01°21'E	660
Pedalino	37°01'N 14°34'E	236
Pinar de Aznalcázar, see Aznalcázar		
Pinar de San Roque, see San Roque		
Pinar del Rey, see San Roque		
Piornal	40°07'N 05°50'W	1000
Poceirao	38°38'N 08°44'W	40
Ponts	41°54'N 01°11'E	670
Prossnitz, see Prostějov		
Prostějov	49°28'N 17°06'E	220
Puebla del Río	37°16'N 06°03'W	23
Puerto de Alijar	36°39'N 05°01'W	1100
Puig Ventos, see Puigventós		
Puigventós	41°45'N 02°47'E	130

Locality	Aprox. coordinates	Altit.
Punta Paloma [estudios]	36°03'N 05°43'W	0
Punta Paloma, see Punta Paloma [estudios]		
Punta Umbria	37°11'N 06°58'W	0
Pustá Ves, see Holohovec		
Qasr bin Ghasir	32°38'N 13°11'E	90
Quinta de Ortiga	38°01'N 08°41'W	180
Rchida	33°53'N 03°14'W	1200
Region de Geryville, see El Bayadh		
Riez	43°49'N 06°05'E	636
Rio Frio	38°40'N 08°51'W	23
Rostrogordo, see Melilla		
Ruma	45°00'N 19°49'E	107
Sagres	37°00'N 08°56'W	18
Saint Gervazy	43°52'N 04°28'E	70
San Roque	36°12'N 05°23'W	78
Sanlucar de Barrameda	36°46'N 06°21'W	32
Sastago	41°19'N 00°49'W	150
Sbeitla, see Sufetula		
Sebdou	34°38'N 01°20'W	930
Sfax	34°44'N 10°45'E	2
Sidi Ali Ben Youb	34°56'N 00°43'W	680
Sierra de Grados	40°18'N 05°05'W	1660
Sierra de la Yedra	37°15'N 03°29'W	1360
Silická planina	48°36'N 20°32'E	615
Siracusa	37°04'N 15°17'E	36
Snina	48°59'N 22°08'E	219
Station Martin Vasubie	44°04'N 07°15'E	1220
Sufetula	35°13'N 09°07'E	532
Şurmân	32°46'N 12°35'E	11
Surman, see Şurmân		
Tabarca	34°25'N 08°46'E	296
Tabernas	37°04'N 02°30'W	614
Tadjiura, see Tagiura		
Taforal, see Taforalt		
Taforalt	34°48'N 02°24'W	733
Tagiura	32°53'N 13°20'E	3

Locality	Aprox. coordinates	Altit.
Tamezret	33°32'N 09°51'E	391
Tarabulus, see Tripoli		
Tarancón	40°00'N 03°00'W	800
Targuejo, see Tariquejo		
Tarifa	36°00'N 05°36'W	20
Tariquejo	37°23'N 07°09'W	114
Termini Imerese	37°59'N 13°41'E	70
Terrasini	38°09'N 13°04'E	34
Thelepte	34°58'N 08°35'E	794
Tobarra	38°35'N 01°41'W	873
Tobruk	32°05'N 23°58'E	0
Tolna	46°29'N 18°33'E	128
Touissite	34°29'N 01°46'W	1126
Toujan	33°28'N 10°07'E	439
Toulon	43°07'N 05°55'E	154
Tozeur	33°55'N 08°08'E	46
Trenčín	48°42'N 17°27'E	315
Trenczsen, see Trenčín		
Tripoli	32°52'N 13°13'E	20
Valdaracete	40°12'N 03°11'W	740
Valverde de Alcalá	40°27'N 03°13'W	860
Vendicari Nature Reserve	36°48'N 15°05'E	19
Vidreras	41°47'N 02°46'E	80
Vila Do Bispo	37°08'N 08°54'W	28
villa Conejos, see Villaconejos		
Villa Joyosa	38°31'N 00°13'W	54
Villacanas	39°37'N 03°20'W	674
Villaconejos	40°06'N 03°29'W	641
Villajoyosa	38°30'N 00°13'W	31
Villamanrique de la Condesa	37°14'N 06°18'W	31
Villaviciosa de Odón	40°21'N 03°54'W	640
Wien	48°12'N 16°22'E	200
Zad Pass, see Col du Zad		
Zaláu	47°11'N 23°03'E	310
Zouiet el Mgaiez	36°56'N 10°51'E	78